SESSION AT-A-GLANCE	WHO?	HOW LONG?
Introduction	Facilitator	5 minutes
The Game	Facilitator, participants	10 minutes
Debrief and Discussion	Facilitator, participants, audience	10 minutes

White Bead Game

Why Use This Game

- To teach the concept of sampling, that you can get a good estimate of performance by looking at a sub-set of results rather than at your entire population.

Target Audience

Senior leaders, managers, QI team members, and all others who will design data collection strategies.

Type of Game

A competition among teams.

Key Concepts:

- Sampling is a good strategy for data collection: it is possible to determine how large a subset of existing data we need in order to answer the question we have about these data, with a prescribed amount of error.

Source, History and Resources for More Information

The concepts behind this game are taking from the publication "*Sampling Techniques,*" developed by Wai Cho Yee for the New York City Health and Hospitals Corporation in 1995. Yee based his work on two sources:

- Plsek, Paul E., "*Tutorial: Planning for Data Collection Part III: Sample Size,*" Quality Management in Health Care, 3:1, Fall 1994, pages 78-92.
- Babbie, Earl, "*The Practice of Social Research,*" Sixth Edition, Belmont, CA: Wadsworth Publishing Company, 1992.
- Cochran, William G., "*Sampling Techniques,*" John Wiley, 1977.

Materials

For this game, you will need:

- A "red bead kit." This is a box with a mixture of red beads and beads of one other color (usually 1000 red beads and 4000 alternate color beads) and a paddle with 50 holes to pull beads out of the box
    - Red bead kits can be purchased at: www.redbead.com
- If you don't have a red bead kit, you can use any container with two types of objects in it: a box of both large and small paper clips, for example, or with two types of rubber bands. You will need to count how many of each type are in the box
- A pad of paper and pens for each team to record its results
- A flip chart and markers to record the key points of the discussion

Preparation

To prepare for this session:

- Familiarize yourself with the session's structure and content:
    - Read through the game instructions and key teachingpoints in their entirety.
    - Practice the game itself.
    - Practice presenting the key teaching points.
- Prepare the room:
    - Arrange chairs around a table. The participants will work in 4 small teams but they will use the same box of beads (or paperclips, or rubber bands) so they need to be close to each other.
    - Give each team a pad of paper and pen.
    - Set up the flip chart so you can record the key points of the discussion after the game.

Playing the White Bead Game

Welcome and Introductions
To begin the game, welcome participants and thank them for their participation. If necessary, ask individuals to introduce themselves to the group.

Learning Objectives
Tell participants that by the end of the session they will:

- Understand how useful it can be to take a sample of data rather than to count every item (for example, every patient, every visit, every screening).
- Begin to see how to apply this concept to the use of data in their HIV program.

Agenda
Provide a brief description of the session's primary ' components:

1. Background to the White Bead Game.
2. The game itself.
3. Debrief and discussion on what the game shows, and how its lessons can be applied to HIV care.
4. Feedback and close.

Background to the Game

Facilitator's note
Managing data is time-consuming and can be expensive. Programs can have several hundred patients or clients and conducting a review of every chart to determine, for example, how many received referrals to a dentist is a daunting task. The field of statistics comes to the rescue by providing a way to select a sample of charts that will still give you a valid picture of your dental visit referral rate, or any other measure you are looking at.

This game is designed to help you show your colleagues just how useful sampling can be. Sometimes, people who have not worked with statistics don't quite trust that counting a small number of charts (carefully selected, of course) can be

as accurate as looking at every single one. This game introduces the concept of sampling, to help people become more comfortable with it.

Selecting your actual sample is more difficult, as there are rules you must follow and decisions you must make on how precise you want the estimate provided by the sample to be. The National Quality Center can provide additional resources on sample selection, or take a look at the sources mentioned earlier in this game description.

Remember that sampling gives you a result within a predictable margin of error, and the value of using sampling is that the margin of error is predictable. In the White Bead Game, one team bases its estimate of the number of white beads by selecting a sample of 20, while another selects a sample of 100. There is always a chance that the sample of 20 may provide a more accurate estimate of the number of white beads than the sample of 100. If this happens, asks Team C and Team D to try several more times. You will see that the sample of 100 (which has a margin of error of plus or minus 8%) provides a more consistent estimate than the smaller sample size, whose margin of error is much larger.

Key points to explain to your audience:
- Sampling provides a way to measure, with a prescribed amount of error, the performance of our program without having to count every single item or review every single chart.

The Game Itself

- Divide your group into four teams. The teams will work sequentially, and each team will have five minutes to determine the number of white beads in the box of the red bead kit. Each team follows a different approach:
  - Team A tries to count every bead in the box.
  - Team B creates an estimate without doing any counting.
  - Team C pulls 20 beads at random from the box and estimates the total number of white beads based on this sample. Team C could repeat this process if needed (see Facilitator's Note).
  - Team D randomly selects 100 beads from the box and estimates the total number of white beads based on this sample. The number 100 is chosen as it should give a result that, with a 95% confidence level, is within the true percentage of white beads plus or minus 8% (for a box containing 4000 white and 1000 red beads). Team D could repeat this process if necessary (see Facilitator's Note).
  - Note that these samples must be randomly chosen. Be sure to mix the beads in the box thoroughly before selecting Team C's or Team D's samples.
- Ask each team to report its result.
- Report the actual percentage and number of white beads (80%, or 4000) and see which team came the closest.

Debrief and Discussion

- Discuss the results. Which method do the participants prefer, and why?
- If you are familiar with statistical sampling, briefly explain how the Team D's sample size was determined.
- Discuss current data collection in your HIV program:
  - Do we sample anything? If so, what?
  - What other data do we collect that we could sample, rather than counting every item? (Anything involving chart review is a likely candidate.)
  - How can we create a sampling plan?

Feedback and Close

- Ask your audience for feedback on whether this session met its objectives. Take notes of their response on a flip chart, and keep it for your use in the future.
- Schedule an informal follow-up session with any audience member who wants clarification or more information on the game or the concepts you discussed.
- Thank your audience and congratulate them on their hard work.

White Bead Game