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**ASSIST PROJECT**  
*Applying Science to Strengthen  
and Improve Systems*

## TRAINING PARTICIPANT GUIDE

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# Improving Health Care

**DECEMBER 2016**

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This quality improvement training participant guide prepared by University Research Co., LLC (URC) for review by the United States Agency for International Development (USAID) and authored by M. Rashad Massoud, Amanda Ottosson, Tamara Nsubuga-Nyombi, Esther Karamagi, Amy Stern, Anisa Ismail, Victor Boguslavsky, and Nigel Livesley of URC and Taroub H. Faramand and Julia Holtemeyer of WI-HER, LLC. The revised guide was produced under the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project, which is made possible by the generous support of the American people through USAID and its Office of Health Systems.



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### DISCLAIMER

The contents of this training guide are the sole responsibility of University Research Co., LLC (URC) and do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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For more information on the work of the USAID ASSIST Project, please visit [www.usaidassist.org](http://www.usaidassist.org) or write [assist-info@urc-chs.com](mailto:assist-info@urc-chs.com).

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## Acronyms

AMTSL	Active management of the third stage of labor
ART	Antiretroviral therapy
ASSIST	USAID Applying Science to Strengthen and Improve Systems Project
HCI	USAID Health Care Improvement Project
HR	Human resources
IT	Information technology
MDG	Millennium Development Goal
MOH	Ministry of Health
NACS	Nutrition assessment, counseling, and support
NCD	Non-communicable disease
NEJM	New England Journal of Medicine
PEPFAR	U.S. President’s Emergency Plan for AIDS Relief
PPH	Post-partum hemorrhage
PRICOR	Primary Health Care Operations Research Project
QAP	Quality Assurance Project
QI	Quality improvement
SDG	Sustainable Development Goal
SOP	Standard operating procedure
TBA	Traditional birth attendant
UN	United Nations
URC	University Research Co., LLC
USA	United States of America
USAID	United States Agency for International Department
WHO	World Health Organization

## INTRODUCTION

This course is an introduction to implementing improvement. This course is intended for anyone with limited to no prior knowledge of improvement science. The course is structured to give a broad overview of the science of improvement, going over key principles and methods necessary to understand and implement and improvement project in any setting.

The course begins with an introduction to the United States Agency for International Development (USAID)-funded flagship project for improving health care, the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project, which provides context to the history of improving health care in low-and middle-income countries.

The course then goes into the definition of quality of care, different perspectives on the problem of achieving quality in health care, and how quality is essential to achieving global health priorities. After which, illustrative results are described to give an idea of what can be accomplished in implementing improvement within a health care system. The model for improvement will be covered, along with the key principles to improve care.

Finally, the course leads the user through a detailed case study from implementing nutrition assessment, counseling, and support (NACS) services in a health care facility in Uganda. Although the course uses an example from a developing country, the theory, methods and principles discussed here can be applied in any context. The example discusses what decisions and steps the improvement team took to achieve results. The exercises begin with building an aim statement and include producing a flow chart, developing indicators, and graphing results on a time series chart.

The course is organized by module, with the content of each module followed by its corresponding slides.

### Course Learning Objectives

This course introduces the science of improvement and how it can be applied to make health care better. The course is designed around a NACS case study. It takes the user through a simulation exercise based on a real NACS improvement journey. The fundamentals of improving health care, as well as the methods, are illustrated through a series of improvement modules.

After this course, participants will be able to:

1. Articulate the key issue in health care quality
2. Explain the fundamentals underlying the science of improvement
3. Give examples of successful improvements from different technical areas and geographical contexts
4. Practice developing the following skills:
  - 1) Define improvement aim(s)
  - 2) Form improvement teams
  - 3) Analyze processes of care
  - 4) Develop indicators
  - 5) Plot a time series chart
  - 6) Develop, test and implement changes to improve everyday work



# Improving Health Care

**M. Rashad Massoud, MD, MPH, FACP**

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Senior Vice President, Quality & Performance Institute  
University Research Co., LLC

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## Learning objectives

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# MODULE 1: THE USAID ASSIST PROJECT AND ITS EVOLUTION

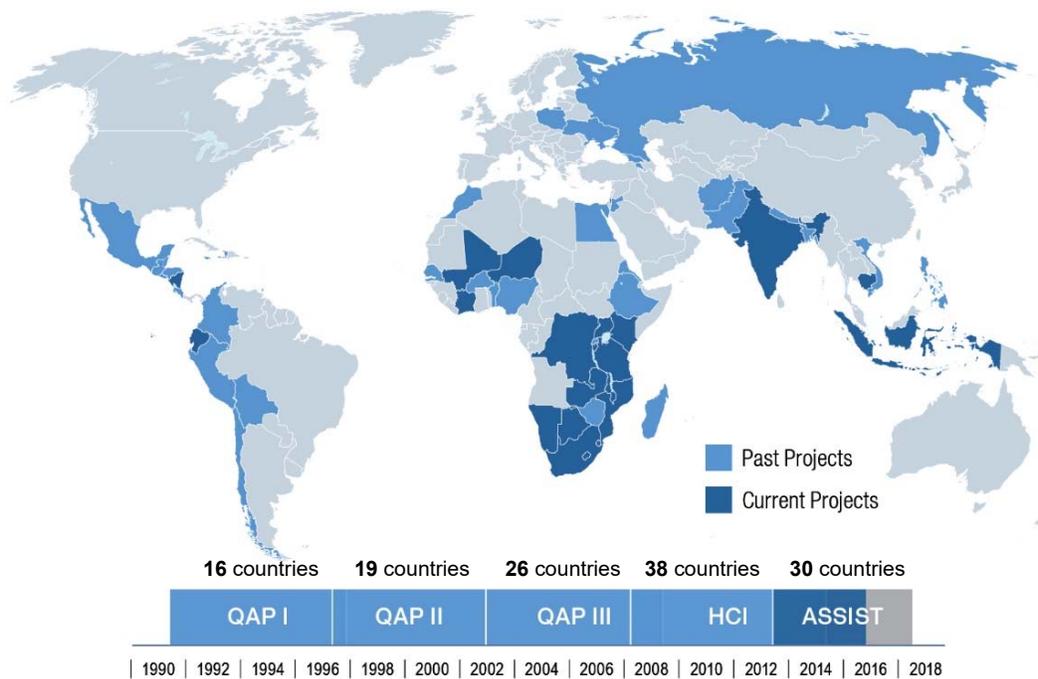
## About the USAID ASSIST Project

The USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project is one of USAID's flagship programs. The project is a cooperative agreement. It is a centrally procured mechanism, bid and awarded out of Washington DC. The program has a global scope and any country that is eligible for assistance from the United States can access the program. It addresses any and all of the global health priorities. The program has a ceiling of \$185 million over five years. It represents the continuation of the USAID Health Care Improvement (HCI) Project, the Quality Assurance Projects (QAP) I, II, and III, and the Primary Health Care Operations Research (PRICOR) Project.

ASSIST is trying to accomplish the following:

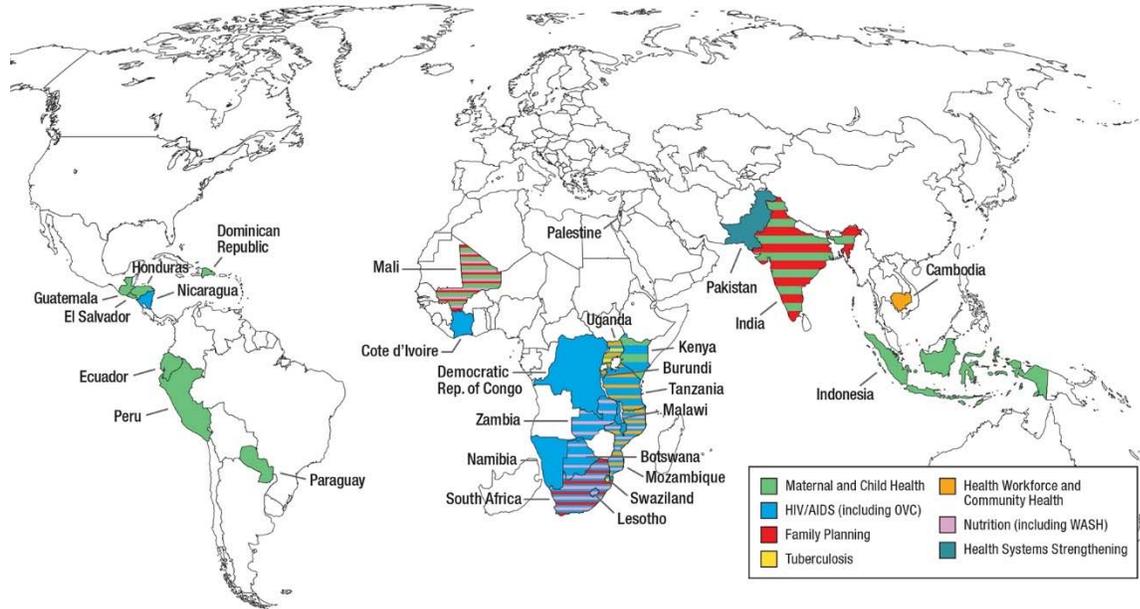
1. **Improve health care at scale.** This is the primary purpose of the project. Successful pilot projects on their own are no longer enough.
2. **Institutionalization.** Enable the host country governments to continue producing results similar to those that ASSIST helped produce in the country. It is very important for the project to institutionalize improvement.
3. **Learning.** Produce the learning in the field, advance the science of improvement in low- and middle-income countries, and generate knowledge that can be shared with other programs, countries, and organizations through knowledge management and research.

## The History of the USAID ASSIST Project



## ASSIST Work in 2016

The previously mentioned projects set the stage at the beginning of the quality improvement field and the rest of the agenda. The countries in which ASSIST works fluctuates; however, here are the locations current as of 2016. Look at the colored-coded key to determine what areas of health improvement are being worked on in each country.



## Scale of USAID ASSIST Activities (as of December 2016)



**143** government and implementing partners (96 PEPFAR)



**2,781** facilities (2,375 PEPFAR)



**1,562** communities (1,327 PEPFAR)



**3,145** quality improvement teams (2,697 PEPFAR)



**104** million catchment population (95 million PEPFAR)

## ASSIST Contributions to Achieving the MDGs in 2015

In 2000, the United Nations (UN) met to set goals across a variety of sectors to stimulate international development, including health goals. These goals are called the Millennium Development Goals (MDGs). The target year to accomplish the set goals was 2015. An example of a MDG is to reduce the under-five infant mortality rate by two thirds, between 1990 and 2015.

The USAID ASSIST Project consistently tracked to which MDGs they are contributing. Here is a chart that lists which country projects contributed to which MDG in the past.

Country	MDG 1: Eradicate extreme poverty and hunger	MDG 2: Achieve universal primary education	MDG 3: Promote gender equality and empower women	MDG 4: Reduce child mortality	MDG 5: Improve maternal health	MDG 6: Combat HIV/AIDS, malaria, and other diseases
Botswana					✔	✔
Burundi				✔	✔	✔
Cote d'Ivoire				✔	✔	✔
Democratic Republic of Congo						✔
Haiti	✔	✔		✔		✔
Kenya	✔	✔	✔	✔	✔	✔
India				✔	✔	
Indonesia					✔	
Lesotho				✔	✔	✔
Malawi	✔	✔	✔	✔		
Mali			✔	✔	✔	
Nicaragua						✔
Niger				✔	✔	
South Africa				✔	✔	✔
Swaziland				✔		✔
Tanzania	✔	✔	✔	✔	✔	✔
Uganda	✔	✔	✔	✔	✔	✔
Ukraine					✔	
Zambia						✔

A new global development agenda has been set now that the MDGs have come to an end. New goals have been determined by the global community, called the Sustainable Development Goals (SDGs). These goals will be discussed in greater detail later in the course.





## MODULE 2: WHAT IS QUALITY HEALTH CARE?

The Institute of Medicine's definition is probably one of the most used definitions of quality health care today. See the definition in the box below.

*The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.*

— Institute of Medicine, USA

How would you interpret this definition?

Although a good definition, it is high-level and does not clearly define quality at the facility or ground level of work. This is an important distinction to understand. Quality health care is complex and there are many aspects that must be addressed. The USAID ASSIST Project has been using a simpler definition, which makes it easier to understand.

The following case is based on a true story. About 15% of deliveries require medical interventions.

A traditional birth attendant (TBA) was part of an improvement team working on reducing maternal mortality. The TBA knew how to recognize danger signs in a delivering woman or newborn. As part of the improvement work, the team developed a standard operating procedure (SOP) that defined what the TBA needed to do if danger signs occurred: the mother must be evacuated to the health center.

In a mother delivered by the TBA, the TBA noticed that the placenta was not delivered within 30 minutes of the newborn. This is considered a danger sign for the mother.

The improvement team members had previously arranged the procedure of what to do and when to do it. The TBA talked to the family and explained that the woman must go to the health center or there would be complications. The woman's brother went and flagged a car to take him to the health center. He told the staff there that he was sent by the TBA. The health center staff asked him to go in their ambulance and take them to his sister. In the meantime, they prepared the emergency team and operating theater. On arrival at the health center, they gave the woman an IV drip, and the obstetrician performed a manual evacuation of the placenta.

Two hours later, the new mother was resting in bed nursing her newborn. She received the care that she needed, because the health professionals were all a part of a cohesive team with clear procedures. They immediately took action, knew what to do, and did it correctly in a timely responsive manner.

This is the desired outcome for a patient – when medical professionals act by using all appropriate resources and current professional knowledge. Context is everything in these situations. It is just as important as the actual science behind the medicine.

The alternative to this story is that the traditional birth attendants do not know what to do, the emergency team is not put in place, SOPs are not developed, and outcomes can be devastating for both mother and newborn.

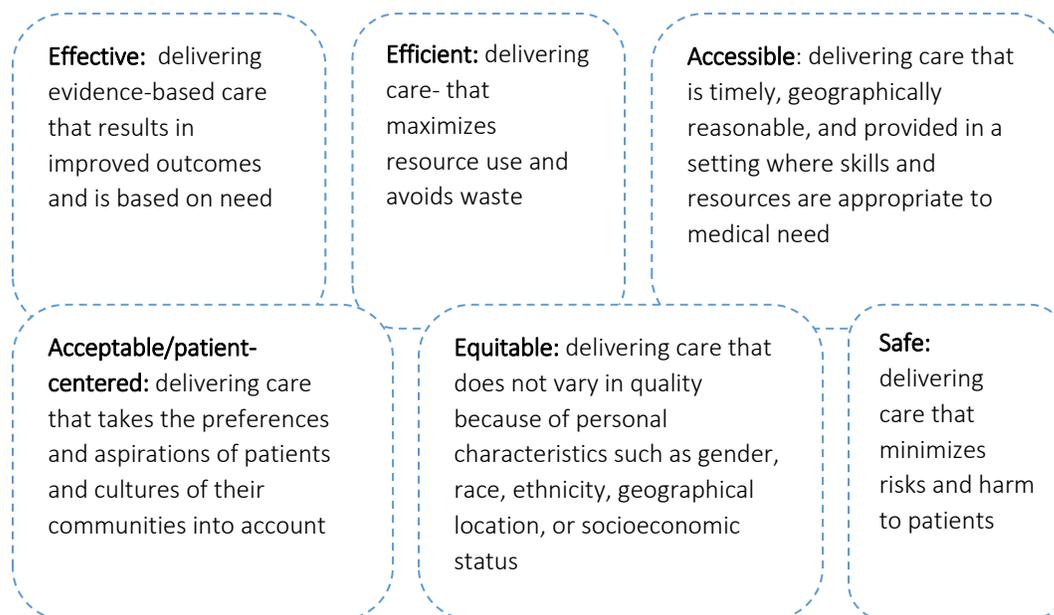
*Quality care is what happens at all the points of service along the continuum of care, and high quality care is a function of the system's ability to produce care that will address the client's needs in an effective, responsive and respectful manner.*

— David Nicholas

Thinking about the example described above, David Nicholas' definition makes quality care easier to understand. It is vital to consider that quality health care also must be contextually appropriate. For example, what constitutes quality health care in the United States varies greatly from that in Sweden and in Uganda, due to context, culture, and resources.

### **World Health Organization Dimensions of Quality**

The World Health Organization (WHO) has taken the definition of quality of health care even further, breaking it down to six different dimensions. Health systems should seek to make improvements in the six defined dimensions of quality:



*WHO, Department of Service Delivery and Safety (2013)*

It is important to recognize that safety is a property of a system; not acknowledging defects in the system will hinder improvement in quality. Improvement work should consider all the above-mentioned dimensions.

## What Do We Mean by Quality Health Care?

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### Definition of health care quality

“The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”

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Institute of Medicine, USA

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### What is quality care?

“Quality care is what happens at all the points of service along the continuum of care, and high quality care is a function of the system's ability to produce care that will address the client's needs in an effective, responsive and respectful manner...”

— David Nicholas

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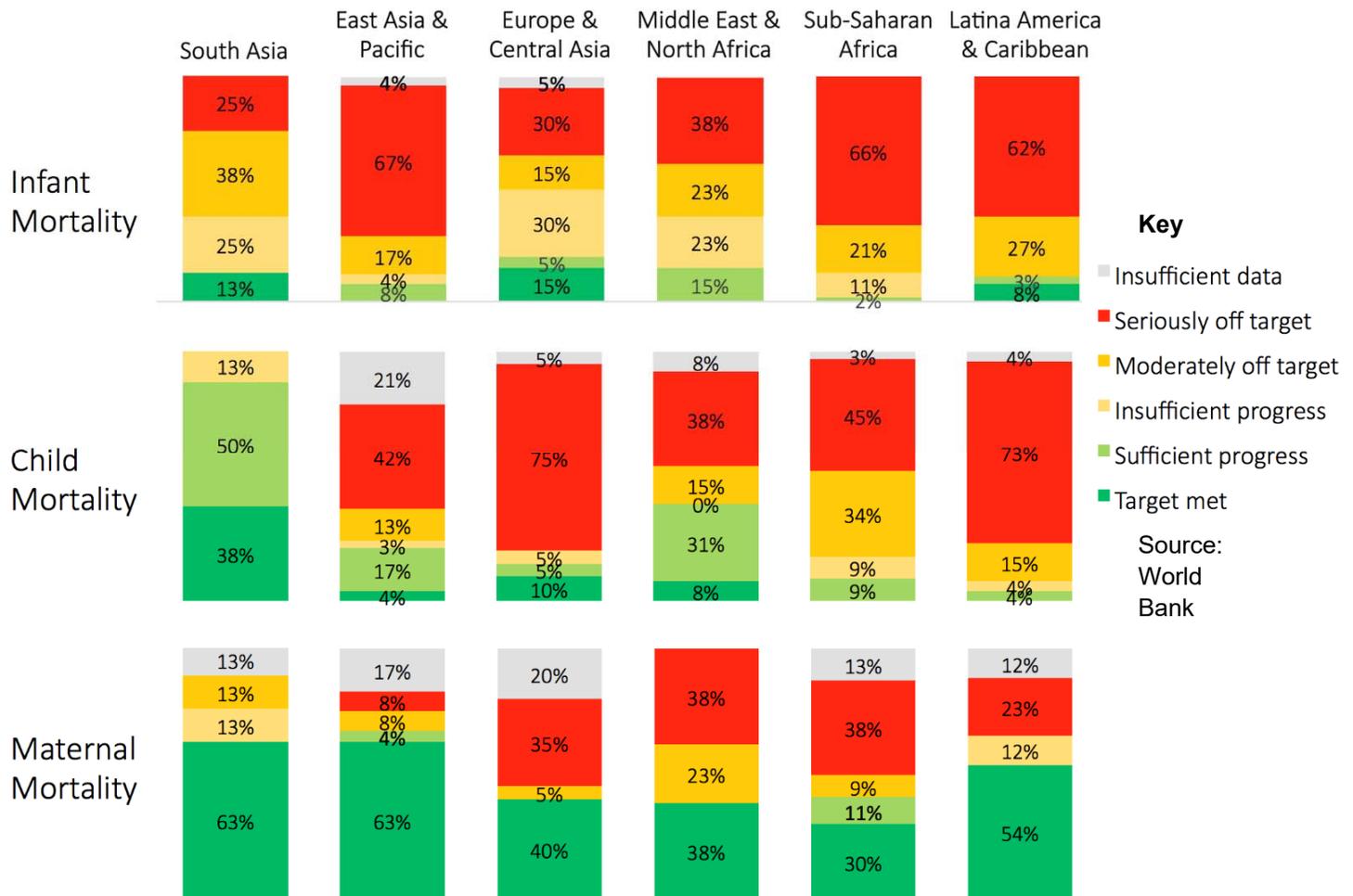
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## MODULE 3: THE ISSUE OF QUALITY IN HEALTH CARE

Take a look at the following country data and the key. Think about the questions below.



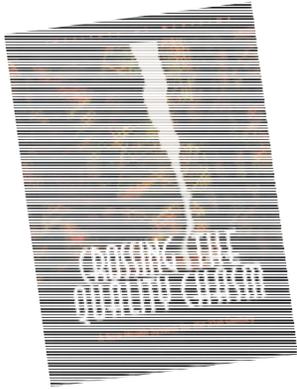
### Questions

- How do you interpret the progress of these goals?
- What do you think is happening?

### The Issue of Quality Health Care: Not Just a Developing Country Issue

It is important to recognize that achieving quality health care is not just a developing country issue. The systems of care are just not in place in many countries (developed and developing). Developed countries may have more technology and resources. However, improvement is not only about the inputs into health care, it is about the way in which the inputs are used.

“The quality of health care delivered to adults in the U.S.” by McGlynn et al. (NEJM, 2003) found that just over half of patients (54.9%) received scientifically indicated care. Therefore, just under half did not. This study included medical records for 6712 patients and examined 439 indicators of clinical quality of care spanning 30 acute and chronic conditions, plus prevention.



*...Between the health care we have and the care we can have lies not only a gap, but a chasm...*

*...The problems come from poor systems – not bad people...*

Institute of Medicine. 2001. Crossing the Quality Chasm. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, D.C: National Academy Press.

## Different Perspectives on the Problem

*The reality is straightforward. The power of existing interventions is not matched by the power of health systems to deliver them to those in greatest need, in a comprehensive way, and at an adequate scale.*

– Margaret Chan, Director General, World Health Organization

*The enormous investments that have been made in global health should have led to what we might have called a science of implementation and execution...*

*...We have just not focused on the enormous complexity of delivering health care in a way that keeps people healthy.*

– Jim Kim, President, World Bank

We are overemphasizing the science of discovery at the expense of the science of delivery. We need to give equal attention to the science of delivery. In medicine, we have an abundance of knowledge and techniques that save lives, but what is the point of having so much if it is not reaching the people who need them?

Very much emphasized

### Science of Discovery:

what we know and find out about health care (new drugs, new equipment, new ways of doing things, etc.)

### Science of Delivery:

taking what we know works and delivering it consistently – to every patient when they need it

Not as emphasized

## Sustainable Development Goals

In September 2015, the United Nations (UN) announced the new global health priorities through the development of the Sustainable Development Goals (SDGs). The UN laid out a set of 17 priority areas to be achieved by 2030. Those include the remaining unfinished goals from the MDGs together with new priorities. A notable difference from the MDGs is the incorporation of non-communicable diseases (NCDs) as a global health priority. 80% of the global burden of illness is attributed to NCDs.



Source: <https://sustainabledevelopment.un.org/sdgs>

Goal number 3, good health and well-being, specifically aims to strengthen prevention and treatment to:

- Reduce global maternal mortality ratio to less than 70 per 100,000 live births
- End preventable deaths of newborns and under-five children
- End the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases while combatting hepatitis, water-borne diseases, and other communicable diseases
- Reduce by 1/3 premature mortality from NCDs
- Reduce substance abuse

A key part of the SDGs is Universal Health Coverage (UHC). UHC is “defined as ensuring that all people can use the promotive, preventive, curative, rehabilitative, and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship,” (WHO, 2010).

Specifically by 2030, ensure:

- Universal access to sexual and reproductive health services
- Universal health coverage
- Support for research and evaluation
- Increased health financing and recruitment, development, training, and retention of the health workforce in developing countries

- Strengthened capacity of all countries for early warning and risk reduction as well as management of national and global health risks

## Quality and Universal Health Coverage

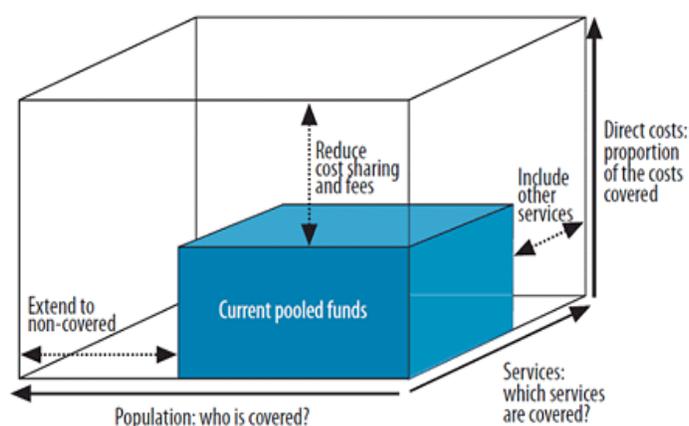
*What good does it do to offer free maternal care and have a high proportion of babies delivered in health facilities if the quality of care is sub-standard or even dangerous?*

– Margaret Chan, World Health Assembly, May 2012

An integral part of Universal Health Coverage (UHC) is ensuring that the health care being received is of the highest quality possible.

### Real world example

A major experiment to provide pregnant women with vouchers that incentivized the mothers to deliver their babies in the hospital was launched. The assumption was that giving birth in a hospital was better than giving birth at home and the number of maternal deaths would decrease. However, what actually happened was an increase in maternal deaths. The fact remained that the quality of care in hospitals was worse than in the care received in homes by traditional birth attendants.



*The last thing we need is universal coverage with poor quality care that does not benefit people or may even harm them.*

– M. Rashad Massoud, USAID ASSIST Project

USAID ASSIST is working closely with the WHO Service Delivery and Safety Department and their partners to promote and ensure the centrality of quality care within UHC.



## The Issue of Quality in Health Care

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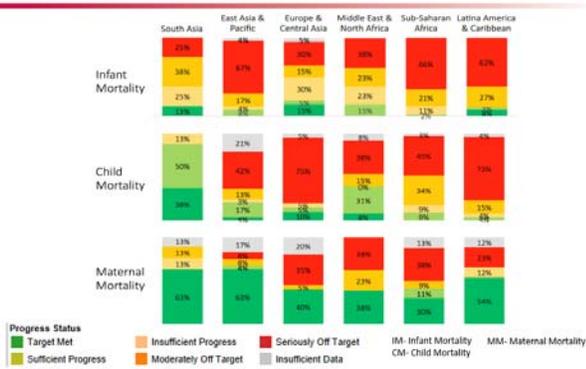
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### MDG progress: Goal 4 and 5 - reduce child, infant and maternal mortality



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Source: World Bank 2015

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### McGlynn et al. NEJM 2003. "The quality of health care delivered to adults in the U.S."

**54.9%** of patients receive scientifically indicated care

439 indicators of clinical quality of care  
30 acute and chronic conditions, plus prevention  
Medical records for 6712 patients

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## MODULE 4: OVERVIEW OF IMPROVING HEALTH CARE, PART 1

### Terminology Confusion

This course is about improving health care. It purposefully avoids the use of commonly used phrases and jargon, as this takes away from the important work at hand and causes confusion. It is important to focus on improving health care and how to accomplish the improvement. Identify what you are trying to accomplish and then determine the most appropriate methods to achieve the end goal.



#### What do the terms in the box above mean?

The truth is they all basically mean the same thing. There are lots of terms to describe quality improvement. The following article citation writes about all the 100+ names used to describe the different methodologies; however, they are pretty much all the same, with minor variations. The general idea is taking what we know to work and making it happen.

Walshe K. Pseudoinnovation: the development and spread of healthcare quality improvement methodologies. *Int J Qual Health Care* 2009; 21:153-9.

### Focus on Outcomes

#### Real world example: Compliance with active management of the third stage of labor and post-partum hemorrhage reduction in Niger

In this example, the purpose of the project was to reduce the percentage of maternal mortality that was happening in Niger. There are three primary causes of maternal mortality worldwide: post-partum hemorrhage (PPH) (bleeding that happens after delivery), septicemia (infection after delivery), and pregnancy-induced hypertension. By far, the number one cause of maternal mortality is PPH.

However, there is an evidence-based intervention for PPH called the active management of the third stage of labor (AMTSL). AMTSL was defined in the project as having three components, but the most important component is giving the patient a dose of the drug oxytocin at the third stage of labor. The drug is a hormone that has the ability to contract the mother's uterus.

The drug is given in the third stage of labor when the head and right shoulder of the infant have been delivered.

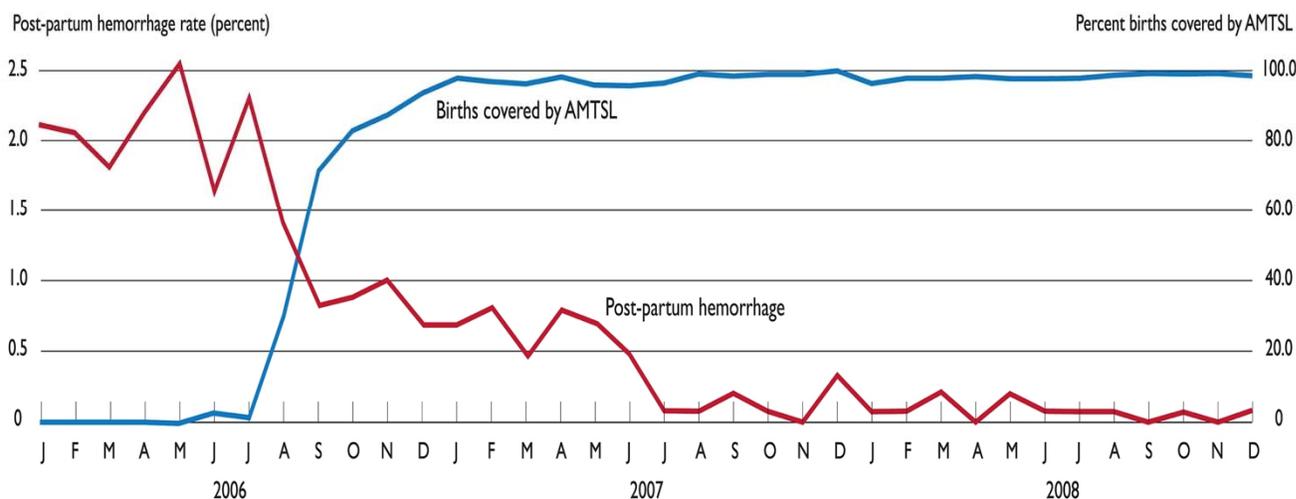
Bleeding may occur after birth. During pregnancy and delivery, the muscles of the uterus get very tired and may become very relaxed and flabby after delivery. This causes a lot of blood to ooze out of the uterus. The uterus is made up of lots of muscle fibers that go in many directions and, lots of blood vessels in between them. Oxytocin contracts the muscles of the uterus, reducing the amount of blood that oozes out.

The second component of AMTSL is controlled cord traction, which helps deliver the placenta. The third component is external uterine massage, which is massaging the mother's belly, which also helps the uterus to contract.

The graph below shows AMTSL coverage and PPH rates in targeted facilities in Niger from January 2006 to December 2008.

### AMTSL coverage and post-partum hemorrhage rates in targeted facilities, January 2006 – December 2008

Total births — 2006: 24,785 (28 sites); 2007: 31,073 (33 sites); 2008: 31,085 (33 sites)



The blue line indicates the percentage of compliance with all three components of AMTSL. These births are given a score of 1. If any one of the components is missing, the birth is given a score of 0 and is not indicated in the blue line. As you can see on the chart, when the measurements were first taken, almost no women were getting all three components of AMTSL.

#### Questions

- What do you think are some reasons for almost no women receiving all three components of AMTSL?
- What might be some factors contributing to these results?
- If we are aware that oxytocin is available and all of the medical staff know how to administer the drug, why do you think the intervention was not happening?

Let's take a look at the facilities' set up.

One of the properties of oxytocin is that it is thermally unstable. It must be kept cold or it will become inactive. To be effective, oxytocin must be kept inside a refrigerator. Niger is a hot country with many power outages. Most babies are born at night. During the night, the oxytocin is kept under lock and key in the refrigerator in the pharmacy. The pharmacist works during the day and keeps the key with him, so the rest of the staff is unable to get to the oxytocin at night.

## Establishing improvement teams

An improvement effort to reduce maternal mortality was launched with multiple health facilities. The first step was to establish improvement teams at each participating facility. These teams then needed to figure out what they were trying to accomplish. Their goal was to reduce the maternal mortality through the provision of AMTSL. How would they know when they are effective? They must measure compliance with AMTSL. They also measure the number of occurrences of PPH.

At a hospital, the improvement team included the pharmacist and the midwife who was involved in providing care. They considered how to reorganize care delivery to allow the medicine to get to the women who need it. A couple of good suggestions came out of the discussion. One suggestion was to place a refrigerator in the delivery room; however, the hospital didn't have money to buy a second refrigerator. The team decided to try putting doses of oxytocin in prefilled syringes and placing them in a cooler with an ice pack.

How did this intervention ended up working? Thinking of the context of the health care system, there are many things that were not possible. No one was going to spend money in the system to get another refrigerator or hire another pharmacist, but a cooler and ice pack was practical and affordable.

The hospital staff and intervention team developed a contextually appropriate solution that significantly changed the uptake of AMTSL from practically nobody receiving it, to almost everyone receiving the care that they need.

*How did they know the intervention was the right one?*

Take a look back the graph on p. 19 and look at the red line, which indicates a serious drop in PPH. It comes right at the same time as the intervention and the increased use of AMTSL. This is expected because AMTSL is implemented in order to reduce PPH.

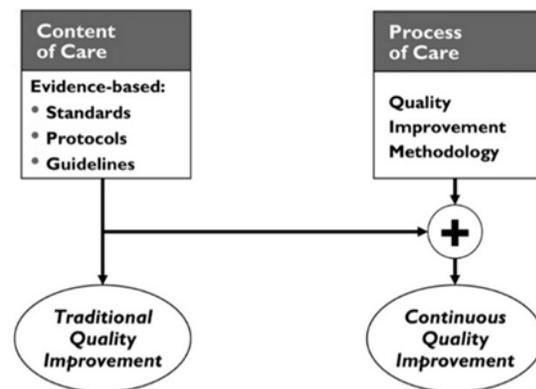
At the heart of improvement is using established (evidence-based) medical science and organizing care delivery to allow us to deliver the established medical science to every person who needs it. The best solutions come from health workers themselves. They have a profound knowledge of their systems. They own the interventions, and when they see them work, they become very proud of what they have accomplished. This is also critical to the sustainability of the changes.

## The Science of Improvement<sup>1</sup>

How did the teams in Niger achieve such great results?

Quality improvement integrates **content of care** and the **process of providing care** thereby establishing what is known to work to reach the person that needs it.

The content of care is the subject matter knowledge about medicine. It is the interventions, the diagnostics, and the understanding of what works to improve care. It is how we organize care delivery to ensure that all patients receive all the care they need.



*Adapted from Batalden and Stoltz (1993)*

<sup>1</sup> Also known as delivery science, execution science, implementation science, etc. More names can be found on page 19.

The process of care, however, is the bigger issue in health care. How can we make a system work in such a way that we get the results that we want?

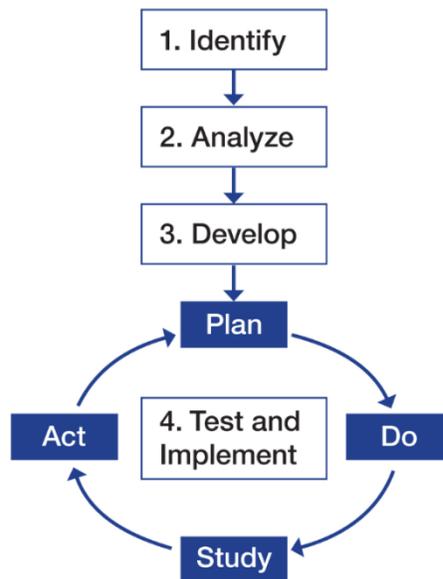
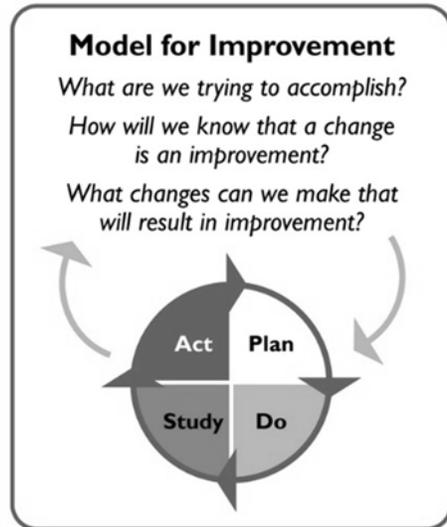
### The Model for Improvement and the Plan-Do-Study-Act (PDSA) Cycle

The Model for Improvement is all about testing a change. The model specifically looks at: *What are we trying to accomplish? How will we know we achieved it? What changes can we make?*

The first step is to plan what change you would like to test (plan), then implement the change (do), analyze if the change has achieved the result you were looking for or not (study), and if it has achieved good results then you should scale up (act), or if it has not achieved the intended results, consider testing a new change and beginning the process again.

In “A Modern Paradigm for Improving Healthcare Quality” published in 2001, Massoud and colleagues use an earlier improvement model, which is slightly easier to use for teaching purposes.

This improvement model’s steps involve identifying a problem, analyzing the issue, and developing a solution to test using PDSAs. The model allows you to think about the specific context of the system that you are working in as well as map out the currently occurring.



Source: “A Modern Paradigm for Improving Healthcare Quality”, Massoud et al. (2001)

The case study portion of this course will use the above model to work through the exercises.

## Improvement principles

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*Every system is perfectly designed to achieve exactly the results it achieves.*

Change is at the heart of improvement. Measurement itself is not an improvement. Nothing changes when only measurement is occurring. There is a Palestinian proverb that says “*you can weigh a cow every day, but that is not going to make it fatter*”. If we continue to do the same thing, we will continue to get the same results.

However, measurement is important. If we test changes, we must still measure to see if an improvement is being made. The key to improvement is change, but not every change is an improvement.

The following are key principles of improvement:

### **1. Understanding work in terms of processes and systems**

All the work that is done in delivering health care can be expressed in terms of processes and systems. Every process and system has a certain level of performance that is characteristic

### **2. Developing solutions by teams of health care providers and patients**

Both health care providers and patients need to be involved in solution making. They are the ones who provide and receive treatment and are the most knowledgeable as to what is feasible or not in their context, including possible resource constraints and cultural barriers.

### **3. Focusing on patient needs**

High quality care takes into consideration patient needs. Improvement must consider these needs throughout the process to improve quality. The more the needs and expectations of patients are met, the better the quality of care.

### **4. Testing and measuring effects of changes**

The performance of every process and system can be measured. If a different result is sought, then changes need to be introduced to the processes and system. These measures must be collected in real time in order to understand the effects of the changes being tested. Data should be collected on a daily basis and then aggregated on a monthly basis. An easy way to see the changes that are made over time is through the use of a time series chart.

A time series chart is a line graph that shows the change in measurement over time. Such a graph allows teams to clearly show when an improvement team started working, when a new change took place, and the effect that occurred after.

Time series charts also allow for improvement teams to mark any large events that occurred during the improvement process which may have disrupted or enhanced the results of their work. For example, a team is working to improve lab diagnosis for patients with suspected malaria. However, the lab suffers a fire and is unable to process tests for patients during the month of repair, causing the number of patients to be tested to drop back to zero.

It is important to understand the difference between common and special cause for an improvement or a decrease in quality of care.

When data are disaggregated by sex, race, or other socio-economic factors, time series charts can show the difference in improvements for different groups of patients. This can help teams assess what different changes may need to be tested by group. This will be discussed further in the case study portion of the course.

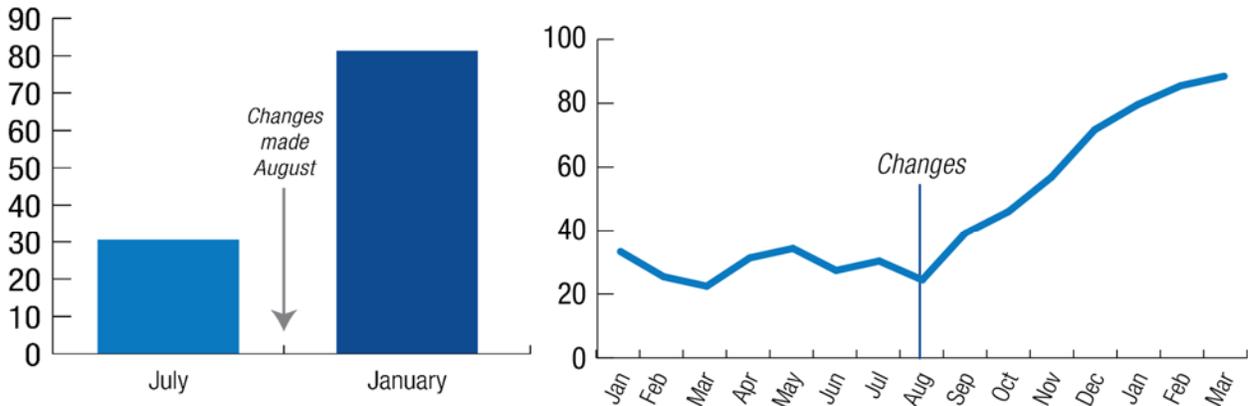
## 5. Shared learning

Time has shown the power of teams working and learning together to improve care. Today, an improvement would not be designed without shared learning as a key component.

These principles will be applied throughout the case study later in the course.

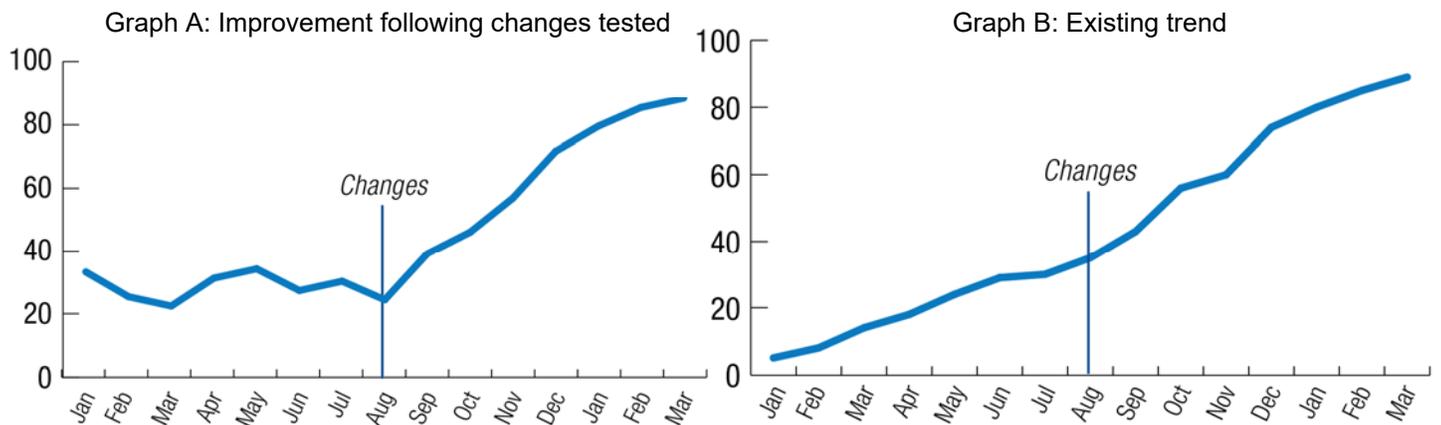
### The importance of showing data over time

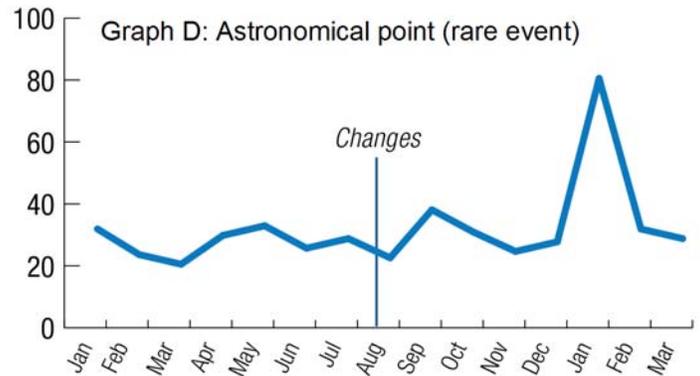
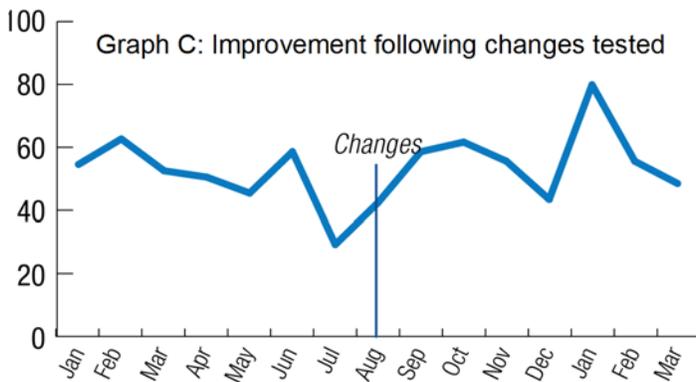
Look at the bar chart and line graph below. The chart and graph shows the same information but presented in a different way. Which one tells you more about what happened?



The bar chart shows only two points in time. It does not show the trend over time that was occurring before and after the changes were made. This is why time series charts are essential in tracking improvement work.

Now, take a look at the following four time series charts. All four of these charts could be plotting the same data that are presented in the bar chart above. By tracking data over time, this allows us to know if the changes tested caused an improvement, or if there was already an existing trend, natural variation, or a rare event that occurred.





Analyze these time series charts.

Graph A shows that when changes were tested, there was improvement.

Graph B shows that there was already improvement happening. It is hard to claim the changes made by the improvement team caused further improvement or not.

Graph C shows there is natural variation occurring. Again the changes are not clearly making an improvement in the results.

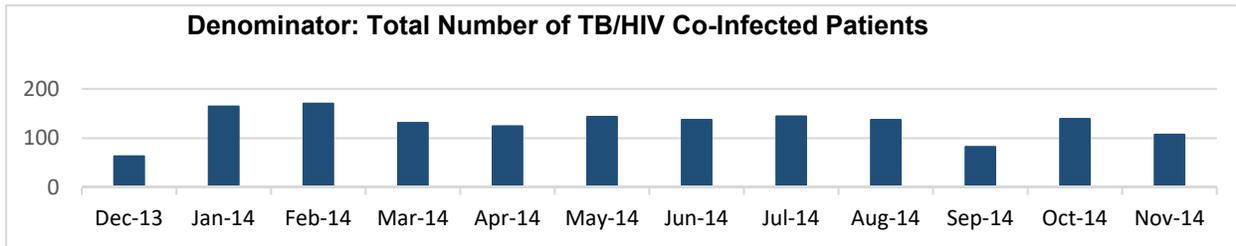
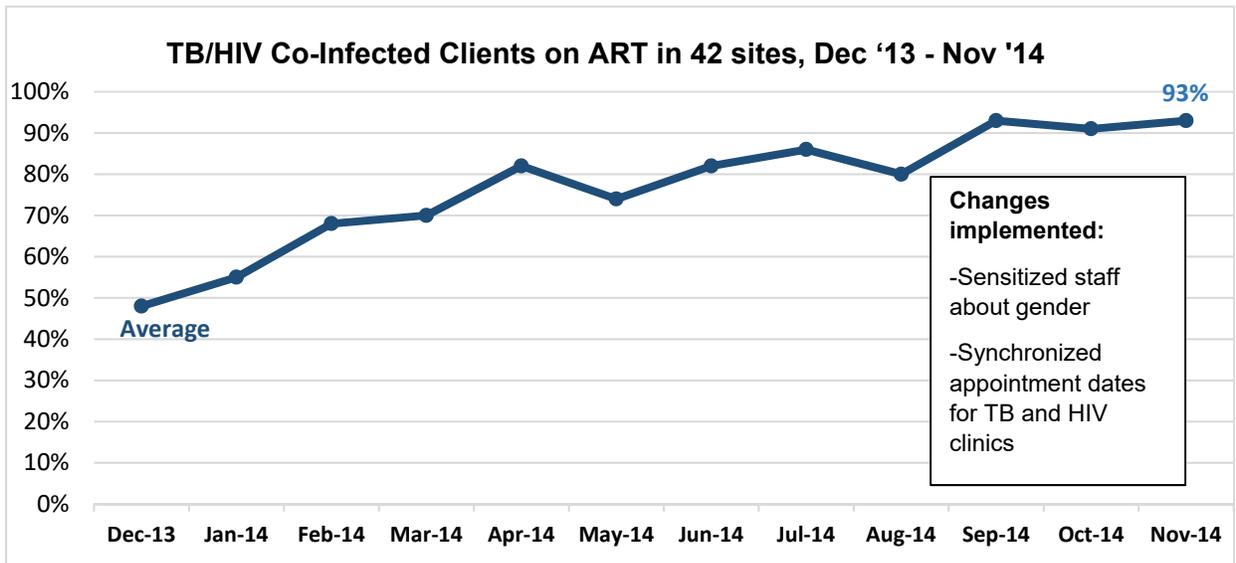
Graph D shows an astronomical point, or a rare event. In this case, it would be interesting for the quality improvement teams to look back at what happened in January to cause the jump in results and what happened in February to cause them to drop back.

In Module 5, Section 4, we will discuss the essential components to a strong time series chart.

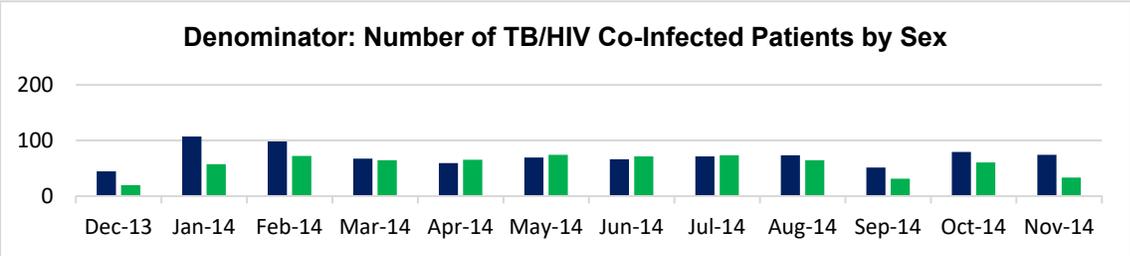
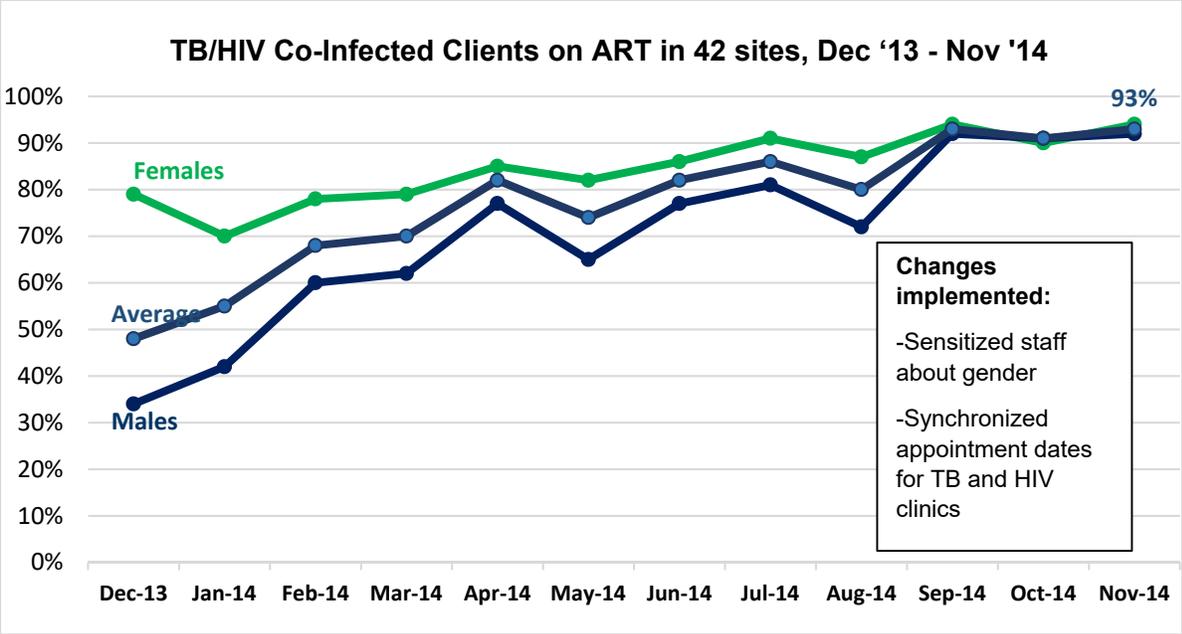
### The importance of the disaggregation of data

An important part of improvement activities is to collect and analyze data separately for males and females—called sex-disaggregated data, or data disaggregated by sex.

For example, look at this graph of TB/HIV co-infected clients on ART during an improvement activity; it shows great progress in getting TB/HIV co-infected clients on ART.



However, when we look at the same results disaggregated by sex, as can be seen on the next page, we see an important gap between TB/HIV co-infected females and males on ART: 79% of females but only 34% of males were retained in care. With this information, the improvement teams could then identify activities to target the men who were not being retained in care, as well as continuing with activities to increase women retained in care. Within ten months, gaps between women and men were closed and over 90% of co-infected clients were retained in care. It is important to collect and analyze sex-disaggregated data to identify gender gaps and then address those gaps based on the local context they are operating in.



# Overview of Improving Health Care

## Part 1

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### Ways to improve quality

- Through experience and knowledge
- As a result of a scientific advancement
- Through trial and error
- By experimenting
- By coincidence
- On the basis of quality improvement theory



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### Improvement science

Walshe K. Pseudoinnovation: the development and spread of healthcare quality improvement methodologies. *Int J Qual Health Care* 2009; 21:153-9.

- Implementation science
- Delivery science
- Execution science
- Quality improvement
- Quality management
- Continuous quality improvement
- Performance improvement
- + many more



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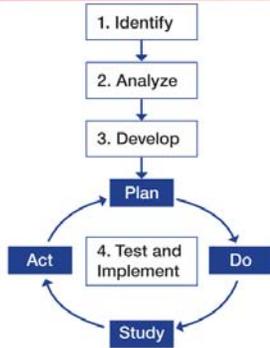
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## Model for improvement



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Adapted from: Massoud et al. A Modern Paradigm for Improving Healthcare Quality

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## Improvement principles and frameworks

### Fundamental Concept of Improvement:

"Every system is perfectly designed to achieve exactly the results it achieves"

### Principles of Improvement:

- Understanding work in terms of processes and systems
- Developing solutions by teams of health care providers and patients
- Focusing on patient needs
- Testing and measuring effects of changes
- Shared learning

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## MODULE 4: OVERVIEW OF IMPROVING HEALTH CARE, PART 2

### Real World Examples

#### Uganda: Improving coverage, retention, and clinical outcomes

What do you think constitutes good quality care for patients who need antiretroviral therapy (ART)? In this example, the USAID ASSIST team defined quality care with three components:

1. Coverage: Those who need the care, receive the care.
2. Retention: Those who receive the care, stay in care.
3. Wellness: Those who stay in care, do well in care.

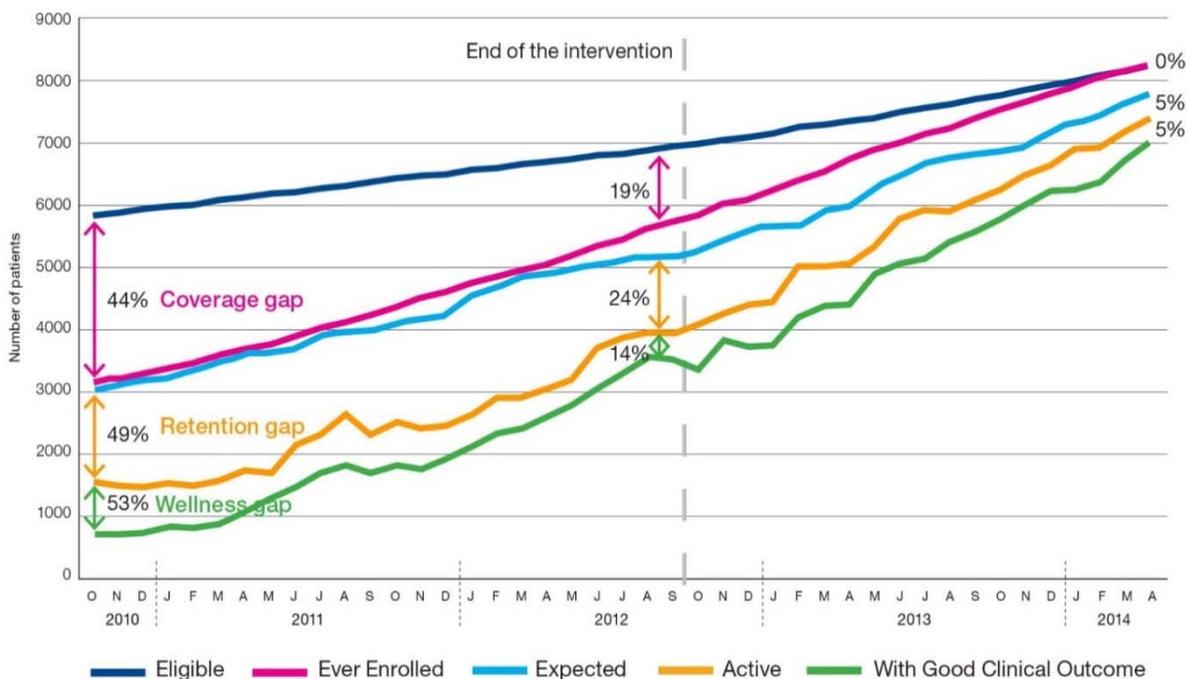
Utilizing these three components, the team developed a model to measure and improve the gaps in coverage, retention, and wellness. These gaps can be seen in the time series chart below.

The dark blue line indicates the estimated number of HIV-positive patients who are eligible for ART in five health care centers the project was working with in Buikwe District, Uganda. The pink line is the number of HIV-positive patients ever enrolled in treatment. The difference between the dark blue and pink lines is the *coverage gap*.

The light blue line shows the data for the patients that are expected to be treated at the five facilities, removing any patients that may have transferred to another facility or passed away. The yellow line indicates patients who come to their appointments. The difference between the light blue line and the yellow line is the *retention gap*.

Finally, the green line indicates good clinical outcome of patients on treatment. The difference between the yellow line and the green line is the *wellness gap*.

Uganda: Coverage, retention, and clinical outcome gap analysis showing improvement at five sites implementing the Chronic Care Model in Buikwe District (October 2010–April 2014)



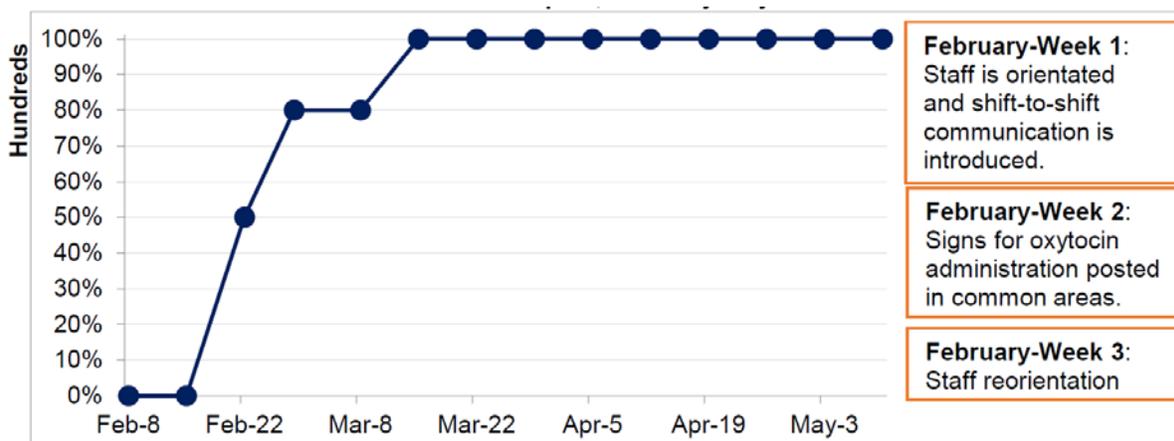
The graph shows that in October 2010, the baseline for coverage, retention, and wellness of patients on ARTs had large gaps of 44%, 49%, and 53%, respectively. After the teams began testing changes (some examples are included in the box below), the gaps began to close over time. At the end of ASSIST's intervention period, the coverage, retention, and wellness gaps were 19%, 24%, and 14%, respectively. Improvement teams at the five facilities continued to test changes and improve the quality of care for patients beyond the intervention period. They continued to collect and analyze data and were able to close the coverage gap completely by April 2014. The retention and wellness gaps were also improved greatly, reducing to 5% each.

Coverage Gap	Retention Gap	Wellness Gap
<ul style="list-style-type: none"> <li>Health workers and expert patients sensitized community members on chronic care for HIV through local radio, at churches, and in health facilities</li> <li>Village health teams mobilized communities for random counseling and testing</li> <li>Conducted HIV counseling and testing to all patients who came to the facility</li> </ul>	<ul style="list-style-type: none"> <li>Health workers and expert patients traced patients lost to follow-up by conducting home visits</li> <li>Introduced outreach visits to reduce travel distance for patients</li> <li>Conducted group classes for patients who defaulted from care</li> <li>Assigned each patient two treatment supporters</li> </ul>	<ul style="list-style-type: none"> <li>Educated patients about their condition and treatment as well as allowed patients to share their experience</li> <li>Conducted health worker-guided health education sessions</li> <li>Introduced self-management classes</li> <li>Health workers and patients set health goals together and monitored progress</li> </ul>

### India: Improving the administration of oxytocin to reduce post-partum hemorrhage

The Hisar District Hospital in the State of Haryana in India delivers approximately 250 to 300 babies a month, approximately ten percent of all deliveries in the district. A quality improvement team was formed in the hospital to improve the administration of oxytocin to reduce post-partum hemorrhage. Because of workload issues, health workers were not giving oxytocin to all women immediately after delivery. To resolve these issues, the team decided to try keeping prefilled syringes with oxytocin and to improve the communication about the new changes to all nurses working on different shifts. The team found that a printed notice with the message to use prefilled syringes along with staff reorientation improved knowledge of these new changes, and following this, all women have received oxytocin in the first minute after delivery. Changes can be seen in the graph below.

**Percentage of bed head tickets having record of oxytocin injection given within one minute of delivery in Hisar District Hospital, Haryana State, India, February – May 2014**



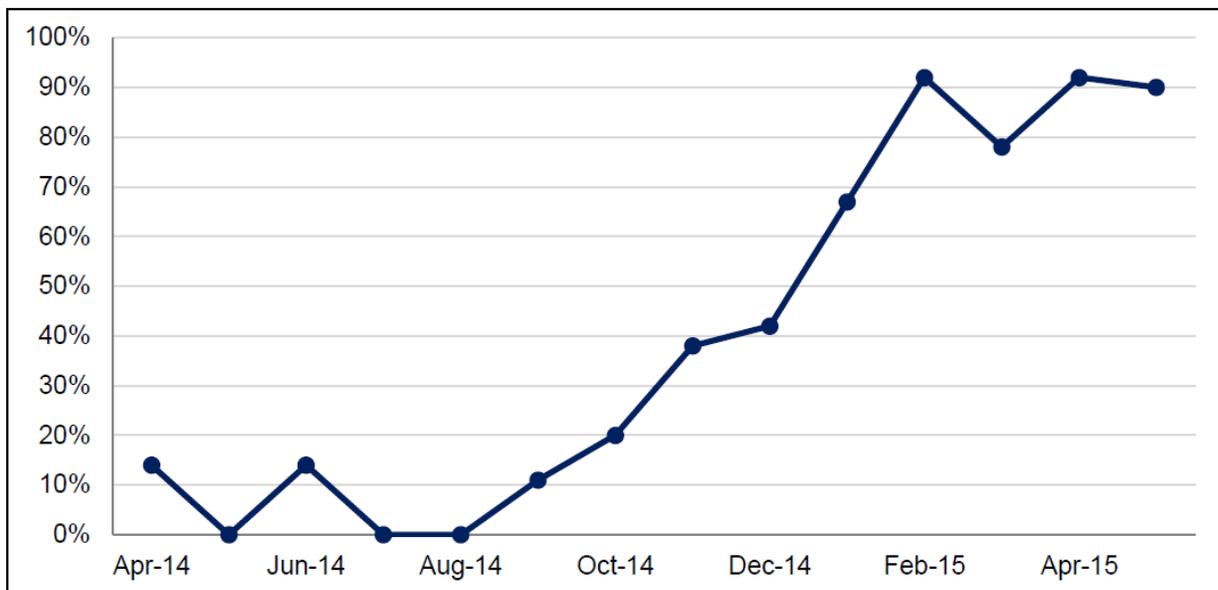
## India: Scaling up quality improvement to reduce maternal and child mortality

Lohardaga District in Jharkhand State in India has high rates of infant mortality, and state authorities recognized that the district needed additional support to reduce mortality. The USAID ASSIST Project initially started supporting four facilities to improve routine care of mothers and newborn babies. The facilities' success in ensuring that nearly all mothers and newborns were receiving quality routine care prompted the district health authorities to scale up quality improvement initiatives to five other health centers and 29 sub-centers. The project supported district health authorities to develop a strategy to scale up quality improvement work in these sites through the government system, using government resources. Quality of care has also improved in the five scale-up health centers, and district officials have taken steps to scale up their quality improvement strategy to the rest of Lohardaga's facilities.

The plan had three main elements:

1. Build the quality improvement skills of frontline workers
2. Set up a management system to support quality improvement work in facilities
3. Increase the ability of leaders to engage in quality improvement activities

**Percentage of pregnant women registered in the first trimester (within 12 weeks) out of total new pregnant women registered in the month, Jowang Public Health Center, Lohardaga District, Jharkhand, India, April 2014 – April 2015**





# Overview of Improving Health Care

## Part 2

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### What is good quality care for patients who need antiretroviral therapy (ART)?

- Everyone who needs ART receives it
- Everyone who receives ART stays on it
- Everyone in care does well on ART

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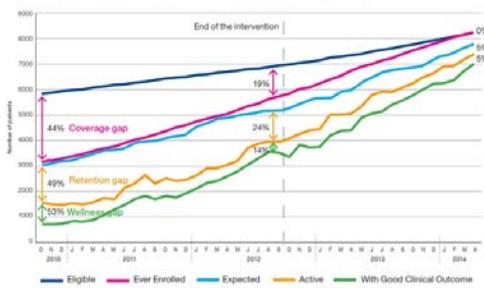
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### Uganda: Applying Chronic Care Model to improve coverage, retention, and clinical outcomes

#### Examples of Changes

- Used SM progress tool and tally sheets to record PI SM progress
- Introduced a VHT referral form to give to patients when sent to a facility
- Each patient enrolled is introduced to a VHT in catchment area
- SM groups formed

Uganda: Coverage, retention, and clinical outcome gap analysis showing improvement at five sites implementing the Chronic Care Model in Bulwe District (October 2010–April 2014)



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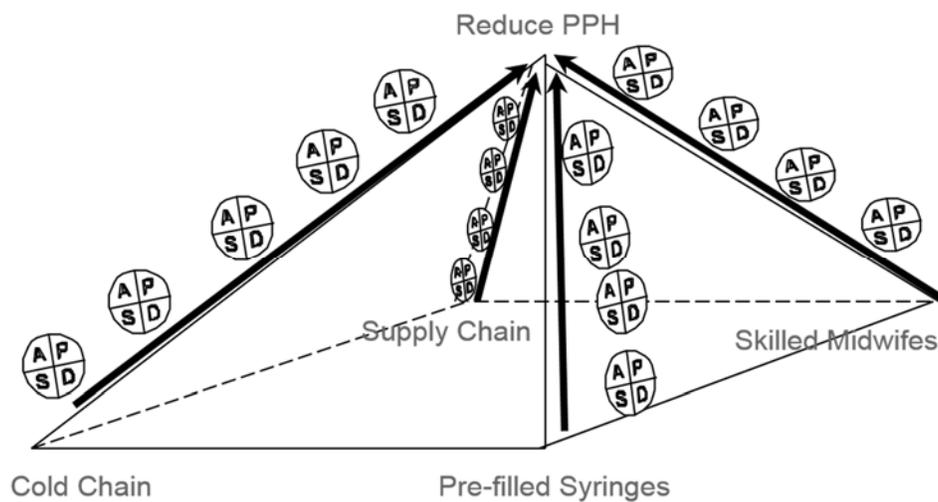
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## MODULE 4: OVERVIEW OF IMPROVING HEALTH CARE, PART 3

### Multiple Ramps of Change towards a Single Aim

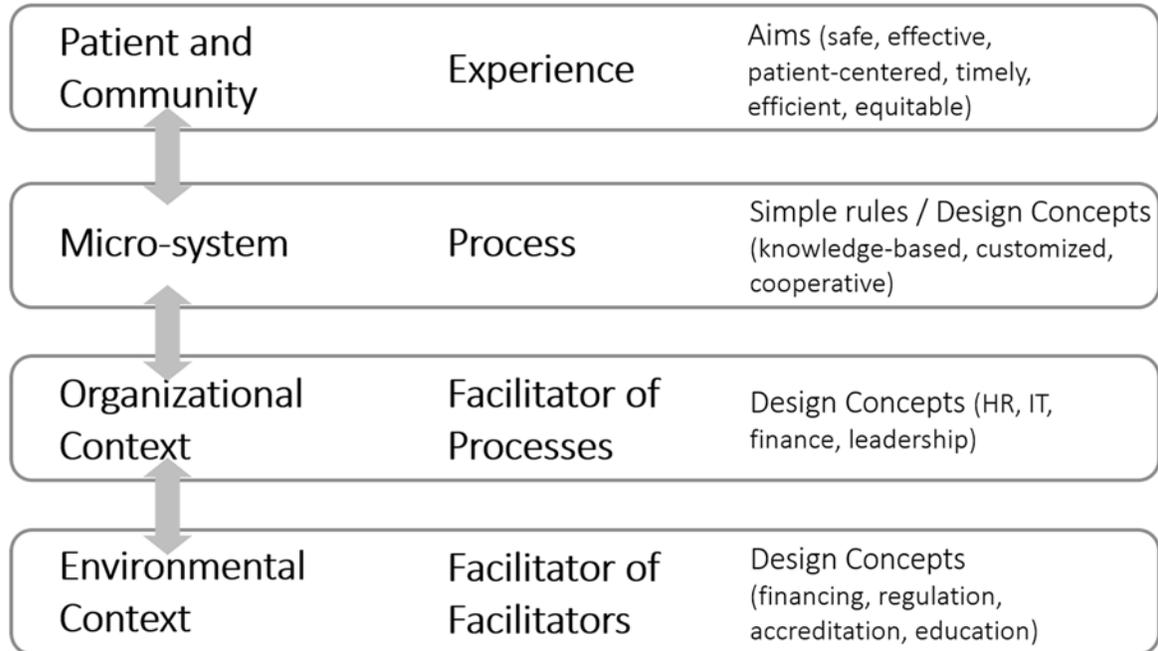
When setting out to accomplish an aim, it is possible to have multiple areas of change. The below figure shows the different areas that could affect reducing PPH. Going back to the previous example in Niger, there were multiple changes that were tested simultaneously in order to achieve the desired result, reducing PPH. The areas addressed during the improvement work was health worker competence, supply chain, cold chain, and pre-filled syringes. These areas were those identified as needing improvements. Not only one change was tested within each area. Although only a few changes were highlighted in the previous example, numerous Plan-Do-Study-Act (PDSA) cycles were implemented in Niger in order to achieve the aim of reducing PPH through AMTSL.



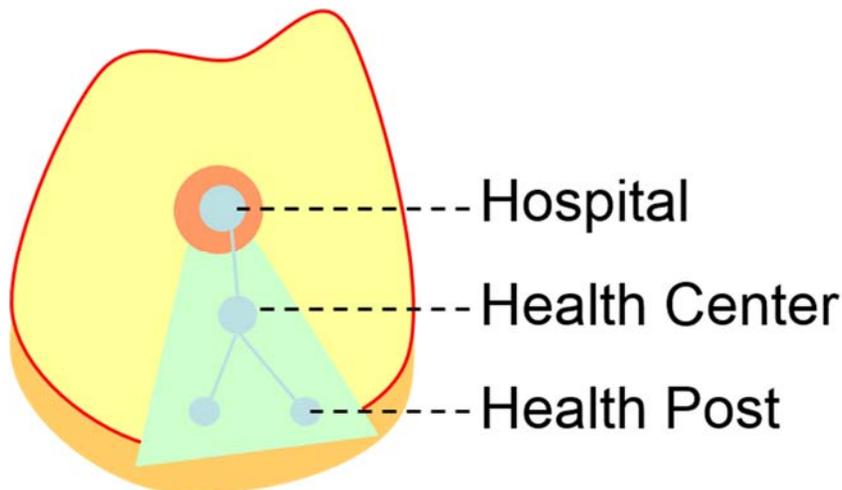
Source: Institute for Healthcare Improvement

## The Importance of Considering All Levels of the Health Care System

Good care happens when the patient receives it, but this happens within a system with several other layers. There is a larger micro-system, organizational context, and overarching environmental context in which a patient's experience is embedded. All these factors must be considered during the improvement process.



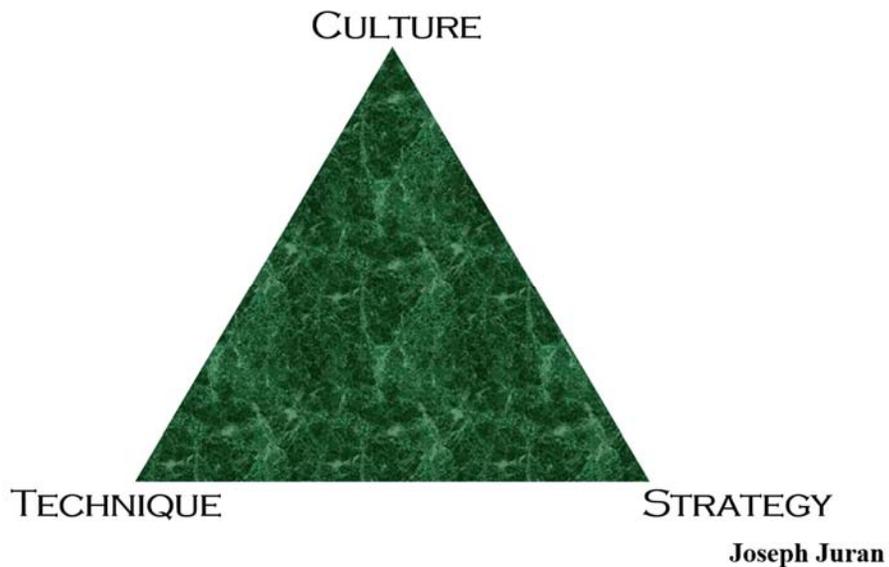
It is important to consider all levels when improving. The various levels of the health care system are all interrelated, as can be seen above. The diagram below illustrates the slice of the system concept. Taking a slice of the system means that when selecting the sites to work in, select sites at the various levels of the system, which represent the levels of the health care system to which the improvement work will be eventually spread. It incorporates the key players and leaders in the health care system.



This concept is utilized to understand how the whole system works and is also a very good tool in planning for scaling up improvement efforts.

## Strategy, Culture, and Technique in Improvement

It is important to note that people with little to no formal knowledge of improvement science can still improve. These types of people have the intuition that if we continue to do what we are doing, we will continue to get the same results. If we want different results, we need to do something different. However, with the right training in techniques, they will be able to improve at a much greater scale. The selection of what to improve and how to do it is equally as important as technique, as is the consideration of the culture and environment in which the work is being conducted.





# Overview of Improving Health Care

## Part 3

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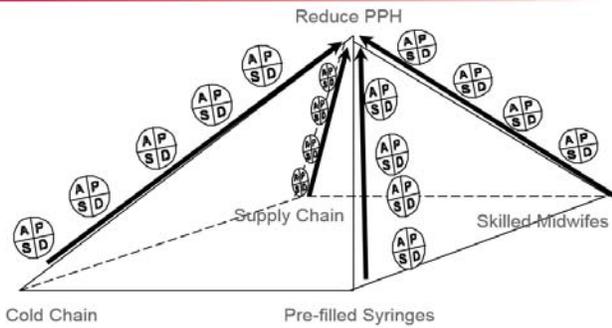
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### Multiple ramps of changes towards a single aim



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### Four-tier health system design



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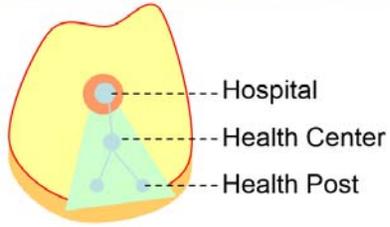
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### Slice of the system



Selection of different types and levels of facilities in a district or province

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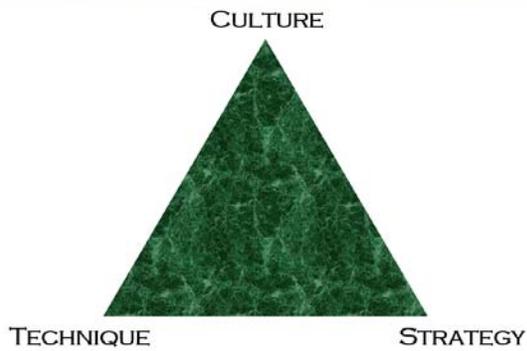
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### Leading health care improvement



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Source: Joseph Juran

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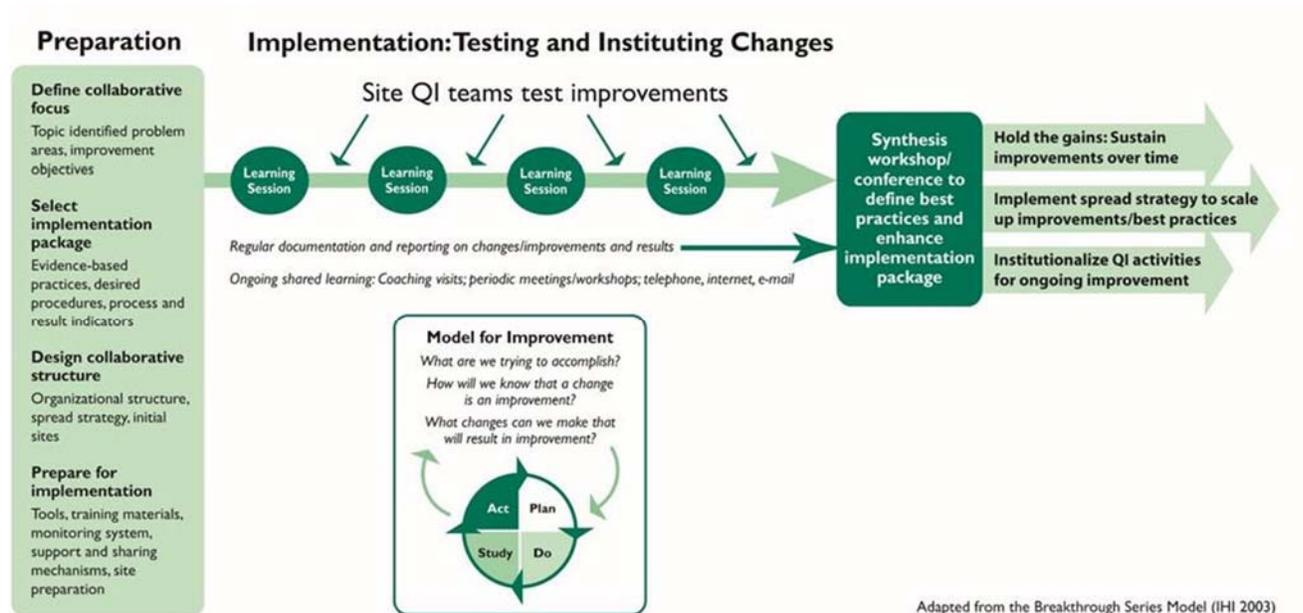
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## MODULE 4: OVERVIEW OF IMPROVING HEALTH CARE, PART 4

### Collaborative Improvement

Collaborative improvement has all of the same principles of improvement that were mentioned in the previous section, but there is more than one team (usually 20-50-100 teams) involved and shared learning is a main component. Collaborative improvement works when multiple sites are simultaneously testing changes using common indicators and then, invoking peer learning about how to improve that area of care. The key component to collaborative improvement is shared learning, facilitated through learning sessions. These learning sessions can take place either in-person. In between learning sessions are action periods, where teams are testing and implementing changes.

#### Model for Collaborative Improvement



Source: “The Improvement Collaborative: An Approach to Rapidly Improve Health Care and Scale Up Quality Services”, USAID Health Care Improvement Project (2008)

The above figure shows the model for collaborative improvement developed under the USAID HCI Project. Collaborative improvement has three phases. The first phase is the preparation phase. This phase is when the focus of the collaborative is defined, including the improvement objectives. The implementation package is also developed during this stage. The implementation package should consist of evidence-based practices, desired procedures, as well as process and result indicators for measuring and evaluating the changes that are tested in phase two.

Preparing for collaborative improvement also requires planning and strategic thinking of the organizational structure of the improvement teams, the initial sites that are going to be included during implementation as well as a strategy for spreading the work beyond the initial sites. During phase one as well it is important to prepare materials and resources that are necessary for the implementation of improvement work. This means that there must be a monitoring system in place, resources for holding learning sessions with the improvement teams involved in the work, and site preparation to begin the work.

The second phase of collaborative improvement is implementation. Usually there are at least four learning sessions that occur on a quarterly basis. These learning sessions are designed to bring together the improvement teams working at different facilities (on the same aim) to attend the a one to two-day meeting where they share changes that were tested, what worked, and what did not in their respective environments. In between these learning sessions, improvement teams test new changes (perhaps ones they learned from another facility's improvement team at a learning session) and continue to monitor the results. They report back on progress at future learning sessions.

Phase two also involves coaching visits from improvement experts. Coaches give improvement teams advice on improvement approaches and provide support through in-person visits, phone calls, or other means. These visits are there to provide support to improvement teams throughout their improvement journey.

The final phase in the model for collaborative improvement is scaling up the efforts beyond the initial sites. This phase begins with a meeting to harvest the knowledge gained throughout the implementation process of improvement teams. The goal of the meeting is to put together a change package that is to be implemented during the scale up. The change package consists of the best practices that occurred during the implementation phase.



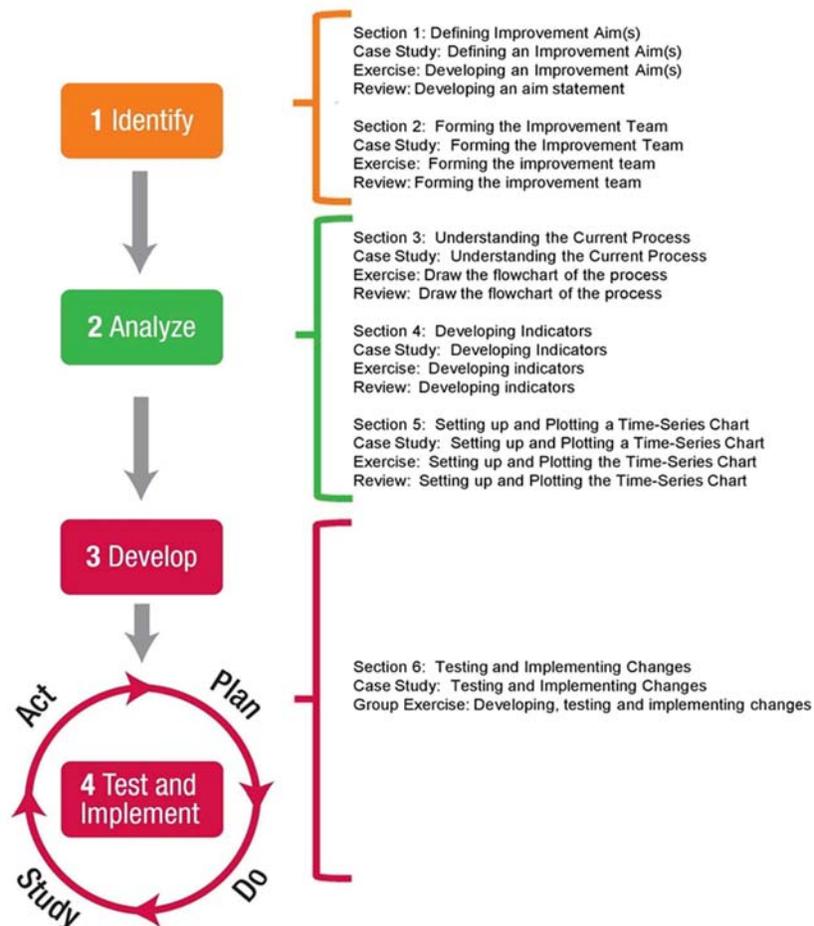
# MODULE 5: CASE STUDY – NUTRITION ASSESSMENT, COUNSELING, AND SUPPORT (NACS)

## Overview

Module 5 contains the following six sections:

- Section 1: Defining Improvement Aims
- Section 2: Forming the Improvement Team
- Section 3: Understanding the Current Process
- Section 4: Developing Indicators
- Section 5: Setting Up and Plotting a Time Series Chart
- Section 6: Developing, Testing and Implementing Changes

## Improving Health Care – An Interactive Workshop for Global Health Professionals



Throughout the remainder of the course, you will be interacting with a real improvement project that happened in Uganda, following the step-by-step sequence of conducting a quality improvement project.

Answers to the exercises can be found in **Appendix A**.



## Case Study: Nutrition Assessment, Counseling, and Support

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### Learning objectives

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Throughout the case study you will practice developing the following skills:

1. Define improvement aim(s)
2. Form improvement teams
3. Analyze processes of care
4. Develop indicators
5. Plot a time series chart
6. Develop, test and implement changes to improve everyday work

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## Section 1: Defining Improvement Aim(s)

### Determining a good aim statement

All improvement starts with aim. If we don't know where we're going, any road will get us there.

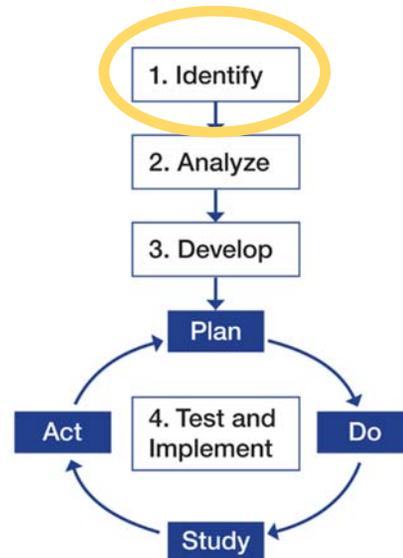
#### Step 1. Identify the problem

- Clearly define the aim for improvement

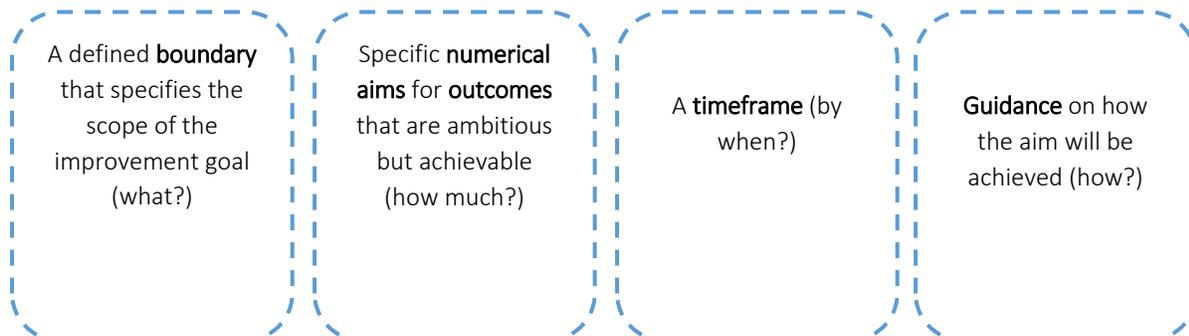
*What can help us develop improvement aims?*

- Existing MOH priorities
- Data that show where need is greatest (e.g., existing reports, assessments, service utilization data, epidemiological data, etc.)
- Priorities recognized by donors and funders
- Patients and staff (questionnaires and interviews)
- Practitioners, communities, and other stakeholders

A good aim statement asks what we are about to improve. It helps us specify the scope and define boundaries. Setting numeric targets is very important as well as they give a clear idea of what is being aimed to achieve. It's hard to determine how much change you can impact. Sometimes you'll exceed, and sometimes your target might be overly ambitious and might not be able to succeed. Numeric targets should be based on evidence of best practices.



#### Elements of a good aim statement



### **Case study exercise, part 1: Defining an improvement aim**

The head of a clinic, Dr. Samson, was informed by his district manager that improving the nutritional status of HIV-positive clients attending the ART clinic was a district priority for the year. The clinic head was aware that his clinic had a number of challenges to overcome – an already overstretched care team, members of the team who did not appreciate the importance of good nutrition in HIV care, and high patient load.

Dr. Samson knew that despite these challenges, improvements could still be made to ensure that all the clients in his clinic would have a good nutritional status, which would in turn have a good impact on his clients' clinical outcomes. He met with the head of the ART clinic, and they agreed that one of the ways to achieve this would be to integrate nutrition services into routine HIV/AIDS care services. During this meeting, they reviewed the processes entailed in providing good nutrition care and support to clients and prioritized assessing clients' nutrition status. They knew that focusing on assessment would enable them identify malnourished clients and take decisive action to treat and support them.

It was agreed that middle-upper arm circumference (MUAC) measurements would be the method of choice for assessment and categorization of clients.

*Develop an aim statement for Dr. Samson's project by answering the questions on the next page.*

## Instructions

When answering these questions, you should remember that your goals should be ambitious, but achievable. An ambitious goal that is not realistic will demotivate you and your colleagues, while a realistic goal that is not ambitious will fail to motivate you to make as much of a change as you are capable of making.

Where will your change be implemented: (A) \_\_\_\_\_

(A location such as a town, clinic, or office)

What outcome are we trying to change: (B) \_\_\_\_\_

(Should be a tangible result, such as a decrease or increase in something that matters in health care)

By what amount are we trying to change it: (C) \_\_\_\_\_

(Should be a percentage or some other numerical value)

When do you expect to see this this result happen: (D) \_\_\_\_\_

(An amount of time or by a certain date)

What will you do/use to achieve this result: (E) \_\_\_\_\_

(What intervention, method, tool, or resource will you employ to make the change?)

*Put together your responses to complete the aim statement for Dr. Samson's improvement project:*

In (A) \_\_\_\_\_, we will (B) \_\_\_\_\_

by (C) \_\_\_\_\_ within/by (D) \_\_\_\_\_

through (E) \_\_\_\_\_.

*Answers can be found in **Appendix A**.*







## Section 2: Forming the Improvement Team

### Establishing the improvement team

Now that we know what we're doing, we need to think about the people we need on the team to help us accomplish the work. We will invite them to sit on the improvement team, as they are the ones actually involved in the work.

The person who comes up with the solution to their own problem will be the most likely person to see through the implementation. The notion of empowerment is extremely strong here. People begin to realize they can be the change they wish to see.

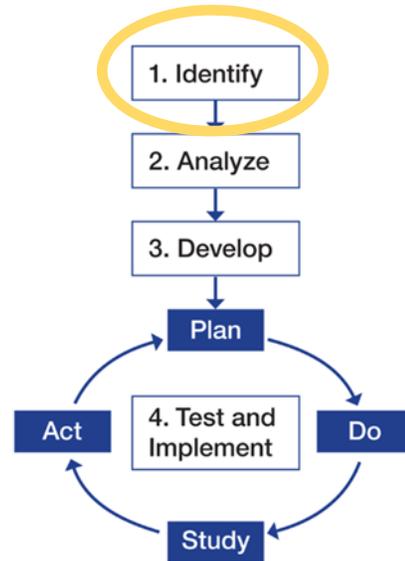
#### Step 1, continued. Identify the problem

- Determine the process(es)/ system that yield this aim for improvement
- Decide who should be on the team that will solve the problem

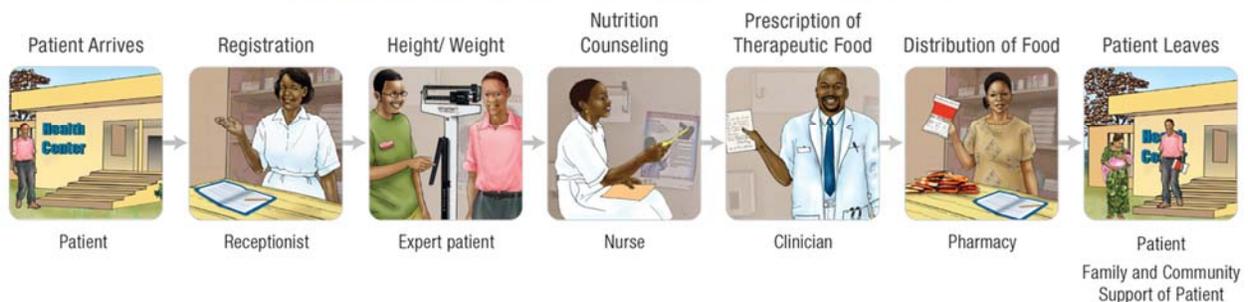
#### The importance of team work

Improvement is about figuring out the interdependencies that occur to give the end result. It is therefore important to include team members who understand the different parts of the system and can give their input into suggested changes.

- Health care processes consist of inter-dependent steps that are executed by different people fulfilling different professional functions.
- Quality faults often occur in the hand-over between people in different steps.
- Given the opportunity, staff can often identify problems and generate ideas to resolve them.
- Participation improves ideas, increases buy-in, and reduces resistance to change.
- Accomplishing things together increases the confidence of each team member, which empowers organizations.



### Steps and participants in a patient visit to the clinic



A representative for the different steps of the process of a patient visit should be included in the team.

People are not resistant to change; however, they hate *being* changed. It is more effective to ask them, *how can we do this better?*

## Team roles and responsibilities

### Improvement Team Member

People who work on the improvement team and share their knowledge and experience while working to accomplish team goals

### Improvement Team Leader

A member of the improvement team who is assigned the responsibilities of orchestrating improvement team activities, maintaining team records, and serving as the communication link with higher levels of the system.

When forming a team, a representative from each of the different functions in the process should be present. No function should be missing; otherwise knowledge and insight about the steps of the process might be missing. The team leader sets the agenda, coordinates the stakeholders, and forms the link between all of the members.

In health care, the more that we can involve patients, the more beneficial the improvement will be, as well. Patient involvement makes a huge difference in the final outcome of a change process, as patients have a powerful and different perspective than the health care worker. Patient participation could be in the form of surveys, interviews, check-ins, or even sitting on improvement teams. You should choose patients who are familiar with the context of the facilities and who themselves or their families have received services from the facility more than once.

### Real world example

In Russia, chronically ill patients needed to make large, sweeping lifestyle changes. The traditional interventions at the hospital were not working. The health care team brought patients into the clinic and asked them what might be helpful for them to make these lifestyle changes. The patients knew that the doctor at the clinic went on nightly walks. At the patients' suggestion, the clinic began sponsoring evening walks where patients walked alongside the doctor discussing good health practices. As the patients proposed the activity, the health promotion activity was successful.

Health promotion activities such as this are generally more related to chronic care than acute care. With acute care, the patient sees the doctor very few times – once, maybe twice. This is a very different type of interaction than with chronic care. For example, when a patient has cancer or diabetes, medical staff that are managing their care and lifestyle over time see them frequently. However, we all know physicians do not do the majority of care. The patient and family also take part. Physicians are there to support the management of care, while the patient drives the process.

## Case study exercise, part 2: Form the improvement team

Doctor Samson and the ART clinic manager considered the process involved in providing good nutrition care for HIV-positive clients in the ART clinic. They looked at the entire clinic flow in order to identify all of the people who contribute to the clients' nutritional care. There is a string of staff members with whom a client interacts upon arrival at the clinic, from the reception staff leading to the nursing staff, the clinicians, and the dispensing staff.

In order for nutrition care to integrate into HIV care, certain clinic staff members will be especially affected in the way they do their work. In fact, the changes even affect clerical staff in some ways. Dr. Samson and the ART clinic manager knew that any effective change that takes into account the contributions of all of these people would require their direct involvement in this improvement project.

While considering all of these things, they made a list of those involved and tried to narrow down the team to include as many individuals as possible without making the team too large.

### Instructions

Referring back to the aim statement you wrote on p. 51, consider the process that you want to improve. Think of those responsible for each step in that process. Think about whom else would be important to include on Dr. Samson's improvement team, such as: management, practitioners, patients or groups representing patients, or other people involved in the system of care. A representative of each function should be on the improvement team.

*Who is involved in the process we are changing that needs to be part of the team?*

What part of the process / what role?	Who performs the function?

*Are there other stakeholders or contributors that are not directly involved in the process, but contribute to successful outcomes? Think about the wider system in which Dr. Samson works.*

How does this process affect others?	Who are they?

When you have filled in all of the individuals above, narrow down the group by circling those who are necessary to have involved. Of those remaining, will the team be able to function well and produce real effective change without them? Make sure all of the necessary people are included but that the team is not too large or too small to be able to function well. An ideal team size is 5 to 9 people.

*See what the team in Uganda decided in **Appendix A**.*



## Why is teamwork important for improvement?

- Healthcare processes consist of **inter-dependent steps** that are executed by **different people** fulfilling different professional functions.
- Quality faults often occur in the **hand-over between people** in different steps.
- Given the opportunity, **staff can often identify problems** and generate ideas to resolve them.
- Participation improves **ideas**, increases **buy-in**, and **reduces resistance** to change.
- Accomplishing things together increases the confidence of each team member, which **empowers organizations**.

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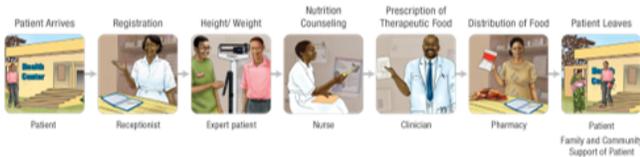
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## Teamwork

Steps and participants in a patient visit to the clinic



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## Team roles and responsibilities

- **Improvement Team Member:** People who work on improvement teams share their knowledge and experience while working to accomplish team goals
- **Improvement Team Leaders:** Members of improvement teams who are assigned the responsibilities of people orchestrating improvement team activities, maintaining team records and serving as the communication link.

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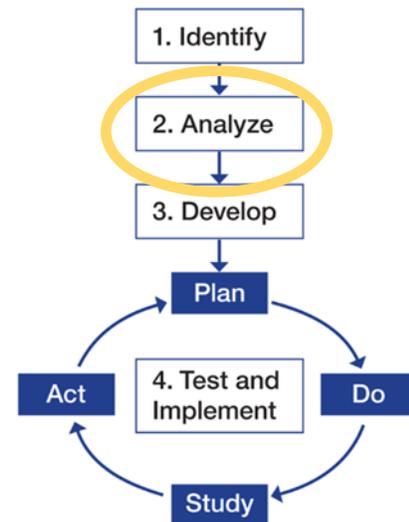
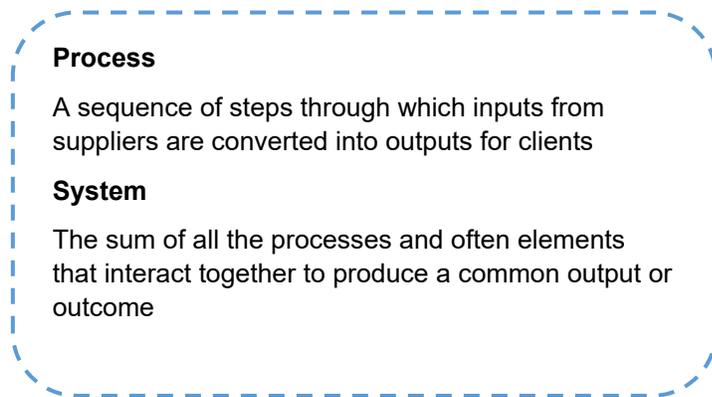
## Section 3: Understanding the Current Process

### Understanding work as systems and processes

We need to analyze our current process and situation to understand where we are.

#### Step 2. Analyze the problem

- Understand the process(es) / system that yields the aim for improvement

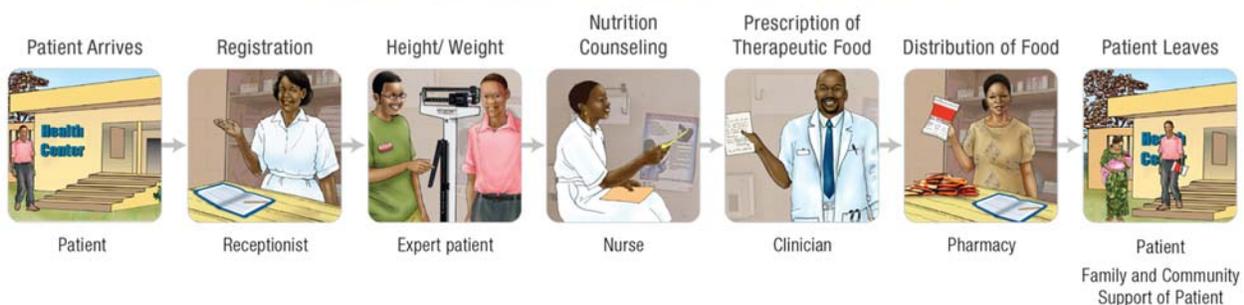


All processes put together make up the system.

For example, when we're managing patients who require nutritional support, NACS is one process that fits into a bigger system of patient care. The health care workers might separate these, but as far as the patient is concerned, they are part of the same service.

All of the services from a clinic can be thought of as processes and systems and can be expressed in discrete steps. For example, the patient arriving to an outpatient clinic has multiple discrete steps.

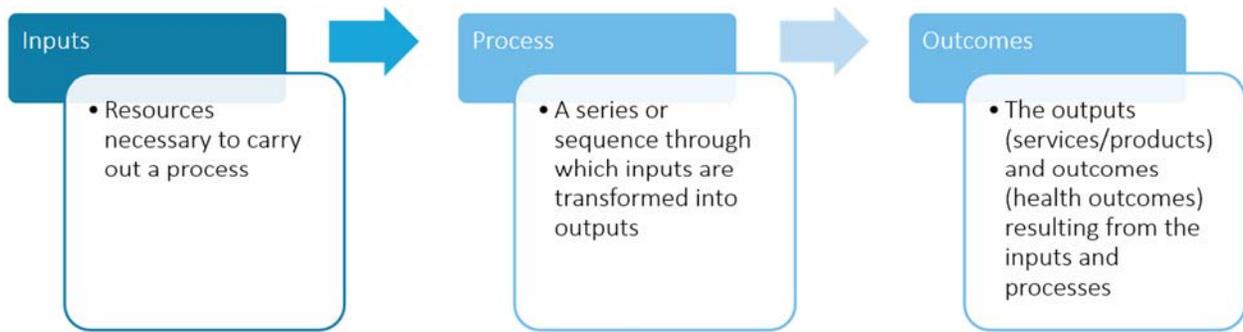
#### Steps and participants in a patient visit to the clinic



Every health care worker is performing a different function; however, from the patient's point of view, going to the clinic is one product. The interaction of all the people produces the required product, which is timely, necessary, and adequate service. It would be a disservice to the whole process if there were inadequacies throughout the process and inconsistency of service along the way.

#### Donabedian model of a system

Avedis Donabedian is one of the fathers of quality Improvement. He wrote that all systems could be looked at in terms of inputs, processes, and outcomes/outputs.



Processes are key, because they represent *how* to use your inputs. It is true that a lack of resources would cause issues in the improvement; however, even if all the resources are available, it does not guarantee that we will get where we want to go.

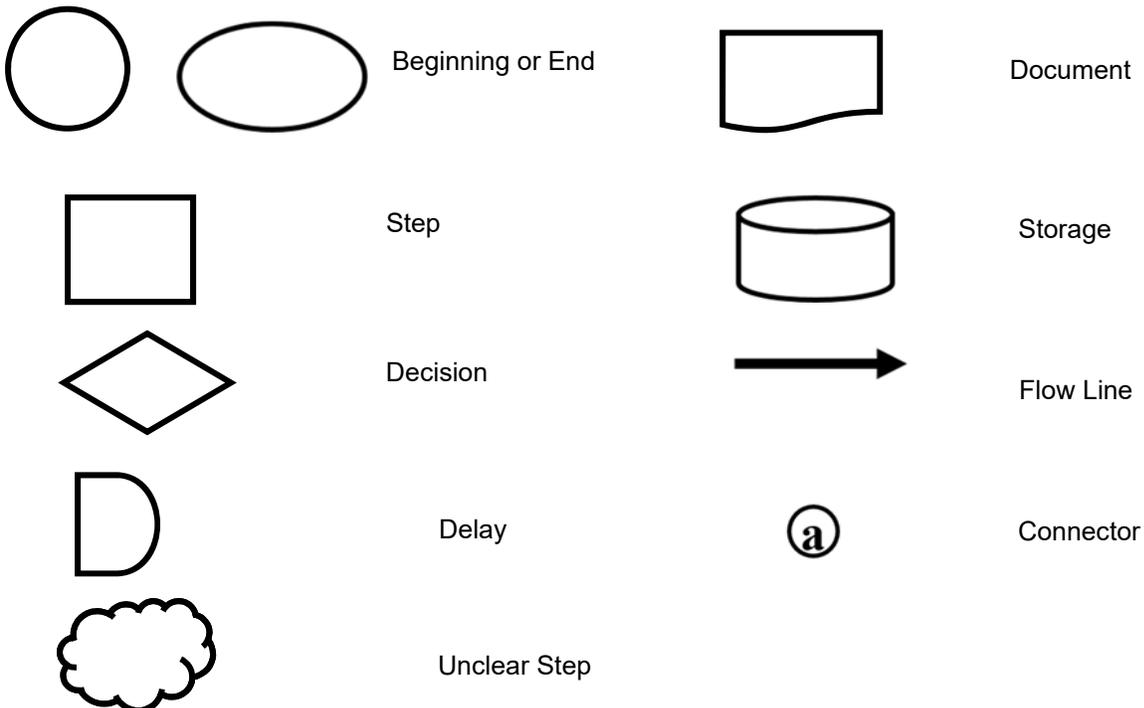
For example, even having the medicine does not mean that the diagnosis is right or the correct treatment is right or that the medicine is given in a timely fashion, etc.

One way to understand a process is to diagram it. Diagramming a process is called flowcharting. Flowcharting is a simple method originating in engineering science.

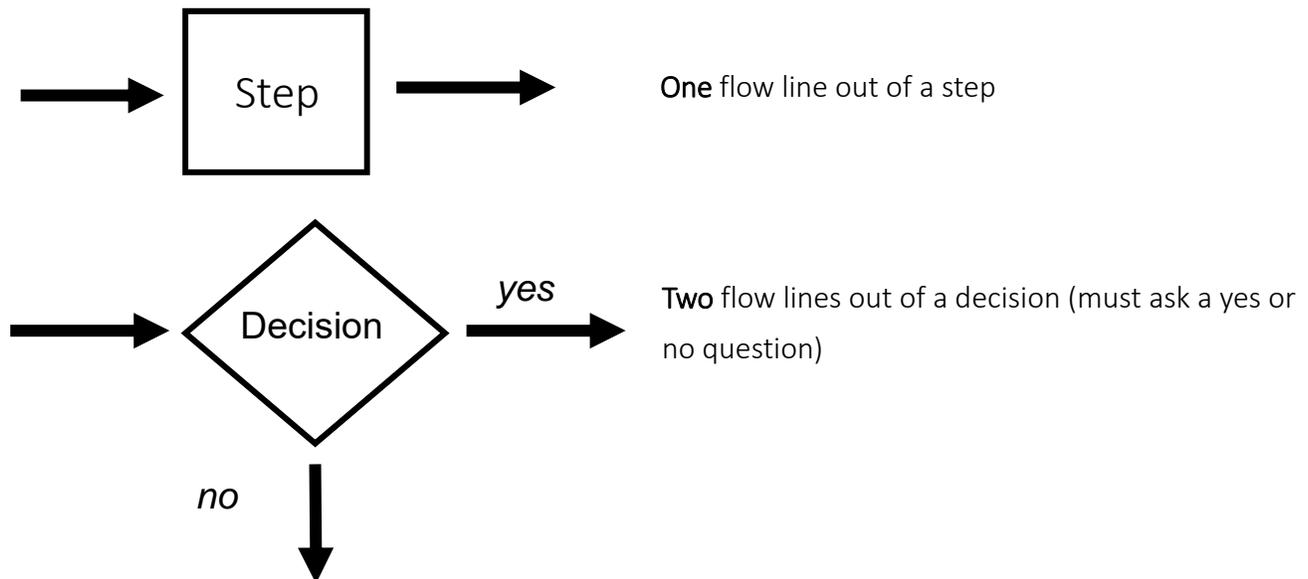
### How to create a process flowchart

1. Decide on the beginning and end points of the process to be flowcharted.
2. Identify the steps of the process.
3. Link the steps with arrows showing direction.
4. Review to ensure that it truly describes the process.

### Symbols of a flowchart



## Flow lines



## Types of flow

- **Clinical algorithms.** For example, a patient comes in with a fever; you ask, what are the options? The options are: a) malaria, b) respiratory tract infection, c) diarrheal, d) etc. What do you do? You perform the test. What if the test is negative? This is how a physician thinks through how the presentation of patient to lead them to a diagnosis.
- **Materials flow.** Resources ordered, prepared, and transported to the hospital. For example, food, laundry, pharmaceuticals, etc.
- **Patient journey.** Patients flowing through the system.
- **Information flow.** For example, a patient is registered in the logbook. We find their outpatient records. That file goes to the station where they take the temperature, weight, etc. Then, the file goes to the physician, etc.
- **Multiple flows.** More often than not, we're not just recording simple processes. Many processes are being intertwined. For example, the clinical diagnosis is made, then the pharmacy produces the prescription for the patient, and the patient chart captures both of these items.

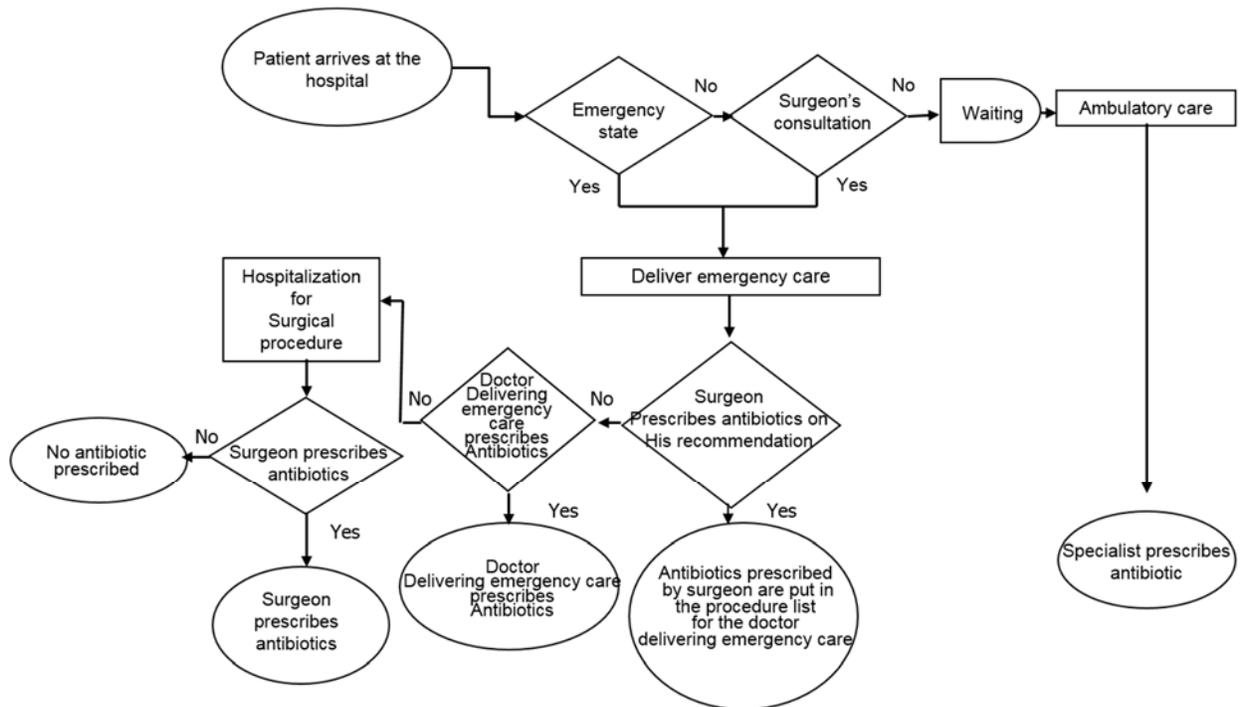
## Example: Process for prescribing antibiotic in surgery before changes were introduced

*Read the following process and try to understand the flow of steps.*

The process for prescribing antibiotics in surgery starts when a patient arrives to receive care at the hospital. This can happen in the emergency room or the surgeon's outpatient consultation. If antibiotics are not prescribed in either of these places, then the patient will have arrived to the hospital for admission, in which case, antibiotics will have been prescribed in outpatient setting outside of the hospital and the prescription receives there is simply administered in the hospital. If it is an emergency and the patient arrives at the emergency room, then antibiotics are prescribed by the surgeon in the emergency room. If it is not an emergency and the surgery has been scheduled, the patient is prescribed antibiotics by the surgeon in the surgeon's outpatient consultation office inside the hospital or antibiotics will have been prescribed previously and simply administered in the hospital.

If the patient is not hospitalized, then the surgeon may prescribe an antibiotic to be taken at home or the patient may be discharged from the hospital outpatient clinic without an antibiotic.

This is the same process diagrammed in a flowchart. Which is easier to understand?



### Analyzing a flowchart



### **Case study exercise, part 3: Understanding the current process**

The team decided to map the process by which HIV-positive patients are currently receiving care. After initial reception of the registration desk, the patient sees a medical officer, who examines the patient and prescribes a treatment or other interventions, as necessary. The patient then proceeds to see an adherence nurse who discusses drug usage and other matters with the patient. Upon completion, the patient goes to the pharmacy, where he picks up his treatment before leaving the health center.

Draw a flowchart below using the symbols depicted on pp. 63-64 to illustrate the flow of the HIV-positive patient in the core process as it is today.

*Answers can be found in **Appendix A**.*

## Section 3: Understanding the Current Process

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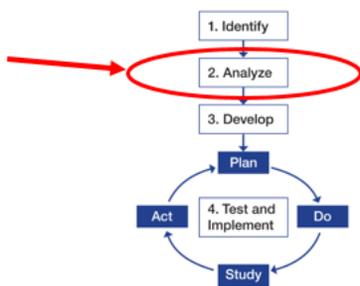
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### Model for improvement



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Adapted from: Massoud et al. A Modern Paradigm for Improving Healthcare Quality

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### Model for improvement

#### STEP 2. Analyze the problem

- **Understand the process(es)/ system that yield this aim for improvement**
- Determine the indicators which enable us to know that we have made the improvement we are seeking
- Analyze the available data and information
- Collect additional data (as needed)

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**Exercise**

Read the exercise and answer the questions.

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## Section 4: Developing Indicators

### Indicators to test and evaluate improvement

Developing indicators is how we complete the testing and evaluation of our improvement. It is at the core of quality improvement. It is how we figure out how to know the changes we are implementing, make the improvement we are seeking.

#### Step 2. Analyze the problem

- Determine the indicators which enable us to know that we have made the improvement we are seeking

#### Why do we measure?

- If you do not measure what you are doing, how will you know you have made an improvement?

Ask yourself, *what is the minimum amount of measurement that you need in order to answer these questions?*

The rule of thumb is to collect the minimum amount of data necessary to answer the question.

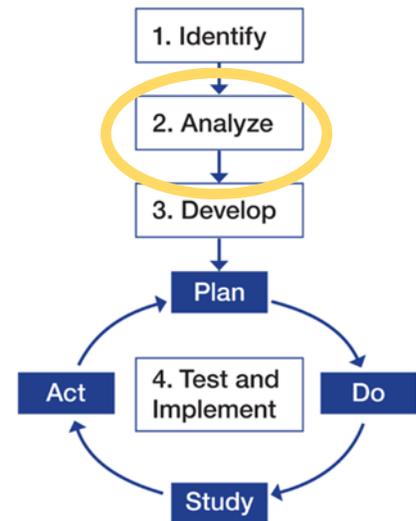
Collecting data is a burden. It is a burden for each health care worker. No one goes into the field of health care to collect data; people go in to help patients. However, we need to collect data to know what we're doing is working or not. Health care workers' engagement is higher if they know why they are collecting the data that they are being asked to collect. If they know there is some sort of improvement, they will be more likely to collect data.

We see a lot of incorrect data going through the system. No matter how well you process the data, if you put garbage in, you'll get garbage out.

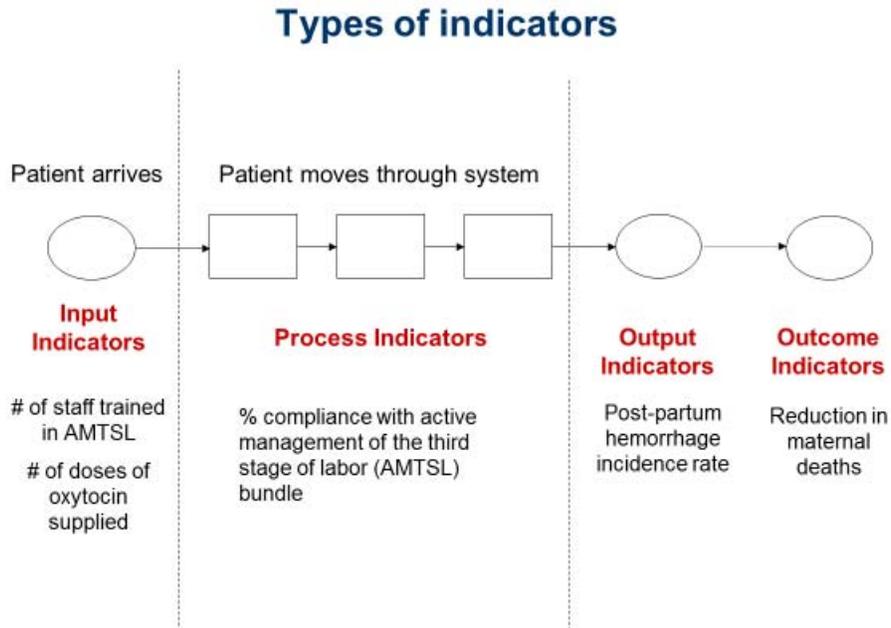
The key is to be judicious about the data you ask people to collect. We should not overwhelm teams with too much data collection. Instead, evaluate what data already exists. What is useful? What else is necessary?

#### How measurement should work

- Should be directly linked to improvement aims
- Should be used to guide improvement and test changes
- Should be integrated into the team's daily routine
- Will allow QI teams to learn
- Should concentrate on *key* measures—don't overwhelm teams with endless data collection and analysis!



Using Donabedian’s model where we have inputs, processes, outputs, and outcomes, we can establish indicators at each of these levels. Note that indicators can be either counts or proportions; proportions are often expressed as percentages. Indicators can also track either an increase in a positive result or a reduction in a negative result—both constitute improvement. Examples of each type of indicator are included in the figure below.



#### Qualities of a good indicator

- Clear and unambiguous (teams will not confuse what is meant by the indicator)
- Quantifiable
- Identifies the source of the data and the person responsible for collecting it
- Identifies a clear numerator and denominator
- Identifies the frequency with which the data should be collected

#### Example

<b>Indicator</b>	Proportion of neonates successfully resuscitated
<b>Numerator</b>	Number of neonates alive after 7 days of initial resuscitation
<b>Denominator</b>	Total # of neonates resuscitated
<b>Source</b>	Patient record
<b>Person Responsible</b>	Neonatologist
<b>Frequency</b>	Weekly

## Case study exercise, part 4: Developing indicators

The improvement team looked at how they can effectively measure whether or not they achieve an improvement. They knew that they should start to immediately collect data so that they have a baseline to compare against in the coming months. The team began to develop indicators by revisiting their aim statement: “In our clinic, we will improve the nutritional status of HIV clients by 90% within 6 months by assessing all our clients using MUAC.”

From this statement, they knew they needed accurate data on the numbers of HIV-positive clients coming to the clinic, how many of those have their nutritional status assessed, and how many clients were found to be malnourished. These are both clear and measurable numbers that are already collected through patient registers. These numbers represent the output indicator, which will tell them whether or not the change is working.

In order to know how well the team was implementing the changes, they also needed to know how many of the clients had their nutritional status assessed using MUAC. This is not something that they had measured or recorded systematically before. The team discussed how to best record this information. During the discussion, the staff focused on the clients’ care card, which is a card filled out by nurses and clinicians when routine care is provided to clients. The card had a spare column, and so the team decided that this would be the best place to record the MUAC measurements. They also agreed that the daily attendance register would enable them to know how many clients came into the clinic each week.

By using the spare column on the care card, the team will now be able to record the MUAC measurements of each client who comes to the clinic; they can then categorize these measurements according to the guidelines to determine if clients are severely or moderately acutely malnourished or are normal. Using this categorization, the team can then decide what sort of care can be provided to acutely malnourished clients.

### Instructions

As you fill out the form below identifying your indicators, ask yourself whether or not they fulfill all of the following qualities:

- Clear and unambiguous (teams will not confuse what is meant by the indicator)
- Quantifiable
- Identifies the source of the data and the person responsible for collecting it
- Identifies a clear numerator and denominator
- Identifies the frequency with which the data should be collected

### Output/outcome indicator: Whether or not the change is making a real improvement

Indicator: Describe what you are measuring	
Numerator: The number of times your process succeeded	
Denominator: The total number of times you ran your process	
Source: Where you are getting your data from	
Responsible person: Individual who will ensure that the data is collected and maintained	
Frequency: How often it will be collected	

**Process indicator: Whether or not your change is being implemented**

Indicator: Describe what you are measuring	
Numerator: The number of times your process succeeded	
Denominator: The total number of times you ran your process	
Source: Where you are getting your data from	
Responsible person: Individual who will ensure that the data is collected and maintained	
Frequency: How often it will be collected	

Answers can be found in **Appendix A**.

## Section 4: Developing Indicators

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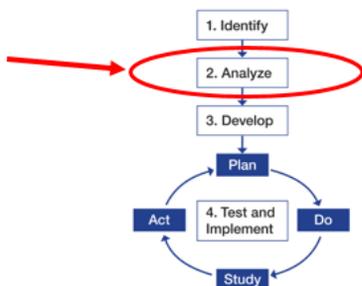
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### Model for improvement



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Adapted from: Massoud et al. A Modern Paradigm for Improving Healthcare Quality

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### Model for improvement

#### STEP 2. Analyze the problem

- Understand the process(es)/ system that yield this aim for improvement
- **Determine the indicators which enable us to know that we have made the improvement we are seeking**
- Analyze the available data and information
- Collect additional data (as needed)

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**Exercise**

Read the exercise and answer the questions.

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## Section 5: Plotting a Time Series Chart

### What is a time series chart?

A time series chart tracks data trends over time. It can be plotted on a daily, weekly, or monthly basis. The x-axis (horizontal axis) is the time. In the graph below, the unit of time is month. The y-axis (vertical axis) is the indicator that the improvement team is tracking.

### Norms for presentation of time series charts

The purpose of these norms is to ensure that those examining our results have enough information to be able to accurately interpret the graphs. All time series charts should have:

- A clear, well-defined title: A clear and well-defined title that expresses who, what, when, and where.
- Labeled x- and y-axes: Axes should include a “scale” such as 0 – 100% and a “label” which describes what variable or indicator is being represented on each axis.
- Denominator definition: The criteria for being counted in the denominator.
- Numerator definition: The criteria for being counted in the numerator.
- Denominator values: If the indicator being shown is a percentage, the corresponding denominator for each measurement period should be presented.
- Data source: Brief descriptions of the source of data (i.e., register or care cards)
- Sampling strategy: If data for the denominator come from a sample, rather than all cases that fit denominator definition in that period, state how sampling was done (e.g., systematic sample of 10 records).

Time series charts showing data for one site or one QI team should also have:

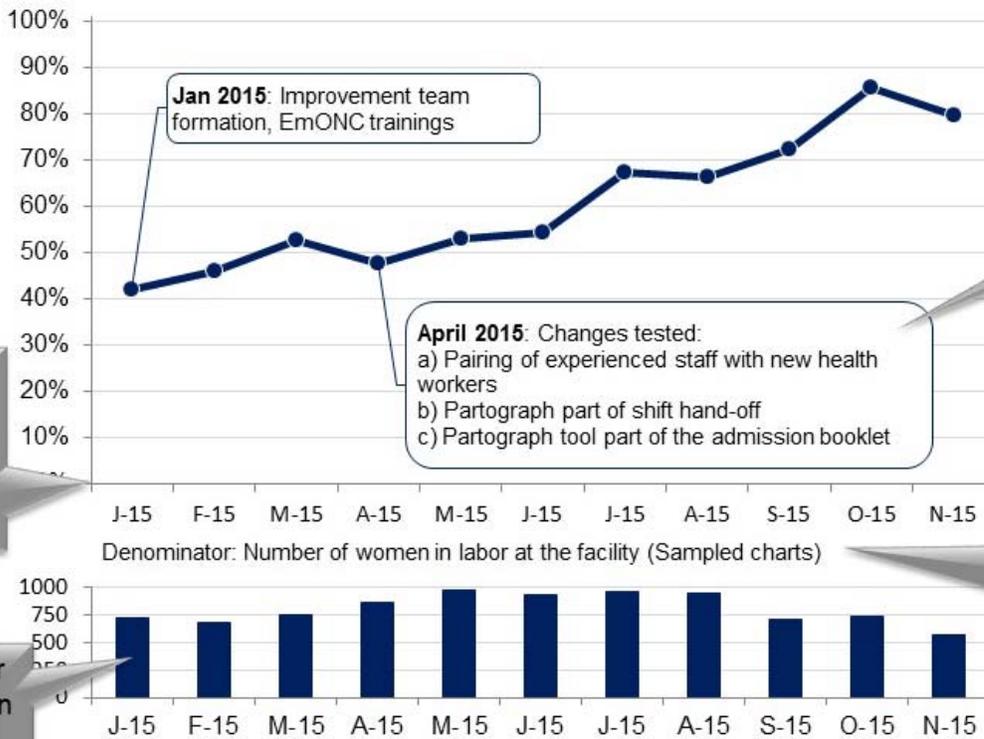
- Annotate key tested changes: Annotations should be of two categories: timing of key changes and other key events that might explain changes in results over time. Key changes represent interventions, which relate to substantial changes in the value of the indicator (positive or negative).

Time series charts showing aggregated data across multiple sites should also have:

- Number of sites reporting for each measurement period: For each point on the graph, the total number of sites included in the aggregated measure should be presented.

Example of a well-defined time series chart

**Percentage of women giving birth whose partograph is complete in 39 facilities in five counties in Kenya, January – November 2015**



Clear and well-defined title that defines indicator, scale, and timeframe

Tested changes are annotated

X and Y axes have clear scale and include labels

Denominator values shown for each month

Denominator defined, including whether data is sampled or whole population

## Plotting a time series chart for the NACS example

Now that indicators have been defined, we can begin to record data. The team created a data form for recording this information:

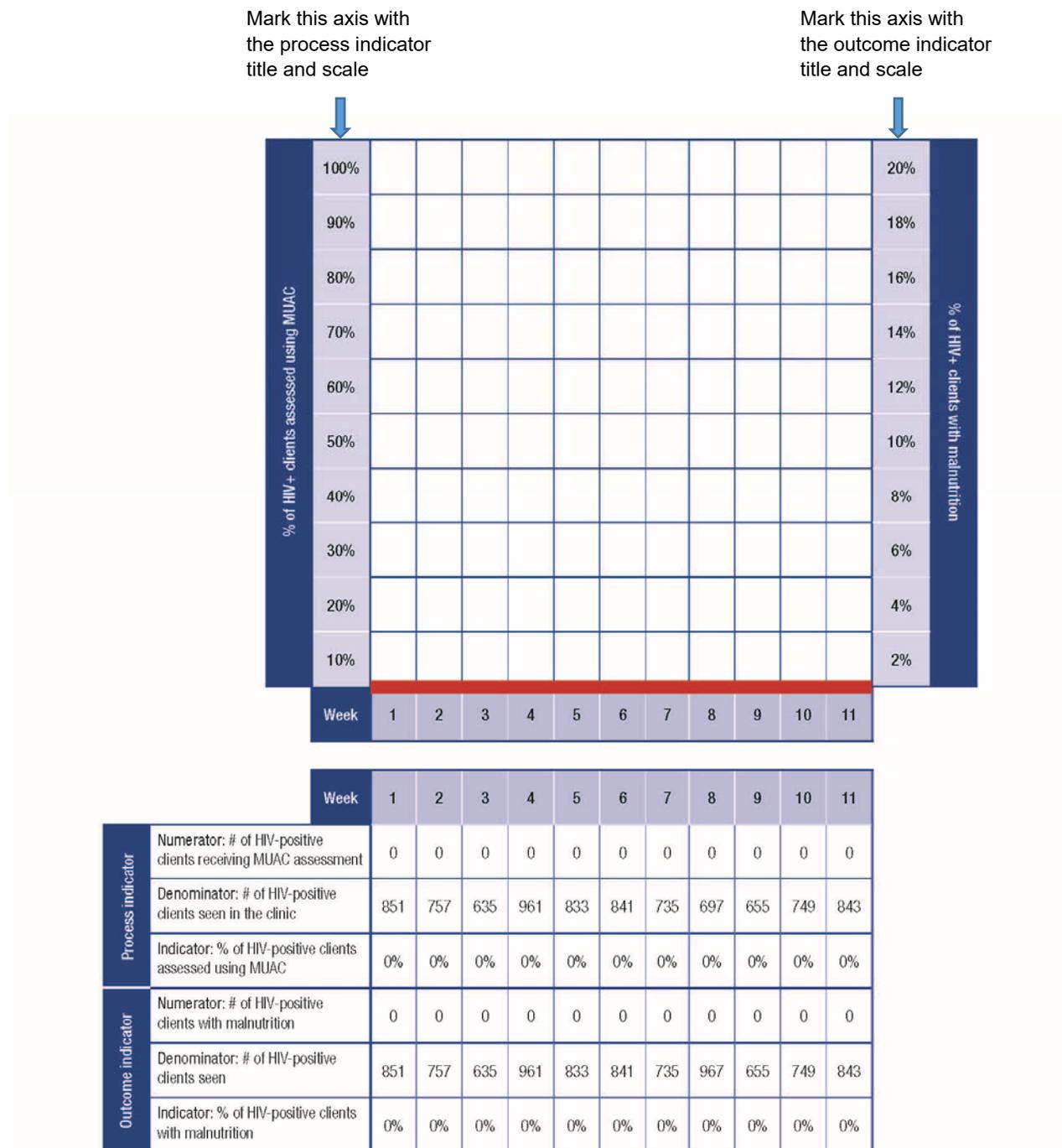
		Mon	Tue	Wed	Thu	Fri	Sat	Sun
Process	Numerator: # of HIV-positive clients receiving MUAC assessment							
	Denominator: # of HIV-positive clients seen in the clinic							
	Percent:							
Outcome	Numerator: # of HIV-positive clients with malnutrition							
	Denominator: # of HIV-positive clients seen in the clinic							
	Percent:							

The clinic data clerk records the data from the register and clients' cards every week into a journal. Each week's entry needs to include the total number of clients who were seen in the clinic, the number of clients who had a MUAC assessment, and the number found malnourished.

The improvement team member in charge of data began plotting this information on a time series chart to allow the team to see the change in both their process indicator and their outcome indicator over time. This chart was posted on the wall in the records room, which is also used as the team meeting space, so that everyone could see and discuss it together. The journal was kept close by so that other team members were able to make additional notes and comments for everyone's benefit.

## Case study exercise, part 5: Collecting and plotting the data

Complete the blanks below to create a time series chart.



The answer may be found in **Appendix A**.





## Section 6: Developing, Testing, and Implementing Change

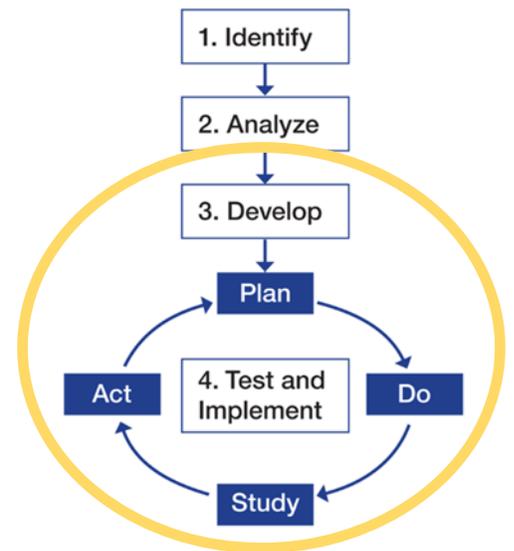
### Develop the solution and test

- In this section we move to the development, testing, and implementation of the quality improvement change.

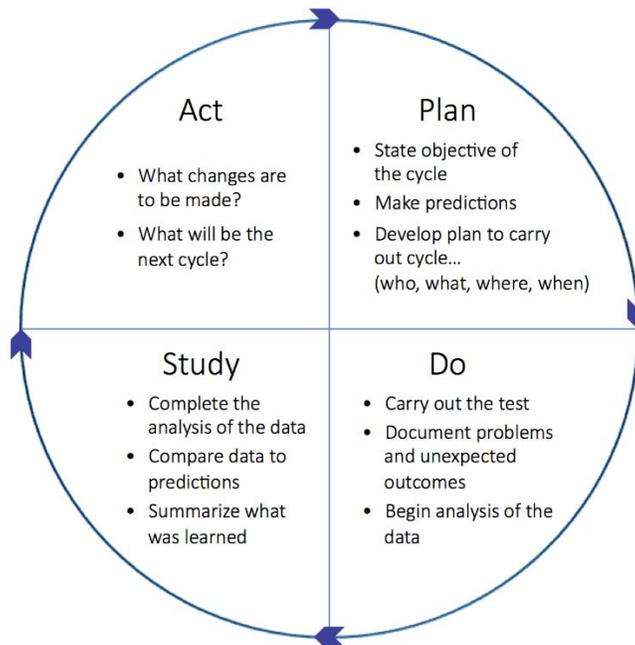
#### Step 3. Develop the solution

- Consider possible changes (interventions) we believe may yield improvement
- Organize changes according to importance and practicality
- Ideas for developing changes come from:
  - Literature
  - Guidelines
  - Normative documents
  - Improvement team brainstorming
  - Benchmarking
  - Knowledge management

Changes should be something that you have not done before, you can do tomorrow, that worked somewhere else, and that feel right. Changes should not be something that you've done before, low impact, or full of technical slow-downs.



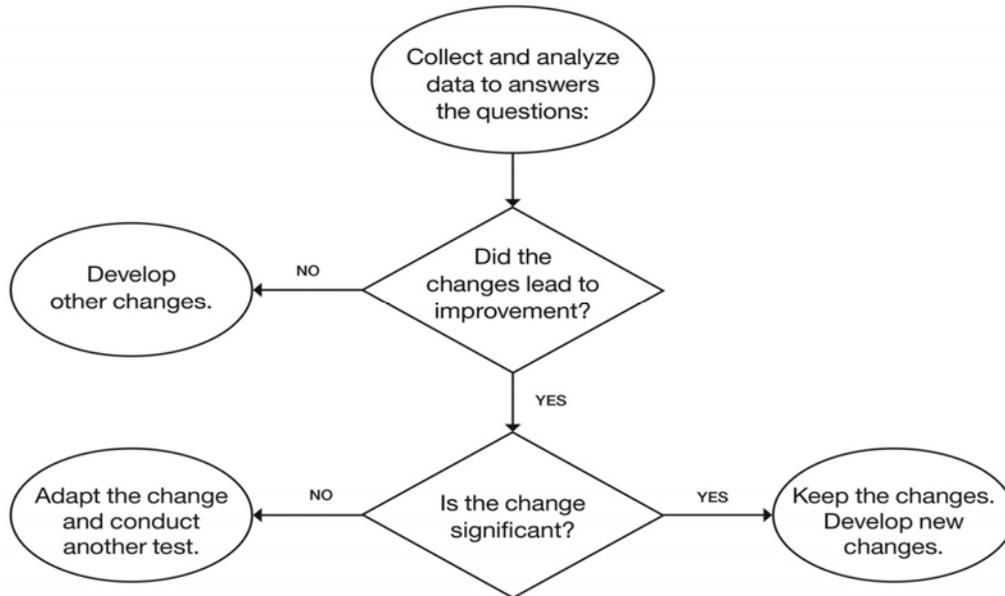
#### Plan-Do-Study-Act (PDSA) Cycle for Learning and Improvement



*What doesn't work, also teaches us.*

#### Step 4. Test and implement changes

- Perform analysis of tests of changes



#### Tips for testing a change

- ✓ Test BIG changes on an initially small scale, then ramp up
- ✓ Test individual changes separately when possible
- ✓ Negative results are an opportunity to learn
- ✓ Think about how conditions change over time (monthly, seasonal patterns, external variables)

#### Re-designing the patient flow process to include MUAC

The improvement team met to review the process of patient care and integration of nutritional assessment (MUAC) in it. They listed the different services that a client passes through when they come for HIV/ART services in this clinic.

1. Reception, registration
2. Health education
3. Taking of vitals e.g., weight, temperature, blood pressure
4. Clinician or nurse visit
5. Adherence counseling
6. Laboratory for tests
7. ART and other drug refills
8. Nutritional assessment (MUAC)

At some of these steps, a simple procedure is followed the same way every time (such as registration of the patient at reception), while at others, important decisions affecting the next steps must be made. The team then listed the type of action performed at each step and how it leads to the next one in the chain. The team knew that nutrition assessments are not routinely done in the clinic and that only those patients

who 'look' malnourished get some form of nutrition assessment. They want this to change so that all clients who are seen in the clinic are assessed as routine care. This will ensure that patients will not go unchecked for their nutritional status and that they will be provided the care they need.

### **What's next?**

Conducting only one change usually is not the end of an improvement activity. A PDSA cycle is never ending. This case study takes you through one change that was made by the team, however it is important to consider other changes the team might have implemented in order to achieve these results. In your own improvement project(s), remember to refer to the multiple ramps of change to achieve the desired aim. These changes should be tracked over time in order to observe the improvements that are made, or not, in a time-series chart. The results should be shared and discussed within the quality improvement team as well as with other quality improvement teams working to achieve the same aim, in another context. This sharing will facilitate learning across different contexts and can stimulate further ideas for testing changes. Building the culture for improvement will instill the will to constantly improve quality of care.



















## Testing a new change: Involve expert patients in MUAC at the registration desk



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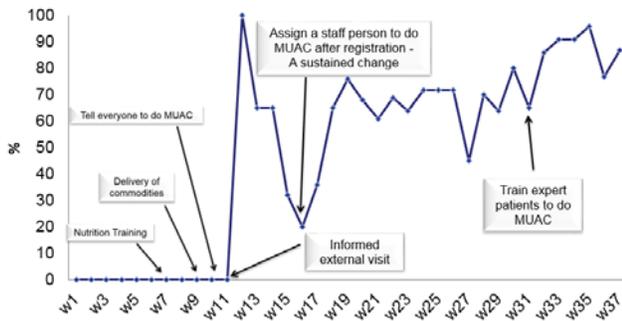
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## Percentage of clients whose nutritional status is assessed using mid-upper arm circumference (MUAC)



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## Question

What do you think happened here?

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## APPENDIX A

### Case Study Exercise, Part 1: Defining an Improvement Aim

Where will your change be implemented: (A) our HIV/ART clinic (a

location such as a town, clinic, or office)

What outcome are we trying to change: (B) improve nutritional status

(Should be a tangible result, such as a decrease or increase in something that matters in health care)

By what amount are we trying to change it: (C) 90%

(Should be a percentage or some other numerical value)

When do you expect to see this this result happen: (D) in 6 months

(An amount of time or by a certain date)

What will you do/use to achieve this result: (E) assess all clients using MUAC

(What intervention, method, tool, or resource will you employ to make the change?)

### Put together your responses to complete the aim statement for your improvement project:

In (A) our clinic, we will (B) improve the nutritional status for our clients

by (C) 90% within/by (D) 12 months

through (E) the use of MUAC

using/by/through (E) assessing all our clients using MUAC.

## Case Study Exercise, Part 2: Form the Improvement Team

Referring back to the aim statement you developed, consider the process that you want to improve. Think of those responsible for each step in that process. Think about whom else would be important to include on your improvement team, such as: management, practitioners, patients or groups representing patients, or other people involved in the system of care. A representative of each function should be on your improvement team.

*Who is involved in the process we are changing that needs to be part of the team?*

What part of the process / what role?	Who performs the function?
<ul style="list-style-type: none"> <li>• Getting the clients to the clinic</li> <li>• Reception, orientation, registration</li> <li>• Assessing nutritional status</li> <li>• Caring for malnourished clients</li> <li>• Prescribing therapeutic feeds</li> </ul>	<ul style="list-style-type: none"> <li>• Family member, community linkage team</li> <li>• Receptionist, nursing assistant</li> <li>• Nurses, clinicians</li> <li>• Doctors: Dr. Samson</li> </ul>

*Are there other stakeholders or contributors that are not directly involved in the process, but contribute to successful outcomes? Think about the wider system in which you work.*

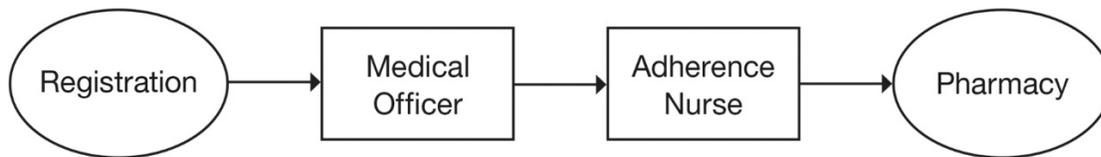
How does this process affect others?	Who are they?
<ul style="list-style-type: none"> <li>• Filing/Record-keeping</li> <li>• Dispensing ready-to-use therapeutic food</li> <li>• Linking clients from the community to the facility</li> </ul>	<ul style="list-style-type: none"> <li>• The data clerk</li> <li>• Dispenser or pharmacist</li> <li>• Patients</li> <li>• Community</li> </ul>

When you have filled in all of the individuals above, narrow down the group by circling those who are necessary to have involved. Of those remaining, will the team be able to function well and produce real effective change without them? Make sure all of the necessary people are included but that the team is not too large or too small to be able to function well. An ideal team size is 5 to 9 people.

### Case Study Exercise, Part 3: Understand the Current Process

The team decided to map the process by which HIV-positive patients are currently receiving care. After initial reception of the registration desk, the patient sees a medical officer who examines the patients and prescribes a treatment or other interventions, as necessary. The patient then proceeds to see an adherence nurse who discusses drug usage and other matters with the patient. Upon completion, the patient goes to the pharmacy where he picks up his treatment before leaving the health center.

The below flow chart illustrates the flow of the HIV-positive patients in the core process as it is described above.



## Case Study Exercise, Part 4: Developing Indicators

### Output / Outcome Indicator: Whether or not the change is making a real improvement

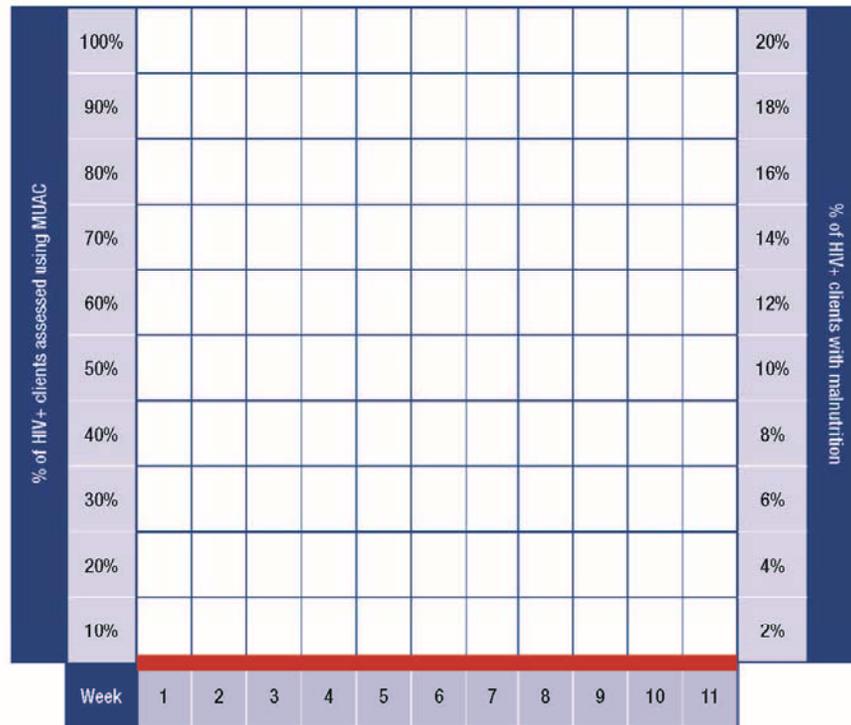
Indicator: Describe what you are measuring	The percentage of HIV-positive clients in the clinic who are assessed for nutritional status using MUAC and found to be malnourished
Numerator: The number of times your process succeeded	# of HIV-positive clients who are found to be malnourished clients (red and yellow MUAC)
Denominator: The total number of times you ran your process	# of HIV-positive clients assessed using MUAC
Source: Where you are getting your data from	Clients' care card/register
Responsible person: Individual who will ensure that the data is collected and maintained	Nurse, nursing assistant
Frequency: How often it will be collected	Clients' charts reviewed monthly

### Process Indicator: Whether or not your change is being implemented

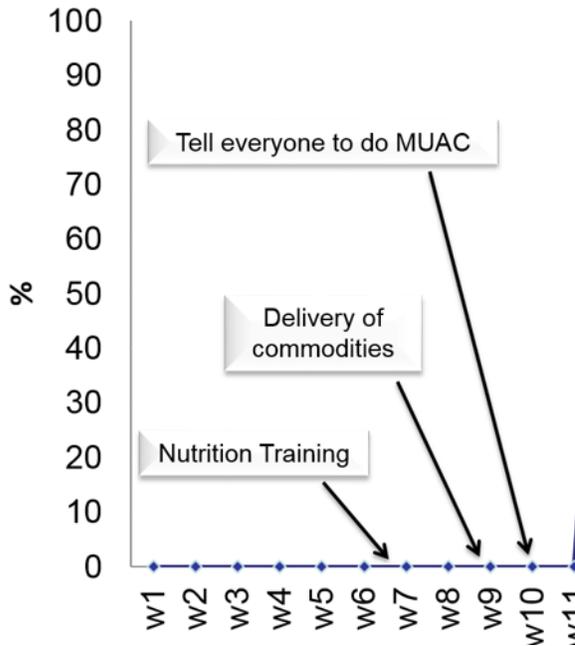
Indicator: Describe what you are measuring	% of HIV-positive clients assessed for malnutrition using MUAC
Numerator: The number of times your process succeeded	# of HIV-positive clients who had their nutritional status assessed using MUAC
Denominator: The total number of times you ran your process	# of HIV-positive clients seen in the clinic
Source: Where you are getting your data from	Client cards
Responsible person: Individual who will ensure that the data is collected and maintained	Nurses and data clerk
Frequency: How often it will be collected	Weekly

## Case Study Exercise, Part 5: Collecting and Plotting the Data

Percentage of clients whose nutritional status is assessed using mid-upper arm circumference. The red line shows that 0% of clients were assessed using mid-upper arm circumference for the first 11 weeks. This is because the facility had tested changes that did not actually have an effect on the number of patients that were assessed using MUAC.



		Week	1	2	3	4	5	6	7	8	9	10	11
Process indicator	Numerator: # of HIV-positive clients receiving MUAC assessment	0	0	0	0	0	0	0	0	0	0	0	0
	Denominator: # of HIV-positive clients seen in the clinic	851	757	635	961	833	841	735	697	655	749	843	
	Indicator: % of HIV-positive clients assessed using MUAC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outcome indicator	Numerator: # of HIV-positive clients with malnutrition	0	0	0	0	0	0	0	0	0	0	0	0
	Denominator: # of HIV-positive clients seen	851	757	635	961	833	841	735	967	655	749	843	
	Indicator: % of HIV-positive clients with malnutrition	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

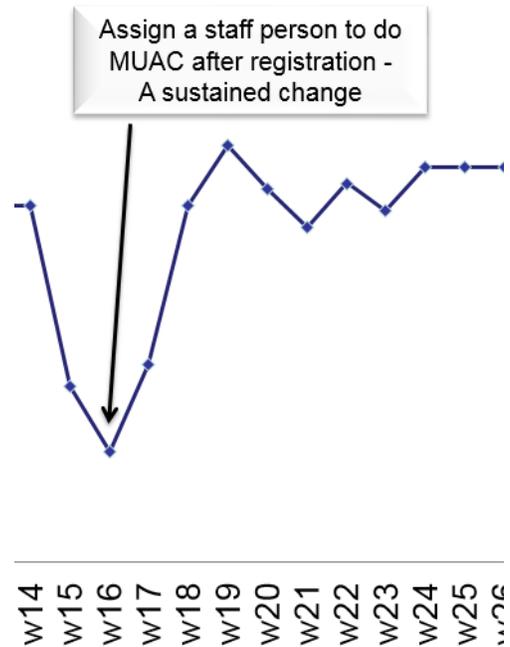


The first change occurred in week 7, implementing a nutritional training, did not have result in an increase in percentage of patients assessed. Staff knew how to measure nutritional status, so adding an additional training was not what was necessary.

The second change in week 8 was the delivery of commodities. This also did not result in an increase in percentage of patients' nutritional status measured.

In week 10, everyone was instructed to do MUAC. However this still resulted in no change.

Positive results were seen only when there was a change made that actually assisted with decreasing the burden of staff. No one had actually been assigned to do this work, so staff were unaware who should be conducting MUAC, only that it should be done. By assigning a person to do MUAC, the change was sustained.





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