**Using Time-Motion Charts to Identify Programmatic Synergies
and Monitor Outcomes of Integrated Interventions**

This how-to guide was created by Jennifer Yourkavitch of ICF International/MCHIP and shared during an online discussion forum on "Monitoring and Evaluation (M&E) of Postpartum Family Planning Integration," hosted by the Maternal and Child Health Integrated Program (MCHIP) from September 24 to October 31, 2013.

Please note that accessing the three attached handouts is essential. The sample time motion charts developed by Jennifer and described in the handouts can be accessed at http://bit.ly/chartebfcs.

Google time-motion charts can be used to monitor and evaluate the outcomes of our integration efforts. This tool can be one piece of a systematic evaluation of programmatic efforts to integrate technical areas through a common delivery mechanism. The chart is useful for examining **outcome indicators**—the end result of our integration efforts. However, it does not replace good process monitoring which tells us how the actual implementation is going—e.g. indicators like "number of community-based agents trained in FP and infant and young child feeding (IYCF) counseling" and "number of mothers receiving an FP message during a well-child visit."

The time-motion charts help us track changes in key outcome indicators like child spacing (CS) and exclusive breastfeeding (EBF) during the life of a project. Like every good monitoring tool, the chart tells us if we need to investigate or adjust processes to boost a lagging indicator. Comparing project results to national trends using time motion charts can tell us if our approach is "working"—that is, if outcomes in the project area are increasing at a **greater rate** than outcomes in the rest of a country.

The attached handout (A) explains the set-up of a chart that assumes integration of two interventions and compares two related outcome indicators in several projects over time. The instructions tell you how to adjust and run the Google time motion program. This example is a post-hoc analysis of the integration of CS and EBF in several projects supported by USAID's Child Survival and Health Grants Program over the past decade or so. A similar chart could be part of any project's final evaluation indicating the results of integration over different time points. It serves as an example for monitoring the progress of two indicators, representing the integration of two interventions.

Handout (B) is from a USAID Maximizing Access and Quality (MAQ) presentation. It illustrates how time-motion charts can be used to report results of your project in a single graphic. It can function as an informative piece of a larger, mixed methods evaluation that reports contextual factors to facilitate understanding of the quantitative data. Charts can be set up to visually compare data from two or more projects.

What if you want to monitor more than two indicators? Handout (C) illustrates how to do this, using mock data for several key child survival indicators. Note the comparison to DHS. Handout (C) also describes a comparison of project to DHS data for several indicators and a comparison of project to DHS data for two indicators in multiple projects/countries.

CREATING A TIME-MOTION CHART
To get started making your own Motion Charts, all you need is a free Google account.

1) Go to drive.google.com and sign in with your Google account (or if you do not have a Google account, click "Create an account" to set one up).
2) Click the "Create" button in the upper left corner and select "Spreadsheet."
3) In the first column (Column A), put in the items you want to track as bubbles in the chart – for example, countries.
4) In the second column (Column B), put in the date/time period – for example, year or quarter.
5) In the next columns, enter in your data (e.g. rate of exclusive breastfeeding, child spacing, population size, etc.)
6) In your spreadsheet, select the cells with the data you'd like to include in the chart.
7) Click on "Insert" in the top menu and select "Chart".
8) The Chart Editor Start tab will show you recommended chart formats -- Select "Motion Chart." (If it is not in the Recommended charts section, click on the Charts tab, select "Trend", and then select "Motion Chart").
9) Click "Insert." The chart will be placed in your spreadsheet.
10) Customize color, size, and other settings either in the Chart Editor or after you have inserted the chart to adjust how the data is displayed.

Handout A – Time Motion Charts for Exclusive Breastfeeding (EBF) and Child Spacing (CS)

NOTE

This Google Motion Chart was originally created by Jennifer Yourkavitch, MCHIP/ICF International, for presentation at the Maternal and Child Health Integrated Program's "Maternal, Infant, and Young Child Nutrition – Family Planning Integration Technical Meeting," held in May, 2010. It depicts project data from USAID's Child Survival and Health Grants Program using software popularized by Dr. Hans Rosling (www.gapminder.org). This analysis focuses on child spacing and exclusive breastfeeding indicators in selected NGO project areas over the past decade, with the purpose of identifying real or potential programmatic synergies between family planning and infant feeding interventions.

Two charts are included: the first is populated by projects that included both interventions; the second is populated by projects that included an EBF intervention but not a child spacing intervention. These notes give an explanation of the data along with instructions on how to run the program. If you do not want to run the program, simply skip those instructions and look at the screen shots provided with the text.

RUNNING THE PROGRAM

To run the program with the first chart, open the following link in a web browser:
https://docs.google.com/spreadsheet/ccc?key=0AlBwWYr7wRVddEctamRYSXhGYWhOaV9jeF8xeWtmdEE&usp=sharing

(If a box appears asking if you want to view only secure content, click "No")

Then make these adjustments to settings (see red arrows in screen shot, below):

1. Click on the "Chart 1" tab at bottom.

2. On the right side, click "color" and choose "unique colors."

3. In that same column click "size" and choose "population size."

4. Run program by clicking the "Play" arrow in the lower left-hand corner.

EXPLANATION OF CHARTS

The screen shot of this chart (below) depicts the baseline values in the project areas.
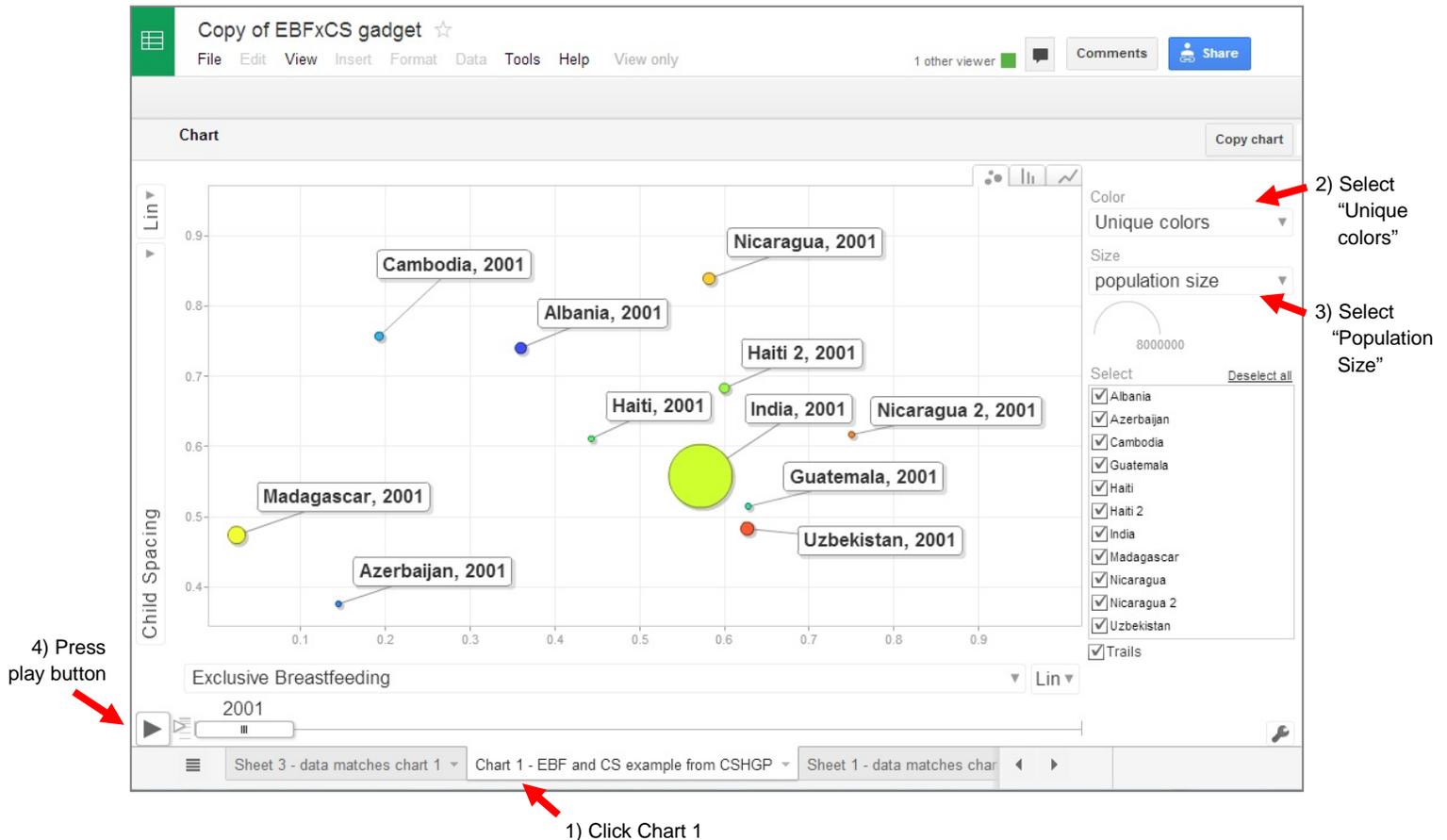
Vertical (y) axis: Child spacing (CS) rates in project areas.
For this analysis, child spacing is defined as the birth interval between the two youngest surviving children. It is measured as the percentage of children age 0–23 months that were born at least 24 months after the previous surviving child (based on children alive at time of interview).

**Horizontal (x) axis:** Exclusive breastfeeding (EBF) rates in project areas.
For this analysis, EBF is measured as the percentage of infants age 0–5 months that were exclusively breastfed in the last 24 hours.

Size/population: Population of project area determines the size of the bubble.

Other notes: You can click on a bubble to see rates and population size. Some projects started later than others, so those bubbles will not move immediately; likewise, some projects ended earlier, so those bubbles will hold their places during the later years of the analysis period.

QUESTIONS/INVESTIGATIONS: What can we learn from these projects?

This screen shot of the first chart (below) depicts final values for project areas. For discussion, it is useful to divide the chart into quadrants by drawing a line from point (0, 0.65) across and from point (0.65, 0) up. This line is red in the chart above. I chose the value (0.65, 0.65) because it is roughly the center of this grouping of projects.
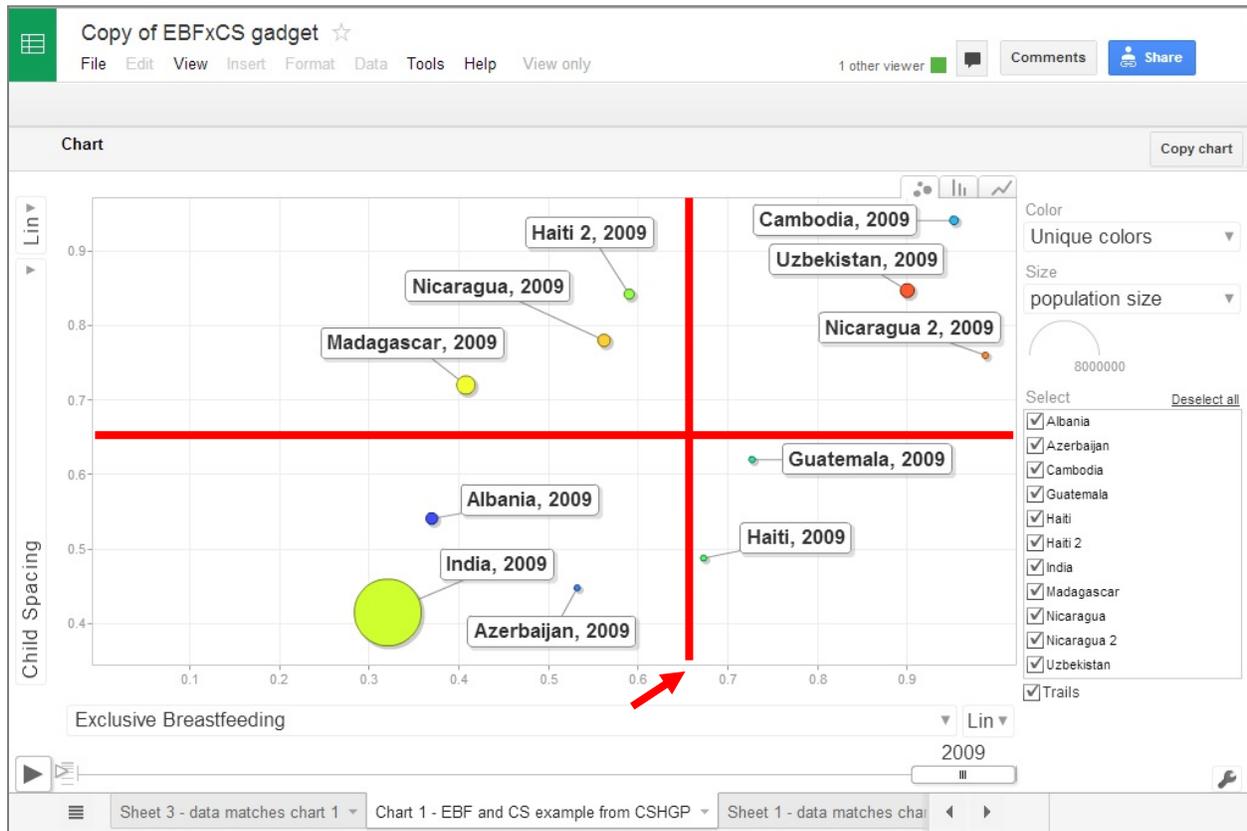
Quadrant 1 (upper right-hand side): Indicates high CS and high EBF; includes project areas in Cambodia, Uzbekistan, and Nicaragua (note sizes of populations).

For these projects, we would want to define and document the approach as clearly as possible. We could identify programmatic synergy by examining these parameters of the approaches:

- **Site** – What took place in the community? What happened at the facility? What work was done related to policy?
- **Agents** – Who was involved in the intervention and in what capacity—health workers, peers, family members, religious leaders, others?
- **Timing** – When were points of contact—ANC? PNC? During first six months (EBF period), well-child visit?
- **Context** – Are there supportive policies? How strong is community capacity in terms of cohesion, agency, self-reliance, etc.

Quadrant 2 (upper left-hand side): Indicates high CS and low EBF; includes projects in Haiti, Nicaragua, and Madagascar (note sizes of populations).

We want to know what was missing in these approaches or context that was present in the project areas of Quadrant 1. With EBF around 50%, do we know who is not exclusively breastfeeding in these project areas? What are the characteristics of those mothers? We may uncover some missed opportunities to conduct formative research—like barrier analyses or doer/non-doer analyses.

Particularly in the case of Nicaragua, it would be important to uncover which elements of the project in Quadrant 1 were missing from the project that falls in Quadrant 2, since both operated in a similar environment.

It is interesting that child spacing messages seemingly resonated with this population, but EBF messages did not. We should examine the accessibility of family planning services and determine ways to integrate optimal infant feeding support into those services.

Quadrant 3 (lower left-hand side): Both CS and EBF rates are low; as such, they don't merit examination for our purposes.

Quadrant 4 (lower right-hand side): Higher EBF, low CS; includes the project in Haiti.

We want to know if the child spacing barriers in this area were the common barriers — lack of access to services and stockouts? Or is something else going on?

Higher EBF indicates an opportunity to promote the Lactation Amenorrhea Method—did the project do that?

Other Notes:

Trails provide additional information. To generate the graph on the following page, **re-run the program after putting a check mark in the boxes on the right side for Guatemala and Azerbaijan, and ensuring that the "Trail" box is checked.** The chart below depicts the trails that follow data from the projects in Guatemala and Azerbaijan from baseline to final measures.

Note the slope of the project in Guatemala (m=1/2, or the slope is nearly equidistant between axes)—perhaps with more time this project area would have seen higher rates of both indicators. Refer to project documents to examine programmatic synergies and analyze approach parameters as described under Quadrant 1.
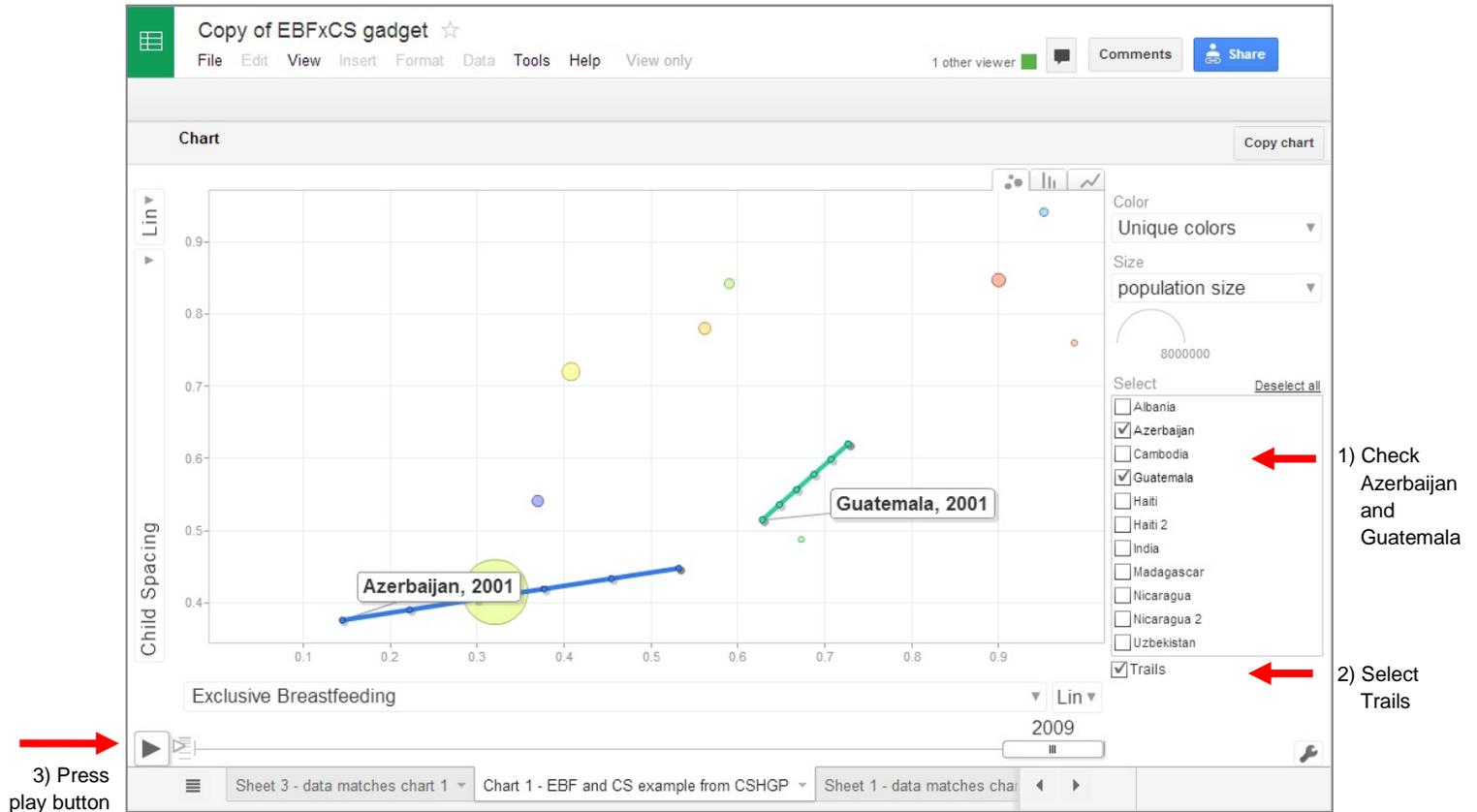
Although the EBF rate in Azerbaijan remained low overall, this project area experienced a considerable increase in EBF. It is worth examining the approach to learn how this behavior was introduced and subsequently adopted by so many in an area where it had been rarely practiced when the project began. What individual and environmental factors supported its adoption? With more time, could it have increased further? The answers to these questions have important policy implications.

CONCLUSION

This analysis demonstrates the utility of a program that can visually present several variables simultaneously (rate of child spacing coverage change, rate of EBF coverage change, population size, location, time). For our purpose of finding synergies between infant feeding and family planning programming, this kind of analysis helps to identify appropriate avenues of investigation, depending on unique project variables. Follow-up investigations with project staff or using project documents could yield important information about how to design projects so that they can build upon thematic, structural, and biological synergies to increase rates of both optimal infant feeding and family planning efficiently and effectively.

USAID Child Survival and Health Grants Program
Selected Results, Exclusive Breastfeeding and Child Spacing 2001 – 2009
By Jennifer Yourkavitch, MPH, CLC
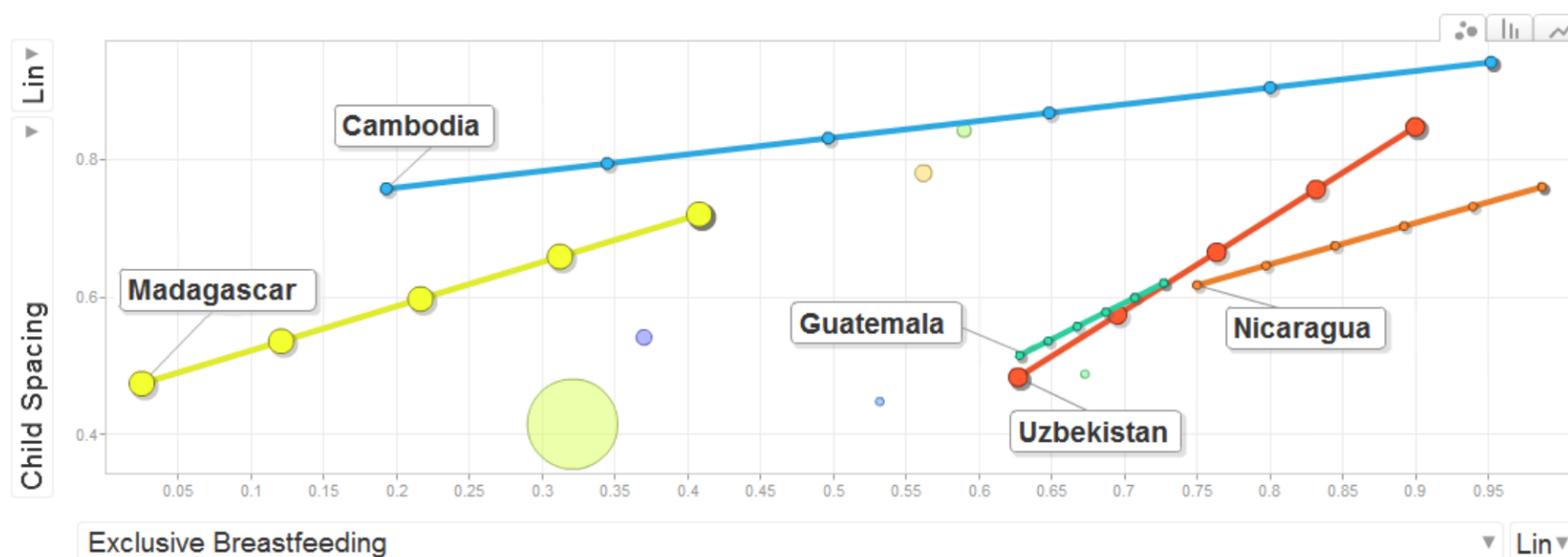
Selected Attributes of Integrated Approaches

	Cambodia*	Guatemala	Madagascar**	Nicaragua	Uzbekistan**
Population	126,658	62,428	564,323	66,044	315,962
Agents	VHVs, CHE, CBDs Religious leaders TBAs Mothers groups HWs	Mothers(Care Groups) HWs	Mothers (VISA) CHVs CBDs HWs mass media	CDCs CHVs TBAs	Community leaders CHVs Visiting nurses HWs
Sites	Home Community Facility	Home Facility	Home Community Facility	Home Community	Home Community Facility
Timing	ANC, PNC Child < 5	Child < 5	PNC Child < 2	ANC, PNC Child < 5	ANC, PNC Child < 2
Policy	EBF for 6m CBD for FP	EBF for 6m facility-based FP	EBF for 6m CBD for FP	EBF for 6m Community pharms for FP	Baby-Friendly Hospitals facility-based FP

*not an extension of a previous project
**co-funded by USAID's Flexible Fund

References
Beracochea, E. et al. "Curamericas Guatemala Census-Based Impact Oriented Child Survival Project Final Evaluation Report" submitted to USAID's CSHGP, Cooperative Agreement HFP-A-10-02-00034-00. Raleigh, NC; Curamericas Global, 2007
Debay, M. "Final Evaluation of the Toliara Province Child Survival Project" submitted to USAID CSHGP, Cooperative Agreement FAO-A-00-98-0002700. Silver Spring, MD: Medical Care Development International, 2007
Wako, S. et al. "Healthy Children in Healthy Communities" Final report submitted to USAID CSHGP Cooperative Agreement HFP-A-00-01-00032-00; Silver Spring, MD: ADRA, 2006
Wako, S. Freeman, P., et al. "Final Evaluation Child Survival XVII" submitted to USAID CSHGP Cooperative Agreement HFP-A-00-01-00039-00; Silver Spring, MD: ADRA, 2006
Wilcox, S. "Increasing the Quality of Child Survival and Maternal Care Services in the Navoi Oblast of Uzbekistan." Final Report submitted to USAID CSHGP Cooperative Agreement FAO-A-00-99-00026-00; Millwood, VA: Project Hope, 2007

Resources
Interested in integration of family planning and maternal, infant, and young child nutrition?
Join MIYCN-FP Community of Practice: https://knowledge-gateway.org/miycnfp

Google Time Motion Charts
- Quick guide to the motion chart: http://www.gapminder.org/upload-data/motion-chart/
- Motion chart overview: https://support.google.com/drive/answer/1047434?hl=en&ref_topic=30240

To run the Google Time Motion program, open the following link in your internet browser: [https://docs.google.com/spreadsheet/ccc?key=0AlBwWYr7wRVddEctamRYSXhGY WhOaV9jeF8xeWtmdEE&usp=sharing](https://docs.google.com/spreadsheet/ccc?key=0AlBwWYr7wRVddEctamRYSXhGYWhOaV9jeF8xeWtmdEE&usp=sharing)

(If a box appears asking if you want to view only secure content, click "No")

For a comparison of Project Data to DHS[1] for one indicator in multiple projects/countries:

1. Click on the "Chart 2" tab at bottom.

2. On the right side, click "color" and choose "unique colors."

3. In that same column click "size" and choose "population size."

4. Run program by clicking the "Play" arrow in the lower left-hand corner.

For a comparison of Project Data to DHS for multiple indicators in a single country:

1. Click on the "Chart 3" tab at bottom.

2. On the right side, click "color" and choose "unique colors." [2]

3. Run program by clicking the "Play" arrow in the lower left-hand corner.

For a comparison of Project Data to DHS for two indicators (which specifically compare the effect of integration in the project area to the rest of the country):

1. Click on the "Chart 4" tab at bottom.

2. On the right side, click "color" and choose "unique colors."

3. Run program by clicking the "Play" arrow in the lower left-hand corner.

Select trails if desired; it helps to interpret the outcomes. Moving the cursor over a bubble will identify it.

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[1] Annual DHS data are calculated by averaging the difference between DHS surveys (usually every 5 years or so) across the years between those surveys. For example, if a survey in 2001 found 39% EBF and the next survey in 2006 found 49% EBF then 49 – 39 = 10 and 10 / 5 (years) = 2 percentage points per year. So each DHS estimate increases by 2 percentage points from the previous year. If only baseline and final project data are available, then annual estimates are calculated the same way.

[2] We do not need to adjust the "size" setting because we are comparing coverage in a single country and thus not reporting population size. This characteristic is more important when comparing multiple projects or countries.