

How are we doing? How to evaluate your Patient Navigation Program

By

Yvonne Kellar-Guenther, Ph.D.



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HOW TO USE THIS TOOLKIT

This toolkit is designed for Patient Navigation program managers who have little to no experience with evaluation. The purpose of the toolkit is to help identify goals, identify what measures can be tracked to help determine if goals are being met, creating data collection tools, and some basic descriptive analysis.

This toolkit does NOT tell give instruction on how to conduct statistical data analysis nor how to create a program logic model. Both of these are important but there are many tools out there on how to create logic models. For data analysis, there are classes on statistical techniques. The data analysis discussed here can help identify if participants saw a change and how many, it cannot identify if the change was statistically significant or that the change only happened due to the program.

SET YOUR GOALS

Evaluation serves as a road map for your project. You need to know what you hope to achieve at the end of your grant period and the stops along the way that show you are on the right path. Evaluation helps you do that.

Goals come in different sizes and different time periods. There are larger goals such as wanting to improve the health of a specific population. This can take many years until an effect is seen. For project goals, think about the **time** you have to complete a project and **what can really happen** during that time frame. Some examples of project goals include;

- “Our goal is to reduce barriers to care and connect patients to needed resources.”
- “Our goal is to decrease cardiovascular risk factors by helping patients adopt behavioral changes.”
- “Our goal is to improve screening among the underserved population.”

TYPES OF GOALS

There are two types of goals – **process goals** and impact (or outcome) **goals**.

Process goals are focused on getting pieces in place to deliver the program or intervention and delivering the program or intervention.

Impact is what happens as a result of the person being part of your intervention or program.

One of the roles of Patient Navigation is to remove barriers to care. This can result in the following types of goals:

Sample PN Process Goals (getting pieces in place to deliver the program)

- Reduce barriers to care by identifying the type of barriers our patients face to getting medical care
 - Practical (e.g. child care, transportation)
 - Emotional (e.g. depression, fear)
- Identify the gaps or unmet needs in services for our clients
- Understand our patients' satisfaction with services and how we can improve our care

Sample Impact Goals (what we want to change as the result of having the program)

- Decrease risk of disease/Increase adoption of health behaviors
- Decrease the number of patients who do not show for appointments or who are unprepared for a screening
- Increase the number of Latino women without insurance who are screened for breast cancer every year.

TOOLS TO USE IN PLANNING – SETTING GOALS, IDENTIFYING WHAT WILL BE MEASURED

Group Charge and Membership (revisit this document at each phase)

1. What do you hope to accomplish as a result of working together? What do you want to be able to tell others your group got done? (This is your goal. You may have more than one. Decide how many you can do given your resources and time.)

a) To help with this think through the following two questions:

- Who do you need to buy-into this program to help us keep it going?

- What will they want to see?

b) Now write out your goal:

c) Look at your goal statement. Can outsiders tell which group or groups you are targeting? If not, re-write the goal statement here making it clear what group is being targeted.

2. How will you know you achieved the goal? What will you see that is different or what will you no longer see? Or if you are wildly successful, what will be different, what will it look like? (this will help you know what you need to measure in your evaluation)

3. Why is this important? What is the benefit of getting this done? OR Why does this matter? How does this program make a difference with the group you want to serve?

4. **Who are the stakeholders for this project? Who has something to gain or lose based on the outcome (or lack of outcome) of this project?** This group is important because your evaluation can affect them. Consider asking them if there is information they need from your evaluation. You may also be getting data from this group.

Try to keep your stakeholders in mind throughout your entire evaluation. Better yet, see if you can include some of them in all the different phases!

MOVING FROM GOALS TO ACTION STEPS

Your goal is the end point or destination but you still need to identify mile markers along your path to know you are making progress. You also need to be able to think through what action steps need to happen to help keep your project moving.

You will use this phase to help write your problem statement for your project (or potential funder).

IDENTIFYING YOUR FIRST STEP

After you set your goal, identify the problem that has led to the issue you are trying to address. For example, if there is a group that is not getting screened, what do you already know about why that group is or is not getting screened? You can use literature like journal articles, health behavior theories like the Transtheoretical Model, or your experiences and what you have heard from your patient/client group.

There are many tools to help think through this – brainstorming, flowcharting, Fishbone Diagrams, and the 5 Whys.

The next section reviews how to use the 5 Whys approach. The following videos explain how to use this approach.

[5 Whys \(MindTools.com\)](#)

[5 Whys: Root Cause Analysis](#)

[The 5 Whys \(Harvard Business Review\)](#)

WHY?

↳ WHY?

↳ WHY?

↳ WHY?

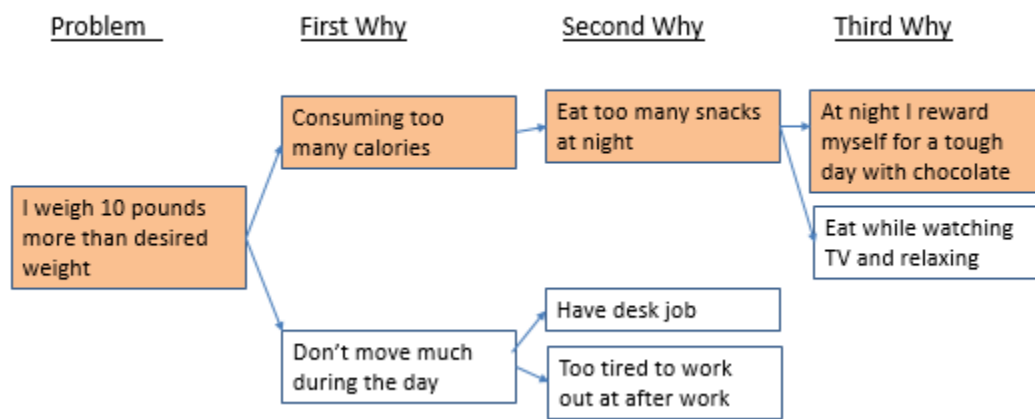
↳ WHY?
Real solution is found here

Basically, your group starts with what you are seeing and then begins to ask why. For example, “Our clinic has a large group of African American women who are at-risk for type 2 diabetes.” Why? Because these women are overweight or obese based on BMI. Why? Because of their diet. Why? Their cultural foods include high fatty foods.

Only 3 whys were identified here but, using this information, you might choose to deliver an educational program aimed at preparing cultural foods differently.

Often what happens is that your “whys” take you down many different paths.

Here is an example of a series of “Whys” for a person.



As you can see in the example, there are two main reasons for the weight gain. One piece can be chosen to focus on, the orange path, or a program or intervention can be used that addresses both eating and lack of movement. Just make sure EVERY piece that you are hoping to change is measured.

Now let's see how this would look for a group of people.

Problem Statement: There is a high rate of STIs among teenagers in X Public Schools

1st Why: Teenagers are having unprotected sex

2nd Why: teenagers aren't accessing free condoms

3rd Why: teenagers aren't aware they can get free condoms

4th Why: condoms aren't being distributed to teenagers

5th Why: School system doesn't allow condoms to be handed out

Problem Statement: There is a low rate of exclusive breastfeeding among low SES women in X.

1st Why: Women supplementing breastfeeding with formula

2nd Why: Women are experiencing challenges with breastfeeding

3rd Why: Women do not know how to resolve breastfeeding challenges

4th Why: Women are not getting the support from their family physicians on how to overcome breastfeeding challenges

5th Why: Physicians are not trained on how to manage breastfeeding challenges

As you fill out your 5 whys sheets, try to do one for each path. Similarly to the example above, you could end up with 4 sheets. Below are some general types of causes that might help you develop the 5 whys for your program.

Types of Causes

- **Physical causes** – Tangible, material items failed in some way (for example, a person does not have transportation so he/she cannot get to a gym).
- **Human causes** – People did something wrong, or did not do something that was needed. Human causes typically lead to physical causes (for example, chocolate in a person's house).
- **Organizational causes** – A system, process, or policy that people use to make decisions or do their work is faulty (for example, she has a desk job so it is hard to move during the working day).

Print off this page and fill this out with your group so that you can identify your goal and what you should measure.

TOOLS TO USE IN PLANNING – THE 5 WHYS

Problem Statement:

1st Why

Why is that?

2nd Why

Why is that?

3rd Why

Why is that?

4th Why

Why is that?

5th Why

SMART ACTION STEPS TO ADDRESS THE WHYS

Once you have identified what your program will address, you need to identify those smaller steps to take in moving towards your goal.

- You can think of these like places to stop on your journey (for example, we stop in Phoenix for the night) or like inches on your yard stick (this small step helps us move towards the whole yard).

TYPES OF CHANGE YOU MAY WANT TO CONQUER

The Institute for Healthcare Improvement identified the following lists of changes healthcare programs may want to conquer.

- **Eliminate Waste:** Eliminate an activity or resource that is non-value added to an external customer.
- **Improve Work Flow:** Improve processes to improve the products/services.
- **Optimize Inventory:** Understand where inventory is stored in a system to find improvement opportunities.
- **Change the Work Environment:** Can be a high-leverage opportunity to make all other process changes more effective.
- **Producer/Customer Interface:** To benefit from improvements in quality of products and services, the customer must recognize and appreciate the improvements.
- **Manage Time:** Gain advantage by reducing time to develop new products, waiting times for services, lead times, and cycle times for all functions in the organization.
- **Focus on Variation:** Reduce variation to improve outcome predictability and to help reduce the frequency of poor results.
- **Error Proofing:** Redesign the system to make it less likely for people in the system to make errors.
- **Focus on the Product or Service:** Address improvement of products and services, not just processes.

Your team may want to use these smaller goals you are trying to accomplishing your larger goal. to as objectives and/or aim



to identify your sub-goals or the reach on the way to These sub-goals are often referred statements.

Print off this page and fill this out with your group so that you can identify the smaller steps/markers you will achieve on your way to achieving your larger goal.

TOOLS TO USE IN IDENTIFYING OBJECTIVES

1. At the end of the project you would like to see*:

a. The benefit of achieving this goal is:

*You did this on the Group Charge page.

2. To achieve this you need to (objectives or aims that fit with what you learned when doing the 5 Whys):
a)
b)
c)

For example, if my goal is to lose 10 pounds in 2 months, my objectives or aims might be:

- a. To get a baseline – how much do I weigh right now? What am I eating? How many steps do I take in a day?
- b. To increase my steps by 250 each day until I am at 10,000 steps a day.
- c. To decrease my calories so I eat no more than 1,500 calories per day.

For example, if the program goal is to increase breastfeeding among low SES women in X city, my objectives or aims might be:

- a. To get a baseline about the perceived knowledge of physicians on handling breastfeeding challenges
- b. To increase physician knowledge of handling breastfeeding challenges

These become the objectives or aim statements.

Do a gut check. Based on what you know from the literature, your theory, or your experience, will these things really move you towards your larger goal? If yes, keep going.

Tip: If you have more than 3 aim statements, look at your list. Choose the 3 that you have the most control over, tap into the experience/expertise of your team, and/or are most likely to lead to quick successes.

**WRITING
ACTION**

"You've got to think about the 'big things' while doing small things so that all the small things go in the right direction."

**SMART
STEPS**

Alvin Toffler
*American Writer and Futurist
 (Author of Future Shock and the Third Wave)*

SMART is an acronym to help you ensure you are clearly explaining WHO is going to do WHAT, WHEN, WHY (what does it demonstrate) and TO WHAT STANDARD. The reasons to write SMART objectives or action steps is to:

- think through your plan,
- understand how one part of the plan influences another part
- identify steps that need to happen prior to and after other steps
- identify who is ultimately responsible for this getting done (accountability)

The table below helps explain each part of SMART.

SMART	Questions to ask to make sure your objective/action step has these:
Specific	Does each step clearly and specifically state what you are trying to achieve? Who will do what?
Measurable	How will you (and others) know if progress is being made on achieving this step?
Attainable Or Achievable	Is achieving this step dependent on anyone else? Is it possible to reframe your step that it only depends on you and not others? Is it feasible to complete within the given time? What factors may prevent you from achieving your goal?
Relevant	Why is achieving this step important towards achieving the larger goal?
Time-bound	Does something need to happen before you start? If so, when will it be done so you can start? When will you end this action step by? Do you need to finish this action step before you can start another action step?

Here are some web sites you can visit for more SMART examples:

[CDC: Writing SMART Objectives](#)

[University of Virginia: Writing SMART Goals](#)

TOOLS TO USE – WRITING SMART OBJECTIVES/ACTION STEPS

Action Plan – What steps must you take to achieve this aim?						
Task/to-do item	Who in charge?	What has to be done before you start?	What resources have?	What resources need?	Date Start	Date End

Obstacles/Challenges – What obstacles stand in the way of you achieving your goal?	
Obstacle	How will you address the challenges if/when they arise?

SMART OBJECTIVE CHECKLIST

✓ if yes	
	We have a step where we get baseline data OR we already have the baseline data.
	Our activities do not all start on day 1 and end when the grant ends.
	It is clear which activities have to happen before others can begin.
	We left time to analyze our data.
	We left time to write our report.
	We can explain how each step moves us towards our larger goal.
	In each step, it is clear who will be responsible for overseeing this step (either a name or the role)

DATA COLLECTION

Before you start providing services, make sure you can gather data to show what you have done. Your first step is identifying what data you will need to show progress on your aims and goals. You can gather data in many ways including:

- ✓ Using data you already have to treat the patients
 - Age, type of insurance, weight, height, A1C, smoking status, blood pressure, dates of services/screenings
- ✓ Directly from patients by asking them
 - Barriers to getting care
- ✓ Directly from patients where they fill something out
 - Questionnaires
 - Sign-in sheets at a program (name, contact info, demographics you may need like race, age, zip code). Remember to always include the date of the program and the topic.

IDENTIFYING WHAT TO COLLECT

There are several ways to think about what data you need. One way is to write down your sub-goals and aims and think about what data you need to have to show that you have reached this goal.

For example, using one of the goals from an earlier section: “Deliver a 6-week Diabetes Craft Plus program to 100 African American Women who are classified as ‘overweight’ based on their BMI.” To demonstrate you did this, you will need to track:

- Race/ethnicity of everyone who came through the program.
- Gender of everyone who came through the program.
- How many sessions each participant attended. (What if you had 100 women but only 20 did all 6 weeks? Did you meet your goal? You might also need to a new action step and find out why it is so hard to make it to all 6 weeks. This could help you refine your program and how it is delivered).
- You need beginning BMI (height and weight to calculate it).
- You may need the last BMI if you are hoping to show a change but you need to decide if you can really decrease BMI in 6 weeks. (You may want to monitor weight change over time in case BMI doesn’t change.)

What if your goal for the 100 African American Women who attended all 6 weeks of the Craft Plus program was to report that they have the skills to make healthier traditional dishes? To demonstrate this achievement you will need to track:

- Race/ethnicity of everyone who came through the program.
- Gender of everyone who came through the program.
- How many sessions each participant attended. *You only want to include those who attended all 6 weeks in your analysis.*
- A way to measure their confidence that they can make these traditional meals “healthier.”
 - This can be a survey or set of questions that ask them how confident they are making these meals with less fat.
 - It could be asking them to take a traditional recipe and show where they might make changes to make the meal healthier.
- If you wanted to show a change or improvement you could get data from the first class and then again at the last but you need a way to match these responses (a name, an ID number) or you can ask them if they think they know more.
 - Comparing the first class to the last class is more objective while asking them if they think they changed is more subjective.
 - What you need really depends on what you, and your stakeholders, including your funder, want.

Here are some questions you need to answer as a group to help you think through what data you need to collect:

- What information is important to collect?
 - Are trends or patterns by groups like ethnicity, race, type of health condition, socioeconomic status important to know?? If yes, make sure you have that data collected.
- Why is this data element important?
 - Will it be used to show that the program is working?
 - Will it be used to make changes to how the program is delivered?
 - What data goes with each sub goal, aim, or SMART objective?
- Who will collect the data?
- Does this data already exist somewhere else?
- Where will data be collected?
- When will data be collected?

List of Sample PN Process Goals & Measures

- Dates of contact between PN and patient
- Types of barriers for getting medical care addressed:
 - Practical (e.g. child care, transportation)
 - Emotional (e.g. depression, fear)
- Types of barriers for getting medical care clients experience
- Date of hand-off
- # of referrals given & # of successful referrals
- Role/type of provider connected patient with
- Date connected patient with medical home
- Patient's satisfaction with services
- Type of contact (e.g. phone, face-to-face)
- Duration of time spent with the patient
- Type of screening conducted for patients
- Date of screening
- # of clients reached (by week, month, year)

List of Sample Reach Measures for PN Programs

- Age or date of birth of patient
- Race/ethnicity
- Zip code
- Insurance type/insured
- Disease type

List of Sample Impact Goals

- Health indicator at beginning of project and while getting services (A1C, weight, BMI, smoking status, etc.)

- Number of patients that had recommended diagnostic follow-up within (time period like 30 days, 60 days, 90 days)
- Number of patients that did not receive recommended diagnostic follow-up within xx days
- Number of patients who initiated treatment within xx days
- Number of patients that did not initiate treatment within xx days.
- Number of patients who fully-understand their treatment recommendation.
- Number of patients adhering to treatment recommendations
- Number of patients who received a survivorship care plan
- Number who were prepared for their medical appointment (e.g. bowel prep)
- Number who missed medical appointments
- Number of patients who report positive change in health behavior (e.g. smoking less)

TOOLS TO USE – TO IDENTIFY WHAT DATA YOU NEED TO COLLECT

Measurement Planning Form - Explained

Measure – what do you want to see	What are you trying to learn about? What will this data help you figure out?
Type	___Outcome (Impact) ___Process
Why is this measure needed in our project?	What will this tell you? Are you looking to see if your program does something specific like helping lose weight? Are you trying to identify patient barriers so you can make changes to an existing program?
Operational Definition	How will you know it when you see it? If you are looking for a percent to do something, what is your denominator (total group)? Do you have that number?
Exclusions	Who is not included in this data? Would you exclude males, people who didn't complete the program, etc. . .
Useful Stratifiers/Ways to look at the data	Do you want to compare those from one age group to another? Do you want to look at men vs women? Those in one program to those in another? The group one PN worked with vs a group another PN worked with?
Data Collection & Sampling Method	Where is the data from? Are you pulling it from medical records or do you need to collect it yourself? If you need to collect it is it at the beginning of a class, a phone call, when the session is over? How will you collect the data- a questionnaire, questions you ask (like zip code), etc?
Display/Visual	Will you make a crosstab table (gender by how many in each group lost weight)? A bar chart? A run chart?
Goal/how much	How much change do you need to see? Is dropping a pound at any point in the program enough or do you want

change	a certain percentage of body weight lost? Do I need to smoke one less cigarette or have stopped smoking for 3 months?
Source (may not need)	If you are looking at another study to help you think through what you would expect to see, cite that here.

Measurement Planning Form for Example Measure

Measure	Percent of attendees who report they understand what is needed to make traditional foods healthy traditional foods.
Type	<input checked="" type="checkbox"/> Outcome <input type="checkbox"/> Process
Why is this measure needed in our project?	The participants in this project need to report how confident they feel about making a health.
Operational Definition (how will I know it when I see it?)	Numerator: Each week the number of program participants who report they feel very confident they understand how to take a traditional dish and make it healthier. Denominator: The number of program participants. Multiply the ratio by 100 to convert to percent. $(\text{numerator}/\text{denominator}) * 100 = \%$
Exclusions	None
Useful Stratifiers/Ways to look at the data	Number of classes attended thus far; Age of participant.

Data Collection & Sampling Method	Each week send out an online survey asking participants 2 questions: (1) to rate their level of confidence in altering a recipe of a traditional dish so that it is healthy and (2) to rate their confidence in cooking that dish. Participants can choose “not at all confident”, “somewhat confident”, “confident” or “highly confident”. Participants would need to enter their code so that the staff can determine how many classes that participant has attended and the gender. The participant numbers, dates of classes attended, gender, age, weight, and A1c will be stored in the StudyData.xls on the e: drive.
How show the data?	Create an Excel spreadsheet that tracks the numbers each week so that a chart can be made showing the rise and fall of the percentage each week.
Goal	At least 70% of the participants rate themselves as highly confident or confident in their ability to alter a recipe of a traditional dish so that it is healthy and at least 70% of the participants rate themselves as highly confident or confident in their confidence in cooking that dish
Source	Reference: Optimizing Patient Flow: Moving Patients Smoothly Through Acute Care Settings. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2003.

Measurement Planning Form – Template for you to use	
Measure – what do you want to see	
Type	___ Outcome (Impact) ___ Process
Why is this measure needed in our project?	

Operational Definition	
Exclusions	
Useful Stratifiers/Ways to look at the data	
Data Collection & Sampling Method	
Display	
Goal/how much change	
Source (may not need)	

Cholesterol First Visit					Cholesterol Last Visit					Weight First visit		Weight Last visit		Height		
Month/year of first visig (mm/yy or mm/yyyy)	LDL	HDL	Triglyc	Total Cholesterol	Month/year of first visig (mm/yy or mm/yyyy)	LDL	HDL	Triglyc	Total Cholesterol	Month/year of first visit (mm/yy or mm/yyyy)	weight in pounds	Month/year of first visit (mm/yy or mm/yyyy)	weight in pounds	feet	inches	other (state unit of measurement)

BMI First Visit		BMI Last Visit		Tobacco Use First Visit (this data varies)										
Month/year of first visit (mm/yy or mm/yyyy)	weight in pounds	Month/year of first visit (mm/yy or mm/yyyy)	weight in pounds	Month/year of first visit (mm/yy or mm/yyyy)	Smoke cigarette s (y/no or 1=yes, 2=no)	cigarette s number per day	chew or smokeles s tobacco (y/no or 1=yes, 2=no)	Smoke cigars (y/no or 1=yes, 2=no)	cigars smoked per day	smoke pipes (y/n or 1=yes, 2=no)	Other tobacco product gather data on use y/no or 1=yes, 0=no)	If gather data on amount, list amount and units used	interested in tobacco cessation (y/n or 1=yes, 0=no)	interested in cutting down on smoking? (y/n or 1=yes, 0=no)

Tobacco Use LastVisit (this data varies)										
Month/year of last visit (mm/yy or mm/yyyy)	Smoke cigarette s (y/no or 1=yes, 2=no)	cigarette s number smoke per day	chew or smokeles s tobacco (y/no or 1=yes, 2=no)	Smoke cigars (y/no or 1=yes, 2=no)	cigars smoked per day	smoke pipes (y/n or 1=yes, 2=no)	Other tobacco product gather data on use y/no or 1=yes, 0=no)	If gather data on amount, list amount and units used	interested in tobacco cessation (y/n or 1=yes, 0=no)	interested in cutting down on smoking? (y/n or 1=yes, 0=no)

Things to note:

- For the project the decision was made to get the number of people served in each zip code rather than by person. This was because the zip code is a HIPAA identifier if area is not heavily populated.
- We asked for age rather than date of birth because date of birth is a HIPAA identifier. It is better to get date of birth if that is allowed.

DESCRIPTIVE DATA ANALYSIS

There are two types of statistics—**descriptive** statistics and **inferential** statistics.

- Descriptive statistics are used to describe the group data was collected from and show and summarize your data so that you can see the patterns. You might be able to see that there was a change from time 1 to time 2 but you CAN NOT tell if that change was statistically significant.

To claim a “significant difference” you would need to use **inferential** statistics.

A lot goes into choosing which inferential statistics to use and there are specialized programs to run these statistics. If you really want to say your program made a statistically significant difference, it is strongly recommended that you hire someone to do this for you.

Be sure to include that person in the goal setting discussion. He/she will help you design your data collection tools so that your group has the data you need to run that appropriate statistics.

This section is devoted to descriptive statistics which can be easily calculated using a spreadsheet or even by hand.

There are different types of descriptive statistics. First, you can report a **frequency and percentage** for each group. Sticking with the Diabetes in African American women example, you may choose to report how many women in each racial/ethnic group participated. You might go with the racial/ethnic categories that the federal government uses for the census but, you would probably be better off if you had racial/ethnic categories that fit your group (e.g. African born, American born, or you if you have a large immigrant population you might have Ethiopian, Kenyan, etc.) A report out with the federal government race categories might look like this:

Frequency = the number in the group, often shown as ‘n’.

In the example below, the total number in the group is 23, or $n=23$.

Percentage= # in group/total #, then multiply by 100

In the example below, for African American race the % in the group is 26% ($6/23=0.26$, times 100= 26%)

Race	N=23	% of total
African American – non-Hispanic	6	26%
Asian or Pacific Islander – non-Hispanic	1	4%
Hispanic	2	9%
Native American, American Indian, or Alaskan Native – non-Hispanic	0	0%

White – non-Hispanic	12	52%
Other – mixed	2	9%
Missing	0	

You may notice that missing is included. You will most likely have missing data and that is okay. One reason you may want to report on missing data is because people like the totals to add up and if there is a lot of missing data, it is helpful for the reader to be aware of that so they can interpret the data better.

If it has been awhile since you had math:

- Calculate a percent by dividing the number in your group by the total number you served which in this example is 23, then multiply that number by 100 to obtain the percentage.

When looking at the table above you may notice that what this data does is describe who was served. **This is important.** If your program is targeting African-Americans this data will tell you that is only one quarter of the group you are serving. Your team now needs to think through how you are recruiting patients for this program. Do you need to do something different?

You may have heard the term “**reach**” before. **Reach** asks “who did the program serve and how does that compare to the targeted population?” This question can be answered using frequencies and percentages.

Just like in our example above – 25% of the group you served was African American. The next step would be to see what percentage of your patients are African American.

If that is also 25% you can say your program mirrors the clinic population. If you were aiming to reach 50% though, you are off.

If you want to learn more about measuring reach you can go to re-aim.hnfe.vt.edu

In addition to using counting to search for patterns, you can also use measures of central tendencies or averages. There are some different ways to find the “middle” of your groups. The most common way is to compute an **average also called a mean** or a mathematical middle.

To get an average you simply add up your scores and then divide the total by the total number in that group.

Average or mean = sum of n's/total # of n's (e.g., $n_1+n_2+n_3+n_4/4$)

An example of what that might look like is this:ID	Weight at First Visit	Weight At Most Recent Visit
1	136	134
2	141	135
3	164	172
4	189	172
5	170	173
6	210	201
7	195	208.8
8	228	214
9	280	264
10	238	287

This shows weight in pounds for a group of 10 patients at their first visit and their last visit. What you can see is the actual individual weight. You can calculate the average or mean weight at first visit by adding up the numbers in that column and then dividing by 10. Typically you do the math in Microsoft Excel using the SUM function. To compute the mean typically you can use the “=SUM(cell with the total number in/10)” function. There are a lot of ways to get the mean; this is just one way. You can also use the AVERAGE function in Excel, in an empty cell type =AVERAGE(highlight the cells that you want to take an average of and close the parenthesis. The formula will look something like this, =AVERAGE(A1:A10).

When you add up the weight you can see that the total pounds at the first visit for these 10 patients is 1,951 pounds. Their average weight is 195.1 pounds. About half should be above this weight and about half should be below it. You can say “about half” because it may not actually be half. If you have someone who weighs a lot more than the group or someone who weighs a lot less, that one weight can really change your mean.

Look at the table below, the mean for this group is 207 pounds. Our mean has shifted 12 pounds because patient #9 weighs so much more than everyone else. If this was your real data you would decide if you leave patient #9 in or not or you may want to include them.

ID	Weight at First Visit	Weight At Most Recent Visit
1	136	134
2	141	135
3	164	172
4	189	172
5	170	173
6	210	201
7	195	208.8
8	228	214
9	400	360
10	238	287
Mean	207.1	205.7

Now let's go back to this table.

ID	Weight at First Visit	Weight At Most Recent Visit
1	136	134
2	141	135
3	164	172
4	189	172
5	170	173
6	210	201
7	195	208.8
8	228	214
9	280	264
10	238	287
Mean	195.1	196.08

You could use this data to see if the overall group lost weight between time 1 and time 2. You know that the mean weight was 195.1 at time 1. At time 2, the mean weight is 196.1 pounds. The group gained weight!

When looking at the data you see that some gained weight but some did not. As a result, you may want to look at the individual change between time 1 and time 2. You need to add another column to the table that subtracts the first weight from the most recent weight (time 2 weight – time 1 weight). Look at the revised table below:

ID	Weight at First Visit	Weight At Most Recent Visit	Weight Change
1	136	134	-2
2	141	135	-6
3	164	172	8
4	189	172	-17
5	170	173	3
6	210	201	-9
7	195	208.8	13.8
8	228	214	-14
9	280	264	-16
10	238	287	49
Mean	195.1	196.1	1

You can use this new column to compute a mean weight change. For this group, the mean weight change is a gain of 1 pound. That is not horrible but you have to really take into account the time lag between the first visit and the most recent visit. If it is a month a gain of one pound is okay but not the direction of change the program really wants to see. If the time lag is a year you may be thrilled there was only an average gain of one pound because we know from the research that an average person gains about a pound a year after 35 (Sheenan, 2003).

Looking at this table, you can see a few things. First, six of the 10 patients lost weight. That is great! If more patients lost weight than those who did not, then why is the average weight the second time higher? Patient 10 gained 49 pounds.

Your first reaction could be to look at patient 10's records to see if his weight was recorded accurately, especially if it is only a few months between time 1 and time 2. If it is accurate, you might report patient 10 separately but then do the mean for the rest of the group so you can see how well the program worked for them.

Please note you would do the same if patient 10 LOST 49 pounds. That is a lot to lose in a short period of time and while it makes the program look good, you would want to make sure it is true and you would still want to report it separately because the change is so different from the others.

In this example it is easy to see the outlier—someone who weighs a lot more than others or who gained or lost a lot more weight than the others; that is not always true. To find outliers, you often look for the **minimum and maximum** in each group.

In the example, the minimum first weight is 136 pounds and maximum first time weight for this group is 280 pounds. If you use Excel you can also use the MIN and MAX functions, just like SUM or AVERAGE or you can find this by selecting my entire data set and then sorting lowest to highest for the second column.

BE CAREFUL YOU CAPTURE ALL YOUR DATA BEFORE YOU SORT. EXCEL WILL JUST SORT ONE COLUMN AND THAT CAN RUIN YOUR DATA SET. MAKE A BACK UP COPY BEFORE YOU SORT!

ID	Weight at First Visit	Weight At Most Recent Visit	Weight Change
1	136	134	-2
2	141	135	-6
3	164	172	8
4	189	172	-17
5	170	173	3
6	210	201	-9
7	195	208.8	13.8
8	228	214	-14
9	280	264	-16
10	238	287	49

Another measure of central tendency is **median**. The median is the actual middle value of your data set. When the median is calculated, the data is arranged from the lowest to highest value and then you find the middle value.

Think of this like a median in the road – it marks the middle of the dataset.

Often times people compare the mean to the median to see how similar or different they are because the median is less affected by outliers and skewed data. Remember this data set with our outlier?

ID	Weight at First Visit	Weight At Most Recent Visit
1	136	134
2	141	135
3	164	172
5	170	173
4	189	172
7	195	208.8
6	210	201
8	228	214
10	238	287
9	400	360

The data has been reordered it to find the median. Because there is an even number, the median is 2 middle numbers. As a result, you have to add these 2 numbers and then divide by 2 to get the actual median. For this data set, the median of weight at first visit is 192 pounds. If you recall, the mean weight at first visit is 207.1 pounds. The median is a more accurate measure of the “average” weight because of the outlier.

The final measure of central tendency is the **mode**. The mode is the number that occurs the most in your dataset. The dataset does not have a mode because every number occurs once but what if our data set looked like this?

ID	Weight at First Visit	Weight At Most Recent Visit	Weight Change	Lose Weight
1	136	134	-2	yes
2	141	135	-6	yes
3	164	172	8	no
5	170	173	3	no
4	189	172	-17	yes
6	210	201	-9	yes
7	210	208.8	-1.2	yes
8	228	214	-14	yes
10	238	287	49	no
9	280	264	-16	yes

In this data set, the mode weight of the first visit is 210 pounds, the mean is 196.6 pounds, and the median is 199.5 pounds. Ideally, the mode is used for categories rather than something like actual weight.

If you altered our dataset to look like this than the mode becomes very helpful. The mean weight loss for the group is a half-pound but the mode of lose weight shows that 7 out of the 10 people lost weight.

ID	Weight at First Visit	Weight At Most Recent Visit	Weight Change	Lose Weight
1	136	134	-2	yes
2	141	135	-6	yes
3	164	172	8	no
5	170	173	3	no
4	189	172	-17	yes
6	210	201	-9	yes
7	210	208.8	-1.2	yes
8	228	214	-14	yes
10	238	287	49	no
9	280	264	-16	yes

MS Excel can be used to calculate median and mode (<https://www.youtube.com/watch?v=6dw3KNn0dYw>).

Finally, when you report the mean, median, or mode, you will also want to list the lowest value and the highest value. That helps you reader to see the range of options.

All of these descriptive statistics can be used to describe who you are serving and if you are seeing a change. **Just remember;**

- You cannot state that a change is statistically significant, you need inferential statistics to do that.
- When you see a change, you can look up previous research to see how the change you are seeing compares to what others have seen.
- Talk to a medical provider who can help your team figure out if the change you are seeing has clinical significance.

REFERENCES

Sheehan, T.J., DuBrava, S., DeChello, L.M., & Fang, Z (2002). Rates of weight change for Black and White Americans over a twenty year period. *International Journal of Obesity* **27**, 498–504. doi:10.1038/sj.ijo.0802263

Other Evaluation Toolkits:

There are many great evaluation toolkits on the internet. I referenced the following when building this toolkit:

<http://toolkit.pellinstitute.org/> - This is a toolkit for college outreach programs

http://www.cdc.gov/hiv/resources/reports/pdf/CDC_Evaluation_Toolkit_Routine_HIV_Screening.pdf

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTHEALTHNUTRITIONANDPOPULATION/EXTHSD/EXTIMPEVALTK/0,,contentMDK:23262154~pagePK:64168427~piPK:64168435~theSitePK:8811876,00.html> - This is like an online tutorial.

<http://friendsnrc.org/evaluation-toolkit>

<https://www.childwelfare.gov/preventing/evaluating/toolkit.cfm> – this toolkit has a logic model builder