ODJFS Methods for High Risk Care Management Program Performance Measures

SFY 2013

Issued: June, 2012

OVERVIEW

NOTE: Unless otherwise noted, codes are stated to the minimum specificity required. For example, if a code is presented to the third digit, any valid fourth or fifth digit may be used. When necessary, a code may be specified with an "x," which represents a required digit.

Exclusions
Listed below are the exclusions that apply to the following three measures: 1) Emergency Department Utilization Rate of Members in High Risk Care Management, 2) Inpatient Hospitalization Rate of Members in High Risk Care Management, and 3) Overall Medical Costs of Members in High Risk Care Management.

(1) The NICU infant population— newborns with a revenue center code of '174' (Newborn – Level IV) and '175' (Nursery – Neonatal ICU) and coded in CAMS with a 96/196 condition code.
(3) Members with a traumatic or related event during the **report period**. The following diagnosis codes will be used to determine the occurrence of a traumatic or related event:

ICD-9 Diagnosis Codes Used To Identify Traumatic or Related Events:
800-854, 860-871, 874.0-874.59, 885-887, 895-897, 900-915, 918, 920-959, 990-996, E80-E84, E88-E92, E96-E98

Data Sources
The sources of the data for calculating the measures are as follows:
(1) MCP submitted encounter data
(2) Medicaid FFS claims data
(3) ODJFS' Medicaid and Managed Care Enrollment and Eligibility Data
(4) Care management data submitted and accepted in the Care Management System (CAMS)

Report Periods
July – December 2012
January – June 2013

Care Management of High Risk Members

The average monthly high risk care management rate for members.

Numerator: Sum of the numerators used to calculate the monthly high risk care management rates during the report period.

Denominator: Sum of the denominators used to calculate the monthly high risk care management rates during the report period.

Monthly High Risk Care Management Rate:

Numerator: The number of members in high risk care management (including NICU infants [CAMS codes: 96/196]), but excluding any other stratification of care management (CAMS codes: 98/198 and 97/197) during the reporting month who were in the denominator.

Denominator: The number of members who were enrolled in the MCP during the reporting month for the entire month.

Example

Month	High Risk CM	Total Members	High Risk CM Rate
July	900	100,000	0.9%
August	1,100	110,000	1.0%
September	1,100	110,000	1.0%
October	1,150	120,000	1.0%
November	1,100	120,000	0.9%
December	1,300	130,000	1.0%
Semi-Annual Rate	**6,650**	**690,000**	**1.0%**

Data Sources: CAMS
ODJFS' Medicaid and Managed Care Enrollment Data

Report Periods
July – December 2012
January – June 2013

Emergency Department Utilization Rate of Members in High Risk Care Management

Measure: *The average difference between the emergency department utilization rates per member between the report period and baseline period for members in high risk care management. For plans that serve both the ABD and CFC populations, a weighted average based on the distribution of ABD and CFC members in the high-risk care management program will be used to determine the overall MCP difference for this measure.*

Two emergency department utilization rates will be calculated for each individual, one for baseline and one for the report period. The following describes the rate, numerator, and denominator criteria that will be used to derive the average difference in emergency department visit rates between the report period and baseline period.

Rate: The average number of emergency department visits per member.

Numerator: The number of emergency department visits for each member who meets denominator criteria.

Denominator Criteria: Members must be: 1) continuously eligible for FFS Medicaid (and no other enrollment with a different MCP) during the six month baseline period prior to the report period; 2) continuously enrolled in the MCP during the report period; and 3) were in high risk care management per CAMS (excluding CAMS codes 96/196, 97/197, and 98/198) for at least three continuous months (90 days continuous care management span) during the report period.

Adjustments: All adjustments will be performed at the program level (i.e., ABD and CFC). The plan's final rates will be adjusted for seasonality. See Appendix A for seasonality adjustment methodology.

Example:
Step 1: Adjust for Seasonality (Individual-Level Calculation)

Plan A	Baseline Number of ED Visits: January-June 2012	Report Period Number of ED Visits: July-December 2012	Seasonality Adjustment Factor	Adjusted Report Period Number of ED Visits: July-December 2012	Adjusted Difference in Number of ED Visits
ABD					
Person A	4 ED Visits	1 ED Visits	1.4	1.4 ED Visits	2.6 ED Visits
Person B	5 ED Visits	2 ED Visits	1.4	2.8 ED Visits	2.2 ED Visits
Person C	6 ED Visits	3 ED Visits	1.4	4.2 ED Visits	1.8 ED Visits
Person D	7 ED Visits	5 ED Visits	1.4	7.0 ED Visits	0.0 ED Visits
Person E	8 ED Visits	6 ED Visits	1.4	8.4 ED Visits	-0.4 ED Visits
CFC					
Person 1	5 ED Visits	2 ED Visits	1.4	2.8 ED Visits	2.2 ED Visits
Person 2	6 ED Visits	3 ED Visits	1.4	4.2 ED Visits	1.8 ED Visits
Person 3	7 ED Visits	4 ED Visits	1.4	5.6 ED Visits	1.4 ED Visits
Overall MCP Calculation	**6.0 ED Visits**	**3.3 ED Visits**		**4.6 ED Visits**	**1.5 ED Visits**

Data Sources: Encounter Data
Fee-For-Service Claims
CAMS
ODJFS' Medicaid and Managed Care Enrollment Data

Measurement Periods	Time Periods	Utilization Data Source	Eligibility Information
Report Period: July – December 2012			
Baseline	January-June 2012	FFS claims and encounters	Medicaid eligibility
Report Period	July-December 2012	Encounters	MCP enrollment and CAMS data
Report Period: January – June 2013			
Baseline	July-December 2012	FFS claims and encounters	Medicaid eligibility
Report Period	January-June 2013	Encounters	MCP enrollment and CAMS data

Codes to Identify Emergency Department Visits

UB-92 Revenue	AND	UB-92 Type of Bill
45x, 981		**13x**

OR

CPT	AND	POS
10040 – 69979		**23**

OR

CPT
99281-99285

Exclusions:
1. Any ED visit, as defined above, with the same member service date as a claim with a revenue center code of '456' (urgent care) or place of service code of '20' (urgent care), will not be counted as an ED visit for purposes of the numerator.

2. ED visits resulting in an inpatient stay (i.e., ED visits on the day prior to, or the same day, as the first day of an inpatient admission) will be excluded from the numerator. Inpatient stays are identified below.

3. Encounters for which the MCP paid zero dollars, or Medicaid paid zero dollars will be excluded.

4. See Overview for newborn and trauma exclusions.

Codes to Identify Acute Inpatient Hospitalizations

UB-92 Type of Bill
111, 121, 411, 421

Inpatient Hospitalization Rate of Members in High Risk Care Management

Measure: *The average difference between the inpatient utilization rates per member between the report period and baseline period for members in high risk care management. For plans that serve both the ABD and CFC populations, a weighted average based on the distribution of ABD and CFC members in the high-risk care management program will be used to determine the overall MCP difference for this measure.*

Two inpatient utilization rates will be calculated for each individual, one for baseline and one for the report period. The following describes the rate, numerator, and denominator criteria that will be used to derive the average difference in inpatient utilization rates between the report period and baseline period.

Rate: The average number of inpatient hospitalizations per member.

Numerator: The number of inpatient hospitalizations based on admission date for each member who meets denominator criteria.

Denominator Criteria: Members must be: 1) continuously eligible for FFS Medicaid (and no other enrollment with a different MCP) during the six month baseline period prior to the report period; 2) continuously enrolled in the MCP during the report period; and 3) were in high risk care management per CAMS (excluding CAMS codes 96/196, 97/197, and 98/198) for at least three continuous months (90 days continuous care management span) during the report period.

Adjustments: All adjustments will be performed at the program level (i.e., ABD and CFC). The plan's final rates will be adjusted for seasonality. See Appendix A for seasonality adjustment methodology.

Example:
Step 1: Adjust for Seasonality (Individual-Level Calculation)

Plan A	Baseline Number of IP Admits: January-June 2012	Report Period Number of IP Admits: July-December 2012	Seasonality Adjustment Factor	Adjusted Report Period Number of IP Admits: July-December 2012	Adjusted Difference in Number of IP Admits
ABD					
Person A	2 IP Admits	1 IP Admits	1.1	1.1 IP Admits	0.9 IP Admits
Person B	3 IP Admits	2 IP Admits	1.1	2.2 IP Admits	0.8 IP Admits
Person C	2 IP Admits	3 IP Admits	1.1	3.3 IP Admits	-1.3 IP Admits
Person D	5 IP Admits	4 IP Admits	1.1	4.4 IP Admits	0.6 IP Admits
Person E	1 IP Admits	1 IP Admits	1.1	1.1 IP Admits	-0.1 IP Admits
CFC					
Person 1	3 IP Admits	2 IP Admits	1.1	2.2 IP Admits	0.8 IP Admits
Person 2	1 IP Admits	3 IP Admits	1.1	3.3 IP Admits	-2.3 IP Admits
Person 3	2 IP Admits	3 IP Admits	1.1	3.3 IP Admits	-1.3 IP Admits
Overall MCP Calculation	**2.4 IP Admits**	**2.4 IP Admits**		**2.6 IP Admits**	**-0.2 IP Admits**

Data Sources: Encounter Data
Fee-For-Service Claims
CAMS
ODJFS' Medicaid and Managed Care Enrollment Data

Measurement Periods	Time Periods	Utilization Data Source	Eligibility Information
Report Period: July -December 2012			
Baseline	January-June 2012	FFS claims and encounters	Medicaid eligibility
Report Period	July-December 2012	Encounters	MCP enrollment and CAMS data
Report Period: January – June 2013			
Baseline	July-December 2012	FFS claims and encounters	Medicaid eligibility
Report Period	January-June 2013	Encounters	MCP enrollment and CAMS data

Codes to Identify Acute Inpatient Hospitalizations

UB-92 Type of Bill
111, 121, 411, 421

Exclusions:

1. Delivery encounters will be excluded (see the Codes Used To Identify Deliveries table on following page).
2. Encounters on which the MCP paid zero dollars, or Medicaid paid zero dollars will be excluded.
3. Direct transfers on the same day or next day between hospitals will be excluded (discharge status codes 02, 05, 30, 43, 65, and 66).
4. See Overview for newborn and trauma exclusions.

Codes Used To Identify Deliveries

ICD-9 Procedure Codes:

72.x Forceps, vacuum, and breech delivery
73.x Other procedures inducing or assisting delivery
74.0 Cesarean section and removal of fetus; Classical cesarean section
74.1 Cesarean section and removal of fetus; Low cervical cesarean section
74.2 Cesarean section and removal of fetus; Extraperitoneal cesarean section
74.4 Cesarean section and removal of fetus; Cesarean section of other specified type
74.99 Cesarean section of unspecified type

ICD-9 Diagnosis Codes to Identify Births and Deliveries:

630-637 Other abnormal product of conception, hydatidiform mole, ectopic or abdominal pregnancy, missed or spontaneous abortion, legally/illegally induced abortion, legally unspecified abortion

639 Complications following abortion or ectopic and molar pregnancies

Complications mainly related to pregnancy
640.x1, 641.x1, 642.x1, 642.x2, 643.x1, 644.21, 645.x1, 646.x1, 646.x2, 647.x1, 647.x2, 648.x1, 648.x2, 649.x1, 649.x2

650 Normal Delivery

Normal delivery and other indications for care in pregnancy, labor, delivery
651.x1, 652.x1, 653.x1, 654.x1, 654.02, 654.12, 654.32, 654.x2, 655.x1, 656.01, 656.11, 656.21, 656.31, 656.51, 656.61, 656.71, 656.81, 656.91, 657.01, 658.x1, 659.x1,

Complications occurring mainly during the course of labor and delivery
660.x1, 661.x1, 662.x1, 663.x1, 664.x1, 665.01, 665.x1, 665.x2, 666.x2, 667.x2, 668.x1, 668.x2, 669.x1, 669.x2, 670.02, 671.x1, 671.x2, 672.02, 673.x1, 673.x2, 674.x1, 674.x2, 675.x1, 675.x2, 676.x1, 676.x2, 678.x1, 679.x1, 679.x2

CPT Codes:

59400 Routine obstetrical care including antepartum and postpartum care and vaginal delivery
59409 Vaginal delivery (with or without episiotomy and/or forceps)
59410 Obstetrical care for vaginal delivery only, including postpartum care
59510 Cesarean delivery
59514 Cesarean delivery only
59515 Cesarean delivery only; including postpartum care
59610 VBAC delivery
59612 Vaginal delivery only, after previous cesarean delivery (with or without episiotomy and/or forceps)
59614 VBAC care after delivery; vaginal delivery only, after previous cesarean delivery, including postpartum care
59618 Attempted VBAC delivery
59620 Cesarean delivery only, following attempted vaginal delivery after previous cesarean Delivery
59622 Attempted VBAC after care, cesarean delivery only, following attempted vaginal delivery after previous cesarean delivery, including postpartum care

Overall Medical Costs of Members in High Risk Care Management

Measure: *The average difference between the medical costs per member between the report period and baseline period for members in high risk care management. For plans that serve both the ABD and CFC populations, a weighted average based on the distribution of ABD and CFC members in the high-risk care management program will be used to determine the overall MCP difference for this measure.*

Two medical costs will be calculated for each individual, one for baseline and one for the report period. The following describes the rate, numerator, and denominator criteria that will be used to derive the average difference in medical costs between the report period and baseline period.

Rate: The average overall medical costs per member.

Numerator: The total medical costs for each member who meets denominator criteria. Medical costs will be calculated based on FFS claims data (when applicable) and encounter data during the baseline period. During the report period, only encounter data will be used to calculate medical costs. Medical costs will include all costs reported on encounters that were paid either on a fee-for-service schedule or as part of a capitation risk-sharing arrangement. For those encounters which are part of a capitation payment arrangement, the MCP must shadow price the encounter to the amount the MCP would have paid to the provider if the capitation arrangement did not exist per the encounter data EDI companion guides. The member's medical costs will include both payment amounts paid on a fee-for-service basis and shadow priced by the MCP. Only Medicaid medical costs will be included (i.e., third party payments will **not** be included).

Denominator Criteria: Members must be: 1) continuously eligible for Medicaid (and no other enrollment with a different MCP) during the six month baseline period prior to the report period; 2) continuously enrolled in the MCP during the report period; and 3) were in high risk care management per CAMS (excluding CAMS codes 96/196, 97/197, and 98/198) for at least three continuous months (90 days continuous care management span) during the report period.

Adjustments: A seasonality adjustment will be performed at the program level (i.e., ABD and CFC). The plan's final rates will be adjusted for seasonality, as well as a medical cost trend factor. The medical cost trend factor will be applied prior to adjusting for seasonality. See Appendix A for the adjustment methodologies.

Data Sources: Encounter Data
Fee-For-Service Claims
CAMS
ODJFS' Medicaid and Managed Care Enrollment Data

Example:
Step 1: Adjust for Inflation (Individual-Level Calculation)—Below is an example for Person E in the ABD population

Category of Service	Report Period Costs: July-December 2012	Inflationary Factor	Adjusted Report Period Costs: July-December 2012
Person E			
Pharmacy	$619	3.0%	$600
Inpatient	$3,158	5.0%	$3,000
Outpatient	$404	1.0%	$400
Emergency Department	$250	0.0%	$250
Professional	$255	2.0%	$250
TOTAL	$4,668		$4,500

Step 2: Adjust for Seasonality (Individual-Level Calculation)

Plan A	Baseline Costs: January-June 2012	Inflationary Factor Adjusted Report Period Costs: July-December 2012	Seasonality Adjustment Factor	Adjusted Report Period Costs: July-December 2012	Adjusted Difference in Costs
ABD					
Person A	$4,500	$2,600	1.2	$3,120	$1,380
Person B	$5,500	$2,400	1.2	$2,880	$2,620
Person C	$5,000	$3,500	1.2	$4,200	$800
Person D	$3,500	$2,000	1.2	$2,400	$1,100
Person E	$6,500	$4,500	1.2	$5,400	$1,100
CFC					
Person 1	$9,500	$4,500	1.2	$5,400	$4,100
Person 2	$6,500	$3,500	1.2	$4,200	$2,300
Person 3	$4,000	$2,000	1.2	$2,400	$1,600
Overall MCP Calculation	**$5,625**	**$3,125**		**$3,750**	**$1,875**

Measurement Periods	Time Periods	Utilization Data Source	Eligibility Information	Financial Information
Report Period: July-December 2012				
Baseline	January-June 2012	FFS claims and encounters	Medicaid eligibility	Medicaid FFS claims and encounters
Report Period	July-December 2012	Encounters	MCP enrollment and CAMS data	Encounters
Report Period: January-June 2013				
Baseline	July-December 2012	FFS claims and encounters	Medicaid eligibility	Medicaid FFS claims and encounters
Report Period	January-June 2013	Encounters	MCP enrollment and CAMS data	Encounters

Exclusions:

1. Delivery costs associated with the codes identified in the Codes Used to Identify Deliveries table on page 7 will be excluded.
2. See Overview for newborn and trauma exclusions.

Appendix A: Adjustment Factor Methodology

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As described above, measures 2 through 4 will be adjusted by ODJFS for seasonality. In addition, measure 4 will be adjusted for medical cost trend. Measures 2 through 4 will not be adjusted by ODJFS for regression toward the mean (RTM). RTM adjustments were determined not to be necessary based on analyses performed using historical data. Further discussion regarding the analyses performed and the results are presented in the RTM Effect Determination section of the Appendix.

Seasonality is when data experience regular and predictable changes over time. Since the measures assess 6-month periods that reflect different levels of utilization and costs, the measures will be adjusted to account for seasonality.

Medical Cost Trend Effect Determination

Data Sources

The source of data for calculating the medical cost trend effect will be as follows:

(1) MCP submitted encounter data
(2) Fee-For-Service Claims

ODJFS will adjust for medical cost trend in the *Overall Medical Costs of Members in High Risk Care Management* measure. This trend is comprised of two primary components: 1) an overall inflationary factor in medical costs; and 2) advances in treatment technologies (e.g., newer, more effective and appropriate pharmaceuticals or procedures may be introduced over time) which drive medical costs. ODJFS will capture trending of cost per claim by categories of service to determine an individual factor for each category of service. The cost per claim will be derived from encounter data. These categories of service include: 1) pharmacy, 2) inpatient, 3) outpatient, 4) emergency department, and 5) professional. The pharmacy category of service will be derived from all data in the pharmacy file. The inpatient, outpatient, and emergency department categories of service will be identified using the codes in the table below.

Description	CPT	UB-92 Revenue
Outpatient	92002, 92004, 92012, 92014, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99341-99345, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455, 99456	051x, 0520-0523, 0526-0529, 057x-059x, 082x-085x, 088x, 0982, 0983
Inpatient	99304-99310, 99315, 99316, 99318, 99324-99328, 99334-99337 99221-99223, 99231-99233, 99238, 99239, 99251-99255, 99291	0118, 0128, 0138, 0148, 0158, 019x, 0524, 0525, 055x, 066x 010x, 0110-0114, 0119, 0120-0124, 0129, 0130-0134, 0139, 0140-0144, 0149, 0150-0154, 0159, 016x, 020x, 021x, 072x, 080x, 0987
Emergency Department	99281-99285	045x, 0981

Any claim/encounter that is not categorized as pharmacy, inpatient, outpatient or emergency department will be included in the professional category of service.
For claims/encounters were multiple categories of service are identified, the following hierarchy will be used to identify the category of service.

1. Pharmacy
2. Inpatient
3. Emergency Department
4. Outpatient
5. Professional

In addition, ODJFS will perform an evaluation on the 1 percent of members submitted by the MCPs in high risk care management to account for advances in treatment technologies as a potential cost driver. High costs driven by advances in treatment technologies during the baseline and report periods will be handled on an individual basis. One of two options will be applied: 1) costs will be shadow priced or 2) costs will be eliminated from the medical cost trend effect evaluation. For example, if a more costly treatment replaces an existing treatment, then the cost of the advanced treatment will be shadow priced to the cost of the existing treatment. However, if the advanced treatment is identified as a new treatment with no prior existing comparable treatment, then the cost for the advanced treatment will removed from the cost trend effect evaluation since no comparable treatment exists. Each member's costs will be adjusted, by category of service, for the medical cost trend.

ODJFS will use data from calendar year 2010 to derive estimated medical cost trend for the *Overall Medical Costs of Members in High Risk Care Management* measure. The MCPs will be required to submit a list of the 1 percent of members who would have been identified by their high-risk identification strategy in 2010. These members will be used to identify the high-risk care management population for purposes of this evaluation. Payment data that are available on the MCP encounter data and FFS data will be used. Due to the limited number of capitated payments in the MCP encounter data, the capitated payments will be removed for purposes of calculating the estimated medical cost trend effects. The following time periods will be assessed for calculating the estimated medical cost trend effects:

Baseline Period: January 1, 2010 – June 30, 2010
Report Period: July 1, 2010 – December 31, 2010

The purpose of the estimated medical cost trend effects is to provide the MCPs an opportunity to see the methods, as well as to understand an approximation of this effect.

After the completion of the first report period, the actual medical cost trend effects will be calculated. The actual medical cost trend effects will be used to adjust the *Overall Medical Costs of Members in High Risk Care Management* measure. Members identified as high risk in the CAMS data will be used to identify the high-risk care management population for purposes of this evaluation.

ODJFS will perform a retrospective comparison of the cost from the baseline period to report period. Actual medical cost trend effects will be applied to each category of service: pharmacy, inpatient, outpatient, emergency department, and professional. The following time periods will be assessed for calculating the actual cost trend effects:

Baseline Period: January 1, 2012 – June 30, 2012
Report Period: July 1, 2012 – December 31, 2012

RTM Effect Determination – Historical Data Analysis

Data Sources
The sources of data for calculating the RTM effect were as follows:

(1) MCP submitted encounter data
(2) Medicaid FFS claims data
(3) ODJFS' Medicaid and Managed Care Enrollment data

For purposes of determining the RTM effect, the same population was used to evaluate the baseline and report periods. The high-risk care management population was identified by the MCP as high-risk members based on the protocol outlined by ODJFS in the Provider Agreement. These members were used to identify the high-risk care management population for purposes of this assessment.

ODJFS performed an analysis based on the 1 percent of members submitted by the MCPs from calendar year 2010 who would have been identified by their high-risk identification strategy to derive an **estimated** RTM effect for each measure. The following time periods were assessed for calculating the estimated RTM effect:

Baseline Period: January 1, 2010 – June 30, 2010
Report Period: July 1, 2010 – December 31, 2010

The analysis revealed that there was no RTM effect for any individual plan for the identified members. An overview of the comparative analysis that was performed, along with the results, is described below.

Overview of RTM Effect Analysis
ODJFS used the top 1 percent of members as identified by the MCPs and determined each member's emergency department (ED) utilization, inpatient utilization, and medical cost for the baseline period (i.e., January 2010 – June 2010) and the re-measurement period (i.e., July 2010 – December 2010). The mean ED utilization, inpatient utilization, and medical cost was calculated for each plan, population (i.e., CFC or ABD), and time period. HSAG calculated the percent difference from baseline to re-measurement. A *t*-test was performed to determine if the re-measurement period was statistically significant from the baseline period. The following tables display the results between the baseline and re-measurement (i.e., report) periods.

ODJFS found that for the two measurements that decreased from baseline to re-measurement (highlighted in yellow in the tables), neither was significant. There were several findings that yielded significant results; however, the value increased from baseline to re-measurement.

ODJFS calculated the RTM adjustment factor, as outlined in Appendix B: Detailed Statistical Methods Used to Calculate the RTM Effect, for each care management measure by MCP and program. It should be noted that no RTM was observed for the 1 percent of members identified by the MCPs. The RTM adjustment factor was 0.0 for every MCP and for every measure.

Comparative Analysis between Baseline and Re-measurement Results

CFC Population

CFC ED Utilization Average ED Visits per Member						
Plan Name	**N**	**Baseline Value (ED Visits per member)**	**Report Value (ED Visits per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
AMERIGROUP	578	3.8 ED visits	4.5 ED visits	16.9%	0.0945	0.0
Buckeye	300	6.7 ED visits	7.4 ED visits	9.4%	0.3362	0.0
CareSource	3,582	5.4 ED visits	6.2 ED visits	13.2%	<.0001	0.0
Molina	382	6.7 ED visits	9.7 ED visits	45.1%	0.0007	0.0
Paramount	919	5.3 ED visits	5.3 ED visits	1.3%	0.8655	0.0
UnitedHealthcare	261	7.0 ED visits	8.4 ED visits	19.1%	0.1903	0.0
WellCare	1,271	3.7 ED visits	3.9 ED visits	7.1%	0.3538	0.0

CFC Inpatient Utilization Average Inpatient Visits per Member						
Plan Name	**N**	**Baseline Value (Inpatient Visits per member)**	**Report Value (Inpatient Visits per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
AMERIGROUP	578	0.8 Inpatient visits	1.0 Inpatient visits	19.5%	0.0265	0.0
Buckeye	300	0.9 Inpatient visits	1.1 Inpatient visits	15.4%	0.2205	0.0
CareSource	3,582	0.7 Inpatient visits	0.8 Inpatient visits	13.9%	<.0001	0.0
Molina	382	0.7 Inpatient visits	1.2 Inpatient visits	72.1%	<.0001	0.0
Paramount	919	0.9 Inpatient visits	0.8 Inpatient visits	-10.2%	0.1768	0.0
UnitedHealthcare	261	0.8 Inpatient visits	1.2 Inpatient visits	56.0%	0.0007	0.0
WellCare	1,271	0.7 Inpatient visits	0.8 Inpatient visits	8.1%	0.2635	0.0

CFC Medical Cost Average Cost per Member						
Plan Name	**N**	**Baseline Value (Cost per member)**	**Report Value (Cost per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
AMERIGROUP	578	$20,265.69	$22,424.79	10.7%	0.5035	0.0
Buckeye	300	$15,086.00	$18,933.98	25.5%	0.0048	0.0
CareSource	3,582	$14,492.97	$16,319.44	12.6%	0.0014	0.0
Molina	382	$17,724.92	$26,341.64	48.6%	0.0219	0.0
Paramount	919	$17,866.79	$18,120.56	1.4%	0.8129	0.0
UnitedHealthcare	261	$19,017.34	$23,525.06	23.7%	0.1301	0.0
WellCare	1,271	$17,848.96	$16,602.14	-7.0%	0.5035	0.0

ABD Population

ABD ED Utilization Average ED Visits per Member						
Plan Name	**N**	**Baseline Value (ED Visits per member)**	**Report Value (ED Visits per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
Buckeye	1,306	5.6 ED visits	6.3 ED visits	12.9%	0.062	0.0
CareSource	5,279	5.0 ED visits	5.7 ED visits	13.4%	<.0001	0.0
Molina	2,071	5.7 ED visits	7.2 ED visits	26.9%	<.0001	0.0
UnitedHealthcare	1,019	6.3 ED visits	6.7 ED visits	6.7%	0.4852	0.0

ABD Inpatient Utilization Average Inpatient Visits per Member						
Plan Name	**N**	**Baseline Value (Inpatient Visits per member)**	**Report Value (Inpatient Visits per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
Buckeye	1,306	1.2 Inpatient visits	1.4 Inpatient visits	21.7%	0.0004	0.0
CareSource	5,279	1.0 Inpatient visits	1.2 Inpatient visits	25.0%	<.0001	0.0
Molina	2,071	1.0 Inpatient visits	1.3 Inpatient visits	35.4%	<.0001	0.0
UnitedHealthcare	1,019	1.1 Inpatient visits	1.3 Inpatient visits	16.8%	0.0084	0.0

ABD Medical Cost Average Cost per Member						
Plan Name	**N**	**Baseline Value (Cost per member)**	**Report Value (Cost per member)**	**Percent Difference**	***p*-value**	**RTM Adjustment Factor**
Buckeye	1,306	$22,367.42	$26,788.58	19.8%	<.0001	0.0
CareSource	5,279	$22,253.24	$26,121.38	17.4%	<.0001	0.0
Molina	2,071	$23,130.39	$30,243.33	30.8%	<.0001	0.0
UnitedHealthcare	1,019	$31,589.96	$32,029.93	1.4%	0.8729	0.0

Quantifying RTM Effect

Since differences may exist in the proportion of members in each MCP's ABD and CFC populations, a separate RTM effect was calculated for each program for each MCP, where applicable. For example, an individual RTM effect was calculated for each MCP's ABD and CFC population. However, an RTM effect was not observed for any of the measures; therefore, an RTM adjustment was not needed for either populations' results. Therefore, the RTM adjustments were removed from the methodology. The following section explains what RTM is, how to control for RTM, and the importance of determining an RTM effect, if one exists.

RTM Methods

RTM is a statistical phenomenon that occurs whenever non-random samples from a population are selected, particularly in the case of a study where repeated measurements over time are taken. When a non-random sample is selected, the average of that sample tends to regress (i.e., move) toward the mean of the overall population. A similar effect will be observed when "high risk" members identified based on an algorithm that includes utilization and costs. Due to this statistical phenomenon, the overall mean of this high-risk population's utilization and costs should improve (i.e., decrease) over time regardless if an intervention (such as care management) is implemented or not. Therefore, any intervention aimed at a population that is significantly different from the average will appear to improve due to RTM.

RTM can be controlled for in two ways: at the design stage (e.g., select a control group) or at the analysis stage. Since ODJFS is not able to control for RTM effect at the study design stage (e.g., select a control group), the statistical methods described in this document was used to calculate the RTM effect after the care management program has been implemented. In addition, these methods were selected since they have been used for both utilization and cost data in health care studies.

The RTM phenomenon is particularly prevalent in the case when extreme outliers are selected as part of an evaluation and they are followed over time. In order to account for this phenomenon and distinguish between real change and expected change, an estimated RTM effect is calculated. Natural variation in repeated data may look like real change; however, this natural variation is an expected change that would occur without intervention. The RTM effect is used to account for this expected change. The calculation of the expected change (i.e. RTM effect) can be used to adjust the observed change in order derive a real change (i.e., change attributed to an intervention). For example, claiming that 100 percent of the reductions in cost and utilization post care management program implementation are due to the program would overstate the program's true impact on cost and utilization.

Adjusting for RTM is supported by the literature and is used in analyses of health care data. Examples of the use of RTM as an adjustment factor include an evaluation of the following:

- **Disease Management Programs—**When evaluating cost savings of disease management programs, RTM is used to adjust for expected changes between those in the disease management program and those who are not.

- **Coordination of Care Programs—**In order to measure the effectiveness of care coordination interventions in reducing inpatient and ED utilization, RTM is used to control for expected change.

For purposes of the care management measures, the non-random sample was the high-risk care management population. The entire eligible Medicaid population was used as a comparison group for the high-risk care management population to estimate the RTM effect. The following are the key components in deriving the estimated RTM effect by way of standard statistical techniques:

- **Within-Member Variance**—the within-member variance was used to calculate the difference in results within a given population between the baseline and report periods.

- **Between-Member Variance**—the between-member variance was used to calculate the difference in results for all members within a given population at baseline.

Correlation Coefficient—the correlation coefficient was used to determine the strength of the relationship between the baseline and report period. The smaller the correlation between baseline and report periods – the higher the estimated RTM effect.

Rationale for Removing RTM Adjustment

The methodology designed to evaluate RTM does not allow for the direct differentiation between RTM and the true care management program impact. The RTM methodology proposed was performed independently to determine if RTM exists. The goal of the care management measures is to determine the true effect of high-risk care management. Since no RTM effect was observed based on the analysis of historical data, no RTM adjustment would be applied. RTM is typically accounted for in the design stage; however, this option was not be feasible due to the nature of the population being measured.

Seasonality Effect Determination

Data Sources
The sources of data for calculating the seasonality effect will be as follows:

(1) MCP submitted encounter data
(2) Medicaid FFS claims data
(3) ODJFS' Medicaid and Managed Care Enrollment data

For purposes of determining seasonality effect, a plan's entire population will be used. Since differences may exist in the proportion of members in each MCP's ABD and CFC populations, a separate seasonality effect will be calculated for each program for each MCP, where applicable. For example, an individual seasonality effect will be calculated for each MCP's ABD and CFC population. The seasonality effect calculated for the MCP's ABD population will be used to adjust the ABD population's results, and the seasonality effect calculated for the MCP's CFC population will be used to adjust the CFC population's results.

Seasonality Methods

A seasonality adjustment factor will be generated as follows for each measure:

ED Utilization

$$Adjustment\ Factor = \frac{[ED\ Visits\ per\ 1{,}000\ members\ during\ Baseline\ Period]}{[ED\ Visits\ per\ 1{,}000\ members\ during\ Report\ Period]}$$

Inpatient (IP) Utilization

$$Adjustment\ Factor = \frac{[IP\ Admits\ per\ 1{,}000\ members\ during\ Baseline\ Period]}{[IP\ Admits\ per\ 1{,}000\ members\ during\ Report\ Period]}$$

Medical Costs

$$Adjustment\ Factor = \frac{[Medical\ Costs\ per\ 1{,}000\ members\ during\ Baseline\ Period]}{[Medical\ Costs\ per\ 1{,}000\ members\ during\ Report\ Period]}$$

The adjustment factor will be used to adjust each member's report period rate. The adjusted report period rate will be calculated as follows:

$$Adjusted\ Report\ Period\ Rate = Report\ Period\ Rate * Adjustment\ Factor$$

Appendix B: Detailed Statistical Methods Used to Calculate the RTM Effect

The following was used to calculate the RTM effect:

$$RTM\ effect = \frac{\sigma_w^2}{\sqrt{\sigma_w^2 + \sigma_b^2}} C(z),$$

$$= \sigma_t(1-\rho)C(z)$$

where $\sigma_t^2 = \sigma_w^2 + \sigma_b^2$ is the total variance, $\sigma_w^2 = (1-\rho)\sigma_t^2$ is the within-subject variance, and $\sigma_b^2 = \rho\sigma_t^2$ is the between-subject variance, ρ is the correlation, and $C(z) = \phi(z)/\Phi(z)$.

The following describes the steps that were used to quantify the RTM effect.

1. Calculate Within-Member Variance of Entire Population

A within-member variance for each member was calculated between the baseline and report period. The equation for calculating each member's variance is:

$$\sigma_w^2 = \frac{\sum(x-\overline{x})^2}{N}$$

where *x* is the member's baseline or report period result, $\overline{x}$ is the mean of the member's baseline and report period results, and *N* is 2. The mean of the member-level variances was calculated to determine the overall population's within-member variance.

2. Calculate Between-Member Variance of Entire Population

A between-member variance was calculated for all eligible members at baseline (i.e., an overall population variance). The equation for calculating the overall between-member variance is:

$$\sigma_b^2 = \frac{\sum(x-\overline{x})^2}{N}$$

where σ_w^2 is the between-member variance, *x* is each member's baseline period result, $\overline{x}$ is the mean of the entire population's baseline results, and *N* is the number of people evaluated.

3. Calculate Total Variance of Entire Population

The sum of the within- and between-member variances was calculated in order to determine the total variance:

$$\sigma_t^2 = \sigma_w^2 + \sigma_b^2$$

4. Determine the Correlation Coefficient of Entire Population

A rho correlation coefficient (ρ) was determined by performing a correlation analysis on the baseline and report period results. The following is the equation for calculating the correlation coefficient:

$$\rho = \frac{\sum_i (x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_i (x_i - \overline{x})^2 \sum_i (y_i - \overline{y})^2}}$$

where $x_i - \overline{x}$ is the difference of each member's baseline period results from the baseline mean, and $y_i - \overline{y}$ is the difference of each member's report period results from the report period mean.

5. Calculate Within-Member Variance of High-Risk Care Management Population

A within-member variance for the high-risk care management population was calculated. The equation for calculating the high-risk care management population's within-member variance is:

$$\sigma_w^2 = \sigma_t^2 (1 - \rho)$$

where σ_t^2 is the total population's variance (Step 3) and ρ is the population correlation coefficient (Step 4).

6. Calculate Between-Member Variance of High-Risk Care Management Population

A between-member variance for the high-risk care management population was calculated. The equation for calculating the high-risk care management population's between-member variance is:

$$\sigma_b^2 = \rho \sigma_t^2$$

where σ_t^2 is the total population's variance (Step 3) and ρ is the population correlation coefficient (Step 4).

7. Calculate Z-Score

The z-score for the high-risk care management population was calculated using the following equation:

$$z = (c - \mu)/\sigma_t$$

where c is the cutoff point (which is estimated by the lower bound of the 95 percent confidence interval of the mean of the high-risk care management population's baseline results), μ is the entire population's mean, and σ_t is the standard deviation of the overall population (i.e., the square root of the total population's variance from Step 3).

8. Determine the Probability Density and Cumulative Distribution Values

The z-score calculated in Step 7 was used to determine the probability density, $\phi(z)$, and cumulative frequency, $\Phi(z)$, functions using tables of the standard normal distribution.

9. Calculate RTM Effect

The RTM effect was calculated using the following equation:

$$\frac{\sigma_w^2}{\sqrt{\sigma_w^2 + \sigma_b^2}} C(z)$$

where σ_w^2 is the high-risk care management population's within-member variance (Step 5), σ_b^2 is the high-risk care management population's between-member variance (Step 6), and $C(z)$ is $\phi(z)/\ \Phi(z)$ (Step 8). Once the RTM effect was estimated, this number was rounded down to the nearest whole number in order to determine the final RTM effect. The RTM effect estimate for each measure was used to adjust each MCP's measure-level results.

References

Barnett AG, van per Pols JC, Dobson AJ. 2005. "Regression to the mean: what it is and how to deal with it." *International Journal of Epidemiology.* 34: 215-220.

Chumbler NR, Vogel WB, Garel M, et al. 2005. "Health Services Utilization of a Care Coordination/Home-Telehealth Program for Veterans with Diabetes." *Journal of Ambulatory Care Management*. 28(3): 230-240.

Hopkins WG. *A New View of Statistics.* Available at: http://www.sportsci.org/resource/stats/regmean.html. Accessed on: July 12, 2011.

Medicare HMOS: HCFA Can Promptly Eliminate Hundreds of Millions in Excess Payments (Letter Report, 04/25/1997, GAO/HEHS-97-16). Available at: http://www.gpo.gov/fdsys/pkg/GAOREPORTS-HEHS-97-16/html/GAOREPORTS-HEHS-97-16.htm. Accessed on: July 12, 2011.

Research Methods Knowledge Base. *Regression to the Mean.* Available at: http://www.socialresearchmethods.net/kb/regrmean.php. Accessed on: July 12, 2011.

Schall EM, Smith G. "Do Baseball Players Regress Toward the Mean?" Available at: http://economics-files.pomona.edu/GarySmith/bbregress/baseball.html. Accessed on: July 12, 2011.

Senn S. 1997. "Regression to the mean." *Statistical Methods Medical Research.* 6: 99-102

Stigler SM. 1997. "Regression towards the mean, historically considered." *Statistical Methods Medical Research.* 6: 103-14.

Tinkelman D, Wilson S. 2004. "Asthma Disease Management: Regression to the Mean or Better?" *American Journal of Managed Care*. 10: 948-954.

Ward. "Identifying and Understanding Analysis Tricks: Regression Toward the Mean." Available at: http://rewardhealth.com/archives/1131. Accessed on: July 21, 2011.

Yudkin PL, Stratton IM. 1996. "How to deal with regression to the mean in intervention studies." *Lancet.* 347: 241-43.