Big Data Principles for Small Data CQI

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Overview

Principles of big data practice – using big data principles in a smaller data setting

1. Triage
2. Timing
3. Monitoring those services and improving them

What are we talking about here…

Best practices in measuring child welfare outcomes…

- Analytic techniques, themselves, may seem basic… however, child serving agencies often do not implement them.
  - e.g., development of databases and dashboards without careful attention to essential principles of measurement

- …so that agencies generate the evidence they need to make investments that lead to improvement.

Big Data (small data) in child welfare

- Electronic administrative databases/electronic case management systems
    - Child and family characteristics
    - Variables pertaining to safety, permanence, well-being
    - Record of key events: admission, placements, exit, etc.
    - Locate children in the agency structure: geography and business units
- Analyzing these databases can give us the evidence we need to guide the process of improvement.

Four principles of big data practice for effective child welfare decision making[1]

1. Start by asking a question.

2. Arrange and analyze the data in ways that support the ability to answer essential questions. (Longitudinal database)

3. Be disciplined in converting data to evidence.
   - Entry cohort analyses
   - Accommodating censored observations
   - Using correct numerators and denominators

4. Use evidence to build a theory of change.
   - I observe that… I think it's because… **so I plan to**… which I think will result in…

[1] Lery, B., Haight, J. M., & Alpert, L. (2016) Four principles of big data practice for effective child welfare decision making. *Journal of Public Child Welfare, 10*(4), 466-474

Questions…

Identifying the target population

- Which children are most/least at risk of experiencing the outcome you are trying to prevent/promote?

Timing the intervention

- When should we introduce the intervention if we want to maximize the potential for effectiveness?

Treatment group and implementation

- After implementation begins, what can we learn about fidelity to the intervention?
- What adjustments are necessary?

Identifying the Target Population

- Triage is an aspect of targeting.
- Describe characteristics and trajectories of people we may want to target.
- Decide who to target based on a triage strategy that fits an intervention's theory of change.

Triage and Targeting: ACF Supportive Housing RCT

"…evidence that the target population includes only families who are most in need of and who would derive the most tangible benefit from receiving assistance…"

- Triage:
  - "the assigning of priority order to projects on the basis of where funds and other resources can be best used, are most needed, or are most likely to achieve success"

What do you need to know?

Where are you going to get it?

Who: What do homeless families look like?

	Number		Percent	
	Homeless	Not Homeless	Homeless	Not Homeless
Total (9,303)	557	8,746	6%	94%
Race/Ethnicity				
Asian/PI	41	1,487	7%	17%
African American	250	2,727	45%	31%
Hispanic	159	3,001	29%	34%
White	102	1,091	18%	12%
Other/Unknown	5	406	1%	5%
Gender				
Female	275	4,332	49%	50%
Male	282	4,383	50%	50%
Age				
0	197	798	35%	9%
1-5	157	2,382	28%	27%
6-12	120	3,435	22%	39%
13-17	83	2,127	15%	24%

Who: What are the major risk factors?

Prevalence of Risk Factors Among Homeless and Not Homeless Families

	Number*		Percent	
Total n=9,303	Homeless	Not Homeless	Homeless	Not Homeless
Risk Factors				
Domestic Violence	117	1,062	21%	12%
Mental Health	200	974	36%	11%
Substance Abuse	255	1,377	46%	16%
Medically Fragile Child	52	104	33%	67%
*Risk factors are not mutually exclusive.				

Characterizing *who* has something to with *when*

Sample Trajectories	
TWO EVENTS	A: REPORT NO SECOND
	B: REPORT REPORT
	C: REPORT OPEN
	D: HOMELESS REPORT
THREE EVENTS	E: REPORT OPEN NO THIRD
	F: REPORT OPEN REPORT
	G: REPORT OPEN PLACE
	H: HOMELESS REPORT OPEN
	I: REPORT OPEN HOMELESS

How risky are the risks?

Probability of Placement for Program Eligible Children by Risk Factor

		Number		Percent	
Total Eligible (n=282)	Total*	Placed	Not Placed	Placed	Not Placed
Risk Factor					
Domestic Violence	79	57	22	72%	28%
Mental Health	157	128	29	82%	18%
Substance Abuse	187	160	27	86%	14%
Medically Fragile	45	39	6	87%	13%

*Risk factors are not mutually exclusive.

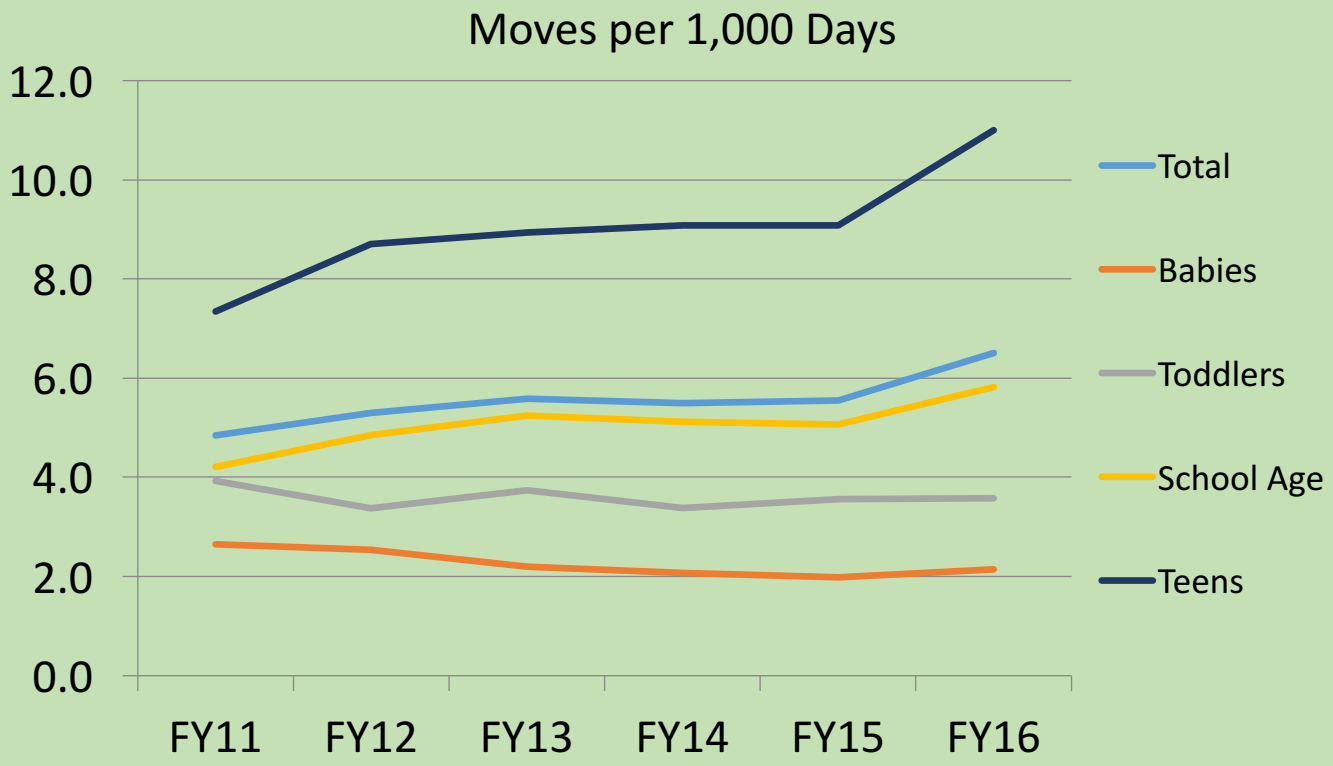
Triage Protocol

Criteria for San Francisco program eligibility:

- Currently homeless
- Beginning their first child welfare case
- Children are not yet in out of home care or recently placed
- One or more presenting needs such as:
  - Domestic violence
  - Mental health problems
  - Substance abuse

Timing the intervention

The Problem: Move Were on the Rise



The Intervention: Project KEEP

- Caregiver-mediated intervention: foster parents (kin and non-kin), adoptive parents
- 16 weeks, 90 minutes per session, group format
- Weekly checks of caregiver stress levels
- Well-being and permanency goals:
  - Reduce caregiver stress in response to child behavior problems
  - Improve caregiver capacity to manage child behavior problems
  - **Improve the stability of out-of-home placements**
  - **Increase the likelihood of and decrease the timing to permanent exits from care (reunification, discharge to relative, adoption)**

The Plan

- First train foster parents (kin, non-kin, adoptive) per system-wide, model
    - Training begins prior to first placement of foster child and continues for several months following licensing/placement
    - Occurs monthly
    - Covers general topics: maltreatment types, intro to trauma, discipline, etc.

- KEEP training to begin after required system-wide training

What do you need to know?

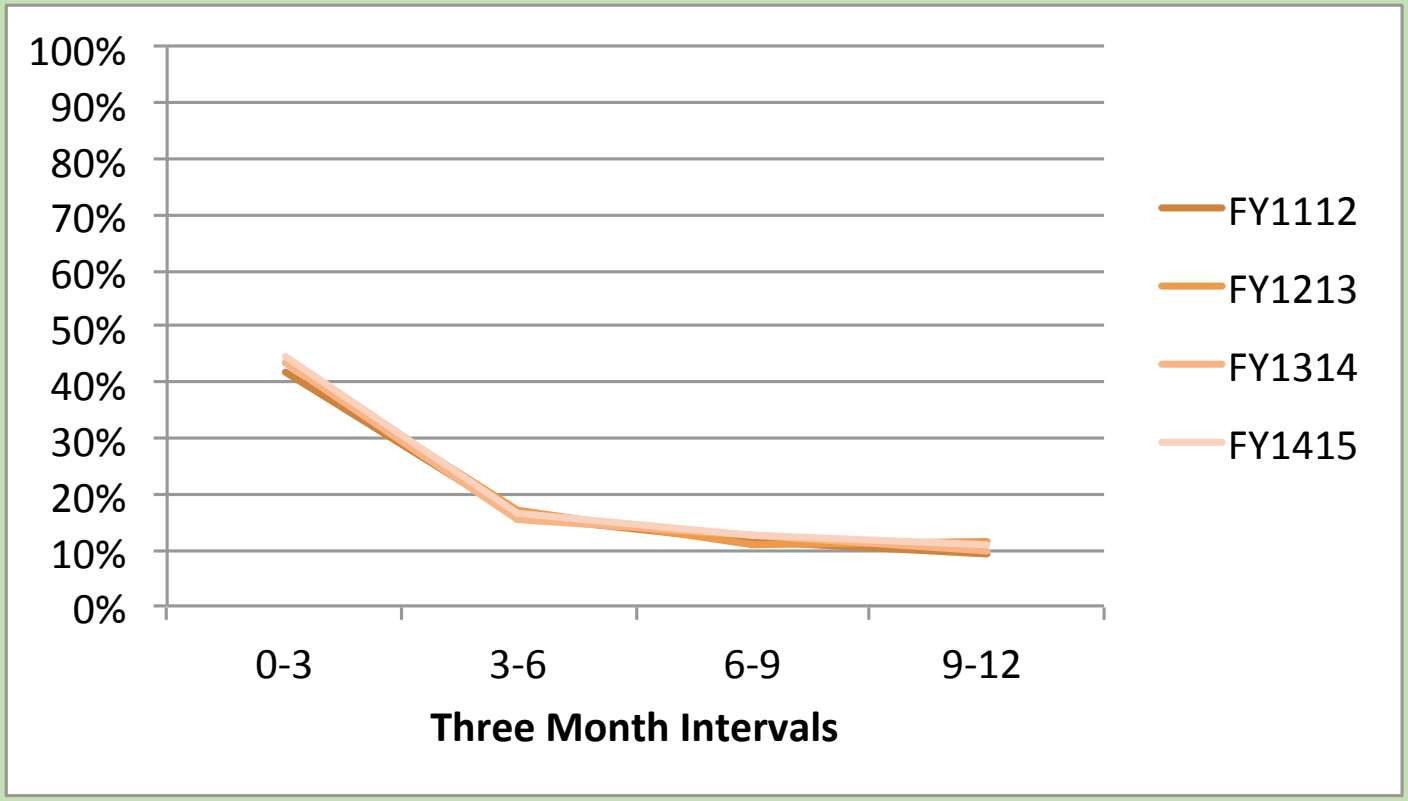
Who gets this training?

How do you roll it out?

Intervention to begin 7 months into the foster care placement

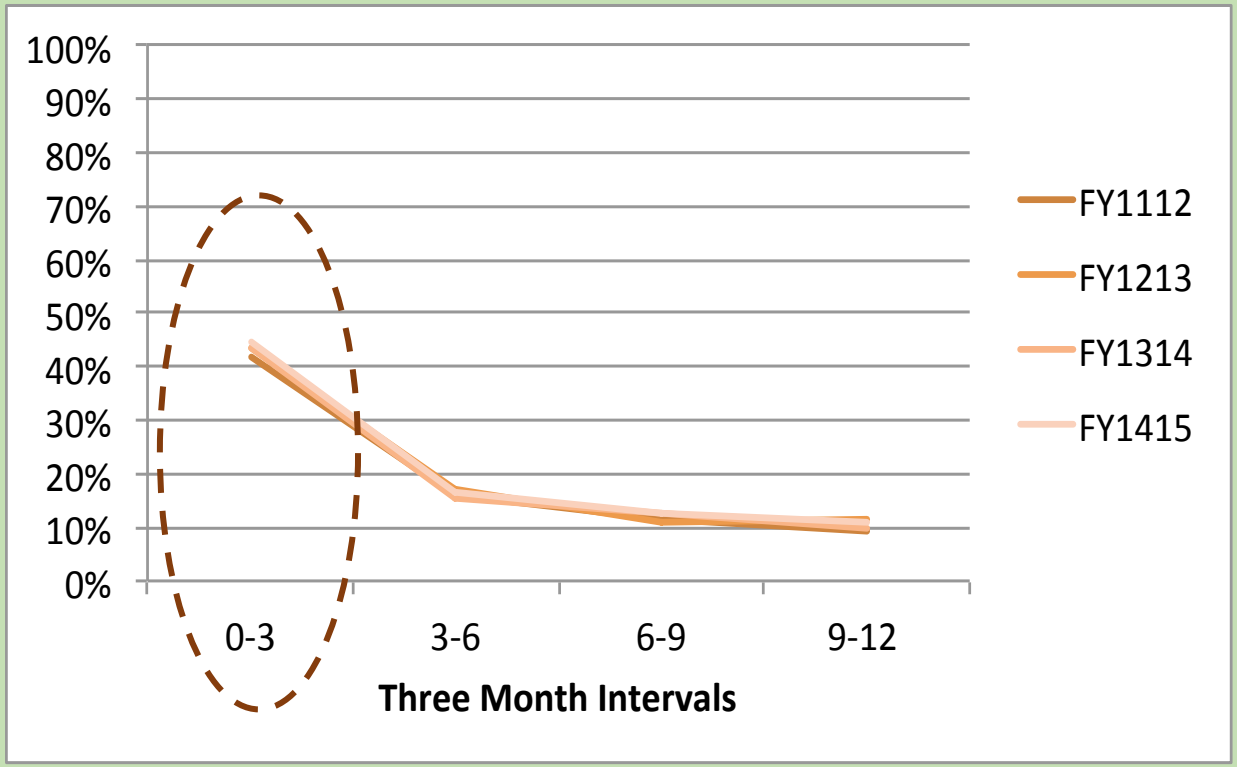
This timing is okay… right?

When do children move?



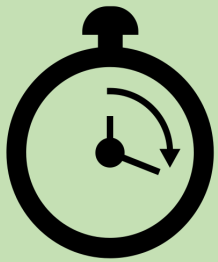
Year after year, we see that children in this system are most likely to have their first placement change within the first three months of their foster care spell.

The timing is way off.



If you wait 7 months to offer an intervention designed to prevent placement change, most of the children who were going to have a placement disruption *will have already had that experience*.

If the intention behind the intervention is to alter the trajectory of children receiving services, then the challenge is to time the intervention such that it has a reasonable chance of doing just that.



Created by Symbolon
from Noun Project

Adaptive Implementation, CQI & Monitoring

Implementation – Early Action

- Built an event-based project database that was designed to collect data from all project partners AND to easily link that data to the child welfare administrative database
- Collected data regularly
- Established a CQI process, supported by data from the project database and used that to track early implementation.

Implementation

The enrollment flow projections reflected three assumptions:

1. Families would receive intensive case management services – a minimum – 5 hours per month AND

2. Given the range of resources and support available to help locate suitable housing, the treatment families would be housed rapidly (within weeks)

3. So that – after housing was secured case management hours could be dedicated to supportive services for the families

Project Implementation Dashboard

- Developed the dashboard using the purpose build data base structured as an event file
- Permitted the status check that is essential to program monitoring
- Guided team toward the precise analytic questions about what evidence the FMF team need to have in order to address program challenges.

FMF families were NOT rapidly housed in permanent housing

Caseloads were growing

FMF-DASHBOARD		Treatment	
#	Component	Cumulative Total	New in Report Month
1	Families randomized to FMF	**79**	0
2	Families in referral > 30 days with no FTM[1]	0	0
3	Families Enrolled in FMF (First FTM held)[2]	**70**	0
4	Families in referral > 30 days with no FTM, >10 service hours[1]	0	0
5	Families for whom initial ANSA is complete	67	0
6	Program Graduations[3]	10	0
7	All other exits that had at least one FTM	22	0
8	Exits that never engaged	9	0
9	Families Currently Enrolled[4]	**38**	
10	Families in Inactive Status[4]	1	0
11	Families in Check-in Status	11	0
12	Families Currently Active in FMF (subtracting inactive and check-in)	**26**	
13	Active FMF Families for whom all Child Welfare Cases are closed	14	2
14	Enrolled Families with Subsequent Current Child Welfare Cases [5]	4	0
15	FTM's Indicated (not including Initial Team Meetings)[6]		12
16a	FTM's Held (not including Initial Team Meetings)[2]		5
16b	FTM's Scheduled but not Held		0
17	Families with at least 5 hours of HPP direct services[7]		19
18	Active Housed Families	**22**	**2**
19	Active Housed Families with at least one home visit this month		12
20	Families in adult inpatient treatment facilities	2	0
21	Families currently using shallow subsidies	2	0
22	Families currently using deep subsidies	6	0
23	Families currently housed in Holloway	4	0
24	Families currently holding FUP voucher	23	0
25	Families using LOSP	9	1
26	Families housed with temporary funding (deep or shallow subsidy f	8	0
27	Families housed with long-term funding (FUP, LOSP, public housing	38	2
	Total families housed	**46**	2
28	Families housed outside of SF	22	0
29	**Active Families still searching for housing**	**4**	0

So … we asked some questions

- What did we need to know?
- How long does it take to secure permanent housing for project families?
- How much time are case managers spending with FMF families?
- Was there variation in case management time or time to housing based on attributes of the FMF families?

How long does it take for families to get housed?

Housing Process for Treatment Families Total and by Entry Year							
		Family Count	Min Days	Max Days	25th Percentile	Median	75th Percentile
1: 2013-2014	Days from Housing Intake to Lease	25	2	776	209	**288**	422
2: 2015-2016	Days from Housing Intake to Lease	21	78	560	239	**313**	443
	Days from Housing Intake to Lease	46	2	776	216	**302**	443
		Family Count	Min Days	Max Days	25th Percentile	Median	75th Percentile
Family Reunification	Days from Housing Intake to Lease	14	121	511	216	**253**	303
Family Maintenance	Days from Housing Intake to Lease	32	2	776	225	**313**	463

- The housing process was much longer than FMF team had anticipated
- For all project families, it took between 9 and 10 months for half to be housed
- This was consistent for those enrolled over time
- Variation in time to housing is observable for FR families relative to FM families

How much time do case managers spend with FMF families?

Case Management Hours Per Month for Treatment Families with 30+ Program Days

	Family Count	Missing	Min	Max	Mean	25th Percentile	Median	75th Percentile
All Program Days	51	0	0	27	9	4	**7**	14
Pre Lease	13	38	0	26	12	9	**9**	18
Post Lease	13	38	1	32	10	4	**8**	12

Case Management Hours Per Month for Treatment Families with 30+ Program Days by HPP Status

			Family Count	Missing	Min	Max	Mean	25th Percentile	Median	75th Percentile
Family Reunification	Active	All Days	16	0	2	19	9	4	**7**	15
	Inactive	All Days	5	0	0	7	3	2	**3**	5
	Check-In	All Days	2	0	4	5	5	4	**5**	5
Family Maintenance	Active	All Days	24	0	2	27	12	6	**10**	16
	Inactive	All Days	3	0	2	3	2	2	**3**	3
	Check-In	All Days	1	0	3	3	3	3	**3**	3

- Families used about 7 hours per month of case management time.
  - For the three HPP caseworkers (on average) this was ALL working time.
  - Pre lease time (as observed) was slightly higher than post-least time.
- Looking at all families, by CW type and HPP status, expected variation in case management hours is observable

How can you progress through program phases when housing takes so long?

What we learned

- The flexible, event-based data base supported continuous review of implementation and program monitoring.
- FMF leadership team used this asset to support best practices in evidence use and in CQI for implementation
- Same asset will be deployed to evaluate the impact of this intervention.
- And importantly – the team will also be able to speak precisely about what it will take to sustain it.

Remember:

1. Start by asking a question.

2. Arrange and analyze the data in ways that support the ability to answer essential questions.

3. Be disciplined in converting data to evidence.

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