This “Microsystems At A Glance” was initially developed by colleagues from Lucile Packard Children’s Hospital at Stanford University Medical Center in Palo Alto, California in an effort to provide the “big picture” and overview of microsystem development to new members engaging in the developmental journey.

The original document has been circulated around the USA and the world to those who are using the microsystem development curriculum, processes and tools to support their engagement in the journey. Feedback and revisions have been incorporated as the booklet has traveled. This booklet is a revised and updated version that offers an overview and quick summary of the various methods, tools and processes to help give the “big picture” and road map of the improvement journey.

The website, www.clinicalmicrosystem.org provides the foundation to the “Microsystems At A Glance”. You will find additional materials and resources to compliment the CliffNotes, including videos, worksheets, publications, stories and contacts.

You can find the electronic version of the “Microsystems At A Glance” at www.clinicalmicrosystem.org under Materials in two formats to print. A full page version and a booklet version you can assemble to create this booklet.

We would like to acknowledge the Dartmouth Clinical Microsystem Resource Group members who have actively engaged in revisions and utilization of the booklet.

Special acknowledgement to Coua Early, format and designer extraordinaire who has the magical “make lovely button” on her keyboard to transform all our scribbles and drafts.

As always we look forward to your stories and feedback on this tool.

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Muda: any activity without value.
**Brainstorming:** idea generating and sharing technique designed to develop quality changes.

**Change Concepts:** stimulants to develop and design detailed and specific tests of change.

**Control Charts:** data display over time that detect amount of variation in a process.

**Dartmouth Microsystem Improvement Ramp:** visual diagram of each step of quality improvement and microsystem development.

**External Mapping:** a map or visual diagram of all the systems and units that impact your own unit.

**Fishbone:** cause and effect diagram

**Flowchart:** pictorial diagram of the steps of any process.

**Gantt Chart:** a visual display that illustrates improvement schedule and timeline to keep improvement pace over 3-12 months.

**Generative Relationships:** a relationship between different groups that “generates” new and different processes which were not present in the separate groups.

**Global Aim:** overall goal of the quality improvement.

**Huddle:** mini staff meeting used to keep all staff aware of current happenings. May include current PDSA, expected admissions and unusual situations on the unit. Does not last more than 7 minutes and is conducted while standing.

**Ladder of Inference:** mental pathway of increasing abstraction, often leading to misguided beliefs.

**Mental Models:** images, assumptions, and stories we create and carry in our minds about ourselves, others, institutions, and every aspect of the world.

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**Introduction and Welcome**

The aim of “Microsystems At A Glance” is to introduce and attract new colleagues to the developmental journey of Microsystems toward transformation by providing an overview and quick introduction to the body of knowledge, various tools and processes to make it easier for you to join in how we are improving care and the workplace we work in. The transformation will result in your being able to “provide exceptional care AND continuously improve your care delivery system.”

It is with great enthusiasm that we welcome you to the Microsystem journey. Your input and participation in the process of making good things happen on your unit are invaluable. We all know that quick fixes don’t tend to last. Through Microsystem development and learning about the scientific approach to change, the “fix,” when it happens, tends to be much more long term. We want to work smarter, not harder. To make this happen, we need to apply methods and tools of the Microsystem developmental approach to quality improvement in health care. We can all think of things we do every day that seem like they could be done more efficiently. By looking at how we do things, and always keeping in focus that our goal is exceptional, safe patient care, we can find ways to work more effectively and efficiently. In the pages ahead you will get a brief outline of the methods and tools used to create positive change in your unit. In addition to this brief summary of methods and tools, we will pair you up with a team member that has already learned the process to serve as a mentor and guide.
Quality is Personal

Essentially, Microsystem development is learning to work together as an interdisciplinary group to change our workplace and result in better quality improvement and outcomes. We are looking to improve patient care and the workplace. One of the best ways to apply the methods and tools that we learn in Microsystem development is to try them on a personal project. Attempting to “improve” something in our lives on a personal level allows us to practice the tools and therefore gain a better personal understanding.

An example follows:

Clinical Microsystem Publications


The same is true with everything we do personally and at work. If we track the data, see trends, search how others do the work and then brainstorm to improve a process, we can make positive things happen. Remember if you can't measure something, you really can't improve it. We can improve our quality. Using the quality improvement methods and tools on a personal quest will help improve our confidence with the methods and tools. Effective Meeting Skills

For meetings to be productive, we follow a standard format that includes the following;

- Ground rules of the meeting
- Meeting roles
- A set timed agenda prepared ahead of time

By following a set plan for our meetings, time is spent more efficiently and everyone who attends has a similar expectation of the outcome.

Meeting Ground Rules Example

1. Be present and ready to begin on time (Arrive early to start on time)

Glossary

5 P's: Visual diagram that looks at the anatomy of your unique clinical microsystem. (Roberts Harry V, Sergesketter, Bernard F, Quality is Personal, The Free Press, NY, 1993.)

5 S's: A system for organizing the workplace and diminishing waste.

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Meeting Ground Rules Example

1. Be present and ready to begin on time (Arrive early to start on time)
No side conversations.

Cut off lengthy discussions and assign offline actions as necessary.

Assign a leader, facilitator, recorder, and time keeper at the beginning of each meeting.

Have and follow an agenda - add times for each agenda item.

If you oppose, you must propose.

Assign action items only to people present at the meeting.

Choose action item due dates with 80% confidence.

Strive for 100% on time, but provide advance warning if an action item will not be completed on time.

Use process check, “Is this what we want to be discussing right now: Should the subject be taken off line from here?”

If things get heated, focus on the situation or issue, not the person.

Respect for each other no matter how contentious the topic.

Meeting Roles

Go to: www.clinicalmicrosystem.org and click “Toolkits - Getting Started” to find the “Effective Meeting Skills in Action Video” and meeting cards to support the meeting roles.

**Leader:** Prepares agenda, moves agenda, elicits participation

**Recorder:** Visual record for the group, next action list

**Timekeeper:** Verbally announces amount of time remaining and when time is up

**Facilitator:** Helps to manage group process, balances participation, keeps group focused on objectives

Recent Publications

Batalden PB, Davidoff F, “What is “quality improvement” and how can it transform healthcare?,” Qual Saf Health Care 2007; 16; 2-3.


The agenda is an important part of your meeting. It should be out to the team members before the meeting. By setting the agenda, people are prepared for what work is expected to be accomplished. Specific tasks are listed and responsible persons noted. This way there is no question who to follow up with for action items. With the agenda, the first part of the meeting is to assign the roles listed for meetings. This helps you to stay on task before you get started. Jobs or participation are never assigned to absent team members because it doesn’t allow for discussion or true ownership of the task. If someone is unable to attend meetings, but is willing to take on a task, that should be announced to the team only if a firm commitment is made by the absent team member. Finally, every meeting should be evaluated for its effectiveness. This should happen the last few minutes of the meeting. Those scoring should be prepared to express what went well and what could be improved. Having an evaluation of the meeting helps develop open communication amongst the team and provides feedback on your meeting process.
Our friends and colleagues at the Institute for Healthcare Improvement have incredible resources and experiences from colleagues around the world to help support your improvement journey. www.ihi.org

### Books


### Publications

**The Joint Commission Journal of Quality Improvement Microsystems in Healthcare original 9 Part Series**


### Dartmouth Microsystem Improvement Ramp

**Assessment**

In the assessment phase of the ramp, you want to look at the strengths of your unit or Microsystem and identify what improvement opportunities exist. You may remember the large spread of categories that all staff was asked to vote on of things on your unit that worked well and things that were “broken” (5P assessment - Core and Supporting Processes Assessment Tool). This is part of the initial assessment of your unit. Essentially in this phase of the ramp we are “diagnosing” our unit problems and coming up with a “plan of care” that will provide a good outcome for our patients and our staff.

The 5 P’s Framework

The 5 P’s can be thought of as a structured diagram that provides a method to visually look into the anatomy of a clinical microsystem and to make assessments.

It makes your thinking and reasoning more visible to others.

It inquires into others’ thinking and reasoning.

Using the ladder of inference improves communication through thinking and reasoning.

The 5 P’s can be thought of as a structured diagram that provides a method to visually look into the anatomy of a clinical microsystem and to make assessments.

What is the benefit of the 5P framework?

It makes your thinking and reasoning more visible to others.

It inquires into others’ thinking and reasoning.

The 5 P’s can be thought of as a structured diagram that provides a method to visually look into the anatomy of a clinical microsystem and to make assessments.

Purpose:

To achieve the best possible outcomes for patients.

Patients:

Who form different subpopulations such as post-partum patients, newborns and antepartum patients.

Professionals:

RN’S, LVN’S, NS, USA’S, Physicians, Social Workers, Translators, Lab Technicians, etc.

Processes:

Accessing systems and needs, diagnosing problems, creating treatment plans and following up.

Patterns:

Patterns measure safety, functional status, risk, patient satisfaction and cost outcomes. Patterns of care, leadership, meetings to discuss care delivery, cultural and traditional patterns and symbols, values of the microsystem. As a whole they gauge the value of care.

The 5 P’s can be thought of as a structured diagram that provides a method to visually look into the anatomy of a clinical microsystem and to make assessments.

What are the 5 P’S?

The 5P’s are the components that give life to a clinical microsystem. Together they have a common goal or core purpose.

LADDER OF INFERENCE

(REFLECTION)

Actions I take:

Recommended

Conclusions I draw

“Interpretations” I make

Means I conclude

Data I select

Patterns I discern

Reference Guide

The following sources may be helpful to you. The Microsystem website has many resources and ideas and is constantly being updated.

www.clinicalmicrosystem.org

The Assess, Diagnose and Treat Workbooks which can be found at www.clinicalmicrosystem.org provide guidance to the 5P assessment.

Click Materials for more information.
Ladder of Inference

The Ladder of Inference is a mental pathway of increasing abstraction, often leading to misguided beliefs. It demonstrates how quickly we make assumptions and come to conclusions with no rationale thought process. It is like rapidly climbing up a ladder in our minds. Some individuals have difficulty hearing what others are saying. Instead they hear what they expect others to say, have little tolerance for multiple interpretations and can only see their own interpretation. Such individuals spend hours arguing their ideas.


Background - The 5 P's

- Patients – 5400 deliveries in fiscal year 2007
- 40 postpartum beds and 12 antepartum beds
- Occupancy rate from 89% - 102%
- Common diagnosis – postpartum vaginal delivery, postpartum c-section delivery; for antepartum PTL, PPROM and PIH
- Average age of patient – 32 to 37 years
- Average length of stay – 3.3 days
- Professionals
  - Physicians – 78 OBs and 406 Peds
  - Residents – 16 OBs and 66 Peds
  - RNs – 104; RN Travelers 15; LVNs 1; CNAs 16
  - USAs - 14; Birth Recorders - 3

Theme

When choosing a theme, you want to look at what you learned during the assessment phase. From that you want to build on what makes your staff and patients happy, and look at what staff and patients find impossible to live with. By looking at these items, you should be able...
to formulate a theme. You can’t come up with the next step, a global aim, without having a theme from which to work. You will usually find many themes to improve, but pick one that will make the biggest difference in the shortest amount of time to begin with. The improvement journey is continuous - there will future time for all the themes!

Reason to work together relates to whether the two units or parties have a reason to work together. There has to be some benefit for both parties aligned with the improvement. If the two parties or groups don’t see value in working together, or if they view one another as adversaries, then it is highly unlikely that the two parties will co-create positive change together. They are below the level of consciousness and are not aware of one another’s existence.

Global Aim

The global aim is based on your major theme for Microsystem improvements. The global aim is the big picture of where you want to go and the specific aim statement is essentially the theme’s improvement journey or is continuous - there will future time for all the themes! The global aim is the picture of where you want to go and work towards achieving specific numeric goals. The aim should be clear and specific, or else you will never achieve the desired change.

We aim to improve the communication process in maternity. The Global Aim Statement is below:

Mental Models

Global Aim Statement

Mental Models are images, assumptions and stories we create and carry in our minds about ourselves, others, institutions and every aspect of the world around us. Mental models determine how we make sense of the world and often influence our actions. Mental models explain why two people can observe the same event and describe it differently - they observe different details. Mental models must be brought to the surface of our awareness and are often untested. Mental models can be created through our experiences and are often invisible.

We aim to improve the communication process in maternity. The process begins with specific patient care needs and those who provide services. The process ends when patient needs are met. By separating actions and separating together work, we expect to see our patients and staff scores improve, interdepartmental relationships improve and our working as a team improve.

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**Generative Relationship STAR Model**

The star model is a visual diagram of the generative relationship between people and or unit services. There are two parts to the generative relationship. One is that the relationship produces something that the individual members could not have produced alone. The second is that the value of the new procedure or service is created by the interaction between the parties. Relationships can be contentious, distant, routine, competitive or generative. The generative relationship is what we strive for in complex systems as they create the greatest potential for creativity and innovation. In the star map, we look at separateness, tuning (which translates to the talking and listening.), action, and reason to work together. As you read through the parts of the star, try selecting a group or different unit that you might apply the idea of the four arms of the star.

For example, what is the STAR model as it relates to you or your unit’s relationship with another unit or service, L&D and F1/F2, or F1/F2 and pharmacy?

Separateness also refers to differences. All parties involved in the relationship need to have skills, backgrounds, and perspectives that are different. If these components are similar, you may be able to have heated conversations and debates, but you will unlikely be challenged and changed. The differences allow for different perspectives and therefore new solutions. Often including patients or family members in the group will help increase the separateness and increase the generative outcomes.

Tuning is related to the need to not only talk but also to listen to one another. There needs to be opportunity for the two parties or groups to challenge things that don’t appear to be working. There can’t be a “sacred cow” as it may be the very thing that changing could promote a better relationship. We need to be open to all input.

Action is essential to the star. Let’s face it, talk is cheap. If you don’t put any action behind the discussion, you haven’t accomplished anything. The parties need to be able to get together to create something.

**Process Mapping**

With the global aim now written, process mapping is the next step. Process mapping simply stated is a diagram of the process you wish to improve. Gathering the information to create the process map will give your improvement a better chance to succeed.

In coming up with a global aim and process mapping, it is often helpful to use one of the tools of our Microsystem called a flowchart. A flowchart is basically a picture of the steps in a process in the order they occur. Using different symbols, a visual diagram of the process can be created. These same diagrams can be used to plan a project, describe a process or document a standardized way of doing things. The flowchart is meant to show the process as it CURRENTLY exists. When the process improvement is completed, the flowchart may be used in the playbook to show the process. See the symbol key to identify the meaning of each symbol in the chart.

**Flow Chart Key**

- **Process beginning or end**
- **Activity Step**
- **Decision Points**
- **Waits and Delays**
- **Things you don’t know**
- **Connector, such as off page**
- **Process flow direction**
Benefits of the 5 S's

- An organized efficient workplace for improved productivity.
- A cleaner workplace for improved safety.
- Reduction in costs and inventory.
- Gaining valuable floor space.
- Contributes to how we feel about our institution and work environment.
- Provides an inviting and pleasing environment at all times.
- An organized efficient workplace for improved productivity.
- Provides a visual display of the systems that affect your specific patient population. The map provides a tool to look at which systems within your department and outside of your department impact our patients. The map provides a tool to look at which systems within your department and outside of your department impact your patients.

Specific Aim

The specific aim is focused and to the point. It is where you want to get with your improvement, the finish line so to speak. It includes measurable outcomes that are clear. These outcomes help maintain the information and focus. Also included in a specific aim is the target date for completion.

External Mapping

External mapping is a visual display of the systems that affect your specific patient population. The map provides a tool to look at which systems within your department and outside of your department impact your patients.

www.clinicalmicrosystem.org

Click Materials to find the 5 S assessment tool.

Flow Chart Example
**Waste and the 5 S’s**

Waste is anything other than the minimum amount of equipment, materials, space and worker’s time which are essential to add value to the product of service. Waste is a symptom, not a cause, of a problem.

**The 5 S’s**

**SORT**

Sort through items, keep only what is needed, and dispose of what is not.

**STRAIGHTEN**

Orderliness.

**SHINE**

Cleanliness. The cleaning process allows us to inspect and expose abnormal or failure conditions that affect quality.

**STANDARDIZE**

Create rules to monitor first 3 S’s.

**SUSTAIN**

Self discipline. Maintaining a stabilized work place is an ongoing process.

In setting a specific aim, the use of a tool called the fishbone is helpful. The fishbone is a way of diagramming the cause and effect relationship(s). The fishbone can stimulate the formation of impressions that would be worth doing a PDSA cycle on (PDSA - Plan, Do, Study, and Act). The fishbone, by its design, encourages looking at problems on a deeper level. By paring things down and looking deeper, more potential solutions may become apparent. From the main bones of the fish, you look at categories of causes, for example, equipment, people, materials, and process. From the smaller bones of the fish, you gather the contributing factors.

So for example, let’s say you are looking at the process of exercising. The things that might prevent you from exercising could be lack of equipment, no partner to exercise with, or you may not have proper materials or instruction. By using a fishbone, you could visually identify where the problems were and start addressing them in the PDSA cycles.

**Fishbone Diagram Example**
S-STDY phase with measures that tell you that the process is being done consistently.

Fishbone Diagram

A-ACT phase to ask "are the standardized processes occurring all the time?" Reflect on what changes need to occur and be tested.

Result

Driver

1. Desired Result, 2. Major categories of potential "drivers", 3. Specific potential "drivers"

Here is an example of a Fishbone of causes for lengthy appointments in an ambulatory practice.

The PDSA and SDSA have a back and forth relationship. Continuous review and evaluation will tell you if the best practice is in place and effective. If you need to move back to PDSA, stop and reevaluate with staff in your microsystem and return. Changes need to occur and be tested.

The Microsystem Playbook

The right decision every time.

See www.clinicalmicrosystem.org/Toolkits to find more on the Playbook:}

(Playbook)
Change Ideas

Change ideas are the list from which you will generate your actual changes. By using, benchmarking and brainstorming, you can formulate your actual change for a PDSA cycle. By formulating change ideas you can identify what tests you will need to do for your PDSA cycles.

**Benchmarking** looks at how other places do the same or similar process. It’s a way of looking for the best of the best or best practice. Why re-invent a process when another hospital or company is already successful with a similar process? By drawing on their experience, time and money can be saved. The company or hospital you choose to do benchmarking with now also becomes a resource for questions and problems with process when you bring it to your unit or hospital. Sometimes when benchmarking a process, new ideas of change around that process can be generated and adapted to your own unique setting. It can truly be a win/win endeavor.

**Brainstorming** is meant to generate lots of ideas for change within the framework of your specific aim. Benchmarking helps you to build knowledge of potential change ideas. All members of the team are invited to add ideas to the list. In a brainstorming session, you want to first review the topic you are discussing. Make sure everyone understands the topic and its relationship to the specific aim. Allow a couple of minutes of silent thinking before proceeding with the actual brainstorming. Encourage everyone in the group, regardless of their role in the group, to throw out ideas no matter how crazy. During the brainstorming period, there is to be no discussion and no criticism of any idea submitted. The ideas should be written on a flipchart or board so all members of the team can see and read them. Now that you have this big list, discuss the ideas and make sure they are clear to the team. Have team members prioritize, in their heads or on paper the top 1/3 of the total ideas from the list. It is useful to use “selection criteria” to help choose the top ideas. The selection criteria is usually easy to do, doesn’t cost any money, could be started on Monday, and will have the biggest impact on improving patient care and staff workplace.

What are we trying to accomplish?
How will we know that a change is an improvement?
What changes can we make that will result in an improvement?

Once the desired specific aim is achieved the SDSA (Standardize-Do-Study-Act) is used to standardize the process until the time comes to make new improvements.

SDSA is the other half of making improvement that has staying power.

**S-STANDARDIZE** phase the process is integrated into daily work.

**D-DO** phase is what is being done to ensure the new standardize process is being maintained.
You now need to begin to narrow the list of ideas. This can be done by using the technique of multi-voting. This process allows members of the team to vote for their top 1/3 of the total choices, then, a second voting is done by selecting the ideas that had the most votes. This then shortens the list further by a second round of voting so that you come up with one or two ideas to work on as a group.

**Run Chart Example**

**Measures**

Measures are what you might expect. They are the way in which we measure or evaluate the change implemented. You will see in the PDSA cycle that measures or evaluation is figured into the process.

1. They can be used to detect problems to check if Microsystems are performing at the expected level or determine if changes are being made, and to unveil causes influencing the process.
2. They provide a picture of how a process is performing.
3. They are easy to make and interpret.

**Reasons Why Run Charts Are Used**

Run charts are a graphical display that allows a team to measure a process for trends or patterns over a specific period of time. A run chart is a graphical display that allows a team to measure a process.

**Run Chart**

They are easy to make and interpret.

- **P-PLAN** phase you describe and plan the objective and the specific change to be tested along with design details.
- **D-DO** phase the pilot test is carried out based on the preparations in the planning step.
- **S-STUDY** phase is the study period of time used to analyze the data and how the pilot test went.
- **A-ACT** phase team decides whether or not the idea being tested should be modified or abandoned based on the results and how the pilot test went.

**Reasons for Using Run Charts**

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- They can be used to detect problems to check if Microsystems are performing at the expected level or determine if changes are being made, and to unveil causes influencing the process.
- They provide a picture of how a process is performing.
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**PDSA**

- **P-PLAN** phase you describe and plan the objective and the specific change to be tested along with design details.
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