Continuous Quality Improvement (CQI) Working Paper
Turning Data into Information
September, 2013

This document is one of eight working papers focusing on the components of a CQI system:

1. Leadership and Making the Business Case,
2. Managing Data to Support CQI,
3. Qualitative Case Review Processes,
4. Turning Data into Information,
5. Action Planning,
6. Program Evaluation Basics,
7. Building the Capacity of the CQI Workforce and
8. CQI Structure, Teams and Communication.

The purpose of these documents is to define and describe the range of specific strategies within each component to implement a high functioning CQI system in a jurisdiction. While recognizing that the evolution of CQI is iterative and requires time to refine and implement strategies, each working paper is intended to stimulate thinking about a range of strategies, to identify possible barriers to implementation and to identify solutions and recommendations.

Each document includes specific citations and suggestions for additional background publications, information and materials, but all the working papers derive critical background information from three key sources. First, the CQI Framework helped identify the 8 components and key strategies across the working papers.[i] Second, the Administration for Children and Families Information Memorandum on CQI helped inform many of the concepts in these papers.[ii] Third, and perhaps most important, the National Child Welfare Resource Center for Organizational Improvement (NRCOI), in collaboration with the National Resource Center for Child Welfare Data and Technology (NRC-CWDT), convened 75 representatives from 23 states and numerous organizations to attend a National CQI Working Meeting on August 29-30, 2012. Participants reviewed draft working papers and worked intensively to refine their content during and after the working meeting.[iii]

I. Definition and Background

Data include raw quantitative numbers (e.g., age), categories (e.g., gender), or and numeric indicators (placement stability) from many sources, including case record reviews, administrative data, surveys, assessment tools, provider-collected service data, data obtained from other systems such as the courts or education, census data, etc.. Data also include raw qualitative results gathered through data interviews, case notes, or focus groups. This core implementation

component of CQI assumes that raw quantitative and qualitative datasets (not only summaries) are available that can be examined in multiple ways and turned into information.

Information is created through a systematic process of examining and organizing raw data, exploring it in multiple ways through analysis, developing a synthesis of what the information may mean, and displaying the information in a way that builds understanding in others. The goal of information is to create a common understanding that can then be used to spark discussions and inform action planning.

Turning data into information refers to the *systematic processes of analysis and synthesis of data and the administrative and leadership structure that support resources for analysis, dissemination and subsequent use of the data.* This is an essential component of the CQI process that aligns with the Children's Bureau's components of CQI (ACYF-CB-IM-12-07) under the 'analysis and dissemination of quality data'. As indicated in this Information Memorandum, this component includes consistent mechanisms for tracking results, analysis of data by qualified persons, aggregating and sharing data with stakeholders and involving them in the analysis and understanding of data, and dissemination of results to a wide range of stakeholders.

Information created from raw datasets falls on a broad continuum divided here into subsections as:

- Management Analysis: data displays for managing functions such as prioritizing work, supervising teams, identifying work load and personnel needs, or knowing point-in-time performance on key indicators.
- Planning Analysis: reports or data displays for program planning such as descriptive data, identifying trends in the data, defining unmet needs, grouping data into themes, identifying links between proximal and distal outcomes, or finding variation in performance between groups.
- Knowledge Building Analysis: reports or data displays for research or formal program evaluation that may include comparative studies, predictive studies, model building and a host of techniques used for epidemiological or research studies.

Data creating (including system design, input and data collection) and data analysis are complimentary. Data developed for the agency serve the CQI process through one process. As these data are analyzed, synthesized and presented to others, data quality issues and needs for additional raw data may be identified. As agency staff use the data, data quality tends to improve and users will ask for additional data. Information is also the foundation for the action planning process among leadership, staff, and stakeholders; information guides decisions and again tends to generate requests for even more information and clarification of the data.

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II.   Key Strategies

Agency leadership encourages data analysis to improve practice. Information without discussion and action planning is relatively useless; information is best shared with others and discussed. To turn data into information, however, requires time, expertise, resources and a willingness to allow the process of analysis to progress. Leadership commitment to hiring and training staff to conduct analyses is essential. Moreover, leadership must model using data and allow the process of synthesis and information exchange to evolve.   In turn, leadership will have information and input from staff to guide decisions on a host of policy and practice issues. Information engages stakeholders in collaboration with the agency and at its best can generate multiple solutions to issues.

Dedicated CQI staff conduct data analyses. The process of turning data into information requires specialized skills and dedicated staff time. Staff with curiosity and a desire to learn will enhance this process. Skills in data analysis and display are necessary, from simple spreadsheets with highlights to created dash boards or other data displays through advanced statistical analysis. Synthesis of data is key to this component (bringing together bits of data, hypothesizing, testing, etc.) but requires sophisticated background in practice. The focus is on the transformation of raw data into useful information that intended audiences understand. Training in analysis and synthesis of data is critical. Staff should have a general understanding of basic statistics, including:
- Frequency, mean or average, ratio, percentage, and rate per 1000.
- Percent of change.
- Measures of central tendency (mean, median, mode).
- Measures of variability or spread: range, standard deviation.

Staff should also have the knowledge and skills to use data in performance improvement. This includes the ability to draw conclusions from data, present data in visual form, and tell the story of data (e.g., what does data tell you, how do you know, what does it mean?). Dedicated CQI staff with these skills can facilitate and coach the agency in efforts to turn data into information and then use that information to diagnose and plan. All agency staff can learn to have conversations around data.

Prepare the data. The process of turning data into information begins by taking raw datasets, cleaning the data and understanding the data (e.g., where do the data come from, what do they represent, what are the limitations?). Exploring the data for errors or outliers should be done initially so data can be cleaned or corrected. CQI staff can prepare basic spreadsheets for different levels of the organization (e.g., highlighting cases that need a home visit or a permanency hearing in the next month) and put big datasets into manageable spreadsheets for the field (e.g., reduce the size to a single-page printout or develop data sets for county or regional

level analysis etc.). Frequencies, distributions, means and other descriptive statistics should be examined to identify patterns or faults in the data.

Plan data analyses based on key questions or needs. The approach to analyses needs to respond directly to the identified need or questions being asked. The following questions should be considered:

- What is the best unit of analysis: child, family, region, adult, county, team, combination?
- Does the question require cohort analysis (exit or entry analysis), longitudinal analysis, or point-in-time analysis?
- Does the dataset support the analysis?
- What analysis would best answer the question (e.g., descriptive analysis, comparative analysis, predictive, analysis of relationships, etc.)?
- Should statistical significance be considered?

Group data into themes. Identifying themes, or patterns, is useful when conducting data analysis. Themes can help explain the data, respond to questions or needs, and serve as categories for further analysis. There are many approaches to identifying themes within data. For example, CQI staff can start with an outcome of interest and compare regions, programs or teams. The performance on the practices or benchmarks that may influence that outcome can also be examined. CQI staff may also want to:

- Compare data points on related indicators.
- Pair data outcomes with data on the quality of the case work.
- Pair quantitative and qualitative data.
- Drill down into naturally occurring groups (e.g., infants, children with reentry, second substantiation).
- Examine trends over time; getting better, worse, or staying the same?
- Find bright spots or successes and determine how they were achieved; celebrate them too.

Generate comparisons. Examining variation between groups often provides critical information. When generating comparisons consider data type (continuous versus categorical data), generate pivot tables and check with chi-square statistics for categorical data. Means or amount of variance can be compared for continuous data.

Avoid pitfalls in data analysis. When conducting data analysis, CQI staff should avoid certain pitfalls in order to prevent misunderstanding and misleading comparisons. For instance, comparing groups implies equality of groups on all other variables; rarely is that true. Comparisons across groups require standard data on the same scale (e.g., percentages rather than frequencies). Ranking can also be misleading if the intervals between ranks is unequal (e.g., a rank of 10 implies twice the rank of 5, but the intervals may be very small). Avoid drawing inferences that are not supported by the data or the sample (e.g., If 50% of men in prison had

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been abused, it does not mean that 50% of abused children will be incarcerated). Just because things are correlated or related does not mean they have a causal relationship (e.g., many families in the child welfare system have low income levels, but poverty does not cause child maltreatment.)

Share the analysis with others. When planning for data analysis CQI staff should keep in mind how they will share this information with others. Will this information be shared in person or electronically? Either way, tell the story of the data and effectively explain what the data show. Data should be translated into usable, applicable information. Consider who the audience will be and what their need and interest level is when preparing an analysis for presentation. Data can be displayed in many formats. Maps, graphs, charts, pictures and diagrams can be incorporated but the key is to keep it simple. Always translate complicated statistics back to descriptive statistics.

Different reports have different purposes (e.g. fact sheets, topical reports, dashboards, etc.). Choose a format with careful consideration. The content should be the main focus. To make sure an analysis is clear and makes sense to others, share it first with a small group of individuals and request feedback. People learn differently, so consider preparing an analysis to accommodate multiple learning styles. If doing an in person presentation, be respective of the time available and use it well.

CQI staff should also help coach agency staff on how to have productive conversations around data. This will help staff use the data and information for action planning. If other managers or staff are going to present on data findings, CQI staff can meet with them beforehand to help them prepare.

III.   Implementation Barriers

Lack of training and resources. Finding people with analysis skills who understand practitioners and can translate data into useable information is difficult. A strategy to address this is to develop data champions among interested staff. Also, if data are incorporated as a part of all meetings, skills in conversing around data and using it in action planning will grow among staff.

Fears and uncertainty about data. Information may contradict long held assumptions and myths that have to be given up if the data are to be believed. Don't jump to conclusions; consider all options, develop multiple interpretations and keep the discussion open. People think they know and may resist information as not accurately portraying the situation. Persist in building the capacity to use data even when it dispels current beliefs.

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People worry that data will make them (or their staff, units, offices, etc.) look bad. It may or may not show some bright spots. In either case, knowledge is power. Information should not be used to penalize staff; it should stem from curiosity and a desire to learn and be used to improve systems.

Data can be used to support a wide range of agendas, including those challenging to child welfare. Data exploration by those outside of child welfare or adversarial parties may be viewed as a real threat. Leadership needs to set clear expectations for using data and ensure options for people to provide feedback and have a dialogue.

## IV.	Background Information and Materials

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[i] Using Continuous Quality Improvement to Improve Child Welfare Practice – A Framework for Implementation, Casey Family Programs and the National Child Welfare Resource Center for Organizational Improvement, May 2005. http://muskie.usm.maine.edu/helpkids/rcpdfs/CQIFramework.pdf

[ii] Information Memorandum: Continuous Quality Improvement in Title IV-B and IV-E Programs. ACYF-CB-IM-12-07. http://www.acf.hhs.gov/programs/cb/resource/im1207

[iii] This was an intense working meeting that detailed the current needs and successes among child welfare jurisdictions in the core implementation components of CQI. Prior to the meeting participants received and reviewed draft working papers developed by the NRCs on 8 CQI core components. Participants with shared expertise worked in groups during the meeting and focused on refining the working papers on the content and execution of CQI core components. Large group sessions focused on the links between these components and the technical assistance (TA) needs of jurisdictions. As key stakeholders in the process, participants defined their needs, shared their successes and struggles, and thought creatively to further refine a CQI framework to advance the work in child welfare. The NRCOI and NRC-CWDT thank them for these efforts.

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