Kitsap Public Health District Parent Child Health Clients

MSS and NFP Client Visits and Outcomes

Report 5: MSS and NFP Clients Closed Between January 1, 2015, and December 31, 2016

July 2017

Table of Contents

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 fifth issue of the Client Visits and Outcomes report is the second one to include both MSS and NFP clients. In this report, data are summarized for clients who were closed during the two-year period of January 1, 2015, through December 31, 2016. 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 511 clients closed, including 458 MSS and 53 NFP clients. There were fewer MSS clients closed in 2015 and 2016 (only 215 and 243, respectively) than there have been in past years. In fact, these are the lowest numbers since 2010 *(see "How do MSS results from the previous reports compare?" section, Table 11).* In contrast, there was a growth in the number of NFP clients closed for this 2-year period, more than three times as many as in 2013-14 (n=17).

The demographic profiles of clients from the MSS and NFP programs are similar in many regards (Table 1), though NFP clients tend to be slightly younger. The average age of NFP clients is 23.2 years; whereas it is statistically higher at 28.1 years for MSS clients ($p<0.0001$).

The majority of MSS clients (80%) are White (any ethnicity) and 1 in 3 are Hispanic. Among NFP clients, three-quarters are White and approximately 1 in 5 are Hispanic. Most clients speak English as their primary language, including 75% of MSS clients and 98% of NFP clients. Guatemalan dialect was the next most commonly cited primary language among MSS clients (13%), followed by Spanish (11%).

Nearly 1 in 3 MSS clients and a little over 1 in 4 NFP clients have less than a high school education. A larger proportion of MSS clients have more than a high school education than NFP clients (38% vs. 32%, respectively), though there is no statistical difference in education level. More than 2 in 3 MSS clients are unemployed, whereas just under 2 in 3 NFP clients are unemployed. The majority 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%).

Only 15% of NFP clients are married, whereas 40% of MSS clients are married. This was a statistically significant difference between the programs. In MSS, 54% of women are either single or unmarried living with a domestic partner, but in NFP this group accounts for 85% of clients. Divorced or separated women represented just 5% of MSS clients.

Table 1. MSS and NFP Client Demographics, 1/2015 – 12/2016

	MSS Clients		NFP Clients	
	Number	Percent	Number	Percent
Year				
2015	215	46.9	25	47.2
2016	243	53.0	28	52.8
Age				
≤19 years	20	4.4	10	18.9
20 to 23 years	101	22.1	25	47.2
24 to 28 years	148	32.3	12	22.6
29 to 34 years	128	28.0	5	9.4
≥35 years	61	13.3	1	1.9
Race (any ethnicity)				
White	334	80.3	37	75.5
American Indian or Alaska Native	7	1.7	2	4.1
Asian	13	3.1	2	4.1
Black	17	4.1	1	2.0
Hawaiian or other Pacific Islander	18	4.3	1	2.0
Multiple races or other/unknown race	27	6.5	6	12.2
Ethnicity (any race)				
Non-Hispanic	298	67.4	40	78.4
Hispanic	144	32.6	11	21.6
Marital Status				
Single	226	51.5	39	75.0
Unmarried with domestic partner	11	2.5	5	9.6
Divorced or separated	24	5.5	0	0.0
Married	176	40.1	8	15.4
Widowed	1	0.2	0	0.0
Primary Language				
English	341	74.5	52	98.1
Spanish	51	11.1	0	0.0
Guatemalan dialect	58	12.7	0	0.0
Other	8	1.7	1	1.9
Level of Education				
No education	1	0.3	0	0.0
Less than high school	119	30.6	13	26.0
High school graduate or GED	121	31.1	21	42.0
More than high school	148	38.0	16	32.0
Employment Status				
Unemployed*	299	68.9	32	62.8
Employed**	135	31.1	19	37.2
Housing				
Own	82	19.0	8	15.7
Rent	316	73.3	36	70.6
Subsidized housing	17	3.9	1	1.9
Foster care, homeless, or other	12	2.8	5	9.8
Group facility	4	0.9	1	1.9

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

Note: most categories have clients with missing data; percentages are based upon clients with known status (unknown excluded); the total number of MSS and NFP clients served are 458 and 53, 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

As previously noted, there were substantially fewer MSS clients closed per year in 2015-16 than in the past several years, whereas there were more NFP clients. This change in the number of clients included also yielded substantial differences in the number of visits conducted. During 2015-16, a total of 2,551 in-person visits completed, which included 1,323 (52%) for MSS clients and 1,228 (48%) for NFP clients. As shown in Table 2, these equate to an **average of 2.9 visits per MSS client** and **23.2 visits per NFP client**. In comparison, the 2013-14 analysis of closed clients showed that the majority (88%) of visits were with MSS clients, with only 12% for NFP. In that 2-year period, there was a very similar average number of visits per MSS client (2.8) as seen in 2015-16, but far fewer visits per NFP client (13.8).

For MSS clients, assessments were the most common type of visit, averaging 1.5 visits per client. However, home visits far outweighed any other type of visit for NFP clients, with an average of 20.7 visits per client.

Table 2. In-Person Client Visits by Program, 2015 – 2016

	MSS Clients (n=458)		NFP Clients (n=53)	
Type of Visit	Total # of visits	Average # of visits per client	Total # of visits	Average # of visits per client
Assessment	702	1.5	87	1.6
Home Visit	526	1.1	1096	20.7
Office Visit	95	0.2	45	0.8
Overall (all types)	1323	2.9	1228	23.2

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. The designated service level may be different from pregnancy to postpartum. 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, 2015 – 2016

	MSS Clients		NFP Clients	
Peripartum stage	n	% of total clients	n	% of total clients
Clients with pregnancy service only	126	27.5	17	32.1
Clients with postpartum service only	127	27.7	3	5.7
Clients with pregnancy and postpartum services	205	44.8	33	62.3
Total	458		53	

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 closed during 2015-16 according to their highest service level was as follows: A = 11%, B = 16%, C = 62%, and NFP = 10%.**

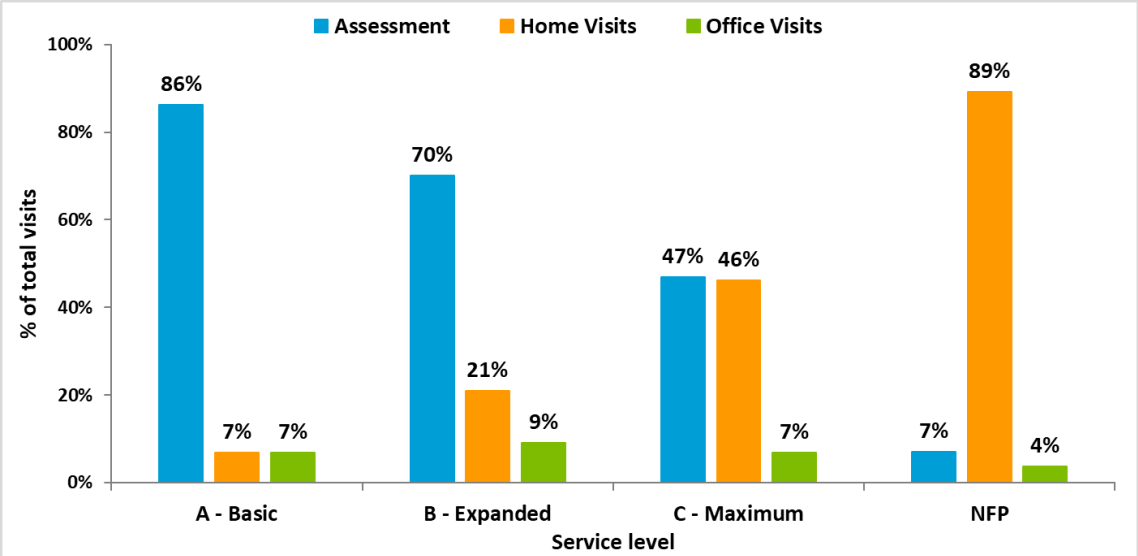
Moving from "A" to "B" to "C" or NFP allows more hours of in-person services. Table 4 demonstrates how those increases in hours translate into a higher average number of visits per client by service level. NFP clients received considerably more visits than even the highest MSS service level clients.

Table 4. In-Person Client Visits by Service Level, 2015 – 2016

Service Level	Average # of visits per client
MSS: A- Basic	1.8
MSS: B- Expanded	2.1
MSS: C- Maximum	3.3
NFP	23.2

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 visits are greater than the proportion of assessments.

Figure 1. Client Visits by Visit Type and Service Level, 2015 – 2016



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

During the 2015-16 closure timeframe evaluated, 53 NFP clients were closed. Of these, just over half (28; 53%) had been in the program less than one year; the remaining 25 were in the program for more than 1 year. (Note that time in the program was calculated from the date the client's account was opened to services through the date of closure, but closure occasionally can be delayed from the actual last date of contact or activity date).

Services were completed on 24 (45%) clients. The two other most common reasons for closure included: moved out of area (10; 19%) and part in services then refused (9; 17%). Six clients were lost to follow-up; 5 within less than 1 year of services.

Among those lost to follow up, all were either in their teens (<=19 years; n=1) or their early 20's (20-23 years; n=5). All 6 had very low educational attainment: 1 had less than a high school education and the others had either earned a GED or graduated high school.

Clients who began NFP services then refused had also mostly remained in for less than 1 year, including 4 who were in for less than 6 months. Six (67%) of these women were less than 24 years old; 2 were 24-28 years old and the other was within 29-34 years. Most had very low educational attainment, with 3 having less than a high school education, 3 with either a GED or high school degree.

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 57% (291) of all clients closed during 2015-16, which was a slight increase from 46% in 2013-14. For the 2015-16 clients, staff declined to conduct the assessment for 10% of clients, 1% of clients declined, and the remainder (30%) did not have a specified reason as to why ACEs assessments were not conducted. A few clients (1%) were excluded from this analysis because although they had an ACEs score, their records were marked as either staff or client declined the assessment, and it was unclear if this was a typo in the presence of a score or the reason.

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. As shown in Table 5, the mean ACEs score for MSS clients (3.0, range: 0 – 10) was statistically significantly lower than the mean score for NFP clients (4.6, range: 0 – 10). Nearly all NFP clients had a score of at least 1; only 6% had a score or 0. Statistically significant differences were also observed by service level (Tables 6-A and 6-B), with clients in the higher service levels (i.e., C-Maximum and NFP) statistically more likely to have 3 or more ACEs and 5 or more ACEs than clients who were enrolled in lower service levels (i.e., A-Basic and B-Expanded).

Table 5. Adverse Child Experiences (ACEs) among Clients by Program, 2015 – 2016

Category	MSS Clients	NFP Clients	p-value
Number of clients with an ACEs score	255	36	-
Percentage of total clients	56%	68%	-
Mean ACEs score	3.0	4.6	0.0012*
Minimum ACEs score	0	0	-
Maximum ACEs score	10	10	-
Percentage of clients with ACEs score = 0	25%	6%	0.0078*
Percentage of clients with ACEs score >=3	48%	72%	0.0080*
Percentage of clients with ACEs score >=5	29%	50%	0.0113*

* Denotes a statistically significant difference (p<0.05)

Table 6-A. Adverse Child Experiences (ACEs) among Clients by Service Level, 2015 – 2016

Category	A-Basic	B-Expanded	C-Maximum	NFP	p-value
# of clients with an ACEs score	31	50	174	36	-
% with score = 0	61%	30%	18%	6%	<0.0001*
% with score >=3	10%	46%	56%	71%	<0.0001*
% with score >=5	3%	24%	35%	50%	<0.0001*

* Denotes a statistically significant difference (p<0.05)

Table 6-B. Adverse Child Experiences (ACEs) among Clients by Collapsed Higher vs. Lower Service Level, 2015 – 2016

Category	A/B	C/NFP	p-value
# of clients with an ACEs score	81	210	-
% with score = 0	42%	15%	<0.0001*
% with score >=3	32%	59%	<0.0001*
% with score >=5	16%	38%	0.0004*

* Denotes a statistically significant difference (p<0.05)

What problems are identified in our clients?

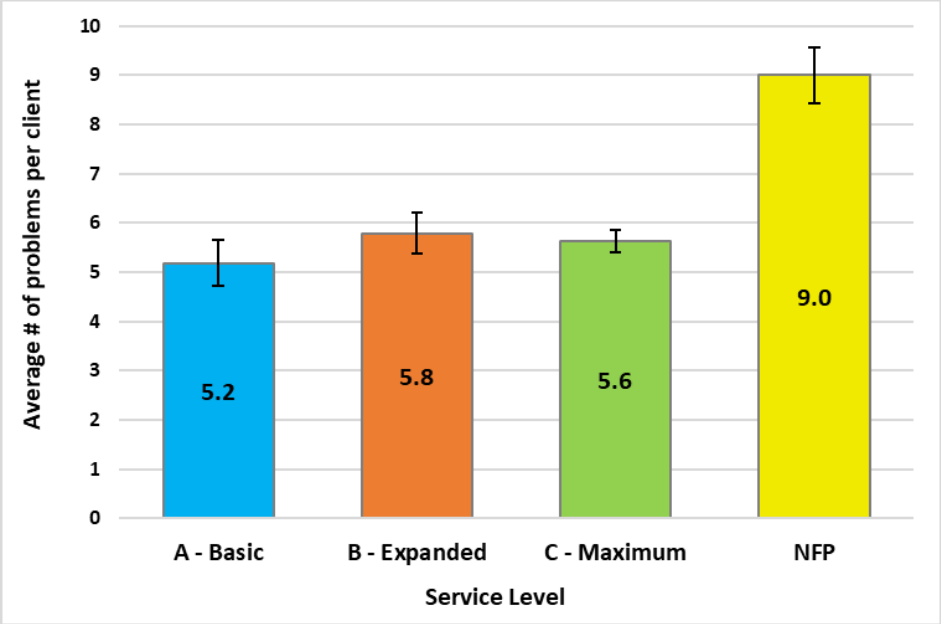
The nurse and/or behavioral health specialist identifies problems and risk factors during in-person encounters. The severity of the problem is classified according to whether a client is showing symptoms of a problem, i.e., an "actual" problem, or not currently manifesting any symptoms but has a history 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%, 510 of 511) had at least one problem identified. This included 457 (99.8%) MSS and 53 (100%) NFP clients with an overall total of 3,041 problems, equating to an **overall average of 6.0 problems per client**. However, clients in the NFP program had statistically significantly more problems on average than MSS clients, 9.0 (95% CI: 8.4-9.6) versus 6.0 (95% CI: 5.4-5.8), respectively. NFP clients had between 4 and 13 problems, whereas MSS clients had anywhere from 0 to 10 problems.

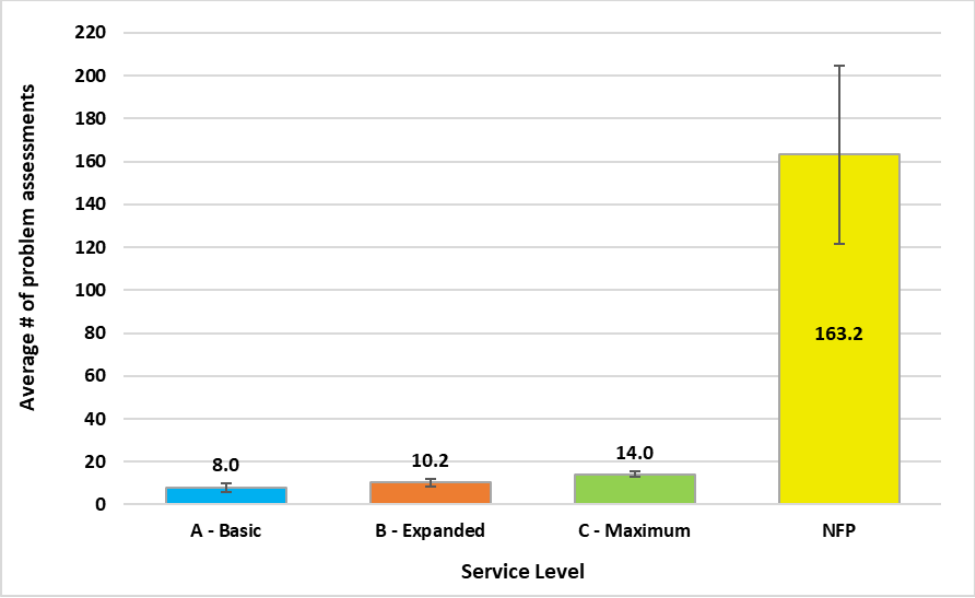
In addition to differences by program, the average number of problems identified per client also varied by service level as shown in Figure 2. Clients designated as Basic ("A") service level had the fewest problems, an average of 5.2 per client. The "B" and "C" level clients had similar averages, with "C" level clients being marginally smaller: 5.8 and 5.6, respectively. None of these three service levels were statistically different. However, NFP clients had statistically significantly more problems on average (9.0) than MSS clients of any service level.

Figure 2. Average Number of Problems per Client by Service Level, 2015 – 2016



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 5.6 (range: 0-10) for MSS clients and 9.0 (range: 4-13) for NFP clients. Overall, when all problems are combined, this equates to NFP clients having vastly more total problem assessments documented, averaging 163.2 per client (range: 9 to 487), whereas MSS clients had an average of 12.6 (range: 0-79) 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, 2015 – 2016



Problems by Type

Income was once again the most commonly identified problem for all clients. During 2015-16, income was documented as a problem for 98.6% of all clients (Table 7a) and was the top problem in both

programs (Table 7b). The second most commonly identified problem was mental health (92.0%). These problems also accounted for the largest numbers—and proportions—of problem assessments overall. The remaining three from the top five problems, in rank order, were caretaking/parenting (70.3%), pregnancy (68.5%), and healthcare supervision (63.0%).

These top five problems were the same in both programs, but the ranked order differed in NFP than for MSS and overall (i.e., all clients). Among NFP clients, pregnancy ranked as third, followed by healthcare supervision (fourth), and then caretaking/parenting (fifth).

Substance abuse had been one of the top five problems for the 2013-14 closure analysis, but in 2015-16 it dropped to seventh place both overall and for MSS clients, and tied with residence for sixth place among NFP clients.

Across the board for all problems, the number of times the problem was assessed per client was substantially larger for NFP clients than MSS clients (Table 7b). This is consistent with what we would expect given the nature of the more intensive NFP program and increased time spent with these clients. As an example, mental health was documented an average of 2.8 times per MSS client but 22.2 times per NFP client. Interestingly, while mental health was ranked second overall and for both programs, there were more assessments conducted (1,161; 20.1%) for mental health than for income (1,114; 19.3%), even though more clients had income identified as a problem (451) as compared to mental health (419). This meant that on average for MSS clients, mental health was assessed more often per client (2.8) than income (2.5). Family planning was not assessed at all for any MSS clients, but was tied for the seventh most common problem among NFP clients (64.2%). Another striking difference was that nutrition was not assessed at all for MSS clients, but it was for 39.6% of NFP clients and it garnered the unique status of having the highest average number of times a problem was assessed per client (25.4).

Table 7a. Most Commonly Identified Types of Problems (All Clients), 2015 – 2016

Problem	# clients with problem	% clients with problem	# of assessments for problem	% of total assessments	Average # times assessed per client
Income	504	98.6%	2304	16.0%	4.6
Mental Health	470	92.0%	2292	15.9%	4.9
Caretaking/parenting	359	70.3%	1635	11.3%	4.6
Pregnancy	350	68.5%	1416	9.8%	4.0
Health care supervision	322	63.0%	1375	9.5%	4.3
Postpartum	299	58.5%	814	5.6%	2.7
Substance use	294	57.5%	1399	9.7%	4.8
Residence	185	36.2%	972	6.7%	5.3
Abuse	156	30.5%	766	5.3%	4.9
Family planning	34	6.7%	450	3.1%	13.2
Nutrition	21	4.1%	534	3.7%	25.4
Communication*	19	3.7%	227	1.6%	11.9
Interpersonal relationship	15	2.9%	139	1.0%	9.3
Sanitation	13	2.5%	94	0.7%	7.2

* Communication with community resources

Table 7b. Most Commonly Identified Types of Problems by Program, 2015 – 2016

Program:	MSS Clients (n=458)					NFP Clients (n=53)				
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	451	98.5%	1114	19.3%	2.5	53	100.0%	1190	13.8%	22.5
Mental Health	419	91.5%	1161	20.1%	2.8	51	96.2%	1131	13.1%	22.2
Caretaking/parenting	314	68.6%	709	12.3%	2.3	45	84.9%	926	10.7%	20.6
Pregnancy	301	65.7%	589	10.2%	2.0	49	92.5%	827	9.6%	16.9
Health care supervision	276	60.3%	544	9.4%	2.0	46	86.8%	831	9.6%	18.1
Postpartum	265	57.9%	465	8.1%	1.8	34	64.2%	349	4.0%	10.3
Substance use	251	54.8%	541	9.4%	2.2	43	81.1%	858	9.9%	20.0
Residence	142	31.0%	298	5.2%	2.1	43	81.1%	674	7.8%	15.7
Abuse	133	29.0%	315	5.5%	2.4	23	43.4%	451	5.2%	19.6
Family planning	0	0.0%	0	0.0%		34	64.2%	450	5.2%	13.2
Nutrition	0	0.0%	0	0.0%		21	39.6%	534	6.2%	25.4
Communication*	3	0.7%	6	0.1%	2.0	16	30.2%	221	2.6%	13.8
Interpersonal relationship	2	0.4%	4	0.1%	2.0	13	24.5%	135	1.6%	10.4
Sanitation	7	1.5%	20	0.3%	2.9	6	11.3%	74	0.9%	12.3

* 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 on that activity date. 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 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. Both programs showed statistically significant increases in average ratings for all three KBS categories. The change in initial to final ratings were greater for NFP in both knowledge and status, but greater for MSS for behavior. 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, 2015-2016

Category	n†	Average initial rating	95% CI (initial rating)	Average final rating	95% CI (final rating)	p-value	Change in rating
MSS Clients							
Knowledge	933	3.02	2.97 - 3.07	3.35	3.30 - 3.40	<0.0001*	0.33
Behavior	933	3.76	3.71 - 3.80	4.03	3.98 - 4.07	<0.0001*	0.27
Status	933	3.98	3.92 - 4.04	4.13	4.07 - 4.19	0.0004*	0.15
NFP Clients							
Knowledge	363	3.27	3.20 - 3.34	3.71	3.65 - 3.78	<0.0001*	0.45
Behavior	363	3.69	3.62 - 3.76	3.89	3.82 - 3.96	<0.0001*	0.20
Status	363	4.32	4.22 - 4.41	4.50	4.42 - 4.57	0.0028*	0.18

† 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 286 for MSS and 51 for NFP.

* Denotes a statistically significant change if p<0.05.

Figure 5a. Average KBS Ratings for MSS Clients (Actual & Potential Problems), 2015–2016

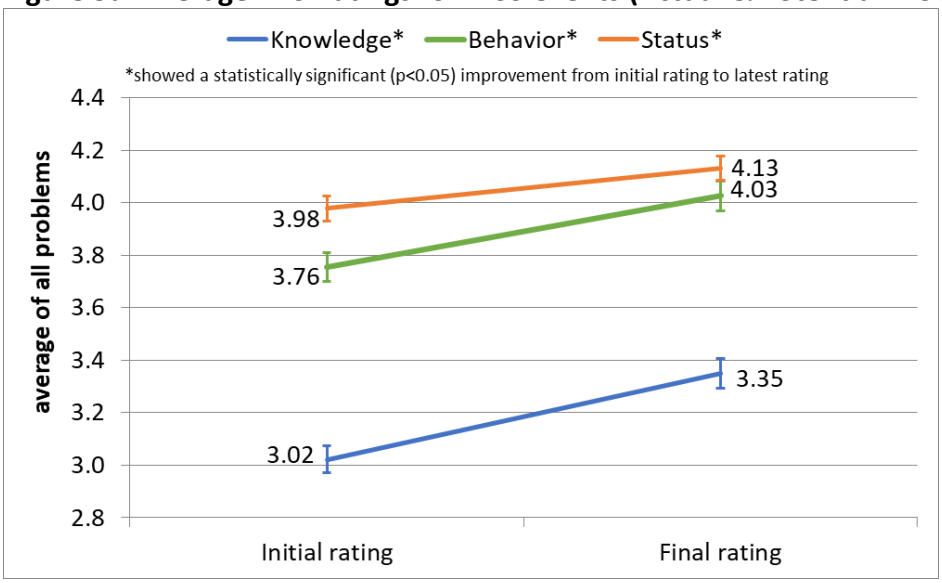
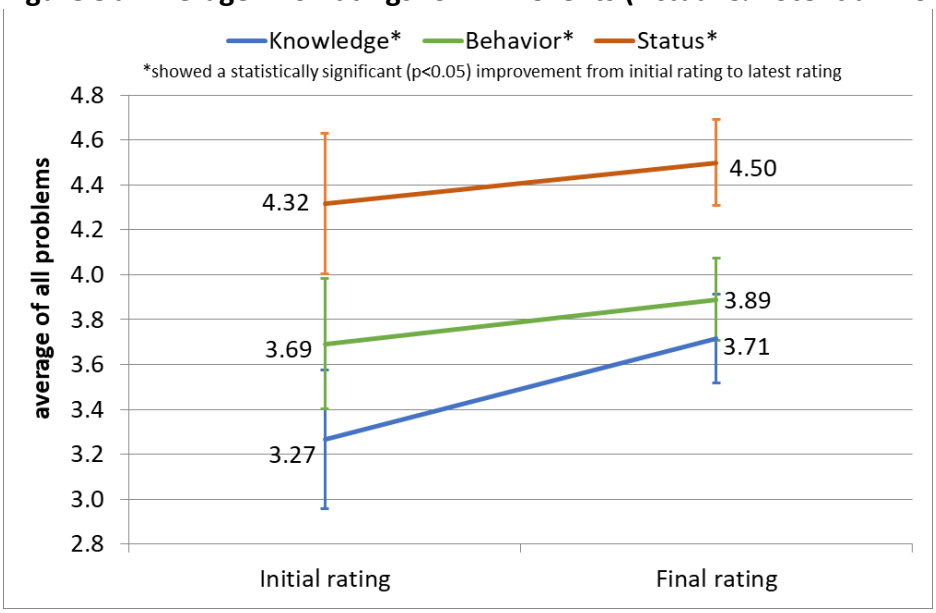


Figure 5b. Average KBS Ratings for NFP Clients (Actual & Potential Problems), 2015–2016



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). A problem required a minimum of 10 clients with paired scores to be included from the KBS ratings analysis.

Overall, the greatest gains from initial to final scores were for knowledge of both caretaking/parenting (0.80 points) and pregnancy (0.66 points) among NFP clients. Most of the other largest gains were knowledge, including income for NFP (0.53 points), mental health for NFP (0.49 points), and pregnancy for MSS (0.47 points), though status of mental health for NFP clients (0.44) was the sixth highest. The increases between the average initial and final ratings were larger for the NFP program than the MSS program for all of the knowledge scores (Table 9).

This two-year period showed numerous statistically significant increases for behavior, including 4 of the top 5 problems (all but healthcare supervision) for MSS clients, as well as both income and mental health for NFP clients. Interestingly, the degree of change according to shift in score were greater for MSS clients in income (0.39 vs. 0.31) and exactly the same (0.29 points) for mental health. The degree of change in behavior for NFP clients were generally slightly slower for the MSS clients for the other problems too.

The three problems with the greatest change in score for status were mental health in both programs (0.44 in NFP; 0.26 in MSS) and income for NFP (0.29). While the latter was not statistically significant, the changes in mental health status were statistically significant. The only other statistically significant change in status was for income among MSS clients, though the score was lower (at only 0.14).

Table 9. Average Initial and Final KBS Ratings for Top 5 Problems by Program, 2015–2016

Problem	Category	n	Average initial rating	Average final rating	p-value	Change in score
MSS Clients						
Income	Knowledge	226	3.13	3.30	0.0172*	0.17
	Behavior		3.62	4.02	<0.0001*	0.39
	Status		3.25	3.39	0.0175*	0.14
Mental health	Knowledge	186	2.89	3.28	<0.0001*	0.39
	Behavior		3.53	3.82	<0.0001*	0.29
	Status		3.80	4.05	0.0067*	0.26
Caretaking/ parenting	Knowledge	152	3.01	3.44	0.1487	0.43
	Behavior		4.12	4.30	0.0094*	0.18
	Status		4.89	4.91	0.6518	0.02
Pregnancy	Knowledge	74	2.77	3.24	0.0004*	0.47
	Behavior		3.65	3.93	0.0291*	0.28
	Status		4.07	4.09	0.8140	0.03
Healthcare supervision	Knowledge	101	3.22	3.49	0.0206*	0.27
	Behavior		3.96	4.05	0.3682	0.09
	Status		4.42	4.52	0.3263	0.11
NFP Clients						
Income	Knowledge	45	3.27	3.80	0.0003*	0.53
	Behavior		3.53	3.84	0.0468*	0.31
	Status		3.44	3.73	0.0502	0.29
Mental health	Knowledge	45	2.98	3.47	0.0009*	0.49
	Behavior		3.58	3.87	0.0354*	0.29
	Status		3.89	4.33	0.0088*	0.44
Caretaking/ parenting	Knowledge	35	3.00	3.80	<0.0001*	0.80
	Behavior		3.94	4.06	0.2918	0.11
	Status		4.97	4.91	0.3108	-0.06
Pregnancy	Knowledge	41	2.98	3.63	<0.0001*	0.66
	Behavior		3.73	3.95	0.1635	0.22
	Status		4.44	4.44	1.0000	0.00
Healthcare supervision	Knowledge	39	3.49	3.77	0.0536	0.28
	Behavior		3.72	3.79	0.6335	0.08
	Status		4.62	4.62	1.0000	0.00

* 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. The two single greatest increases in scores were for level-A clients in caretaking/parenting knowledge (0.77 points) and income behavior (0.68 points). Averaging scores across all levels, the greatest average changes were for knowledge, followed by behavior, then status. However, for income, the greatest increases in initial to final ratings for all three service-levels were actually seen in behavior; the only statistically significant increase for income knowledge was among the C-level clients. Mental health could not be evaluated for A-level clients due to small numbers, but statistically significant gains were seen in knowledge, behavior, and status of C-level clients. Interestingly, mental health knowledge increased on average for B-level clients, but the average behavior score statistically decreased. There were numerous statistically significant increases for behavior. For status, the only statistically significant increases were for C-level clients in both income and mental health.

Table 10. Average Initial and Final KBS Ratings for Top 5 Problems by Service Level among MSS Clients, 2015–2016†

Problem	Service level	n	Rating category	Average initial rating	Average final rating	p-value	Change in score
Income	A - Basic	22	Knowledge	3.41	3.45	0.8388	0.05
			Behavior	3.77	4.45	0.0005*	0.68
			Status	3.59	3.55	0.7859	-0.05
	B - Expanded	38	Knowledge	3.32	3.42	0.5685	0.11
			Behavior	3.89	4.26	0.0123*	0.37
			Status	3.50	3.55	0.6511	0.05
	C - Maximum	166	Knowledge	3.05	3.25	0.0142*	0.20
			Behavior	3.54	3.90	<0.0001*	0.36
			Status	3.15	3.33	0.0086*	0.18
Mental health	B - Expanded	32	Knowledge	3.06	3.56	0.0004*	0.50
			Behavior	3.81	3.62	0.0498*	-0.19
			Status	4.34	4.56	0.2980	0.22
	C - Maximum	145	Knowledge	2.85	3.20	<0.0001*	0.35
			Behavior	3.43	3.71	0.0004*	0.28
			Status	3.63	3.90	0.0099*	0.27
Caretaking/ parenting	A - Basic	13	Knowledge	3.08	3.85	0.0092*	0.77
			Behavior	4.23	4.69	0.0404*	0.46
			Status	5.00	5.00	n/a	0.00
	B - Expanded	30	Knowledge	3.03	3.47	0.0601	0.43
			Behavior	4.07	4.23	0.2412	0.17
			Status	4.90	4.90	1	0.00
	C - Maximum	109	Knowledge	2.99	3.39	<0.0001*	0.39
			Behavior	4.12	4.28	0.0713	0.16
			Status	4.87	4.90	0.6096	0.03
Pregnancy	C - Maximum	66	Knowledge	2.82	3.26	0.0013*	0.44
			Behavior	3.68	3.92	0.0762*	0.24
			Status	4.06	4.06	1	0.00
Healthcare supervision	B - Expanded	16	Knowledge	3.19	3.44	0.4194	0.25
			Behavior	3.94	4.13	0.5068	0.19
			Status	4.50	4.75	0.2521	0.25
	C - Maximum	76	Knowledge	3.17	3.45	0.0421*	0.28
			Behavior	3.96	4.00	0.7344	0.04
			Status	4.36	4.43	0.5637	0.08

† 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

Summary and Conclusions

- Just under half of clients (47%) were seen during both pregnancy and postpartum, and just under a third (28%) are seen during pregnancy only, suggesting retention of clients after delivery is similar to the last report.

- MSS clients had an average of 2.9 in-person visits. A client who is designated an "A" level generally receives only 1.8 in-person visits on average. Therefore, many of these clients are not receiving a second visit after the initial assessment to address areas of concern or recognized problems. This also calls into question whether the level-A clients should be included in future analyses of problems and KBS score changes.

- Yet again, just over two-thirds (69%) of MSS clients are designated as "C-Maximum" level. Thus, most clients have a high level of needs to support positive maternal and infant outcomes.

- Adverse Childhood Experiences (ACEs) assessments were conducted for 57% of all clients closed in the 2015-16 period. Over half (58%) of the NFP clients had 3 or more ACEs, with a mean score of 4.2. In the MSS program, 51% had 3 or more ACEs and the mean score was 3.1. Those enrolled in the higher need service levels of NFP and MSS level C-Maximum were statistically more likely to have 3 or more ACEs than clients who were enrolled in lower MSS service levels of A-Basic and B-Expanded.

- The NFP clients closed during 2015-16 had an average of 9.0 specifically identified problems, while MSS clients had 6.0 problems on average. This included analysis of both actual and potential problems, using the same methodology as the 2013-14 analysis ("Report 4").
    - Income and mental health continue to be the top two problems overall (99% and 92%, respectively), as well as for both MSS (98% and 92%) and NFP (100% and 96%).
        - In comparison to the 2013-14 analysis, this represented an increase in clients with mental health documented as a problem.
    - Overall, the remainder of the top five problems included: caretaking/parenting (70.3%), pregnancy (68.5%), and healthcare supervision (63.0%).
        - This order was the same for MSS clients but differed slightly for NFP clients, where pregnancy ranked as third, followed by healthcare supervision (fourth), and then caretaking/parenting (fifth).
    - This year, substance use did not rank in the top 5 problems. It placed seventh (55%) among MSS clients and sixth (81%) among NFP clients.

- The KBS analysis showed statistically significant increases (i.e., change from average initial to final ratings) for knowledge, behavior, and status for both NFP and MSS clients when all problems were assessed together. NFP had an overall greater gain in knowledge than MSS (0.45 vs. 0.33) and status (0.18 vs. 0.15), but smaller for behavior (0.20 vs. 0.27).
    - Each of the top 5 problem knowledge gains were greater for NFP clients than for MSS clients.

    - Among MSS clients, the 3 greatest statistically significant KBS gains by problem type were seen in *knowledge* of pregnancy (0.47), *knowledge* of caretaking/parenting (0.43), and a tie for both *knowledge* for mental health and *behavior* for income (both at 0.39). When analyzed by service level, the largest gains were surprisingly observed among level-A clients in caretaking/parenting knowledge (0.77 points) and income behavior (0.68 points). A closer look at the top 2 problems of income and mental health by MSS service level revealed some unexpected trends too: First, the greatest increases for income were seen in *behavior* – across all three service-levels;

the only statistically significant increase for *knowledge* of income was among the C-level clients. Second, there were statistically significant gains in *knowledge, behavior*, and *status* of mental health for C-level clients. Interestingly, mental health *knowledge* increased for B-level clients, but *behavior* statistically decreased.

- The largest gain within the top 5 problems for NFP clients was for *knowledge* in caretaking/parenting, which increased by 0.80. The second and third greatest gains were *knowledge* of pregnancy (0.66) and *knowledge* for income (0.53). While substance use was not among the top 5 problems, it had a similarly high increase in knowledge (0.53). (Of note, substance use could not be evaluated for change in score during 2013-14 even though it was a top 5 problem then, because there were not enough clients with valid paired scores). The average gains for *knowledge* were greater than those for *behavior* and *status* for all 5 of the top problems.

- Similar to previous years, the KBS findings show very few significant changes in status, which reinforces the need to understand why increases are not occurring and to find effective interventions. However, there were more instances of statistically significant changes for behavior than seen in prior analyses.

- 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. The assumptions made that the first documented and the last documented set of KBS ratings were equivalent to the actual initial and final ratings are a potential bias and limitation of this report, as previously discussed in Report 4 (2013-14). Discussion between epidemiology staff and PCH staff following the completion of Report 4 helped clarify that a complete set of K, B, and S ratings are not necessary and that a partial score (e.g., K but no B or S) should still be valid. However, for comparison purposes, the analytical methods were not changed in this Report 5. As the PCH leadership explores what direction to take KBS analysis in the future, this detail of including or excluding partial sets of KBS scores should be considered and discussed again between epidemiology and PCH staff.

How do MSS results from the previous reports compare?

Table 11. Comparison to Historical MSS Results

	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)*	Report 5 (1/15-12/16) *(MSS only)*
Number of clients*	406	258	352	635	458
Year 1	178	258	352	292	215
Year 2	228	N/A	N/A	343	243
Average number of visits per client	3.4	3.8	3.0	2.8	2.9
Proportion of clients by service levels					
Level A	14%	16%	10%	13%	13%
Level B	23%	16%	14%	18%	18%
Level C	63%	67%	77%	69%	69%
Proportion of clients by peripartum stage:					
Pregnancy only	13%	24%	35%	29%	28%
Pregnancy and postpartum	50%	65%	40%	51%	45%
Postpartum only	39%	11%	25%	21%	28%
Average number of problems per client:					
Actual	2.6	2.5	2.3	N/A	N/A
Potential	2.2	2.3	1.4	N/A	N/A
Total *(actual & potential)*	N/A	N/A	N/A	4.8	6.0
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	N/A
Top 3 *potential* problems	Mental health Caretaking/parenting Pregnancy	Pregnancy Caretaking/parenting Mental health	Caretaking/parenting Pregnancy Mental health	N/A	N/A

Top 5 problems *(actual & potential)*	N/A	N/A	N/A	Income (99%) Mental health (77%) Pregnancy (67%) Caretaking/parenting (59%) Substance use (47%)	Income (98%) Mental health (91%) Caretaking/parenting (69%) Pregnancy (66%) Healthcare supervision (60%)
Statistically significant increase in KBS ratings for all *actual* problems	Yes (n=248)	Yes (n=187)	Yes (n=241)	N/A	N/A
Statistically significant increase in KBS ratings for problems *(actual & potential)*	N/A	N/A	N/A	Yes (n=405)	Yes (n=286)

* For reports 2 and 3, the number of clients was determined over a 12-month period, whereas Reports 1, 4, and 5 used longer periods. Report 1 included a 17-month period (Aug 2009 – Dec 2010); if that report had been limited to Jan – Dec 2010, the number of clients would be 228. Reports 4 and 5 each covered 24-month periods.

Data Notes

- Clients who were closed between January 1, 2015, and December 31, 2016, 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 methodology used in this Report (#5), which was the same used in Report #4 (2013-14).
- 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 final ratings per problem were included in the KBS 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.