

**Kitsap Public Health District Parent Child Health Clients:
MSS Client Visits and Outcomes, Second Report**

MSS Clients Closed Between January 1st, 2011 and December 31st, 2011

August 2012

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Kitsap Public Health District's Parent Child Health Program (PCH) nurses and behavioral health specialist enter all client data into Nightingale Notes, a web-based EMR that uses Omaha language. The following data are representative of all Maternity Support Services (MSS) eligible clients who were closed between January 1st, 2011 and December 31st, 2011. A total of 258 MSS clients were closed during this time.

Who are our clients?

Table 1 shows the demographics of the clients.

Table 1. MSS Client Demographics, Jan. 1, 2011 – Dec. 31, 2011

	Number	Percent
Age	256	
≤19 years	21	8%
19 to <24 years	90	35%
24 to <29 years	78	30%
29 to 34 years	42	16%
34 to <39 years	21	8%
≥39 years	4	2%
Race (any ethnicity)	256	
White	194	76%
American Indian or Alaska Native	15	6%
Asian	9	4%
Black	21	8%
Hawaiian or other Pacific Islander	10	4%
Multiple races or other/unknown race	7	3%
Ethnicity (any race)	256	
Non-Hispanic	201	79%
Hispanic	55	21%
Marital Status	253	
Single	132	52%
Unmarried with domestic partner	28	11%
Divorced or separated	13	5%
Married	80	32%
Primary Language	253	
English	208	82%
Spanish	31	12%
Guatemalan dialect	8	3%
Tagalog	2	1%
Other	4	2%
Level of Education	219	
No education	3	1%
Less than high school	57	26%
High school graduate or GED	85	39%
More than high school	74	34%
Employment Status	244	
Unemployed*	162	66%
Employed**	82	34%
Housing	243	
In a rented apartment	65	27%
In a rented house	121	50%
In an owned house	43	18%
In a mobile home	11	5%
Homeless or sheltered	3	1%

*includes receiving disability, GAU-X, SSI, or SSDI; **includes on family or medical leave

Note: all categories have clients with missing data

- A total of 1 in 4 clients is under the age of 21.
- Approximately 1 in 4 clients is non-White (any ethnicity) and 1 in 5 is Hispanic.
- Less than 1 in 3 clients is married. Of those that are not married, 16% are living with a domestic partner. A total of 40% of Hispanic clients are married compared to 29% of non-Hispanic clients.
- More than 1 in 4 clients have less than a high school education. A total of 59% of Hispanic clients have less than a high school education compared to 17% of non-Hispanic clients.
- After English, Spanish was the most common primary language with 12% of clients reporting it as their primary language.
- A total of 2 in 3 clients are unemployed.
- Less than 1 in 5 clients owns their residence.

How many visits do our clients receive?

In-person visits with clients include assessments, home visits, and office visits. An assessment occurs at the first visit during pregnancy and at the first visit during the postpartum period. Assessments are always completed in-person but may be done at either a home or office location.

Visits per client: There were 970 total in-person visits completed, for an **average of 3.8 visits per client**. The following visits by type were completed: 417 assessments (an average of 1.6 per client), 363 home visits (an average of 1.4 per client), and 190 office visits (an average of 0.7 per client). Table 2 summarizes in-person visits.

Table 2. MSS Client In-Person Client Visits, Jan. 1, 2011 – Dec. 31, 2011

Type of in-person visit:	Total visits #	Total clients #	Average visits per client #
Assessment	417	258	1.6
Home Visit	373	258	1.4
Office Visit	190	258	0.7
Total	970	258	3.8

Visits by client service level: All clients are designated a service level which determines the number of overall hours the nurse and/or behavioral health specialist can spend with the client. The three service levels are A-Basic, B-Expanded, and C-Maximum. These service levels are designated by the nurse or behavioral health specialist during an initial risk assessment, using WA State Department of Health criteria and can change during the course of services rendered if new issues are revealed or develop. For clients seen during both pregnancy and postpartum, the designated service level may be different during these two time periods. Table 3 shows the number and proportion of clients receiving nursing services during pregnancy, postpartum, or both.

Table 3. MSS Clients by Peripartum Stage, Jan. 1, 2011 – Dec. 31, 2011

	n	% of total clients
Clients with pregnancy service level only	61	24%
Clients with postpartum service level only	28	11%
Clients with pregnancy & postpartum service levels	166	65%
Total	255	100%

Note: 3 clients were missing a service level

Overall, the following proportions of clients had as their highest service level: an “A”– 14%, a “B”– 14% and a “C”– 73%. (Note: clients who had service levels that changed from pregnancy to postpartum were counted only at the higher service level; this was the case for 20 clients, or 8% of the total client population).

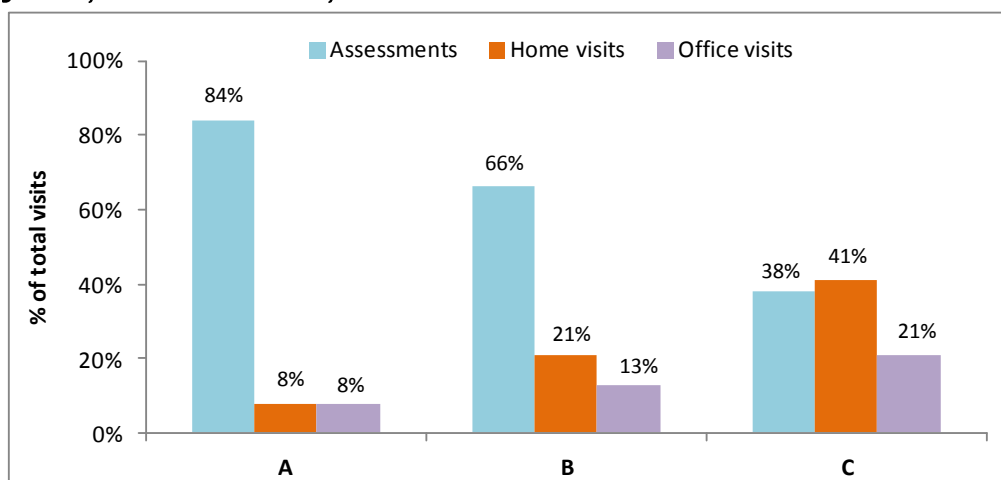
As clients move from an “A” to a “B” and from a “B” to a “C”, they are allowed more hours of in-person services. Table 4 demonstrates how those increased allowed hours translate into more average visits per client.

Table 4. MSS In-Person Client Visits by Service Level, Jan. 1, 2011 – Dec. 31, 2011

Designated service level :	Average # of visits per client
A- Basic	1.8
B- Expanded	2.3
C- Maximum	4.4

Figure 1 shows the proportion of visits by type– assessment, home visit, or office visit– by service level. As the service level increases in severity the proportion of assessments decreases while the proportion of both home and office visits increases. For a “C” level only, the proportion of home and office visits together is greater than the proportion of assessments.

Figure 1. MSS Client Visits by Type and by Service Level, Jan. 1, 2011 – Dec. 31, 2011



What problems are identified in our clients?

The nurse/behavioral health specialist identifies problems during in-person encounters. Problems with signs or symptoms are designated as actual problems, and problems with no signs or symptoms but a history of or other risk factor(s) present are designated as potential problems.

Problems per client: A total of 241 clients had 620 actual problems identified, for an average of 2.6 actual problems per client (n=258). Of those clients with an actual problem identified, there was a range of 1 to 7 problems. A total of 125 clients had 275 potential problems identified, for an average of 2.2 potential problems per client (n=258). Of those clients with a potential problem identified, there was a range of 1 to 6 problems.

The number of actual problems identified per client increases as the designated service level goes from “A” to “B” and from “B” to “C”. Figure 2 shows the total number of problems identified by severity of problem and service level, and Figure 3 shows the average number of problems identified per client by severity of problem and service level. “C” level clients have significantly more actual problems on average than both “A” and “B” level clients.

Figure 2. Total Problems for MSS Clients by Problem Severity and Service Level, Jan. 1, 2011 – Dec. 31, 2011

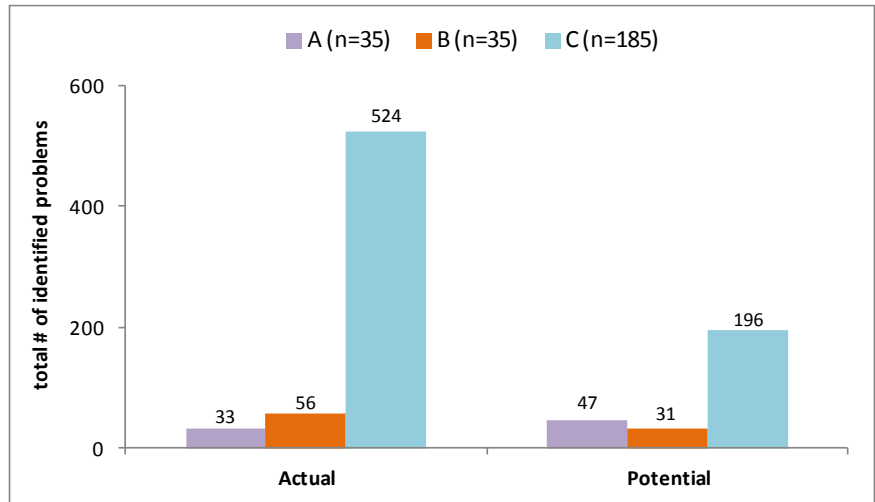
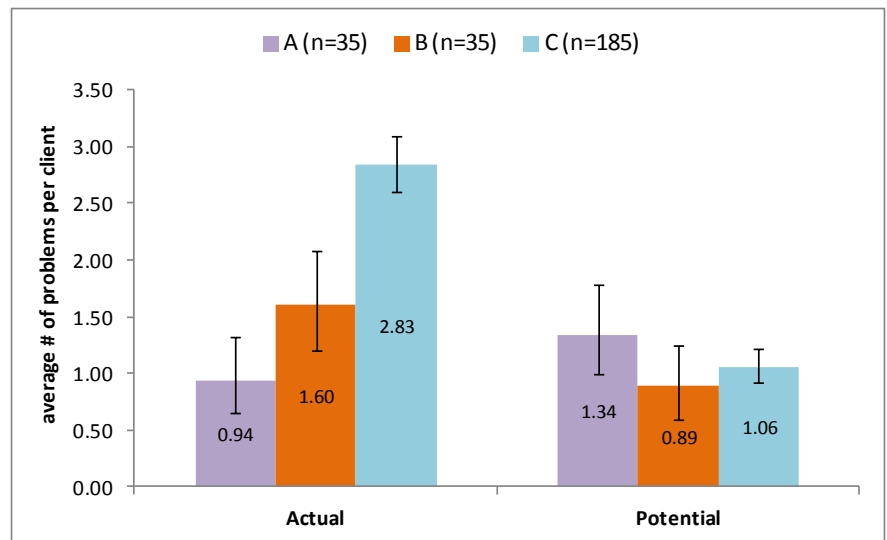


Figure 3. Average Problems per MSS Client by Problem Severity and Service Level, Jan. 1, 2011 – Dec. 31, 2011



Top problems for clients: The top three actual problems identified for clients were **income, mental health, and substance use**. The top three potential problems identified were pregnancy, caretaking/parenting, and mental health. Table 5 shows the total number of clients for which each actual and potential problem was identified.

Table 5. Problems Identified for MSS Clients by Problem Severity, Jan. 1, 2011 –Dec. 31, 2011

Actual (241 clients)	Potential (125 clients)
Income (n=223)	Pregnancy (n=55)
Mental health (n=104)	Caretaking/parenting (n=51)
Substance use (n=78)	Mental health (n=48)
Pregnancy (n=71)	Postpartum (n=37)
Postpartum (n=53)	Substance use (n=34)
Healthcare supervision (n=31)	Healthcare supervision (n=24)
Abuse (n=18)	Residence (n=13)
Caretaking/parenting (n=15)	Abuse (n=11)
Residence (n=11)	Family planning (n=1)
Interpersonal relationship (n=8)	Grief (n=1)
Communication w/ community resources (n=4)	
Grief (n=3)	

Income was identified for 86% of all clients, mental health for 40% of clients, substance use for 30% of clients, pregnancy for 28% of clients, postpartum for 21% of clients, and health care supervision for 12% of clients. Table 6 shows the proportion that each actual problem comprises of the total actual problems identified for all clients and the proportion of all clients for which each problem was identified.

**Table 6. Actual Problems Identified for MSS Clients,
Jan. 1, 2011 – Dec. 31, 2011**

	# of times identified as actual problem	% of total actual problems identified	% of all clients for which problem was identified
Income	223	36.0%	86.4%
Mental health	104	16.8%	40.3%
Substance use	78	12.6%	30.2%
Pregnancy	71	11.5%	27.5%
Postpartum	53	8.5%	20.5%
Health care supervision	31	5.0%	12.0%
Abuse	18	2.9%	7.0%
Caretaking/parenting	15	2.4%	5.8%
Residence	11	1.8%	4.3%
Interpersonal relationship	8	1.3%	3.1%
Communication with community resources	4	0.6%	1.6%
Grief	3	0.5%	1.2%

- Almost 9 in 10 of all clients had an actual problem of income.
- More than 1 in 3 of all clients had an actual problem of mental health.
- Almost 1 in 3 of all clients had an actual problem of substance use.

What are the Knowledge, Behavior, and Status (KBS) outcomes of our clients?

Clients may be given a rating within three categories for each identified problem; these three categories are Knowledge (K), Behavior (B), and Status (S). The KBS ratings are given on a scale of 1 to 5, with “1” denoting the highest severity in that area and problem, and “5” denoting the lowest severity in that area and problem. For this analysis, only KBS rating from actual problems were included. Also, only KBS ratings from clients who were seen two or more times with at least one actual problem identified and entered into their client record were included. KBS ratings are only entered again after the initial assessment of a problem if a score in any one of the three KBS areas changes. For example, a client may have an initial KBS rating for a particular problem and then may be seen and have that problem addressed at various visits, but if the KBS rating remains unchanged, then nothing will be entered again in the KBS portion of the client record. This analysis includes those clients for which this “no change” is the case. There were a total of **187 clients who were included in the analysis** based on these criteria.

Change in KBS ratings for all actual problems combined: Table 7 shows the average initial and final ratings for all actual problems in each of the KBS areas and whether the average rating showed a statistically significant increase from the initial to the final rating using a paired t-test.

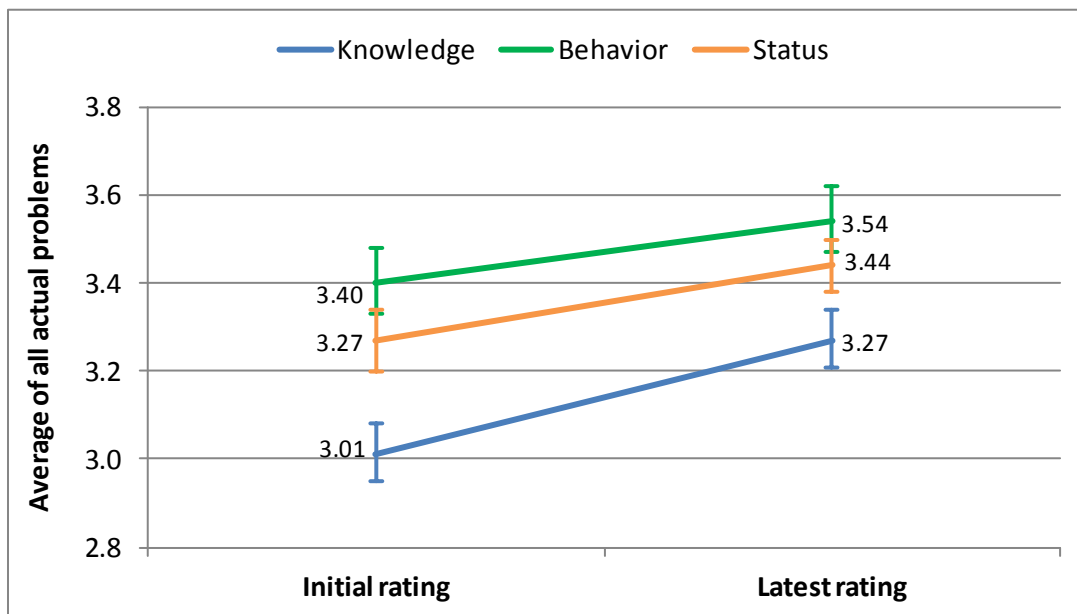
Table 7. Average KBS Initial and Final Ratings for MSS Clients' Actual Problems, Jan. 1, 2011 – Dec. 31, 2011

Rating category	Average of initial ratings	95% confidence interval of initial ratings average	Average of final ratings	95% confidence interval of latest ratings average	p-value
Knowledge	3.01	2.95 - 3.08	3.27	3.21 - 3.34	<0.001*
Behavior	3.40	3.33 - 3.48	3.54	3.47 - 3.62	<0.001*
Status	3.27	3.20 - 3.34	3.44	3.38 - 3.50	<0.001*

*denotes statistically significant change (p<0.05)

In all three KBS area, the change from the initial rating to the final rating showed a statistically significant increase. Figure 4 shows this increase from the average initial rating to the average final rating for all actual problems.

Figure 4. Average KBS Ratings for MSS Clients' Actual Problems, Jan. 1, 2011 – Dec. 31, 2011



Change in KBS ratings by actual problem: Table 8 shows the change in KBS ratings from the initial rating to the final rating by problem (n=the number of clients identified with that problem who were seen two or more times and who had that entered into their client record). It also shows which KBS area(s) showed a statistically significant increase by problem (p<0.05 and has an asterisk).

Table 8. Average KBS Ratings for MSS Clients by Actual Problem, Jan. 1, 2011 – Dec. 31, 2011

	n	Rating category	Average initial rating	Average final rating	p-value
Income	164	K	3.23	3.41	<0.001*
		B	3.75	3.82	0.096
		S	3.49	3.55	0.033*
Mental health	79	K	2.84	3.21	<0.001*
		B	3.09	3.49	<0.001*
		S	2.92	3.29	0.003*
Substance use	55	K	2.89	3.33	<0.001*
		B	2.98	3.07	0.389
		S	3.15	3.38	0.036*
Pregnancy	45	K	3.00	3.04	0.570
		B	3.47	3.51	0.486
		S	3.40	3.49	0.200
Postpartum	19	K	3.21	3.47	0.096
		B	3.58	3.79	0.163
		S	3.16	3.42	0.096
Health care supervision	25	K	3.24	3.40	0.043*
		B	3.36	3.40	0.574
		S	3.56	3.60	0.327
Abuse	14	K	2.71	3.07	0.055
		B	2.93	3.21	0.104
		S	2.86	3.14	0.104
Caretaking/parenting	9	K	2.22	2.56	0.081
		B	2.86	3.25	0.081
		S	3.00	3.33	0.195

*denotes statistically significant change (p<0.05)

- The mental health problem had statistically significant increases in the areas of Knowledge, Behavior, and Status.
- Both the income and substance use problems had statistically significant increases in the areas of Knowledge and Status.
- The health care supervision problem had a statistically significant increase in the area of Knowledge only.

Table 9 shows the change in KBS ratings from the initial rating to the final rating by service level for the top six actual problems (n=the number of clients identified with that problem who were seen two or more times and who had that entered into their client record). It also shows which KBS area(s) showed a statistically significant increase by problem and service level (p<0.05 and has an asterisk). Service levels for a problem in which there were less than five clients were not included in the analysis.

Table 9. MSS Client Average KBS Initial and Final Ratings by Service Level for the Top Six Actual Problems, Jan. 1, 2011 – Dec. 31, 2011

		n	Rating category	Average	Average	p-value
				initial rating	final rating	
Income	Level A	11	K	3.55	3.91	0.104
			B	3.82	4.09	0.192
			S	3.64	3.73	0.341
	Level B	19	K	3.44	3.67	0.042*
			B	4.00	4.00	1.000
			S	3.61	3.61	1.000
Level C	134	K	3.18	3.33	0.001*	
		B	3.71	3.77	0.179	
		S	3.45	3.52	0.049*	
Mental health	Level C	79	K	2.84	3.22	<0.001*
			B	3.09	3.50	<0.001*
			S	2.92	3.28	0.004*
Substance use	Level B	6	K	2.83	3.50	0.102
			B	2.83	2.33	0.203
			S	3.17	3.50	0.363
	Level C	49	K	2.90	3.35	<0.001*
			B	3.00	3.16	0.132
Pregnancy	Level C	42	S	3.14	3.37	0.062
			K	3.00	3.05	0.570
			B	3.52	3.57	0.486
Healthcare supervision	Level C	20	S	3.38	3.48	0.200
			K	3.10	3.25	0.083
			B	3.30	3.40	0.163
Postpartum	Level C	19	S	3.45	3.50	0.330
			K	3.21	3.47	0.096
			B	3.58	3.79	0.163
			S	3.16	3.42	0.096

*denotes statistically significant change (p<0.05)

note: service levels with n<5 were not evaluated for change

- The mental health problem had statistically significant increases in the areas of Knowledge, Behavior, and Status for Level C clients.
- The income problem had a statistically significant increase in the area of Knowledge for Level B clients and in the areas of Knowledge and Status for Level C clients.
- The substance use problem had a statistically significant increase in the area of Knowledge for Level C clients.

Conclusions

- Hispanic clients are likely to have different needs than non-Hispanic clients. Compared to non-Hispanic clients, Hispanic clients are more likely to be married and to have different social support structures but are much more likely to have less education and speak Spanish as a primary language.
- Although almost 2 in 3 clients are seen during both pregnancy and postpartum, 1 in 4 are seen during pregnancy only, suggesting retention of clients after delivery as an area of improvement.
- The average number of in-person visits for all clients is just less than 4 visits. For a client who is designated an “A” level, she receives less than 2 in-person visits on average. Therefore, a substantial proportion of these clients are not receiving a second visit after the initial assessment to address areas of concern or recognized problems.
- Almost three-fourths of clients are designated a level “C”. Most clients have a high level of needs to address to support positive maternal and infant outcomes.
- The top 3 actual problems are income, mental health, and substance use. While KBS ratings show a statistically significant increase from the initial to the final rating in all 3 areas for mental health, there were only increases in the areas of Knowledge and Status for both income and substance use. This suggests a need to understand the lack of increase in the area of Behavior and to find effective interventions.
- PCH staff should use these results to discuss whether data reflect their current practices and caseload and to then determine areas of improvement for client recruitment/retention, data entry standards and protocols, and nursing practice.

Are these results similar to those from the first report?

- The number of clients was 258 compared to 406 in the first report, a 36% decrease.
- The demographics of the clients are very similar to those in the first report.
- The average number of visits per client is slightly higher than in the first report—3.8 versus 3.4.
- The proportions of clients at the three service levels are similar to those in the first report. The methodology differed slightly as clients were included only in the highest service level for this report compared to being counted in each service level for the first report. Using the methodology from the first report to make a comparison, the following proportions of clients are at each level: “A”— 16% in this report versus 14% in the first report, “B”— 16% in this report versus 23% in the first report, “C”— 67% in this report versus 63% in the first report. There was a slight shift to a higher proportion of clients at a “C” level from the first report to this report.

- There was a substantial change in the time period(s) during which clients received nursing services. Table 10 shows the change.

Table 10. MSS Clients by Peripartum Stage, Report 1 versus Report 2

	% of total clients	
	Report 1	Report 2
Clients with pregnancy service level only	13%	24%
Clients with postpartum service level only	39%	11%
Clients with pregnancy & postpartum service levels	50%	65%
Total	100%	100%

Although more clients were seen during pregnancy only, fewer clients were seen during postpartum only and more clients were seen during both pregnancy and postpartum. Overall, more clients began receiving MSS services earlier– during pregnancy instead of postpartum. Successful ways to increase retention of clients from pregnancy to postpartum will further improve the proportion of clients seen during both pregnancy and postpartum.

- The average number of actual problems per client was essentially the same as in the first report (2.5 per client versus 2.6 per client); the average number of potential problems per client was also essentially the same (2.3 per client versus 2.2 per client).
- In both reports, “C” clients have a significantly higher average number of actual problems than clients of lower service levels. There is no difference between average number of actual problems for “A” and “B” clients.
- Both reports have the same top three actual problems. The proportion of all clients with these problems was also similar: income– 92% vs. 86%, mental health– 37% vs. 40%, substance use– 33% vs. 30%. Both reports have the same top three potential problems: pregnancy, caretaking/parenting, mental health.
- In both reports, for all actual problems combined there were statistically significant increases in K, B, and S average ratings. The average ratings were very similar in all three areas.
- There were some differences in the statistically significant K, B, and S average rating increases for various problems. In the first report there were statistically significant K, B, and S increases for income and mental health; in this report there were K, B, and S increases for mental health but only K and S increases for income. In the first report, caretaking/parenting and postpartum showed increases in K and S but there were no increases in these problems in this report. In this report there were K and S increases for substance use while there was only K increase previously. In this report there was an increase in K for health care supervision while there were no increases previously.

Consideration of Methodology of KBS Data Entry into Nightingale Notes and Implications for Outcome Analysis

Background: The public health nurses/behavioral health specialist enter a problem and its severity* into a client record when the problem is first identified. That problem remains in that client record whether or not it is addressed again by the nurse/behavioral health specialist on subsequent visits. The KBS ratings are given for actual problems and some potential problems. A KBS rating should be given for all actual problems when the problem is first identified. A KBS rating is then completed again only if the problem is addressed on a subsequent visit *and* there is adequate information to give another rating, or if the visit is a discharge visit. The nurses/behavioral health specialist does not look at the previous KBS rating; KBS ratings are always completed based on the day of the visit.

*actual, potential, health promotion, adequate

Current methodology of KBS analysis for statistical change: A client's problem is included in the KBS change analysis if: 1) there is at least one KBS rating and 2) there are two or more visits in the client record. In the case of two or more KBS ratings, the first and the final ratings are selected by using the dates of in-person visits. In the case of only one KBS rating, the first KBS rating is copied to the final in-person visit.

Alternate methodology of KBS analysis for statistical change: A client's problem is included in the KBS change analysis if: 1) there are at least two KBS ratings and 2) there are two or more visits in the client record. The first and final ratings are selected by using the dates of in-person visits.

Importance of considering the different methodologies: If a problem isn't being addressed on subsequent visits, the true KBS rating may or may not be the same as it was previously. Copying the KBS (current methodology) is a conservative method; it is likely underestimating real change that has occurred and would be recorded if the problem had been addressed again. Having a protocol in which problems are not addressed on a regular basis, so that a KBS rating may not be given again, doesn't provide a reliable way for analyzing KBS change.

Results:

1. Differences in sample size: With the current methodology, there are 187 clients (72% of all clients) who are included in the KBS change analysis. With the alternate methodology, there are 128 clients (50% of all clients) who are included in the KBS change analysis.
2. Differences in statistical KBS change: With both the current and the alternate methodology, the average ratings of all clients' actual problems show a statistical increase in Knowledge, Behavior, and Status (Table 1). The averages, though, are higher for the alternate methodology. This is because the 'copied ratings'– for those clients who had an actual problem with only one KBS rating but had two or more visits– are not included.

Table 1. Average KBS Ratings for MSS Clients' Actual Problems: Comparison of Methodologies, January 1, 2011 to December 31, 2011

Rating category	Average of initial ratings		Average of final ratings		p-value	
	current methodology	alternate methodology	current methodology	alternate methodology	current methodology	alternate methodology
Knowledge	3.01	3.09	3.27	3.56	<0.001*	<0.001*
Behavior	3.40	3.52	3.54	3.84	<0.001*	<0.001*
Status	3.27	3.65	3.44	3.88	<0.001*	<0.001*

*denotes statistically significant change (p<0.05)

Possible decisions and implications:

1. Continue to enter KBS data the same way and continue to analyze KBS data the same way. This methodology is likely underestimating KBS change but increases the number of client problems that can be analyzed when compared to #2.
2. Continue to enter KBS data the same way but analyze the data by the alternate methodology– only including those clients who had a KBS rating entered two or more times. This methodology more accurately reflects real KBS change but decreases the number of client problems that can be analyzed.
3. Change the protocol for entering KBS data and analyze the data by the alternate methodology. Consider ways to change KBS data entry, such as consistently giving a KBS rating on a regular interval by visit or by time once a problem is identified or by giving a KBS rating on each visit for some or all problems. This type of change would increase the number of clients who have two or more KBS ratings, increase the number of problems that have two or more KBS ratings, and increase the validity of analyzing KBS change by statistical methods.

Data Notes

- Clients who were closed between January 1st, 2011 and on or before December 31st, 2011 were included because their services were either completed or clients would have no longer been eligible for services, thus most accurately describing the total number of visits per client.
- Clients whose service level designation changed were included in the highest service level category that was entered; no client service levels decreased.
- Some client problems may have changed from actual (have signs/symptoms) to a different severity, such as potential or adequate, during their services. In these cases, the full improvement in the KBS scores would not be reflected because only actual problems were included in the KBS analysis.
- Paired t-tests at a 95% confidence interval were used to analyze the change in KBS ratings from the initial rating to the final rating.