Kitsap Public Health District Parent Child Health Clients

MSS and NFP Client Visits and Outcomes

Report 4: MSS and NFP Clients Closed Between January 1, 2013, and December 31, 2014

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Introduction

Kitsap Public Health District's Parent Child Health (PCH) Program serves pregnant women and new mothers who meet low-income requirements under the Maternity Support Services (MSS) and Nurse Family Partnership (NFP) programs. This report includes MSS and NFP clients who were closed during the two-year period of January 1, 2013, through December 31, 2014. Data were extracted from the Nightingale Notes electronic charting program used by the PCH Program nurses.

Who are our clients?

During the two-year period evaluated there were a total of 652 clients closed, including 635 MSS and 17 NFP clients. The demographic profiles of these clients from the two programs are similar in many regards (Table 1), though NFP clients tend to be slightly younger. The average age of NFP clients is 21.5 years; whereas it is statistically higher at 26.5 years for MSS clients ($p<0.0001$).

A quarter of MSS clients are non-White (any ethnicity) and 1 in 4 are Hispanic. Among NFP clients, 1 in 5 are non-White and 1 in 5 are Hispanic. The vast majority of all clients speak English as their primary language, including 81% of MSS clients and 100% of NFP clients. After English, Spanish was the most commonly cited primary language among MSS clients (10%), followed by Guatemalan dialect (7%). A smaller minority of the MSS population speak other languages, including Tagalog (1%) and other (1%).

Across both programs, just under 1 in 4 clients have less than a high school education. A larger proportion of MSS clients have more than a high school education than NFP clients (49% vs. 38%, respectively), though there is no statistical difference in education level. Nearly 1 in 3 MSS clients are unemployed, whereas less than 1 in 4 NFP clients are unemployed. The majority of clients in both programs (71% MSS and 67% NFP) are renting their housing, though a greater proportion of NFP clients (17%) are in subsidized housing or mobile homes than MSS clients (4%). A larger proportion of MSS clients (16%) own their homes than NFP clients (8%).

In both programs 39% of women are either single or unmarried living with a domestic partner. While about one third of MSS clients are married, just under a quarter of NFP clients are married. A higher proportion of NFP clients (15%) are divorced or separated than MSS clients (6%). However, there is no statistical difference in marital status between the programs.

Smoking status was only recorded for 247 of the total 652 clients. The smoking variable was recently changed in Nightingale Notes and PCH staff training has been ongoing about the best way and timing to assess smoking status. Available data included 18% of clients closed in 2013 and 55% of those closed in 2014. Given that overall these data are missing for 62% of clients, caution should be exercised in drawing any conclusions about trends. Of the 4 NFP clients whose smoking status was documented, 1 reported being a current smoker, whereas only 1 in 5 MSS clients currently smoke.

Table 1. MSS and NFP Client Demographics, 1/2013 – 12/2014

	MSS Clients		NFP Clients	
	Number	Percent	Number	Percent
Year				
2013	292	46.0	8	47.1
2014	343	54.0	9	52.9
Age				
≤19 years	30	4.7	2	11.8
19 to <24 years	209	32.9	12	70.6
24 to <29 years	204	32.1	3	17.7
29 to 34 years	139	21.9	0	0.0
≥34 years	53	8.4	0	0.0
Race (any ethnicity)				
White	454	75.2	14	82.4
American Indian or Alaska Native	34	5.6	0	0.0
Asian	17	2.8	1	5.9
Black	29	4.8	1	5.9
Hawaiian or other Pacific Islander	24	4.0	0	0.0
Multiple races or other/unknown race	44	7.3	1	5.9
Ethnicity (any race)				
Non-Hispanic	458	74.8	14	82.4
Hispanic	154	25.2	3	17.7
Marital Status				
Single	241	38.9	5	38.5
Unmarried with domestic partner	140	22.6	3	23.1
Divorced or separated	41	6.6	2	15.4
Married	197	31.8	3	23.1
Primary Language				
English	509	80.7	14	100.0
Spanish	61	9.7	0	0.0
Guatemalan dialect	46	7.3	0	0.0
Tagalog	7	1.1	0	0.0
Other	8	1.3	0	0.0
Level of Education				
No education	7	1.4	0	0.0
Less than high school	112	22.8	3	23.1
High school graduate or GED	133	27.0	5	38.5
More than high school	240	48.8	5	38.5
Employment Status				
Unemployed*	197	32.4	3	23.1
Employed**	411	67.6	10	76.9
Housing				
Own	98	16.1	1	8.3
Rent	431	71.0	8	66.7
Subsidized housing	24	4.0	2	16.7
Mobile home	22	3.6	1	8.3
Foster care, homeless, or other	32	5.3	0	0.0
Smoking Status				
Current (every day)	39	16.1	1	25.0
Current (some days)	14	5.8	0	0.0
Former	53	21.8	0	0.0
Never	133	54.7	3	75.0
Not current (but unknown if ever)	3	1.2	0	0.0
Unknown if ever	1	0.4	0	0.0

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

Note: all categories have clients with missing data; the total number of MSS and NFP clients served are 635 and 17, respectively.

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 2,008 total in-person visits completed, which included 1,774 for MSS clients and 234 for NFP clients. As shown in Table 2, these equate to an **average of 2.8 visits per MSS client** and **13.8 visits per NFP client**.

For MSS clients, assessments were the most common type of visit, averaging 1.6 visits per MSS client. However, for NFP clients, home visits far outweighed any other type of visit, with an average of 10.4 visits per client.

Table 2. In-Person Client Visits by Program, 2013 – 2014

	MSS Clients (n=635)		NFP Clients (n=17)	
Type of Visit	**Total # of visits**	**Average # of visits per client**	**Total # of visits**	**Average # of visits per client**
Assessment	1025	1.6	24	1.4
Home Visit	648	1.0	178	10.4
Office Visit	101	0.2	32	1.9
Overall (all types)	1774	2.8	234	13.8

Visits by Service Level

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 assessment, using Washington 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. Clients by Peripartum Stage and Program, 2013 – 2014

	MSS Clients		NFP Clients	
Peripartum stage	**n**	**% of total clients**	**n**	**% of total clients**
Clients with pregnancy service only	184	29.0	5	29.4
Clients with postpartum service only	130	20.5	3	17.7
Clients with pregnancy and postpartum services	321	50.6	9	52.9
Total	635		17	

Not all NFP clients were assigned an A, B, or C service level; some transferred in to the KPHD programs from other counties or states. Additionally, since NFP is in essence a higher service level than the MSS program, service level was assessed by examining the differences between 4 service levels: MSS-A, MSS-

B, MSS-C, and NFP. **Overall, the distribution of clients according to their highest service level was as follows: A = 12%, B = 17%, C = 68%, and NFP = 3%.**

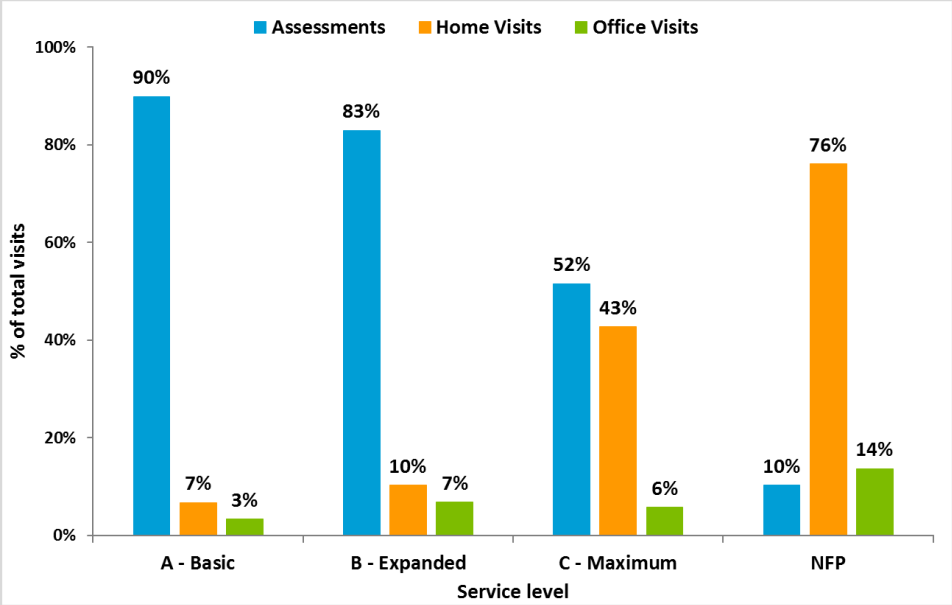
Moving from "A" to "B" to "C" or NFP allows more hours of in-person services. Table 4 demonstrates how those increases in hours translate into a higher average number of visits per client by service level. NFP clients received considerably more visits than even the highest MSS service level clients.

Table 4. In-Person Client Visits by Service Level, 2013 – 2014

Service Level	Average # of visits per client
MSS: A- Basic	1.5
MSS: B- Expanded	1.8
MSS: C- Maximum	3.3
NFP	13.8

Figure 1 shows the proportion of visits by service level and visit type. As the service level increases the proportion of assessments decreases while the proportion of second visits (home or office) increases. For NFP only, the proportion of home and office visits are greater than the proportion of assessments.

Figure 1. Client Visits by Visit Type and Service Level, 2013 – 2014



How long are NFP clients in the program and what are their reasons for closure?

During the 2013-14 timeframe evaluated, only 17 NFP clients were closed. Of these, the majority (70%) had been in the program less than one year; only 5 were in the program for more than 1 year. Services were completed on only 3 of 17 clients; other reasons for closure included: lost to follow up (4), part in services then refused (4), and moved out of area (6).

Among those lost to follow up, 3 were in their early 20's and one was in her mid-20's. Two had more than a high school education, 1 had either a GED or graduated high school, and one had an unknown education status. All 4 were in the program less than a year; with 2 participating less than 6 months.

Of those who began the services then refused, 2 remained in for less than 6 months, 1 participated between 6 months and a year, and the last participated 1.5-2 years. Three of these women were in their early 20s; the fourth was 19 years or younger. Two had less than a high school education, 1 had a either a GED or finished high school, and the last had more than a high school education.

What are the ACEs profiles of our clients?

There is a growing body of evidence that Adverse Childhood Experiences (ACEs) are linked to poor health outcomes later in life. PCH nurses or a behavioral health specialist conducted an ACEs assessment on 46% of all clients closed in the 2013-2014 period. Staff declined to conduct the assessment for 21% of clients, 4% of clients declined, and the remainder (29%) did not have a specified reason as to why ACEs assessments were not conducted.

ACEs are scored according to a standardized scale, ranging from 0 (none) to 10 (maximum). A lower score is ideal as it indicates that a person had fewer adverse experiences during their childhood. The mean ACEs score for MSS clients (3.1, range: 0 – 10) was lower though not statistically different than the mean score for NFP clients (4.2, range: 0 – 9). While there was no statistical difference in ACEs between the two programs (Table 5), there was a statistically significant association by service level (Table 6). Clients in the higher service levels (C-Maximum and NFP) were statistically more likely to have 3 or more ACEs than clients who were enrolled in lower service levels (A-Basic and B-Expanded).

Table 5. Adverse Child Experiences (ACEs) among Clients by Program, 2013 – 2014

Category	MSS Clients	NFP Clients	p-value
Number of clients with an ACEs score	286	12	-
Percentage of total clients	45%	71%	-
Mean ACEs score	3.1	4.2	0.1785
Minimum ACEs score	0	0	-
Maximum ACEs score	10	9	-
Percentage of clients with ACEs score = 0	23%	8%	0.4754
Percentage of clients with ACEs score >=3	51%	58%	0.6377
Percentage of clients with ACEs score >=5	28%	50%	0.1154

Table 6. Adverse Child Experiences (ACEs) among Clients by Service Level, 2013 – 2014

Category	A-Basic	B-Expanded	C-Maximum	NFP	p-value
# of clients with an ACEs score	23	51	212	12	-
% with score = 0	43%	27%	19%	8%	0.0268*
% with score >=3	22%	37%	58%	58%	0.0011*
% with score >=5	13%	18%	33%	50%	0.0198*
Category	**A/B**		**C/NFP**		**p-value**
# of clients with an ACEs score	74		224		-
% with score = 0	32%		19%		0.0140*
% with score >=3	32%		58%		0.0001*
% with score >=5	16%		33%		0.0046*

* Denotes a statistically significant difference (p<0.05)

What problems are identified in our clients?

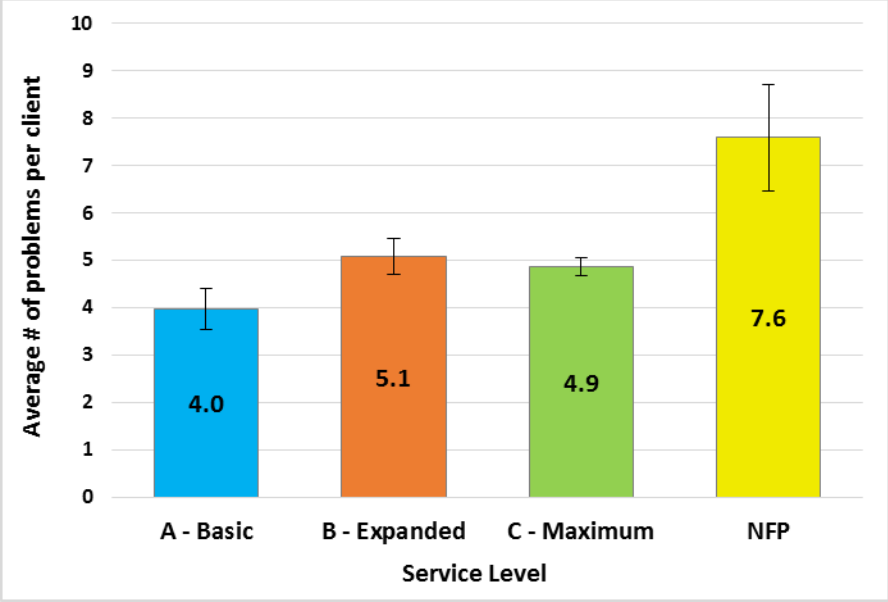
The nurse and/or behavioral health specialist identifies problems and risk factors during in-person encounters. The severity of the problem is classified according to whether a client is showing symptoms of a problem, i.e., an "actual" problem, or not currently manifesting any symptoms but has a history of or risk factor(s) for, i.e., a "potential" problem. In order to analyze the full scale of improvement, actual and potential problems were analyzed together. Thus if a client had a problem of mental health, for example, it was counted only once as a problem and the progress could be tracked as it either improved from actual to potential status, or worsened by moving in the opposite direction.

Problems per Client

Nearly all clients (99.8%, 651 of 652) had at least one problem identified. This included 634 (99.8%) MSS and 17 (100%) NFP clients with an overall total of 3,171 problems, equating to an **overall average of 4.9 problems per client**. However, clients in the NFP program had statistically significantly more problems on average than MSS clients, 7.6 (95% CI: 6.5-8.7) versus 4.8 (95% CI: 4.6-4.9), respectively. NFP clients had between 3 and 11 problems, whereas MSS clients had anywhere from 0 to 9 problems.

In addition to differences by program, the average number of problems identified per client also varied by service level as shown in Figure 2. Clients designated as Basic ("A") service level had the fewest problems, an average of 4.0 per client. This average was significantly less than all of the other service levels. Interestingly, the "B" level clients had a similar average to "C" level clients: 5.1 and 4.9, respectively, which were not statistically different. NFP clients had statistically significantly more problems on average (7.6) than MSS clients of any service level.

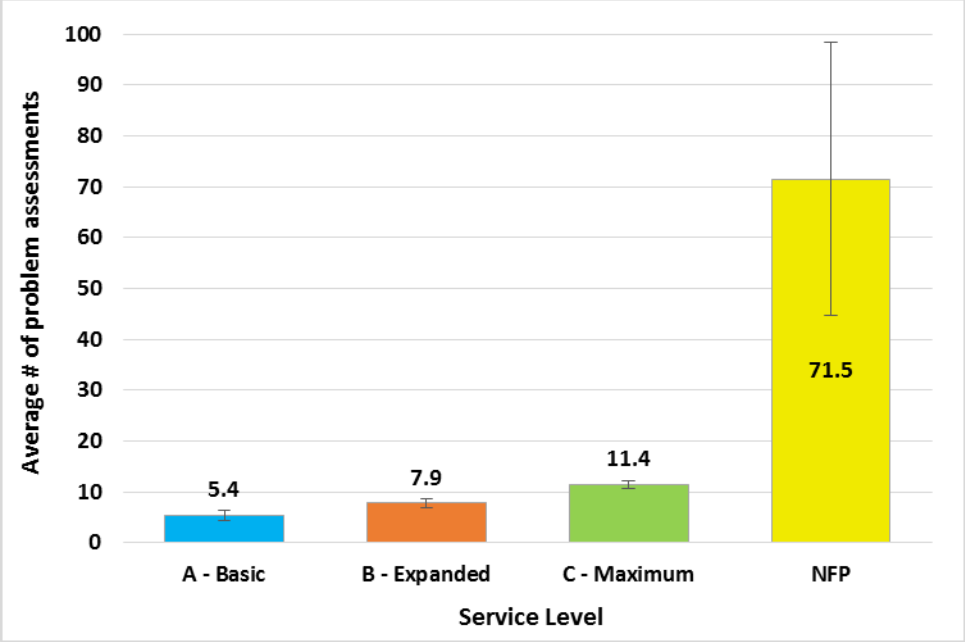
Figure 2. Average Number of Problems per Client by Service Level, 2013 – 2014



There were also differences in the overall number of times problems were assessed both by program and service level. On an individual problem level, the average number of times a unique problem was assessed per client was 2.1 (range: 1-13) for MSS clients and 9.4 (range: 1-40) for NFP clients. Overall, when all problems are combined together, this equates to NFP clients having vastly more total problem assessments documented, averaging 71.5 per client (range: 9 to 181), whereas MSS clients had an

average of 10.0 (range: 0-47) total problem assessments. Figure 3 shows the step-wise increase in the average number of problem assessments per client as the service level increases; as expected, this coincides with the increasing amount of time spent with clients in higher service levels.

Figure 3. Average Number of Problem Assessments per Client by Service Level, 2013 – 2014



Problems by Type

Income was the most commonly identified problem for all clients. It was documented for 99.1% of all clients (Table 7a) and accounted for the top problem in both programs (Table 7b). The next two most commonly identified problems were mental health (76.8%) and pregnancy (67.0%). These problems also accounted for the largest numbers—and proportions—of problem assessments overall.

In general, the number of times a problem was assessed was substantially larger for NFP clients than MSS clients (Table 7b). The top three problems were commonly assessed numerous times per client, with NFP clients having many more assessments on average than MSS clients as would be expected based on the nature of the program and increased time spent with the clients. For instance, income was documented an average of 2.5 times per MSS client (range: 1-10) but 12.2 times per NFP client (range: 2-40). Similarly, the average number of times mental health was documented as a problem was 2.5 for MSS clients (range: 1-13) and 12.2 for NFP clients (range: 2-38). Among MSS clients, caretaking/ parenting and substance use ranked as fourth and fifth in terms of the number of clients documented to have these problems, but these two problems were assessed more frequently than pregnancy (the third most common problem) thus accounted for larger proportions of the total problem assessments and had higher average number of times assessed (1.9 and 2.4, respectively) than pregnancy (1.6).

Table 7a. Most Commonly Identified Types of Problems (All Clients), 2013 – 2014

Problem	# clients with problem	% clients with problem	# assessments for problem	% of total assessments	Average # times assessed per
Income	646	99.1%	1762	23.2%	2.7
Mental Health	501	76.8%	1465	19.3%	2.9
Pregnancy	437	67.0%	849	11.2%	1.9
Caretaking/parenting	388	59.5%	834	11.0%	2.1
Substance use	308	47.2%	817	10.8%	2.7
Health care supervision	295	45.2%	613	8.1%	2.1
Postpartum	267	41.0%	412	5.4%	1.5
Residence	186	28.5%	399	5.3%	2.1
Abuse	112	17.2%	260	3.4%	2.3
Communication*	10	1.5%	37	0.5%	3.7
Family planning	9	1.4%	24	0.3%	2.7
Interpersonal relationship	5	0.8%	53	0.7%	10.6
Nutrition	5	0.8%	42	0.6%	8.4
Sanitation	2	0.3%	12	0.2%	6.0

* Communication with community resources

Table 7b. Most Commonly Identified Types of Problems by Program, 2013 – 2014

	MSS Clients					NFP Clients				
Problem	# clients with problem	% clients with problem	# assess-ments	% of total assess-ments	Average # times assessed per client	# clients with problem	% clients with problem	# assess-ments	% of total assess-ments	Average # times assessed per client
Income	629	99.1%	1554	24.4%	2.5	17	100.0%	208	17.1%	12.2
Mental Health	486	76.5%	1282	20.1%	2.6	15	88.2%	183	15.1%	12.2
Pregnancy	422	66.5%	660	10.4%	1.6	15	88.2%	189	15.6%	12.6
Caretaking/parenting	376	59.2%	728	11.4%	1.9	12	70.6%	106	8.7%	8.8
Substance use	296	46.6%	703	11.0%	2.4	12	70.6%	114	9.4%	9.5
Health care supervision	284	44.7%	533	8.4%	1.9	11	64.7%	80	6.6%	7.3
Postpartum	258	40.6%	353	5.5%	1.4	9	52.9%	59	4.9%	6.6
Residence	177	27.9%	329	5.2%	1.9	9	52.9%	70	5.8%	7.8
Abuse	105	16.5%	200	3.1%	1.9	7	41.2%	60	4.9%	8.6
Communication*	7	1.1%	19	0.3%	2.7	3	17.6%	18	1.5%	6.0
Family planning	1	0.2%	2	0.0%	2.0	8	47.1%	22	1.8%	2.8
Interpersonal relationship	1	0.2%	1	0.0%	1.0	4	23.5%	52	4.3%	13.0
Nutrition	0	-	0	-	-	5	29.4%	42	3.5%	8.4
Sanitation	0	-	0	-	-	2	11.8%	12	1.0%	6.0

* Communication with community resources

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

Clients may be given a rating within each of three categories for each identified problem: 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, 'actual' and 'potential' problems were analyzed together, allowing for a problem to worsen, i.e., increase in severity from potential to actual, or to improve by decreasing from actual to potential. Some client records documented a problem was assessed, with the severity designated as actual or potential, yet there were no KBS ratings documented. In other cases, only a partial KBS rating documented (i.e., a score was present for knowledge but not for behavior or status). Records that were either missing the full KBS score or a partial KBS score were excluded from the KBS analysis. Additionally, only paired KBS ratings (i.e., problems for which there were at least 2 KBS scores documented) were included so that comparisons could be made between initial and final ratings. While these are referred to as 'initial' and 'final' ratings, because of the limitation previously noted (i.e., not all initial documentations of a problem contained KBS scores), the 'initial' rating was actually the first available set of complete KBS scores and the 'final' ratings were the last available documented set of complete KBS scores.

Overall Change in KBS Ratings

Table 8 shows the average initial and final ratings for all problems (regardless of problem type) 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. The MSS program showed statistically significant increases in average ratings for all three KBS categories, whereas the NFP program only showed statistically significant increases for knowledge and behavior. However, the change in initial to final ratings were greater across all three KBS categories for the NFP program. Figures 5 (a) and 5 (b) show these increases in by MSS and NFP programs, respectively.

Table 8. Average Initial and Final KBS Ratings for All Problems by Program, 2013-2014

Category	n†	Average initial rating	95% CI (initial rating)	Average final rating	95% CI (final rating)	p-value	Change in rating
MSS Clients							
Knowledge	1310	3.01	2.97 - 3.04	3.30	3.26 - 3.34	<0.0001*	0.29
Behavior	1310	3.69	3.69 - 3.73	3.86	3.82 - 3.90	<0.0001*	0.17
Status	1310	3.92	3.86 - 3.97	4.05	4.00 - 4.10	0.0004*	0.13
NFP Clients							
Knowledge	107	3.21	3.07 - 3.34	3.76	3.66 - 3.86	<0.0001*	0.55
Behavior	107	3.74	3.60 - 3.87	3.94	3.84 - 4.05	0.0194*	0.21
Status	107	4.34	4.15 - 4.52	4.53	4.40 - 4.67	0.0879	0.20

† The number (n) cited refers to the number of unique client-problems, i.e., the total number of paired KBS ratings. Clients are often represented more than one time since this analysis includes all problem types. The number of individual clients included was 405 for MSS and 17 for NFP.

* Denotes a statistically significant change if p<0.05

Figure 5a. Average KBS Ratings for MSS Clients (Actual & Potential Problems), 2013–2014

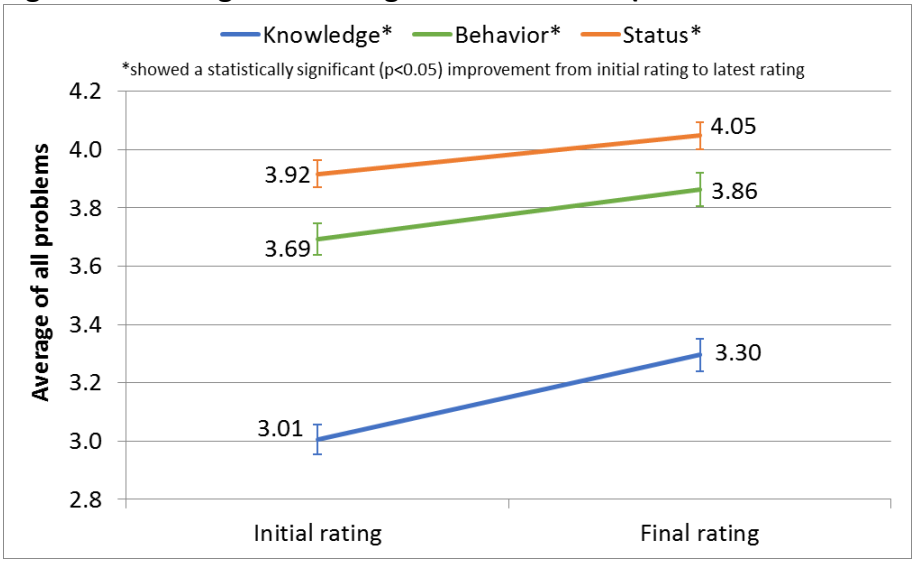
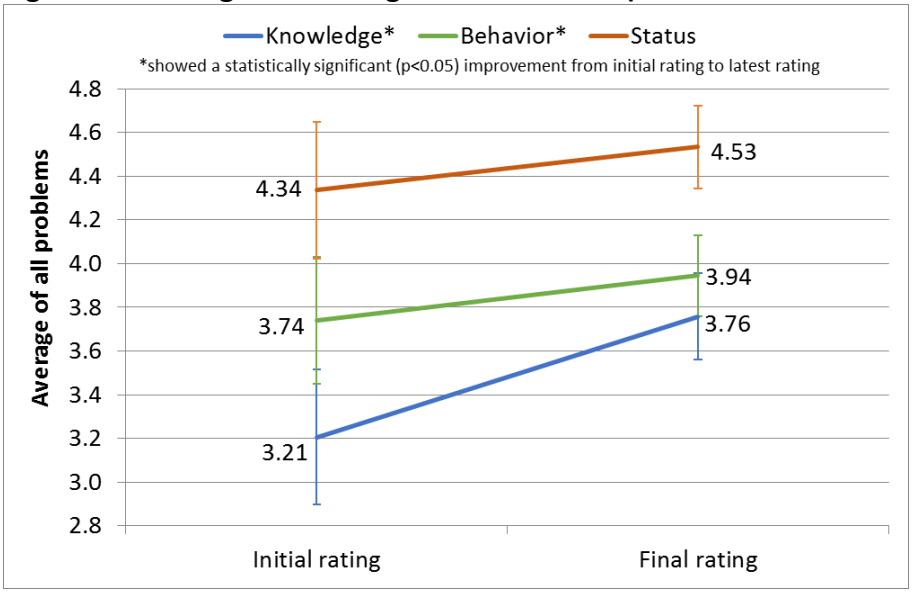


Figure 5b. Average KBS Ratings for NFP Clients (Actual & Potential Problems), 2013–2014



Change in KBS Ratings for the Top 5 Problems

An evaluation of the changes in KBS ratings among top 5 problems for both the MSS and NFP programs is shown in Table 9. Note that since KBS scores were not always recorded each time a problem was documented and since some problems were only rated a single time, the number of clients with paired KBS scores available for this analysis was diminished and does not match the numbers shown in Table 7b (above). Any problem that had less than 10 clients with paired scores was excluded from the KBS ratings analysis.

Overall, the greatest gains from initial to final scores were for knowledge of both mental health and pregnancy among NFP clients both of which significantly increased by 0.71 points. In general, the increases between the average initial and final ratings were larger for the NFP program than the MSS program (Table 9). A few notable examples include the knowledge gains for income, mental health, and caretaking/parenting; each program demonstrated its own statistically significant increase in score yet the NFP gains were 0.22, 0.30, and 0.38 points greater than the MSS changes. While the change in

knowledge about pregnancy among NFP clients was also much greater (0.57 points) than for MSS clients, the difference was not statistically significant for MSS clients. Substance abuse could not be compared across programs because there were too few NFP clients with valid paired KBS ratings.

The only statistically significant increases for behavior were among MSS clients for income, mental health, and pregnancy. NFP clients were statistically no different in behavior for any of the top 5 problems; however this analysis was likely limited by small numbers. The degree of change in behavior for NFP clients were generally not much different than the MSS clients, and were not significant.

The average gains in status were generally smaller than for knowledge and behavior across all problem areas, with the exception of income for NFP clients. The only statistically significant changes in status were for income in both the MSS and NFP programs and mental health for MSS clients. Of note, the status gains for income was 0.31 points greater for NFP than MSS.

Table 9. Average Initial and Final KBS Ratings for Top 5 Problems by Program, 2013–2014†

Problem	Category	n	Average initial rating	Average final rating	p-value	Change in score
MSS Clients						
Income	Knowledge	375	3.10	3.35	<0.0001*	0.25
	Behavior		3.85	4.03	<0.0001*	0.18
	Status		3.31	3.41	0.0160*	0.10
Mental health	Knowledge	259	2.98	3.39	<0.0001*	0.41
	Behavior		3.68	3.89	0.0001*	0.21
	Status		3.89	4.10	0.0103*	0.21
Pregnancy	Knowledge	110	2.95	3.09	0.1487	0.15
	Behavior		3.71	3.89	0.0407*	0.18
	Status		4.31	4.30	0.9410	-0.01
Caretaking/ parenting	Knowledge	131	3.08	3.28	0.0201*	0.20
	Behavior		3.89	3.94	0.5199	0.05
	Status		4.81	4.78	0.7078	-0.03
Substance use	Knowledge	136	3.04	3.38	<0.0001*	0.33
	Behavior		3.12	3.39	0.0513	0.27
	Status		3.60	3.76	0.1212	0.17
NFP Clients						
Income	Knowledge	17	3.29	3.76	0.0382*	0.47
	Behavior		3.76	4.00	0.2553	0.24
	Status		3.59	4.00	0.0405*	0.41
Mental health	Knowledge	14	3.00	3.71	0.0142*	0.71
	Behavior		3.64	3.64	1.0000	0.00
	Status		3.93	4.29	0.2887	0.36
Pregnancy	Knowledge	14	3.14	3.86	0.0042*	0.71
	Behavior		3.93	4.14	0.3837	0.21
	Status		4.57	4.50	0.8348	-0.07
Caretaking/ parenting	Knowledge	12	3.17	3.75	0.0448*	0.58
	Behavior		3.83	4.17	0.1114	0.33
	Status		5.00	4.92	0.3388	-0.08

† Only categories for which there were 10 or more clients with valid KBS scores were included; this resulted in the exclusion of substance abuse for NFP clients (n=8).

* Denotes a statistically significant change if p<0.05

Further evaluation of the KBS ratings changes for the top 5 problems by service level of the MSS clients is shown in Table 10. Again, the two single greatest increases in scores were for mental health (0.57 points) and pregnancy (0.63 points), this time specific to B-level clients. On average, the changes were greatest for knowledge, behavior, and status among B-level clients. The largest knowledge gains were among B-level clients for each of the top 5 problems, though pregnancy was not statistically significant. The only statistically significant changes for behavior were for income among both B- and C-level clients and for mental health among B-level clients. For status, the only statistically significant change was for income among B-level clients.

Table 10. Average Initial and Final KBS Ratings for Top 5 Problems by Service Level among MSS Clients, 2013–2014†

Problem	Service level	n	Rating category	Average initial rating	Average final rating	p-value	Change in score
Income	A - Basic	24	Knowledge	3.25	3.46	0.3947	0.21
			Behavior	4.00	4.25	0.0764	0.25
			Status	3.51	3.67	0.4246	0.15
	B - Expanded	54	Knowledge	3.44	3.83	0.0024*	0.39
			Behavior	4.02	4.26	0.0195*	0.24
			Status	3.56	3.78	0.0141*	0.22
	C - Maximum	297	Knowledge	3.03	3.26	<0.0001*	0.23
			Behavior	3.80	3.97	<0.0001*	0.17
			Status	3.25	3.32	0.0998	0.08
Mental health	B - Expanded	37	Knowledge	3.24	3.81	<0.0001*	0.57
			Behavior	4.03	4.38	0.0012*	0.35
			Status	4.70	4.62	0.5933	-0.08
	C - Maximum	214	Knowledge	2.93	3.31	<0.0001*	0.38
			Behavior	3.60	3.79	0.0028	0.18
			Status	3.72	3.98	0.0029	0.26
Pregnancy	B - Expanded	16	Knowledge	3.13	3.75	0.0027	0.63
			Behavior	3.88	4.25	0.0329	0.38
			Status	4.81	4.88	0.6998	0.06
	C - Maximum	89	Knowledge	3.03	3.26	<0.0001*	0.23
			Behavior	3.66	3.81	0.1495	0.15
			Status	4.19	4.16	0.8124	-0.03
Caretaking/ parenting	B - Expanded	13	Knowledge	3.31	3.85	0.0297*	0.54
			Behavior	4.15	4.08	0.712	-0.08
			Status	5.00	4.84	0.337	-0.16
	C - Maximum	109	Knowledge	3.06	3.21	0.0982	0.16
			Behavior	3.85	3.90	0.5623	0.05
			Status	4.77	4.75	0.848	-0.02
Substance use	B - Expanded	18	Knowledge	3.06	3.61	0.0268*	0.56
			Behavior	2.67	3.22	0.1295	0.56
			Status	3.22	3.78	0.1059	0.56
	C - Maximum	114	Knowledge	3.02	3.33	0.0003*	0.32
			Behavior	3.14	3.38	0.119	0.24
			Status	3.63	3.74	0.3614	0.11

† Only categories for which there were 10 or more clients with valid KBS scores were included.

* Denotes a statistically significant change if p<0.05

Conclusions

- Just over half of clients (51%) were seen during both pregnancy and postpartum, and just under a third (29%) are seen during pregnancy only, suggesting retention of clients after delivery may have improved since the last report.

- MSS clients are have an average of 2.8 in-person visits. A client who is designated an "A" level generally receives only 1.5 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.

- Just over two-thirds of clients are designated as "C-Maximum" level. Thus most clients have a high level of needs to address to support positive maternal and infant outcomes.

- Adverse Childhood Experiences (ACEs) assessments were conducted for 46% of all clients closed in the 2013-2014 period. The mean ACEs scores for MSS clients (3.1) was lower, though not statistically different, than the mean score for NFP clients (4.2). Clients in the higher service levels of C-Maximum and NFP were statistically more likely to have 3 or more ACEs than clients who were enrolled in the A-Basic and B-Expanded service levels.

- Income and mental health continue to be the top two problems for MSS clients, and the same was true for both the NFP clients and overall. However, the methodology for analysis changed in this report as compared to prior annual reports, which looked at MSS clients only and separated *actual* from *potential* problems. In this new analysis, substance use – previously the third top *actual* problem – placed as the 5th most common problem overall, following pregnancy and caretaking/parenting, respectively.
    - Virtually all clients (99%) had income documented as a problem.
    - Mental health was problem for 77% of clients.
    - One in 3 clients (67%) had documentation of pregnancy being a problem.
    - Caretaking/parenting was a problem for more than half (59%) of all clients.
    - Almost half (47%) of all clients had a substance use problem.

- Despite the changed methodology, the KBS ratings for the MSS clients show a statistically significant increase from the initial to the final rating in all 3 categories of knowledge, behavior, and status for both income and mental health, similar to when these were analyzed separately as *actual* and *potential* problems. For the other top five problems, both substance use and caretaking/parenting showed statistically significant increases in knowledge.
    - Among MSS clients, the greatest KBS gains (i.e., largest change from average initial to final ratings) were seen in knowledge for both mental health (0.41) and substance use (0.33). However, when analyzed by service level, the largest gains were observed among B-level clients for pregnancy (0.63) then mental health (0.57), closely followed by substance abuse (0.56).

- Among NFP clients, there were statistically significant increases for knowledge in income, mental health, pregnancy, and caretaking/parenting.
    - The greatest gains in KBS ratings (i.e., largest change from average initial to final ratings) for NFP clients were for knowledge in pregnancy and mental health (both 0.71 points).

- Similar to previous years, the KBS findings show very few significant changes in behavior and status may suggest a need to understand the lack of increase in these areas 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. One particular challenge of this analysis was the recording of the KBS scores. Ideally, KBS scores should be recorded in Nightingale Notes each time a problem is assessed and classified as being either actual or potential. This would allow for improved accuracy in comparing the changes between truly initial and final ratings. The assumptions made that the first documented and the last documented ratings were equivalent to the actual initial and final ratings are a potential bias and limitation of this report. There were at least a few instances where the initial severity of a problem was documented as potential but there were no KBS scores recorded, and the next time the same problem was assessed it was deemed actual, thus calling into question what the true initial scores were. Similarly, it is not possible to know whether the scores actually remained the same between the last recorded scoring and the final date on which the problem is documented without KBS scores on the final date; it is possible that the scores actually changed but there was a data entry or data saving error thus the changed scores were not retained. The impact of such missing data could lead to artificially increased or decreased KBS score changes and would not be an accurate reflection of truly initial identification of the problem to truly final assessment. The historical practice of not recording some scores should be reconsidered.

How do MSS results from the previous reports compare?

	Report 1 (8/09-12/10)	Report 2 (1/11-12/11)	Report 3 (1/12-12/12)	Report 4 (1/13-12/14) *(MSS only)*
Number of clients*	406	258	352	635
Year 1	178	258	352	292
Year 2	228	N/A	N/A	343
Average number of visits per client	3.4	3.8	3.0	2.8
Proportion of clients by service levels				
Level A	14%	16%	10%	13%
Level B	23%	16%	14%	18%
Level C	63%	67%	77%	69%
Proportion of clients by peripartum stage:				
Pregnancy only	13%	24%	35%	29%
Pregnancy and postpartum	50%	65%	40%	51%
Postpartum only	39%	11%	25%	21%
Average number of problems per client:				
Actual	2.6	2.5	2.3	N/A
Potential	2.2	2.3	1.4	N/A
Total *(actual & potential)*	N/A	N/A	N/A	4.8
Top 3 *actual* problems (% of all clients with problem)	Income (86%) Mental health (40%) Substance use (30%)	Income (92%) Mental health (37%) Substance use (33%)	Income (100%) Mental health (38%) Substance use (37%)	N/A
Top 3 *potential* problems	Mental health Caretaking/parenting Pregnancy	Pregnancy Caretaking/parenting Mental health	Caretaking/parenting Pregnancy Mental health	N/A
Top 5 problems *(actual & potential)*	N/A	N/A	N/A	Income (99%) Mental health (77%) Pregnancy (67%) Caretaking/parenting Substance use
Statistically significant increase in KBS ratings for all *actual* problems	Yes (n=248)	Yes (n=187)	Yes (n=241)	N/A
Statistically significant increase in KBS ratings for problems *(actual & potential)*	N/A	N/A	N/A	Yes (n=405)

* For reports 2 and 3, the number of clients was determined over a 12 month period, whereas Reports 1 and 2 used longer periods. Report 1 included a 17 month period (Aug 2009 – Dec 2010); if this report had been limited to Jan – Dec 2010, the number of clients would be 228. Report 4 covered a 24 month period (Jan 2013 – Dec 2014); the MSS client counts for each year were 292 and 343, respectively.

- The number of average visits per client ranged from 2.8 to 3.8 among the four reporting periods. The lowest number of average visits per client occurred during this most recent reporting period.
- The proportion of clients designated as level C increased during each of the three prior reporting periods, accounting for 77% during 2012, but fell in this period to only 69%.

- During the most recent reporting period, the proportion of clients seen during both pregnancy and postpartum increased, while the pregnancy only proportion declined. This is in contrast to the previous report. The proportion of postpartum only visits remained similar to last report.
- The average number of total problems per client in 2013-14 was roughly equivalent to the sum of the average numbers of *actual* and *potential* problems per client in both 2009-10 and 2011, though higher than the sum for 2012.
- Combining *actual* and *potential* problems together in this analysis eliminated the possibility of direct comparison to the rankings of years past, yet still, the types of problems that were previously found to be the top *actual* and top *potential* problems remained among the top 5 overall problems for 2013-14. The top two *actual* problems from all three prior reporting periods were income and mental health, which aligned with the current top two overall problems for 2013-14. The top two *potential* problems for all three prior periods (pregnancy and caretaking/parenting) ended up being the third and fourth most common problems overall. Substance use, which was the third top *actual* problem in the past, ranked as the fifth most common problem overall.
- There were statistically significant increases for KBS ratings among the top two *actual* problems of income and mental health during the prior three time periods. While the current KBS ratings for the combination of *actual* and *potential* problems are not directly comparable to prior years, there were statistically significant increases for MSS clients in all three KBS areas for income and mental health.

Data Notes

- Clients who were closed between January 1, 2013, and December 31, 2014, 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* to *potential* during their services. In these cases, the full improvement in the KBS scores would be reflected based on the new methodology used in this version of the report; whereas it was not reflected in prior versions.
- Calculation of the total number of problems per client was without regard to whether KBS scores were documented. Many records were excluded from the KBS analysis (see below), thus the total number of problems is based on a greater number of records than the KBS analysis. This may have resulted in an overestimate of the number of problems if those without KBS scores are indeed not valid. Alternatively, the KBS analysis may have been affected if all valid problems were not included due to a lack of documented KBS scores.
- Paired t-tests at 95% confidence intervals were used to analyze the change in KBS ratings from the 'initial' (first documented) rating to the 'final' (last documented) rating. Only those clients with paired initial and a final ratings per problem were included in the analysis. Records with partial KBS ratings, i.e., a score was present for knowledge but not for behavior or status, were excluded prior to the pairing in order to standardize the comparisons of time points between the 3 rating areas of knowledge, behavior, and status for a particular problem. Furthermore, any problem that had less than 10 clients with paired scores was excluded from the KBS ratings analysis because of the instability in conducting a t-test on a data set with such small numbers.