

Association of Program Directors in Internal Medicine Fall Meeting April 2007

Teaching Residents How to Design and Implement Performance Improvement Interventions in their Continuity Clinics.

Workshop Leaders: Ursula Whalen, MD, Associate Program Director, Emory University, Shelly-Ann Fluker, MD, Clinic Conference Co-Director, Emory University; and Jason S. Schneider, MD, Associate Clinic Director, Resident Continuity Clinic, Emory University, Joyce P. Doyle, MD, Residency Program Director and Vice Chair for Education, Emory University,.

Workshop Description

Teaching performance improvement (PI) is a new challenge facing medical educators. While teaching residents PI techniques and the approach to practice based learning and improvement, we developed a clinic-based longitudinal program to teach a systems-based approach to improving nutrition and exercise counseling among hypertensive patients. This workshop will outline our PI curriculum and methods used to facilitate development of resident-led interventions. We will outline a toolkit for educating residents about the principles of performance improvement in addition to discuss approaches to measure project outcomes such as resident knowledge and skills, chart abstraction, and patient surveys.

Objective 1: We will provide attendees with a toolkit for educating residents about principles of performance improvement, including use of the Deming wheel, cause and effect diagrams, flow charting, and data measurement and tracking.

Objective 2: We will share experiences, including lessons learned, in how to get resident buy-in and interest in performance improvement.

Objective 3: We will provide a practical framework and approach to facilitating resident-led performance improvement projects from project development to implementation and outcomes measurement.

Description of Curriculum:

Beginning October 2006, 150 Emory Internal Medicine residents participated in a Performance Improvement (PI) core curriculum in their primary care clinic. They applied PI techniques with the goal of improving compliance with national guidelines that recommend nutrition and exercise counseling in all hypertensive patients.²

A 10-session PI core curriculum was integrated between October 2006 and June 2007 into a weekly clinic conference for 150 residents. The residents were divided into 12 teams based on clinic day and location. The Plan, Do, Check Act (PDCA) cycle was the model for continuous process improvement utilized. During the planning phase, baseline

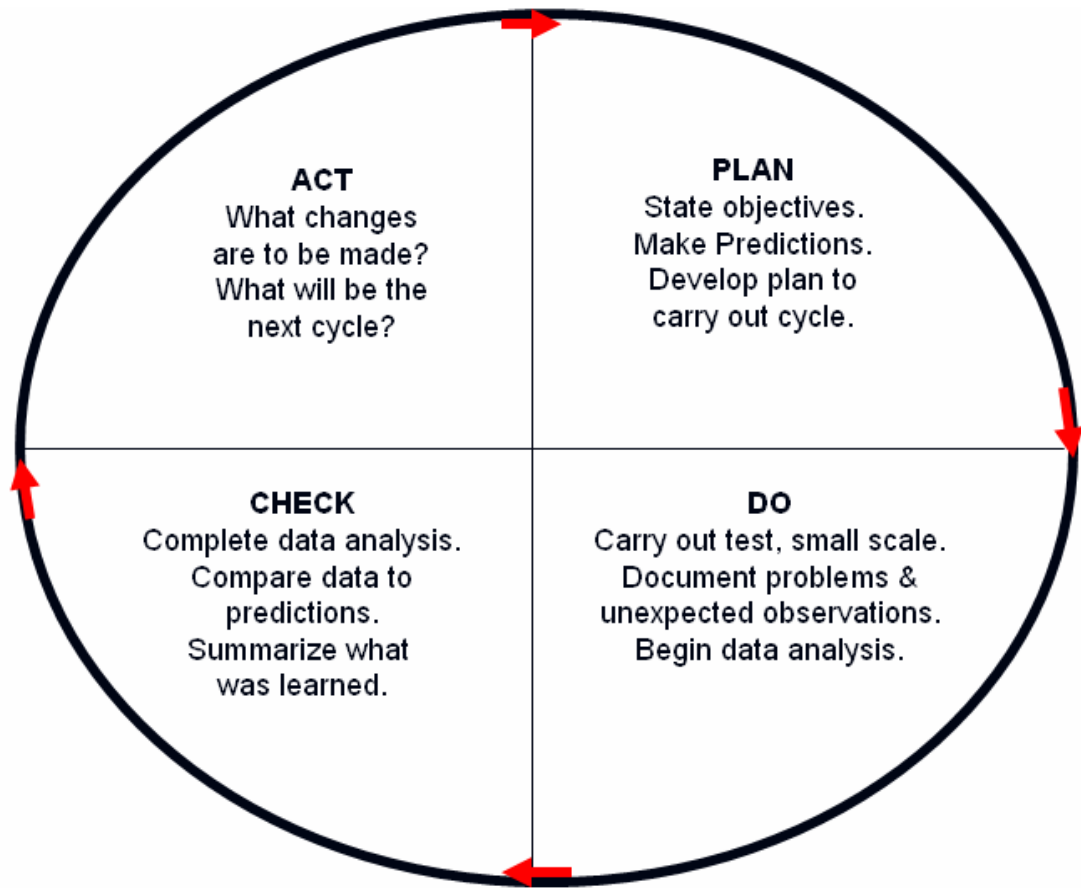
resident counseling rates for nutrition and exercise in patients with HTN were estimated by abstracting 15-20 randomly selected charts from 1 week per month from April to September 2006. Curriculum sessions included:

Session 1	Basics of Performance Improvement
Session 2	Identification of Barriers to Counseling: Fishbone Analysis
Session 3	Understanding Clinic Operations by Outlining a Flow Diagram
Session 4	Review of Baseline Data and Understanding Variability
Session 5	Journal Club to review EBM Guidelines
Sessions 6-7	Developing Interventions targeting barriers identified fishbone and opportunities for change in flow analysis
Sessions 8-9	Team Meetings: Piloting Interventions
Session 10	Group Presentation: Check Phase of Pilot Results

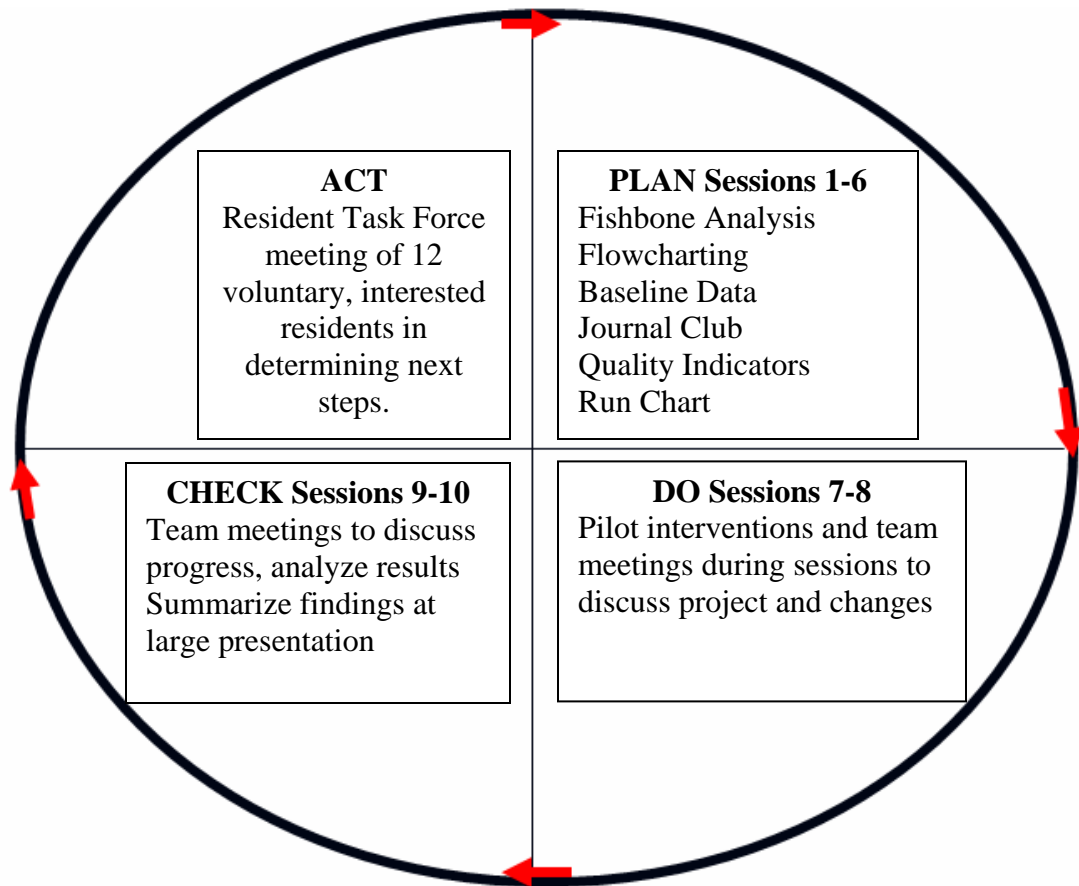
Recommended Toolkit for Developing Performance Improvement Curriculum

1. **Demming Wheel as methodology for Performance Improvement, PDCA (Plan Do Check Act).** PDCA cycle used as basis for curriculum and project development.¹

¹ Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. San Francisco, California, USA: Jossey-Bass Publishers; 1996



Outline of curriculum within PDCA format.

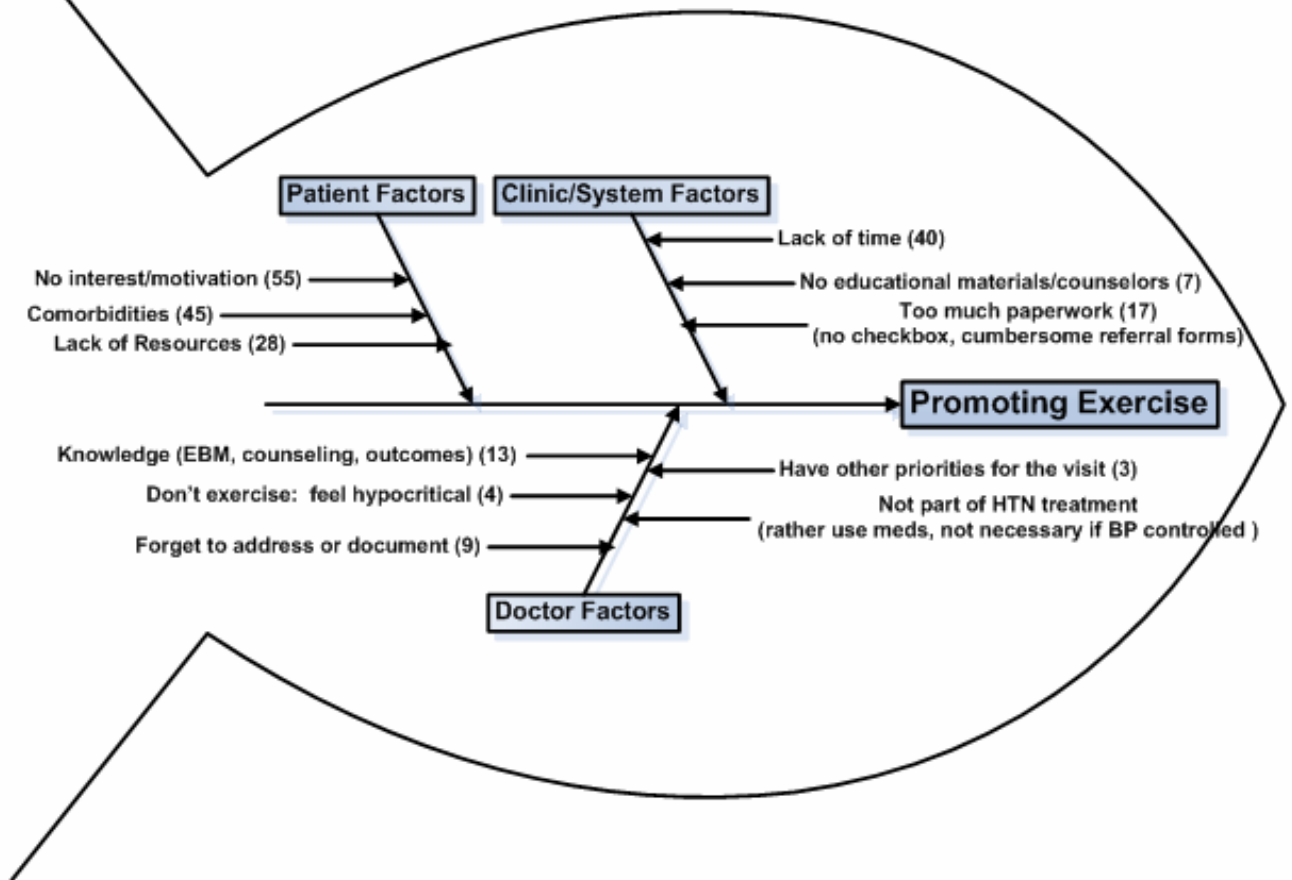


2. Fishbone Analysis:

Fishbone or Cause/Effect Diagram helps visually display the potential causes for a specific problem or effect. Fishbone residents created in PIP session 2:

- When utilizing a team approach to problem solving, there are many opinions as to the problem's root cause.
- A cause and effect diagram (also called a fishbone diagram) helps capture different ideas and stimulate the team's brainstorming on root causes.
- To create the fishbone analysis during a session, we adopted a method recommended by Dr. Doris Quinn, GME office at Vanderbilt University. Gave each resident a stack of 20-30 small square post-it notes. Resident instructed to list as many barriers to promoting exercise as they could in 10 minutes in silence. Residents then asked to spend next 10 minutes in silence walking around the table and grouping the post-it notes into categories. As a group, the fishbone analysis was made on large white paper and post it notes taped to appropriate categories.

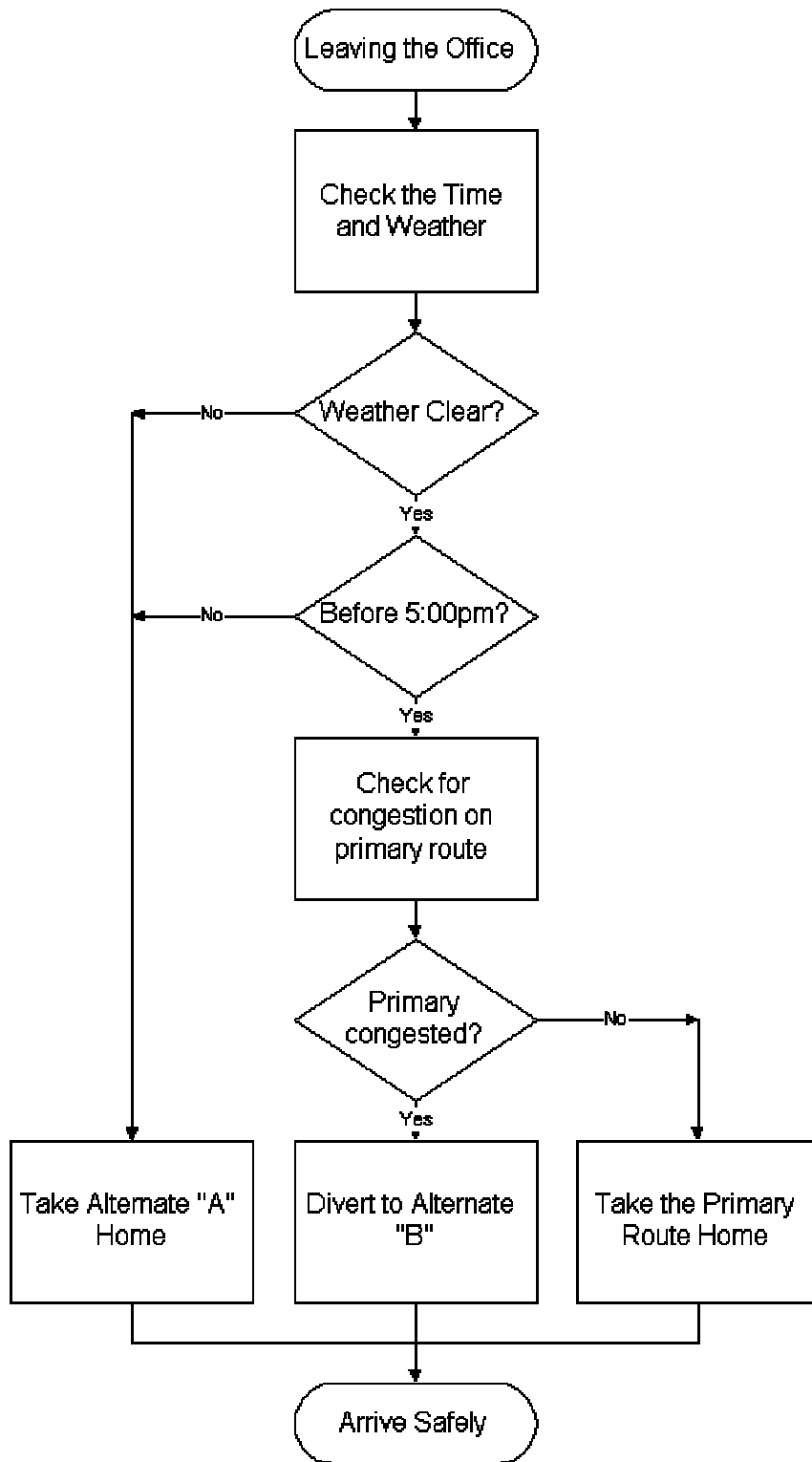
Session 2 Summary: Reasons for not assessing and counseling (and documenting) on exercise in pts with HTN



3. **Flowcharting:** understanding clinic operations by outlining a flow diagram
 - A flowchart illustrates steps in a process. A flowchart can quickly help quickly bottlenecks or inefficiencies.
 - **Flowchart symbols basics:** circles represent start and end points, diamonds represent decision points/tree, boxes represent steps in a process.
 - **Ex Flow Chart- Finding the best way home**

This is a simple case of processes and decisions in finding the best route home at the end of the working day.

The Best Way Home

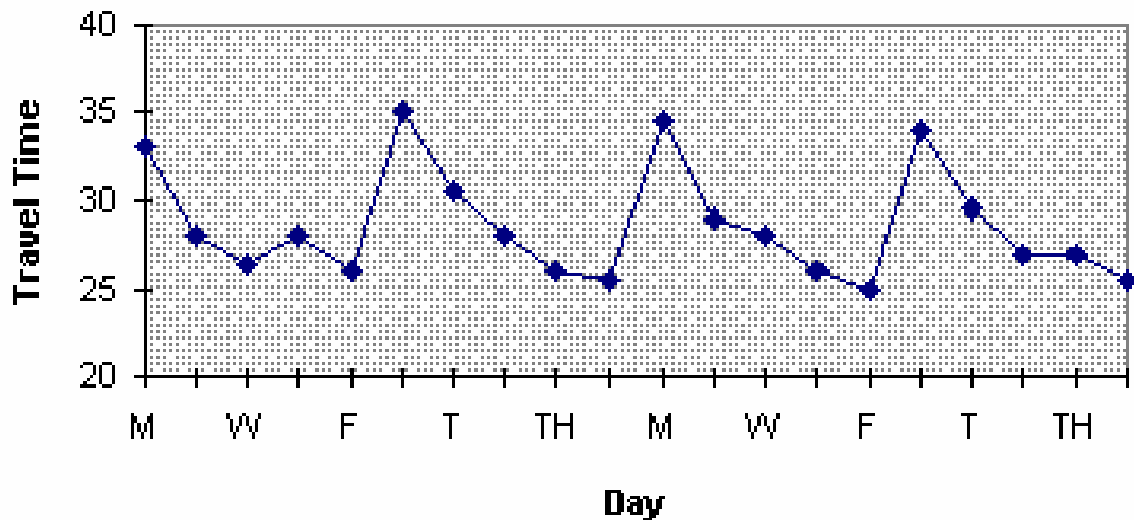


3. Action Plan Worksheets. Used at the end of each team session for residents to track planning and pilot progress as well as data collected and assignments. Information documented on the Action Plan Worksheet included the following:
 - a) **What did you accomplish since last session? Pilot problems/successes:**
 - b) **How will we know that change is an improvement?**
 - c) **What changes can we make that will result in an improvement? (Revised PilotPlan)**
 - d) **Document next steps and who is responsible for them:**

4. Run Chart: The crux of performance improvement is evaluating a process by tracking data over time.

Run charts originated from control charts, which were initially designed by Walter Shewhart. Walter Shewhart was a statistician at Bell Telephone Laboratories in New York. Shewhart developed a system for bringing processes into statistical control by developing ideas which would allow for a system to be controlled using control charts. Run charts evolved from the development of these control charts, but run charts focus more on time patterns while a control chart focuses more on acceptable limits of the process. Shewhart's discoveries are the basis of what is known as Statistical Quality Control.

Run Chart/Time Plots



5. Understanding Variation:

Two kinds of Variation:

- a. Random variation
 - i. Similar to variation that has occurred in the past
 - ii. Does *not* indicate that change has occurred
- b. Variation due to change

Q: How do you tell the difference between random variation and variation due to change? Plot data over time

6. Control Charts.

A control chart is a tool used in quality control, as originally developed by Walter A. Shewhart at Western Electric in 1924 to improve the quality of telephones.

Creating a control chart enables you to assess:

- a. Stability of the process
- b. Determine whether variation is random or due to change.

The type of control chart you use depends on:

- c. Type of data
- d. Sample size

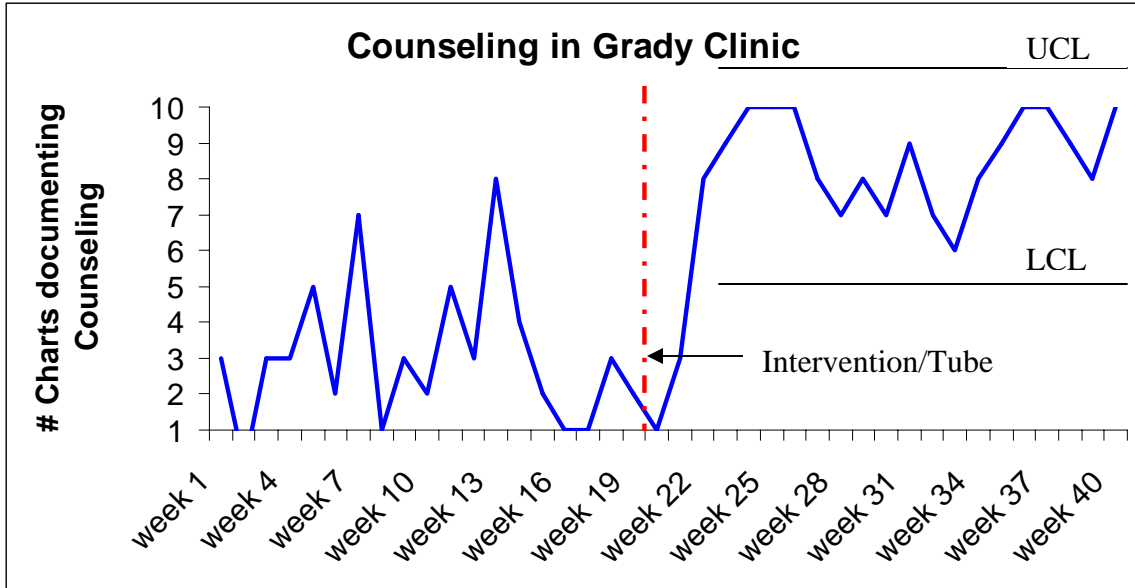
The Xbar Chart is an example of a control chart.

- e. represents the line of central tendency which is the sample average

To teach control charts, we tracked data in excel with a gumball exercise as follows:

Establish baseline counseling rates by plotting data from 20 weeks

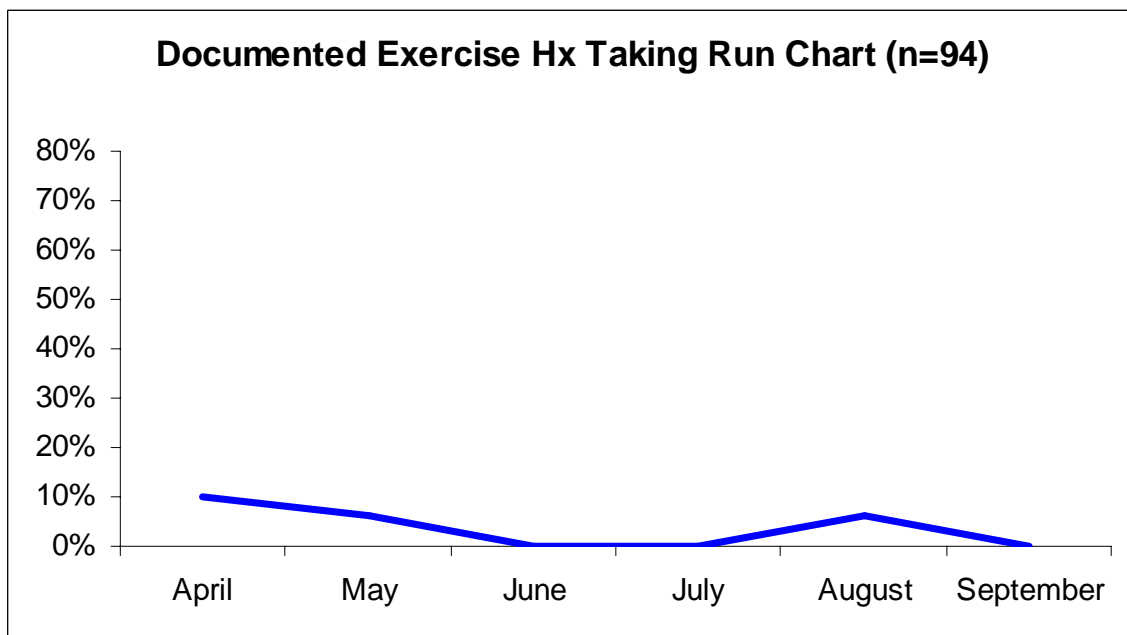
- Select 20 residents
- Each of these residents is given an index card with a number (1-20) which will represent the week of data collection.
- Each resident is given 10 gumballs.
- Each gumball represents a randomly selected patient chart from a visit that week.
- Each resident will throw all 10 gumballs at once from behind the drawn line and try to get them in the bucket.
- # Gumballs in the bucket represents # of charts documenting counseling. This number is recorded on the index card.
- Give the index card for data entry into excel
- Exercise repeated at week 21 and resident given a tube (intervention) to facilitate gumball delivery into buckets.



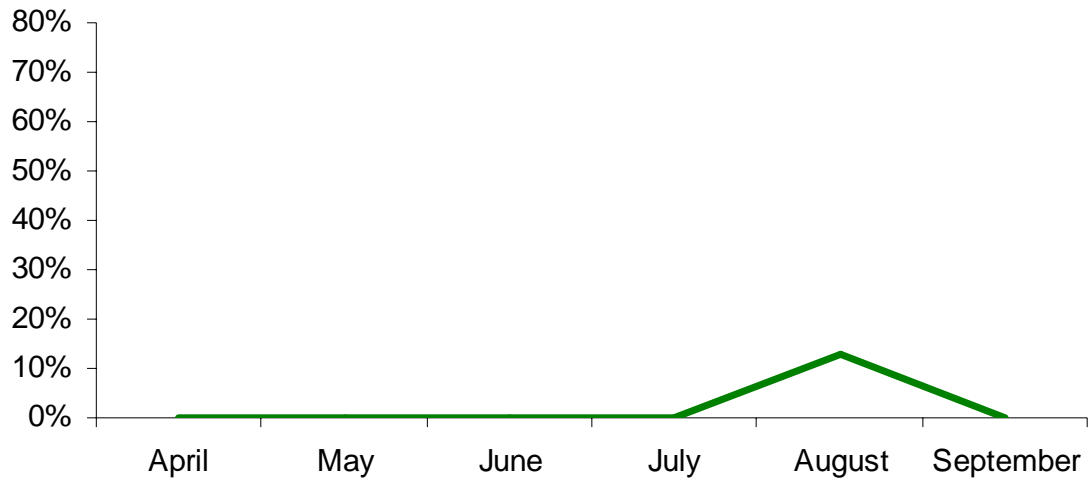
- Upper Control Limit (UCL)= average (of week 21-40)+1.96*standard deviation
- Lower Control Limit(LCL)=average(of week 21-40)-1.96*standard deviation
- If change occurs within those control limits, it is random variation.
- If change occurs outside those limits, it is due to change that needs investigating.

7. Baseline Data Collected from Charts:

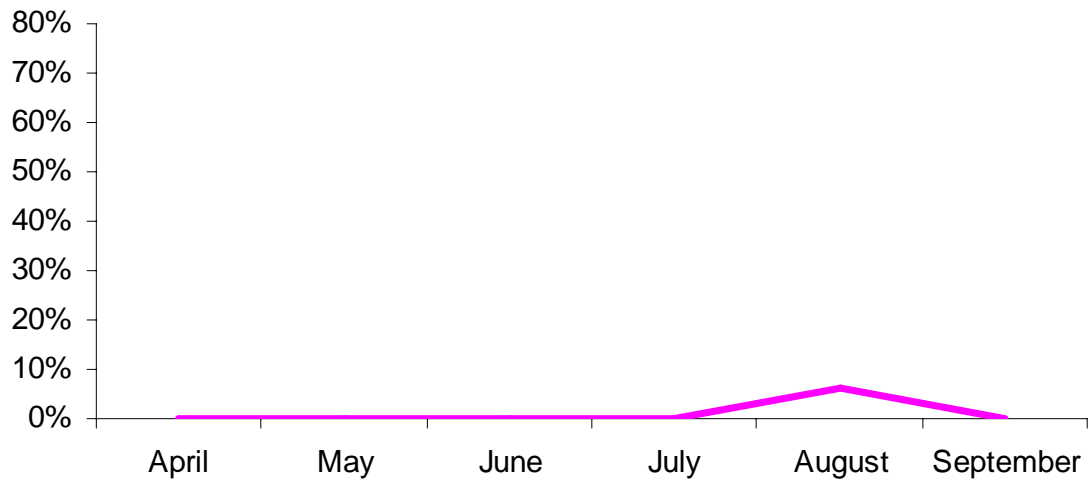
- 15-20 charts from 1 week/month (April-Sept)
- Randomly selected from green, orange, purple am and pm clinics
- Total of 103 charts: 6 excluded because not resident charts
3 charts were excluded due to illegibility
- Data abstracted from 94 charts
- Percentage of documented exercise counseling, history taking, or referrals calculated per week



Documented Exercise Counseling Run Chart (n=94)



Documented Exercise Referrals Run Chart (n=94)



Lessons Learned –

a. Things that worked.

1. Continuity of Ambulatory setting
2. Having a team of faculty learning and working together helped in facilitating the conference but also helped hone each of the sessions (since shared effort) and improved teaching skills
3. Final Presentation: this forced residents to put their data together and reflect on its significance as well as get the big picture of what everyone had done.
4. Creating a task force of leaders in performance improvement – this group meets with the performance improvement faculty to discuss curriculum and issues and assists in teaching the concepts they learned the previous year.
5. Letting residents develop their own projects as a means of learning

b. Things to improve:

1. More resident input into picking a project - could promote more buy in
2. Greater focus on team dynamics;
 - Team size and composition – our teams combined 6-10 residents from morning and afternoon clinics. Within clinics, residents knew each other well, but not as well from different clinics. Having small (more familiar?) teams is better, more accountability.
 - Defining the roles and responsibilities of team members for each session: (team leader, facilitator, recorder) and developing resident leadership skills as part of the curriculum to ensure that team work is better divided as most projects were completed by 1-3 team members entirely.
 - Maintaining team accountability – Residents had a hard time pulling data together at the end of year for the presentation. They were given Action Plan Worksheets to document plans and progress, etc. that were passed in but in the end, they didn't document the information we needed and the faculty facilitators did not have that information either.
3. Better assessing resident knowledge/learning: our large pre-test and post-test at beginning end and end of year did not provide us with a real time assessment of what points we were or were not teaching effectively. For this year, we will supplement with 1-2 pre-conference questions and 1-2 post-conference questions (distributed at the next session) to assess whether we attained our teaching objectives.
7. Data measurement: make as simple as possible.
8. Move end of the year Resident Performance Improvement Presentation to Department of Medicine Grand Rounds (**Note: The end of the yr presentation was better attended than our poorly attended Gr Rds-now we will have telecasting!)