QI Primer for Nephrology Residents

Why QI?

Understanding principles and methods of quality improvement is a skill set that will serve you well throughout your career. Enhancing efficiency whether at the level of your own clinical practice or on a larger scale, the health system you work in has potential to improve job satisfaction, interdisciplinary relations, and most importantly, the safety of the patients we look after.
Additional benefits to consider:

- QI is a convenient and practical way to gain research experience. Even if you're undecided on an academic vs clinical career path, QI projects have benefits for both.
- A QI project that aligns with health system objectives/needs (eg. NARP) improves the quality of care for the patients we look after every day
- And with both these points in mind, completing a QI project looks great on a resume, especially if published or presented at a meeting
- And following this logic further, a poster or presentation is a likely consequence of a well-constructed QI proposal

Getting started

QI models

There are a number of ways to structure a QI initiative. Remember that these models were originally designed for businesses to improve efficiency and only later translated to health care (there's many parallels when you think about it). You'll notice a lot of the terminology has a business-like tone for this reason.
Common models include: DMAIC, Six Sigma, LEAN, PDSA. An article I've circulated, as well as Dr Pannu's introductory lecture summarizes the principles of these. Which model we choose doesn't matter that much- they all essentially get us to the same goal. We'll discuss the DMAIC model here- I like this model as it has a defined sequence and flow.

DMAIC stands for:

Define: what is the problem that needs to be addressed ("the problem statement") and who is affected by it, and any subsequent changes made ("the stakeholders").

Measure: how big a problem is this? What is the scope? ("hierarchy of outcomes" helps us define magnitude of both the problem and subsequent **i**mprovements.

Analyze: what are the roots of the problem ("root cause analysis"). From the business model, in what way is out current model of care inefficient, dangerous or "wasteful"? Thinking about these help determine places to potentially intervene in the next step. Again, the stakeholder input is going to be key here- talking to the right people in allied health, management and the patients themselves gets you multiple perspectives on problems we don't always appreciate as physicians.

Improve: what are potential solutions to these root causes of the problem? We need to be creative here. Here again, stakeholders may help- the people that raised the problem may well have an opinion on how things need to be fixed. There will be multiple roots, and each may have multiple potential solutions, so you have to prioritize here. In business this is called an effort-yield analysis. Which solution has the best combination of low effort, high yield, high sustainability. This might sound challenging, but it actually just common sense really. We've got limited time, limited budget so which solution is going to work best for us? Once an intervention is chosen, it's implemented as a test, using something called a PDSA cycle.

Control: don't quite know why control is the word picked for this step, but this really refers to thinking about how to implement and sustain the solution identified above. It will be beyond the focus of a QI rotation, but obviously pivotal and definitely worth considering before proposing an intervention.

Consider these elements as steps, a sequence, in performing a QI analysis. In the scope of a two week rotation we'll focus on defining a problem, identifying and talking to key stakeholders and suggesting a possible intervention.

Step 1: define the problem.

Think about an issue with patient care you've encountered. This will always make the work that follows more relevant and important to you. It can stem from an individual patient encounter, discussions with nurses, administrators, colleagues at rounds. Think about an adverse outcome, or something that frustrates health workers or patients. Or alternatively, NARP has organized lists of potential quality improvement markers, "benchmarks" or standardized measurable from it's various departments that tell us we're reaching a certain standard of care.

Defining the problem actually consists of two main steps:

1. state the problem. This sounds obvious, but a well-written problem statement is challenging. It needs to articulate the scope of the problem concisely and sets the parameters of everything that comes next. A well written problem statement must include three elements:

- specify what the system problem is
- what is the patient population affected
- what is the instrument that will measure the magnitude of the problem

For example: patients attending general nephrology clinics at the University Hospital are waiting over three months for a routine clinic appointment, as measured by the clinic booking software (eClinician).

The problem is long wait times to see a nephrologist. The population is general nephrology clinic referrals. The vehicle identifying, or measuring the problem, is the clinic booking software. Note that we're not proposing solutions yet- this is just to set the parameters of the problem being addressed.

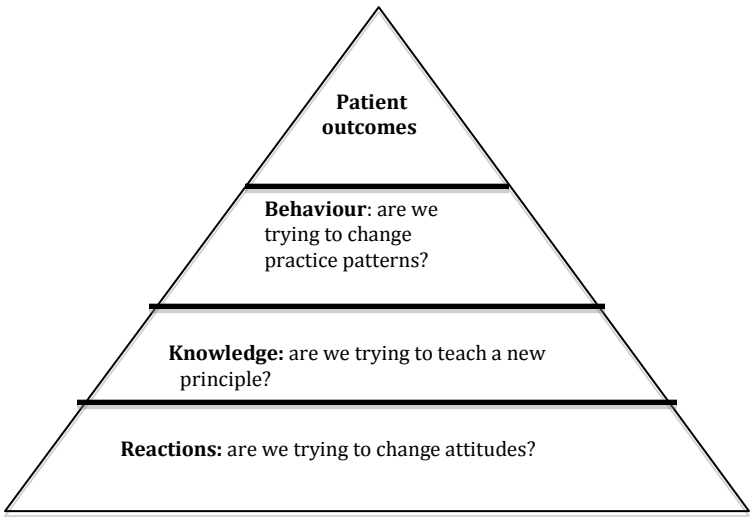
2. identify who the key stakeholders are. Who is affected by the problem, and it's possible solutions? Be creative here. This step sounds daunting maybe, but identifying a complete list of stakeholders is going to help you enormously. These are the people most affected by the problem (they may have even raised it). They're the ones that are going to help you describe it's scope (the root causes-step 3) and maybe even suggest solutions (step 4). As physicians we can't possibly hope to have all the right perspectives and answers.

For the example above, stakeholders in long wait times might include the nephrologists themselves, referring physicians, triage clerks, physician secretaries, clinic staff. You may not even know who all the stakeholders are in advance- talking to one group may well point you towards another to talk to next.

As you proceed, it's helpful to get started on constructing a map or blueprint of how the system works (or isn't working)- how things actually happen. This actually is a physical drawing or chart of some kind. Incidentally, this is called a "system walk" or "fishbone diagram" depending on how you draw it (you can already see how these steps are interrelated- you're already getting started on a root cause analysis here in fact).

Step 2: measuring the scope of the problem.

It's useful to think of measurement in terms of potential outcome. What is the action we are trying to effect? Apply the hierarchy of outcomes:



Using the example of the clinic wait times, ultimately we want to effect patient outcomes- in this case, more timely consultations. However, you may choose to develop your QI project evaluating this problem to identify/measure/change people's attitudes about timely referral, knowledge about the value of timely referral, or processes by which referrals are processed and booked.

Step 3: analyze

As mentioned, the stakeholders are going to input greatly here.

When thinking about the root causes yourself, or prompting stakeholders for ideas, consider a framework from industry called the Seven Types of Waste:

- transport or movement of patients
- inventory or materials
- motion or movement of people (physically or through a system)
- waiting
- overproduction
- overprocessing
- defects

All or some might apply to the problem you've identified. Note that in this step you might already start identifying potential interventions. Again, this is all inter-related, even though we're dividing into steps.

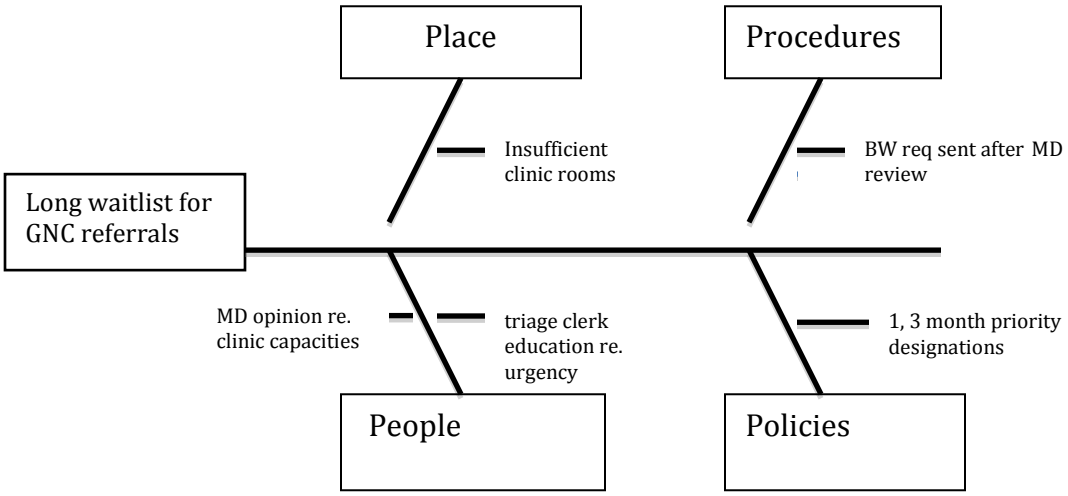
There's several ways we can start to organize our analysis of the roots of the problem, and they can actually be integrated and used together.

1. <u>the five why's:</u> basically, much like a little kid you might know, this involves stating the problem and then keep asking why that is until it no longer makes sense to keep doing so. Five is just an average by the way.

2. <u>Ishikawa ("fishbone") diagram:</u> This guy actually was a fishplant operator who wanted to improve efficiency.
   (i) write the problem statement on a page. This is the "backbone" of the fish.
   (ii) The "ribs" as it were are the root causes. It's helpful to organize each rib as a theme. Each rib can be a stream of a "5 Whys" exercise written on the page, or alternatively you can organize into groups like:

- the 4 Ms: methods, machines, materials, manpower
- the 4 Ps: place, procedures, people, policies
- the 4Ss: surroundings, suppliers, systems, skills

Any of these might work depending on the problem- they all sort of say the same thing. For example:



3. <u>Spaghetti diagrams:</u> this one works if the issue is confined to a physical space of some kind. You basically draw the space, then map out with lines (the spaghetti) how something or someone moves through the space. Helpful, for example, in tracking patient movement through a clinic space

4. <u>System walks:</u> similar to spaghetti but this is sort of a flow chart to map processes as they actually are occurring and then look for areas of inefficiency or redundancy.

   In the GNC example, you could fairly easily, upon consultation with triage staff, administrative assistants and physicians, map out the sequence of events that occurs from the time a new referral is received to when it is booked.

Step 4: improve (or interventions)

This is where we suggest interventions to improve the identified problem, weigh the options in terms of feasibility and then trial on a small scale.

Identifying interventions requires two main things:

1. Stakeholder input and suggestions as previously mentioned
2. Creativity!

Obviously there may be multiple solutions to a problem. We have to think practically here. Options should be weighed in terms of:

- the amount of **effort** required to initiate the change
- the potential **yield** of those efforts
- how sustainable will the change be?

Some examples, weighted in terms of effort/yield/sustainability:

Strong: architectural changes, process simplification, process standardization, forcing functions in software

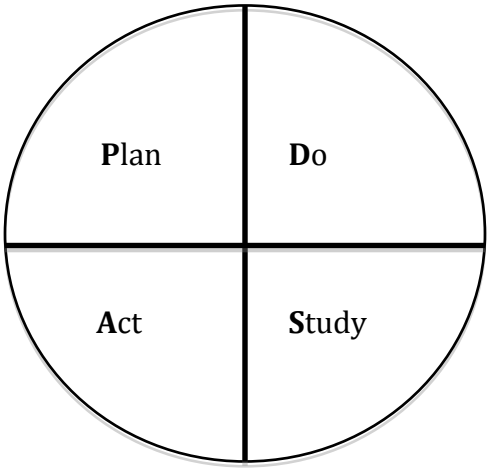
Intermediate: checklists, increasing staff, read back mechanisms, redundancy mechanisms

Weak: warnings, new policies, reminders, more education, additional studies

It's also important to consider "unintended" consequences of an intervention- are more challenges created by the intervention that will need to be addressed? For example, a new educational tool for family practitioners about the importance of timely nephrology referral may generate more referrals of a less urgent nature- can your clinic cope with the extra volume? Stakeholder consultations can help here too- going back and asking stakeholders about the implications of a change may help us troubleshoot.

Note that this is as far as I'd anticipate you'd get on a two week rotation.

In practice, or if you wish to follow through on the QI proposal during a research rotation, the next step is to trial the intervention.
In QI nomenclature, this is called a PDSA cycle:



In reality, this really is a sequence you'll follow automatically when trialing an intervention.

Step 5: control

In clinical practice, this means broadening the scope of the intervention, monitoring outcomes and trouble-shooting to sustain the changes made.

In the case of the GNC example, wait times are now monitored, overall and by physician by triage staff and reported and reviewed six monthly.