Using Agency-wide Dashboards for Data Monitoring and Data Mining: The Solano County Health and Social Services Department

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The Director needed accessible data on critical program areas in order to monitor changes presenting potential negative impacts. The Research, Evaluation and Planning division spearheaded the Dashboard featuring the seven program areas (Employment & Eligibility, Child Welfare Services, Mental Health, Public Health, Older Disabled Adult Services, Substance Abuse, and the Special Investigations Bureau), and three administrative units. Deputy Directors specified several key areas that their divisions were mandated to report or viewed as important for monitoring. The Dashboard enables Directors to communicate internally and externally about program results, strengths and growth areas, as well as track progress in relationship to strategic plan initiatives and intervene in areas needing improvement. Executive team members identify critical areas for improvement and the Assistant Director for Research and Evaluation implements corrective action through the Quality Assurance Committee. Agency lessons relate to the importance of automation, data interpretation, and team members' understanding of the indicators, related practice strategies, and contextual factors.

KEYWORDS   Dashboard, data mining, data monitoring

INTRODUCTION: CREATING A DASHBOARD

The idea of the dashboard came about when the current Solano County

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Health and Social Services Department (H&SS) Department Director, Patrick Duterte, began at the agency in 2001. As a director of an agency that has a $263 million dollar budget, 1200 employees, and seven program service areas, he needed easily accessible data on each of the critical program areas in order to assess changes that may prove to be harmful to clients or the agency as a whole. These hot-spots needed to be closely monitored in order to avoid any negative impacts. An entire agency could potentially suffer if an issue in one division is not addressed in a timely manner, and the credibility of the agency could be damaged due to the performance of one division. Negative community or client impact could lead to bad press in the media, budget reductions, and/or difficult political problems.

Another reason for creating a dashboard was the need for more transparency of data across departments, especially to highlight areas that reflected improvement as well as areas that needed improvement. In a large social service agency there is a tendency for each division to work separately as if they were in silos. The dashboard allows all divisions to see what is going on in other program areas, opens the doors to communicating about program results, program strengths, and data from program growth areas. When additional resources are needed in a particular division or area, data from the dashboard can be used to document the need for more effective client services.

Another use of a dashboard is to report out data to the public and to the Solano County Board of Supervisors. When the board of supervisors supports the creation of a new or updated strategic plan, the H&SS department is able to use the plan to create the metrics needed to assess output and outcomes. A reporting tool was needed to allow the H&SS department to update the board of supervisors on a monthly basis about the specific measures in the strategic plan. While there are many measures of outcomes beyond the limited number noted on the dashboard, the dashboard is an efficient tool for reporting the data that is useful both internally to the agency and to the board. In addition, each of the H&SS divisions has a strategic plan with outcomes measures and deliverables that are related to Solano County's Strategic Plan. The dashboard enables the executive team to track the progress being made by their divisions in relationship to the strategic plan initiatives as well as intervene in areas that need improvement.

Prior to the creation of the dashboard, no reporting system existed within the agency to address issues across programs for the executive team and directors to review and discuss. It was the creation of a new Research, Evaluation and Planning Division that spearheaded the data reporting project and the launch of the dashboard in early 2007 that featured each of the seven program areas, as well as the administrative units that handle budgeting, hiring, and staff training. The seven divisions are: Employment & Eligibility (E&E), Child Welfare Services (CWS), Mental Health, Public Health, Older

Disabled Adult Services (ODAS), Substance Abuse, and the Special Investigations Bureau (SIB).

The dashboard indicators were gathered through a collective process with the deputy directors of each division who specified three to four key areas that their division were either mandated to report or viewed as important for monitoring service provision. The management philosophy of the department is based on the principle that the best decisions are made by those closest to the issues. As a result, the deputy directors are able to make decisions based on their intimate knowledge of their service program and therefore needed to identify the key metrics for inclusion on the dashboard. The deputy directors also solicited feedback from their staff members in order to ensure that there was buy-in from all levels of the agency regarding the metrics being used on the dashboard that would inform staff about key aspects of their work.

USING THE DASHBOARD FOR MANAGERIAL DECISION MAKING AND STAFF EDUCATION

Before the dashboard was created, the Planning Department was sending data to the deputy directors based on the objectives in the strategic plan but the data were not organized in a way that the executive team could make informed decisions. The sea of data could be overwhelming at times. There was a need to have access to the most critical data that could be used to develop action plans for meaningful changes in client services.

Currently, the dashboard is only visible to the executive director, deputy directors, and managers and the data are reviewed monthly during meetings of the executive team. It is not shared more widely with staff and the media because the numbers could be interpreted incorrectly without placing them in the proper context. The executive team is responsible for disseminating the dashboard information, within the appropriate context, to line staff and partners in the community. While the dashboard adds another layer of complexity to agency management by displaying the inner-workings of the agency, it is also important to maintain good relationships with the board of supervisors and the community where data is more transparent about successes and areas for improvements.

When the executive team members review the monthly dashboard report, they discuss the direction of the arrows for each indicator that either points to: "above target for the month," "on target," or "below target." The red arrows are the first metrics to be explored since they indicate a metric being below target and may require immediate action. For example, more funds may be needed to hire more Child Welfare workers to address the "monthly visit completion rate." The dashboard has the potential to put

pressure on the board of supervisors for allocating more county funds to address costs not covered by state and federal funding. The department is continuously exploring the best way to use the dashboard data to advocate for change and securing needed resources.

Once the dashboard data is published each month, it is the role of the assistant director of Planning, Evaluation and Research to ensure that the agency takes immediate corrective action when needed. While the dashboard is an efficient tool to "take the temperature" on the hot items, it has little use unless it leads to action. After the data is presented to the executive team, the team members identify critical areas for improvement and refer these to the assistant director for Research and Evaluation to implement corrective action through the Quality Assurance (QA) Committee (comprised of all the QA Coordinators from each of the seven divisions). The turnaround time for putting a corrective action in place is two months from the date of the monthly dashboard report, and the desired result needs to appear in a changed indicator after two more months. For example, the "Mental Health acute hospital care utilization rate" relates to the Solano County cost of $837 per day for patient treatment in a state acute care hospital. In order to find ways to decrease the number of clients utilizing acute care (a current corrective action for the Mental Health Division), case files are continuously evaluated for the clients in acute care to see if they would be better served in the community.

Another example of how the dashboard is used to inform decisions is through finding possible errors in the reporting software. For example, the Child Welfare Services "monthly visit completion rate" metric was consistently in the 91%–94% range at the end of 2007 and early 2008, then suddenly the February 2008 the metric dropped to 76%. After some research, it was found there was an error in the software that records visitation rates and H&SS was able to fix this error before it could have created problems in reporting to the state.

DASHBOARD COMPONENTS

The key dashboard indicators that are updated monthly are illustrated in Appendix A. Within the report, there is a gauge-like image and color-coded arrows that serve as visual representations of the monthly metric for each indicator, compared to the target metric for that month. If an actual metric is above target, there will be a green arrow pointing up. If the metric is just about on-target, there is a blue arrow pointing side-to-side, and if the actual metric is below target, there is a red arrow pointing down. The Operations team manually enters in these graphics based on the data entered into the dashboard. The dashboard components and indicators follows.

INDICATOR	DIVISION	CONDITION	TREND	MAR 08	FEB 08	JAN 08	MAR 07	TARGET
8. Mental Health Acute Hospital Care Utilization (Admissions)	Mental Health		→	38	30	46	46	24
9. IMD (Institutions for Mental Disease) Utilization Rate (Beds Occupied)	Mental Health		→	42	39	37	41	24
10. Wait Time to obtain a Regular Appointment for Health/ Dental Clinic	Public Health		na	na	Vljo/FF/Dntl 3.3/3.25/3 Peds: 3/4.5/na	Vljo/FF/Dntl 4.5/3/4 Peds: 3/9/na	Vljo/FF/Dntl 2.75/2.75/6 Peds: 3/6.5/na	2 Weeks or Less
11. TB Referrals	Public Health		→	90	74	62	67	64.6 (Monthly Average FY 07)
12. WIC – Percent of Average Monthly Caseload Served	Public Health		↕	98.20%	97.90%	99.63%	97.32%	> 97%
13. IHSS Caseload[4]	ODAS	TBD	TBD	2,746	2,718	2,733	2,595	2,609.6 [Monthly Average FY 07]
14. APS -- Reports of Abuse/Neglect	ODAS		←	103	108	122	116	96.3 [Monthly Average FY 07]

[4] Beginning with the June dashboard, the IHSS measure will be revised to track intake and discontinuation of cases.

FIGURE 1 Dashboard Elements.

164

INDICATOR	DIVISION	CONDITION	TREND	MAR 08	FEB 08	JAN 08	MAR 07	TARGET
15. Number of Completed APS investigations[5]	ODAS		←	84	62	63	86	**79.5** [Monthly Average FY 07]
16. Percentage of IHSS Renewals (Reassessments) that are Overdue	ODAS		←	26.6%	31.3%	29.1%	na	< 10%
17. Substance Abuse Cumulative Client Treatment Completion Rate	Substance Abuse		↕	35.6%	35.3%	34.3%	40.9%	> 45%
18. Early Fraud Detection (% of Early Fraud Cases Denied/ Discontinued)	SIB		←	21.7%	18.5%	13.8%	16.7%	20.4% (Monthly Average FY 07)
19. Percentage of Fair Hearing Requests resolved prior to Hearing	SIB		←	67.0%	59.3%	na	na	> 50%

[5] Item 15 will be adjusted to track the percentage of APS investigations that are completed in a "timely" manner.

FIGURE 2 Dashboard Elements (*continued*).

165

INDICATOR	DIVISION	CONDITION	TREND	4th Qtr 2007	3rd Qtr 2007	2nd Qtr 2007	4th Qtr 2006	TARGET
20. Proportion of pregnant women screened for substance abuse (at participating clinics)[6]	Public Health		←	100%	90.7%	82.2%	50.2%	> 50%
21. Medi-Cal Performance Measures Combined Index Rate[7]	E&E		↕	95.5%	94.0%	96.7%	94.1%	> 90%
				Jan 2008	Oct 2007	Jul 2007	Jan 2007	TARGET
22. Initial Placement in Least Restrictive Setting (Proportion Placed with Kin)	CWS		←	28.1%	26.1%	26.4%	24.4%	> 33%
				Oct 2007	Jul 2007	Apr 2007	Oct 2006	TARGET

[6] 4Ps Plus Program. (Began in July 2006. Other sites will be added later.)

[7] Index of a) Number of Medi-Cal applications ready to grant within 45 days; b) Number of Medi-Cal renewals not processed within 45 days after the form was due back to the worker; c) 90% of the general Medi-Cal applications complete and without applicant error and are granted or denied within 45 days.
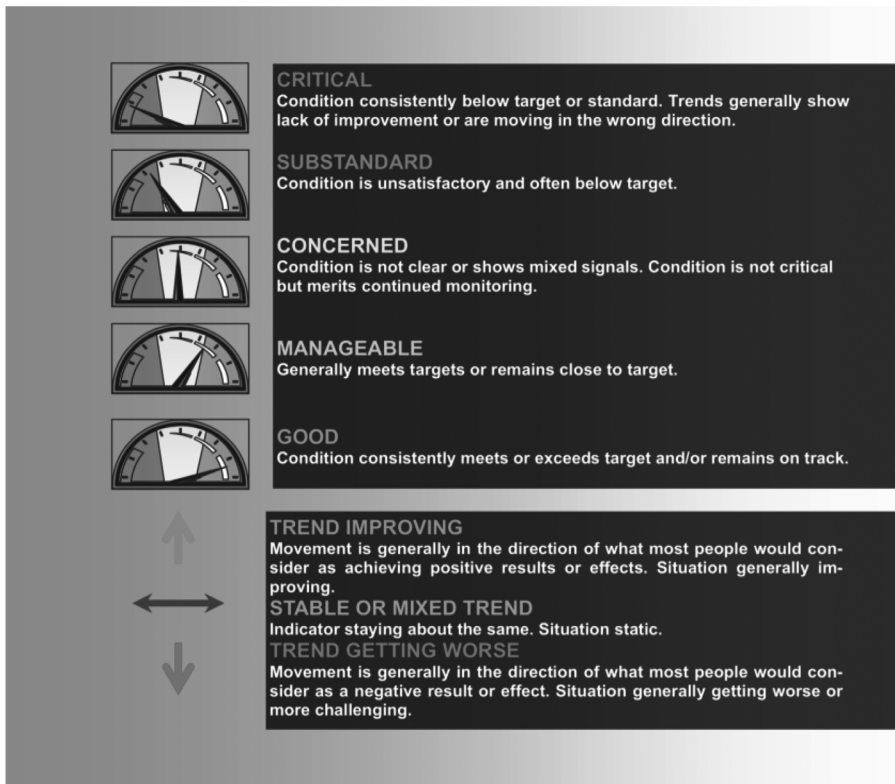
FIGURE 3 Dashboard Elements (*continued*).

166

FIGURE 4 H&SS dashboard: Solano County Health and Social Services Department.

Administration

Revenues—Percentage of annual budget collected. By tracking and collecting the revenue coming into the department, this indicator relates to county, state, and federal funds, especially funds that are still outstanding and need to be collected. This indicator helps to demonstrate the department's efforts to balance revenues with expenditures and help to build trust within the community and board of supervisors that the department is being financially well managed.

Vacancy rate/unfilled positions. In order to balance the budget, the department needs to maintain a certain number of vacant positions. The dashboard metric features the current month's vacancy rate in relationship to the target of 8% or less.

Mandated trainings completion rate. There are mandated trainings and the target is that 100% of the staff completes the required training. Each deputy director monitors staff compliance (e.g., sexual harassment training, supervision skills training), especially since a lack of compliance can lead to

liability issues. In addition, the department operates more effectively when staff members are well trained.

Employment and Eligibility

Employment and Eligibility (CalWorks, General Assistance, Food Stamps, MediCal) is the largest division of the agency and monitors the following indicators:

Food stamp error rate. The Federal government audits food stand eligibility and payment to ensure the error rate is below 6% and there is a fine if an agency is above the 6% rate. Solano's Quality Assurance staff regularly review cases in their database and sends the results to the state. The state has the right to come in and review the audit a second time. Food stamps is one of the hot buttons because if the department goes over the 6% rate and has to ask the county for money to pay the fines, it immediately raises questions by the board of supervisors about how well the agency is being managed.

CalWORKs work participation rate. The federal and state mandated workforce participation rate is that more than 50% of the CalWORKS caseload (receiving cash assistance and employable, working 30 hours per week) needs to be working and Solano, as well as almost all counties in California, are struggling to meet this metric. H&SS is currently addressing the work participation rate by reorganizing the Employment & Eligibility Department so that the same worker is not doing both the employment searching and eligibility paperwork. By creating specialized workers (focused solely on employment or eligibility), the goal is to streamline the process in order to improve client services and the workforce participation rate.

Child Welfare Services (CWS)

Child Welfare monthly visit completion rate. Workers should be visiting their clients monthly with a state-mandated rate of greater than 90%. The H&SS effort is greater than 98%.

Mental Health

Mental Health acute hospital care utilization (admissions). This is a hot button issue because the cost is about $100,000 per year for a client in acute care. Continuous monitoring is required to see if acute care is the proper place for clients, or if they can be moved to a less costly placement in the community. Their goal is to have less than 24 clients in acute

care in any given month and to provide the most appropriate cost-effective services.

Institutions for Mental Disease (IMD) utilization rate (beds occupied). IMD's are a lower level of care than acute care facilities, and clients typically get moved from acute care down to IMD's, and eventually into community-care settings. The goal is to reduce IMD utilization by moving more clients into the community.

Public Health

Wait time to obtain a regular appointment for health/dental clinic. The goal for any client that calls the public clinics is that they will obtain an appointment within two weeks or less.

TB Referrals. This metric is more of a surveillance metric than a performance metric, as the Public Health division needs to be aware of any spike in TB referrals in order to start investigating corrective action.

Women, Infants, and Children (WIC)—Percent of average monthly caseload served. WIC provides food, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk. The goal is to serve more than 97% of the existing caseload every month.

Older Disabled Adult Services (ODAS)

In-home Support Services (IHSS) caseload. This is a monitoring metric, similar to the TB referral metric for Public Health. If the caseload for the vulnerable older adult clients increases, H&SS needs to reassess the correct amount of workers and county funds needed to support the rising caseload. IHSS works with some of the most vulnerable adult populations in the county, and if there is not staff to make all the necessary home visits and investigations, the clients will suffer.

Adult Protective Services (APS) related to abuse/neglect. Another monitoring metric, especially when there is a sharp rise, can signal the need for more funds to properly address the increased reports of abuse and neglect. These metrics can also be used to promote community awareness and advocacy as well as provide evidence to support requests for additional funding for staff.

Number of completed APS investigations. Related to reports of abuse/ neglect, the number of completed investigations should parallel the number of reports. A flag will be raised if the number of investigations decreases as the number of reports increases.

Percentage of overdue IHSS renewals (reassessments). The annual client services assessments should not lapse more the 30-days past the one-year point in order to not jeopardize continuing funding of IHSS services. The goal is to not have more than 10% of IHSS contracts past their assessment date. A large factor that helps explain a higher percentage (26% in March 2008) is that federal, state, and county funding has not kept up with increased demand for services. One approach is to cluster overdue contracts into 30-day, 60-day and 90-day categories and letting contracts go out to more than 30 days, and less than 60 days, as the most efficient way to manage overload of annual assessments.

Substance Abuse

Cumulative client treatment completion rate. This metric is measuring the percentage of clients who start and complete substance abuse treatment. It is tracked on a cumulative basis over the course of the fiscal year so that new clients are added to the previous ones and the goal is to have the completion rate greater than 45%.

Special Investigations Bureau (SIB)

Early fraud detection (% of early fraud cases denied/discontinued). This is the monthly average of fraud detection; detecting clients who are collecting money yet should not be due to ineligibility issues. This monthly indicator is compared to the 2007 monthly average (20.4%) and should track below this 2007 average.

Percentage of fair hearing requests resolved prior to hearing. The "Fair Hearing" deals with CalWORKs and other cash assistance programs, usually related to a client's appeal about a reduction or termination of their benefits (e.g., IHSS reduction in "allowable hours" for care). The percentage in the dashboard is the percent of all requests for a hearing (appeal) from clients in that month, which are resolved prior to going to a hearing.

In addition to the monthly indicators, the dashboard also includes the following quarterly indicators: (a) Public Health (proportion of pregnant women screened for substance abuse at participating clinics), (b) Employment and Eligibility (MediCAL performance measures combined index rate), and (c) Child Welfare Services (initial placement in least restrictive setting, usually the proportion place with kin).

In addition to the dashboard metrics listed above, the Planning Department also creates two other reports that allow the department to add context to the dashboard metrics. The first monthly report is the H&SS UPDATE Newsletter (Appendix B) that focuses each month on a specific demographic measurement for the county (e.g., age, gender, ethnicity, and

single or double parent household). H&SS Trends (Appendix C) is the second report, and it reports out all the caseloads of all the programs within H&SS and puts them into an index that displays the actual number of workers and their corresponding caseload. These actual numbers are then compared to what an ideal worker-to-caseload ratio would be, to show how H&SS is tracking against an 'ideal' metric.

The H&SS Trends Report provides a context for the dashboard data. For example, in June 2008, the employment rate dropped 0.5% for the county and at the same time Food Stamp recipients increased by 5% in one month. The declining county employment rate not only affects the CalWORKS work participation rate (making it harder for the poor to find work) but also increases the Food Stamp rate due to the lack of income from work. These increasing and decreasing numbers provide important context for understanding dashboard information.

UPGRADING THE DASHBOARD

The data reported on the dashboard come from many different databases, many operated at the state level and making it difficult to get the data in a timely manner in order to create the monthly dashboard report. This issue of pulling information from multiple databases is not unique to Solano County and the state is working to link key social service databases to make it easier to access state-level data.

Another upgrading issue for H&SS is to incorporate the most recent Solano County Strategic Plan (2007/08) into the dashboard. H&SS is in a position where they have to adjust their internal department strategic plan to reflect the metrics required by the county plan, and then work on updating the dashboard to be in-line with both county and internal plans. Two specific metrics from the Solano County Strategic Plan that the H&SS executive team will review in October 2008 for inclusion in the dashboard are: "obesity rate" (reduce the obesity rate for county employees by 5% by 2010 and increase percentage of county employees engaged in physical activity by 10% by 2010) and "healthy children" (increase number of children and adults who engage in physical activity by 10% in 2010 and increase health outcomes for age 0–5 children by 2010).

Automation is another issue that is being addressed in upgrading the dashboard. Currently, the dashboard indicators are updated manually based on information flowing from the divisions. In addition, the state-level Welfare database (CalWIN) does not have a reporting function and therefore data needs to be downloaded manually making data-mining very time consuming. The state-level Child Welfare database (CWS/CMS) generates reports that are a month behind when they get updated. The goal is to access real-time data of client cases.

DASHBOARD IN ACTION

The dashboard has generated increased H&SS credibility with the board of supervisors by demonstrating that the department is performance oriented. At the same time, there are critics of the dashboard who note that H&SS is monitoring processes and outputs but not client outcomes. The H&SS Department is consistently working toward performance metrics that ultimately relate to improvements in client outcomes (e.g., setting goals to assess client outcomes, monitoring workforce participation rates, and staff compliance with required trainings). H&SS recognizes that social service agencies are working with people-changing technologies that are neither predictable nor standardized. At the same time, performance metrics related to clients, staff, and service standards help to create common expectations about measuring outputs, outcomes, and metrics and H&SS also has the supporting data needed to place the dashboard within a larger context. For example, the Mental Health Division wanted to find out why they were operating at a 55% productivity rate rather than their goal of 65%. They began by assessing the data on the number of client encounters per day, the length of each encounter and the cost associated with each encounter. They found that the largest number of encounters were three to five minutes long (for medication), the next group of encounters were about 15 minutes for short consultations and 30 minutes for a longer consultation. Even fewer encounters were one hour and the smallest category consisted of encounters lasting an hour and a half. H&SS is paid for each minute of a client encounter but the three to five minute meetings where scheduled for 20 minutes and therefore many workers were sitting idle, not seeing patients and wasting time throughout a day. In addition, the clients all come with unique needs and levels of need that may change several times throughout a week. To address the issue of too many three to five minute consultations, the Mental Health Department moved their least severe level 1 clients (the three to five minute appointments) to the primary care clinic, freeing up more time for the more serious cases. Within nine months, there was a 15% increase in productivity.

LESSONS LEARNED

A year and a half into working with the dashboard and creating monthly dashboard reports, there are several items that H&SS is working on for future enhancements. First, they are initiating efforts to automate the process of converting raw data for many of the indicators into the finalized dashboard report, displaying indicator arrows and gauge images for each measure. The current process of manually converting raw data into the final report is time consuming, where efforts could be spent on creating and implementing

action items rather than the creation of the initial report. A second learning is the importance of understanding the story behind the data. This is critical for the reader. H&SS found that interviewing their deputy directors on the story and presenting the story with the dashboard report proved more successful than presenting the data first, then entering into a discussion of "why the data are in this shape."

A third lesson learned is that all participants in the discussion around the monthly dashboard report should have no less than a rudimentary understanding of "turning the curve" strategies and terminology for each indicator. Otherwise, discussions end up in disagreements of terms rather than understanding the factors that would turn the curve. The final lesson learned is related to participants having a common understanding of the chaotic terms of the interplay between Human Services and changes in community indicators. This lesson is related to chaos theory, such that in order to properly analyze any indicator and fully understand it, one must analyze the whole picture comprised of many individual factors. For example, it's important to understand the county's employment rate when analyzing food stamp recipient metrics because employment rate will have an effect. There are an overwhelming number of deterministic factors that make a dashboard indicator appear chaotic, when in reality the factors influencing the metric are all related and must be looked at as a whole to understand the workings of the whole.

APPENDIX A: SOURCES OF INFORMATION

Interviews

Patrick O. Duterte, Director, Solano County Department of Health and Social Services, CA

Stephan Betz, Assistant Director, Solano County Department of Health and Social Services, CA