Florida
MEDS-AD Waiver

Annual Report
January 1, 2015 – December 31, 2015

Demonstration Year 10

1115 Research and Demonstration Waiver #11-W-00205/4

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I. Introduction

This annual report includes programmatic and financial activities for Demonstration Year Ten (DY10), January 1, 2015 through December 31, 2015. By implementing Florida's 1115 MEDS-AD waiver (MEDS-AD waiver), the Agency for Health Care Administration (Agency) seeks to demonstrate that the total cost of providing access to care for the MEDS-AD population (including costs for the Medication Therapy Management (MTM) program) will not exceed expected long-term cost of care for these individuals had they not received coverage until they required institutional care.

II. Waiver History

1. Legislative Changes

Prior to 2005 changes to section 409.904, Florida Statutes, the MEDS-AD eligibility group was defined as an optional program for persons who were age 65 years or older or who were determined to be disabled; whose assets did not exceed established limitations; and whose incomes were at or below 88% of the federal poverty level (FPL). Individuals eligible for the program could receive Medicaid medical assistance payments and related services. In 2005, concurrent with federal Medicare Part D implementation, the Florida Legislature amended the statutory eligibility criteria for the MEDS-AD program and directed the Agency in Chapter 2005-60, Laws of Florida, to seek federal waiver authority to revise Florida Medicaid eligibility coverage for the Medicaid MEDS-AD eligibility group beginning January 1, 2006. The eligibility changes to the MEDS-AD program maintained eligibility for qualified recipients without Medicare coverage and eliminated coverage for dually eligible individuals unless the person is eligible for and receiving Florida Medicaid hospice services, home and community-based services, or institutional care services.

2. Program Design

To implement the Legislative changes described above, the State amended Florida Medicaid's state plan to eliminate the former MEDS-AD eligibility category and submitted an 1115 research and demonstration waiver for aged or disabled residents of the State of Florida with incomes at or below 88% of the FPL and assets at or below $5,000 for an individual and $6,000 for a couple. Coverage is limited to those aged and disabled persons who are either receiving or elect to receive hospice services, home and community-based services, or institutional care services or who are not eligible for Medicare. The MEDS-AD program is designed to prevent premature institutionalization of these vulnerable individuals by maintaining their level of care in the community longer through the provision of:

- Access to health care services
- Medication therapy management

The continued coverage, as well as the MTM program, will be funded through savings obtained by avoiding institutional costs that would otherwise occur in the next five years had these vulnerable individuals been denied access to prescribed drugs and other medical services. The focus of the demonstration is to provide MTM for enrollees who are not yet receiving institutional care.

3. Waiver Extension Request

In December 2010, the State received approval from the Centers for Medicare and Medicaid Services (CMS) for the period January 1, 2011, through December 31, 2013. During the 2011 Legislative Session, the State funded the MEDS-AD waiver through state fiscal year 2011–2012, and in 2012 funding was extended through state fiscal year 2012–2013. On June 28, 2013, the State submitted an extension request under 1115(a) authority to extend the MEDS-AD waiver through December 31, 2016. The Centers for Medicare and Medicaid Services granted the State a one-year temporary extension on August 14, 2013, extending the waiver period to December 31, 2014.

On November 21, 2014, the State received a second one-year temporary extension for the period January 1, 2015 through December 31, 2015. On June 30, 2015, the State submitted a new three-year extension request under 1115(a) authority until December 31, 2018. The Centers for Medicare and Medicaid Services granted the State a three month temporary extension on December 8, 2015, extending the current waiver period to February 29, 2016. See Appendix A for a copy of the letter from CMS granting the three month temporary extension.

4. Maintenance of Effort Provisions in Sections 1902(a)(74) and 1902(gg)

The MEDS-AD waiver was renewed by CMS after March 23, 2010; therefore, it is no longer subject to the maintenance of effort provisions of the Patient Protection and Affordable Care Act.

III.Budget Neutrality Update

Table 1 compares actual waiver expenditures to the costs projected for this population had the waiver not been granted. To date, actual expenditures have been below the projected cost.

Table 1
Budget Neutrality
MEDS-AD waiver

Demo Year	Quarter Ended	WW* Expenditures ($)	WW Expenditures Cumulative Total ($)	WOW* (Target) Expenditures ($)	WOW Expend Total ($)	Difference ($)	Cumulative Difference ($)
DY1	Q1	51,696,950		507,710,894		456,013,944	
	Q2	132,235,096		507,710,894		375,475,798	
	Q3	105,271,113		507,710,894		402,439,781	
	Q4	146,356,839	435,559,998	507,710,894	2,030,843,575	361,354,055	1,595,283,577
DY2	Q5	69,927,763		460,700,626		390,772,863	
	Q6	79,047,475		460,700,626		381,653,151	
	Q7	87,567,517		460,700,626		373,133,109	
	Q8	90,210,963	762,313,716	460,700,626	3,873,646,079	370,489,663	3,111,332,363
DY3	Q9	93,882,619		455,999,599		362,116,980	
	Q10	103,108,178		455,999,599		352,891,421	
	Q11	95,761,142		455,999,599		360,238,457	
	Q12	96,128,169	1,151,193,824	455,999,599	5,697,644,476	359,871,430	4,546,450,652

Table 1
Budget Neutrality
MEDS-AD waiver

Demo Year	Quarter Ended	WW* Expenditures ($)	WW Expenditures Cumulative Total ($)	WOW* (Target) Expenditures ($)	WOW Expend Total ($)	Difference ($)	Cumulative Difference ($)
DY4	Q13	107,727,900		465,401,653		357,673,753	
	Q14	106,365,677		465,401,653		359,035,976	
	Q15	120,849,499		465,401,653		344,552,154	
	Q16	133,665,863	1,619,802,762	465,401,653	7,559,251,086	331,735,790	5,939,448,324
DY5	Q17	138,153,082		460,700,626		322,547,544	
	Q18	144,229,555		460,700,626		316,471,071	
	Q19	134,966,909		460,700,626		325,733,717	
	Q20	148,599,566	2,185,751,874	460,700,626	9,402,053,590	312,101,060	7,216,301,716
DY6	Q21	154,004,876		*			
	Q22	146,340,361		*			
	Q23	155,268,617		*			
	Q24	163,774,246	2,805,139,974	*	9,402,053,590		6,596,913,616
DY7	Q25	165,396,338		*			
	Q26	184,629,761		*			
	Q27	165,063,579		*			
	Q28	168,922,270	3,489,151,922	*	9,402,053,590		5,912,901,668
DY8	Q29	151,084,893		*			
	Q30	150,685,372		*			
	Q31	159,542,998		*			
	Q32	162,697,430	4,113,162,615	*	9,402,053,590		5,123,996,918
DY9	Q33	158,788,398		*			
	Q34	78,648,235		*			
	Q35	56,437,124					
	Q36	116,880,369	4,523,916,741	*	9,402,053,590		4,878,136,849
DY10	Q37	134,213,827		**			
	Q38	113,860,203		**			
	Q39	113,106,218		**			
	Q40	115,046,182	5,190,074,616	**	9,402,053,590		4,211,978,974

*The original WOW expenditure ceiling was not increased with the renewal period beginning in Quarter 21. The $7,216,301,716 cumulative difference between the approved budget neutrality ceiling and actual waiver expenditures as of the end of the original demonstration period on December 31, 2010, was allocated across the 12 renewal quarters as the new expenditure ceiling.

*WW – With Waiver

*WOW – Without Waiver

IV. Operational Update

1. Eligibility and Enrollment

The Florida Department of Children and Families is responsible for conducting intake, assessment, eligibility determination, enrollment, disenrollment, and data collection on the availability of third-party coverage, including Medicare, and annual re-determinations of eligibility.

To be eligible for the MEDS-AD waiver, recipients must be at or below 88% of the FPL with assets at or below $5,000 for an individual ($6,000 for a couple) and be in one of the following Florida Medicaid Eligibility Groups (MEGs):

- **MEG 1 (MA-Medicaid Only):** Florida Medicaid Only eligibles *not* currently receiving hospice, home and community based services, or institutional care services.
- **MEG 2 (MA-Medicaid Institutional):** Florida Medicaid Only eligibles currently receiving hospice, home and community based services, or institutional care services.
- **MEG 3 (MA-Dual Eligibles):** Florida Medicaid and Medicare (dual) eligibles receiving hospice, home and community based services, or institutional care services. Individuals with Medicare are not eligible for this waiver unless they meet the conditions of MEG 3.

Most individuals in MEG 1 must select a Managed Medical Assistance (MMA) plan in their region. If the recipient does not select an MMA plan they will be assigned to one. Information on the MMA program can be found on the Agency's Web site at the following link: http://ahca.myflorida.com/medicaid/statewide_mc/index.shtml.

Table 2 details the total count of individuals enrolled through the MEDS-AD waiver for DY10 (January 1, 2015 through December 31, 2015) by month.

Table 2 **Enrollment** MEDS-AD waiver January 1, 2015 – December 31, 2015	
January 2015	42,198
February 2015	41,759
March 2015	40,471
April 2015	43,779
May 2015	43,216
June 2015	41,684
July 2015	44,029
August 2015	45,046
September 2015	44,372

October 2015	45,875
November 2015	45,556
December 2015	44,890

2. Comprehensive Medication Reviews

The comprehensive medication review focuses on the MEG 1 fee-for-service group within the MEDS-AD waiver, as these individuals are not receiving institutional care and are not enrolled in a managed care plan. The process includes an initial direct telephone contact to a recipient from medically trained staff (which may include nurses, pharmacists, clinical associates, etc.) who explain the review process and invite the recipient to participate in a comprehensive medication review (CMR) with a pharmacist (covering all prescription, over-the-counter, herbal, and other medications and chronic diseases). If the recipient agrees, a call with a case reviewer is scheduled for performance of an annual CMR. A Personalized Medication List and a Medication Action Plan is then developed and mailed to the participating recipients. As part of the services, prescribers are notified of potential issues or problems via phone and/or facsimile, depending on the urgency of the issue, following the review. Quarterly follow-up reviews of the patient health information and claims history are performed to track the result of the review and feedback to the prescriber. The patient and prescriber are contacted again if issues or risks are identified. Recipients are given the option at the end of the year of participation in the program to continue into the next year.

3. Data Mining Activities

The current status of initiatives resulting from the data mining activities approved for the DY10 (January 1, 2015 through December 31, 2015).

There were a total of 85 data mining analysis requests submitted by the Medicaid Fraud Control Unit (MFCU) staff:

- MFCU completed: 39
- Agency denied: 22
- MFCU denied: 2
- Approved & assigned - in process: 22
- Approved & in cue for assignment: 0
- Awaiting Agency response: 0

V. Evaluation Activity

1. Evaluation Requirements

The Agency continues to contract with Florida State University (FSU) to conduct an independent evaluation of the MTM program and data mining activities to cover the demonstration period for the MEDS-AD Waiver.

The original evaluation plan for the MEDS-AD Waiver was submitted to CMS on April 29, 2011. No deficiencies were noted, and the evaluation activities are proceeding as planned.

2. MEDS-AD MTM Program Description, Design and Initial Findings

The goals of the MTM program, implemented by the University of Florida's (UF) College of Pharmacy (COP), are to improve the quality of care and prescribing practices based on best-practice guidelines, improve patient adherence to medication plans, reduce clinical risk, and lower prescribed drug costs and the rate of inappropriate spending for certain Medicaid prescription drugs for a high-risk population of Florida Medicaid recipients. The UF COP uses high-intensity pharmacy case management services in conjunction with access to appropriate medical care for select aged and disabled individuals as a way to maintain care in the community and prevent premature institutionalization. The program is to be budget-neutral and incorporate innovative service concepts. The Special Terms and Conditions of the MEDS-AD waiver require that the total cost of medical services and MTM for persons who are enrolled in the MEDS-AD waiver be compared with the estimated cost of institutional care that is avoided.

During the past year, the research team contracted to oversee the evaluation activities submitted several analyses related to the MTM program evaluation for four cohorts. The intervention period for Cohort 1 (Year 1) encompassed the period from June 1, 2011 through May 31, 2012; Cohort 2 (Year 2) was June 1, 2012 through May 31, 2013; Cohort 3 (Year 3) was June 1, 2013 through May 31, 2014; and Cohort 4 (Year 4) was June 1, 2014 through May 31, 2015. Analyses also included a pre-intervention (observation) period of one year for all cohorts.

The MTM program's final evaluation report integrates findings across all quantitative and qualitative evaluation questions for MTM participants, MTM eligible non-participants, and a subset of the MTM eligible non-participants who are restricted to having at least 150 days of eligible enrollment in the MEDS-AD waiver population in both the pre-intervention and intervention study periods. For the quantitative analyses, the latest available data for inpatient, outpatient, long-term care, medical, and pharmacy claim types was obtained from the Agency and analyzed. The qualitative analyses included interviews with MTM participants and pharmacists. See Appendix B for the MEDS-AD waiver MTM Program Final Report.

A thorough examination of a variety of utilization, expenditure, clinical, and recipient participation and demographics measures potentially influenced by the MTM intervention produced the following findings:

- Participants gave overwhelmingly positive feedback during qualitative interviews about their experiences in the MTM program. Participants credited the CMR with increasing their knowledge about their medication and positively impacting their health.

- All MTM participants rated the MTM program good or very good overall. They have recommended that the program continue.

- Mean total expenditures per person declined more in the intervention group (MTM program participants) than in a comparison group of non-participants. This finding approached statistical significance.

3. Medicaid Fraud Control Unit Evaluation Component

The goal of the Data Mining Initiative (DMI) under the MEDS-AD waiver is to determine if data mining activities by MFCU, in conjunction with the Agency's Bureau of Medicaid Program Integrity (MPI), result in the recovery of Florida Medicaid funds paid as a result of fraudulent or abusive billing. In Florida, the investigation of suspected Florida Medicaid fraud is under the auspices of MFCU, whereas cases of suspected abuse of the Florida Medicaid program are handled by MPI.

The evaluation of the MEDS-AD waiver also includes the evaluation of data mining in terms of recoveries and costs. Specifically, the evaluation is required to determine if the data mining-related recoveries or measurable cost avoidance are directly attributable to analyses performed by analysts from MFCU and MPI.

The evaluation team completed a final evaluation report for federal fiscal year (FFY) 2014-15, which includes quantitative and qualitative evaluation methods, each chosen for their appropriate application. These evaluation methods include: comparative analyses, observation of key management meetings, stakeholder and key informant interviews, literature reviews, as well as case file reviews to gather information and develop insights for the evaluation. In addition, repeated rounds of information requests were submitted and honored by MFCU and MPI staff.

As a result of the analyses, the evaluation produced the following findings:

- Data mining activities (FFY 2014-15) have led to MFCU opening 114 complaints, four of which have an ongoing active status, while 55 complaints have been converted to full case investigations.

- Of the 55 full case investigations, 39 have been closed and 16 cases have an ongoing active status. Four individuals have been convicted of Medicaid Fraud, four have pled no contest, and three have been arrested and are awaiting trial.

- There have been a total of 24 MFCU complaints or cases referred by MFCU to MPI for any action deemed necessary.

- Although the amount of monetary recoveries solely attributable to the DMI cannot be determined, MFCU, altogether, recovered a total of $41.3 million and investigated 917 cases in FFY 2014-15. Overall criminal restitution ordered in the criminal cases was $1,381,337, while overall civil recoveries to date are $209,719.

- The benefit-cost ratio for every federal financial participation dollar spent in FFY 2014-15 was approximately 2.70. This means that for every federal dollar spent, MFCU generated approximately $2.70. Similarly, the benefit-cost ratio for DMI was 36.7.

- Efforts to guard against duplication of effort between MFCU and MPI are ongoing. For example, a data mining analyst request for a subset of data is used to inform both agencies of potential data mining activities. And if one agency is in possession of a subset of data, that same subset may not be looked at by staff at the other agency until the subset of data is officially "released."

- The division between the MFCU and MPI is one of specialization. For example, MPI's focus is on abuse in broad or general respects (i.e., database wide). The Medicaid Fraud Control Unit's focus is on fraud, with data mining conducted on smaller subsets allowing for deeper research into the data and toward more specific ends. This specialization allows each agency to do its data mining simultaneously, but well-coordinated, to ensure non-duplication of effort.

See Appendix C for the Data Mining Activities Evaluation Final Report.

Appendix A
Three-Month Temporary Extension
January 1, 2015 – February 29, 2016

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop S2-01-16
Baltimore, Maryland 21244-1850

State Demonstrations Group

DEC 0 8 2015

Justin Senior
Deputy Secretary for Medicaid
Florida Agency for Health Care Administration
2727 Mahan Drive, Mail Stop 8
Tallahassee, FL 32308

Dear Mr. Senior:

This letter is to inform you that the Centers for Medicare & Medicaid Services (CMS) is granting a temporary extension of Florida's MEDS-AD (Project No. 11-W-00205/4) section 1115 demonstration through February 29, 2016. This temporary extension will allow the state and CMS to continue working together on approval of the MEDS-AD demonstration extension.

The demonstration will continue to operate under the authority of section 1115(a) of the Social Security Act. Additionally, the current list of expenditure authorities and Special Terms and Conditions will continue to apply to the MEDS-AD demonstration until February 29, 2016.

If you have any questions, please contact your project officer, Ms. Dina Payne. Ms. Payne can be reached at (410) 786-3574 or at dina.payne1@cms.hhs.gov.

We look forward to continuing to work with you and your staff on this demonstration.

Sincerely,

Eliot Fishman
Director

cc: Jackie Glaze, Associate Regional Administrator, Region IV

Appendix B
Medication Therapy Management Program
Final Report

Deliverable #34

MEDs-AD Waiver Medication Therapy Management (MTM) Program Final Report

Prepared for Florida Medicaid

In Partial Fulfillment of Contract MED143

College of Medicine

Florida State University

March 7, 2016

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Executive Summary

Overview

The goals of the Florida Medicaid Medication Therapy Management (MTM) program are far-reaching: to improve the quality of care and prescribing practices based on best-practice guidelines, to improve patient adherence to medication plans, to reduce clinical risk, and to lower prescribed drug costs and the rate of inappropriate spending for certain Medicaid prescription drugs. The program was implemented in a high-risk population of Medicaid recipients eligible through Florida's Section 1115 MEDs-AD Research and Demonstration Waiver.

This report summarizes the findings of the pre-intervention periods (June 1, 2010 through May 31, 2014) and their respective intervention years (June 1, 2011 through December 31, 2014) for the evaluation of the MTM intervention conducted by the University of Florida (UF) College of Pharmacy (COP). The report includes findings based on combined or pooled data for three demonstration years and a one year extension (four years total) of the current waiver for MTM program interventions beginning in 2011 (Year 1 Cohort 1), 2012 (Year 2 Cohort 2), 2013 (Year 3 Cohort 3) and 2014 (Year 4 Cohort 4). MTM program participants are compared with Medicaid recipients who were members of the MEDs-AD Waiver population (MEG1) but either declined the opportunity to participate or were never contacted about the opportunity.

Quantitative Results

The results of the analysis of the Florida Medicaid MTM program for all four cohorts indicate no statistically significant improvements in the intervention group when contrasted with comparison groups of non-participants. This finding was consistent across all the economic, service utilization, and clinical outcomes measured in the strongest analytic models. These models were fully adjusted, controlling for age, race, ethnicity, gender, morbidity, and length of enrollment.

However, one finding from the multivariable models approached significance for arguably the broadest outcome, total per person expenditures. Mean total expenditures per person were shown to decline more in the MTM participant intervention group than in the MTM non-participant comparison group (hereafter "MTM-P" and "MTM-NP," respectively) after controlling for baseline differences. All findings in this report should be interpreted with recognition of the dynamic nature of the study population, which is a product of intermittent eligibility gaps and moderate loss to follow-up. Positive findings,

including those that approach significance, require further investigation, specifically, carrying out additional models that control for attrition effects where possible. Fundamentally, the findings in this report are similar to the penultimate evaluation of the MTM program[1], in that none of the multivariable models from the previous report demonstrated a significant effect of the intervention on the MTM-P group.

Qualitative Results

MTM participants gave overwhelmingly positive feedback during qualitative interviews about their experiences in the MTM program. These interviews indicate substantial benefits resulting from the Comprehensive Medication Review (CMR) and subsequent contact with UF COP pharmacists. Participants credited the CMR with increasing their knowledge about their medication(s) and positively impacting their health. Overall, they found the information provided during the CMR helpful, and many reported that the intervention allowed them to take a more active role in their health care.

The participants also provided global support for the MTM program. Their recommendation that the program continue provides insight into their desire for support in addressing their complex medical issues and echoes the statements of UF COP pharmacists who wished to keep in touch beyond the initial CMR. UF COP pharmacists shared that MTM participants frequently reported needs outside the scope of a CMR. These needs often directly impacted the participants' health. Three recommendations reflect the qualitative findings in this report: (1) Expand the amount of contact between pharmacists and participants by increasing the number of phone calls required per protocol and/or by extending the program for more than the current one year interval; (2) Add social workers or case managers to the UF call center staff to meet the needs of MTM participants; (3) Streamline the information provided to MTM participants by mail and explore options to ensure participants receive the information.

[1] MEDs-AD Waiver (MTM) Program Evaluation—Final Report Prepared for Florida Medicaid by the Florida State University College of Medicine, March 16, 2015

Report Prepared By:

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List of Tables

List of Terms, Acronyms, and Abbreviations

Acronym or Abbreviation	Explanation
ACE	Angiotensin-Converting-Enzyme inhibitor
ACG	Adjusted Cost Groups, e.g., Johns Hopkins ACGs®
AHCA	Florida Agency for Health Care Administration (the Agency)
ARB	Angiotensin Receptor Blockers
BETOS	Berenson-Eggers Type of Service codes
CCC	Chronic Condition Count, a Johns Hopkins ACGs® indicator
CG1	Comparison group 1 constructed from MTM pool sent to UF COP that did not receive the intervention (MTM non-participants, i.e., MTM-NP).
CG2	Comparison group 2 constructed from MEDs-AD eligible recipients whose names were not submitted to UF COP
CI	Confidence Interval
CMR	Comprehensive Medication Review
CMS-1500	The standard form used by medical professionals to submit claims for reimbursements
Cohort 1, COH1	MTM program participants and non-participants for program year June 1, 2011 to May 31, 2012
Cohort 2, COH2	MTM program participants and non-participants for program year June 1, 2012 to May 31, 2013
Cohort 3, COH3	MTM program participants and non-participants for program year June 1, 2013 to May 31, 2014
Cohort 4, COH4	MTM program participants and non-participants for program months June 1, 2014 to December 31, 2014
CPT	Current Procedural Terminology
CSA	Continuous Single-Interval Measure of Availability (an ACG adherence measure)
DiD	difference-in-difference
ED	Emergency Department
EQ	Evaluation Question
ET	Evaluation Team
FAMU	Florida A&M University
FSU	Florida State University
HCBS	Home and Community-Based Services
HCPCS	Health Care Procedure Coding System
ICD or ICD-9	International Classification of Disease, Version 9 CM (Clinical Modification)
LCL	Lower Confidence Interval Limit
LTC	Long-term Care
MAP	Medication Action Plan
MAS	Morisky Adherence Score

Acronym or Abbreviation	Explanation
Max.	Maximum
MCAP	Medicaid Administrative Personnel
MCC	Multiple Chronic Conditions
MCO	Managed Care Organization
MEDs-AD	Medicaid for Aged and Disabled. Florida's Section 1115 MEDs-AD Research and Demonstration (Project No. 11-W-00205/4).
MEG1	Medicaid eligible population number one. A category of persons eligible for Medicaid under the MEDs-AD Waiver.
Min.	Minimum
MPR	Medication Possession Ratio—an ACG medication adherence measure
MTM	Medication Therapy Management
MTM-NP	Medication Therapy Management Non-Participants
MTM-P	Medication Therapy Management Participants
N or No.	Number, as in number of recipients or events
OR	Odds Ratio
Participant	Any Medicaid recipient who participates in the MTM program intervention, i.e., has completed a CMR with the UF COP staff
PCP	Primary Care Physician/Provider
QFUR	Quarterly Follow-Up Review, e.g., QFUR3, QFUR6, QFUR9
RA	Research Assistant
Recip./recipient	Any person enrolled in Florida Medicaid
SP	Study Period (pre-intervention, intervention, & post-intervention)
SP-INT	Study Period Intervention
SP-PRI	Study Period Pre-Intervention
Std. Dev.	Standard Deviation
UB-04	Standard form used by facilities to submit claims for reimbursement
UCL	Upper Confidence Interval Limit
UF COP	University of Florida College of Pharmacy

Introduction

This report summarizes the final findings of the evaluation of the Florida Medicaid Medication Therapy Management (MTM) program implemented by the University of Florida (UF) College of Pharmacy (COP) for the pre-intervention periods (June 1, 2010 through May 31, 2014) and their respective MEDs-AD Waiver intervention years (June 1, 2011 through December 31, 2014). Medicaid does not typically cover MTM services, and the recipients included in this evaluation were adults that are often ineligible for Medicaid. Recipient eligibility for Medicaid and approval for the MTM program was achieved through a Section 1115 MEDs-AD Research or Demonstration Waiver approved by the Centers for Medicare and Medicaid Services. The waiver is referred to as the MEDs-AD Waiver in this document.

Demonstration waivers under Section 1115 allow states flexibility to design and improve Medicaid programs by expanding coverage to individuals not otherwise covered by Medicaid, thereby providing services not typically available to these recipients. The MEDs-AD Waiver defines three distinct populations. This evaluation only relates to a population designated in this report as MEG1. Eligibility criteria for the evaluated population includes individuals eligible for Medicaid but not eligible for Medicare and who are eligible for but not currently receiving: 1) long-term institutional care, 2) hospice services in the home or a facility, 3) home and community-based services (HCBS), or 4) coverage under a contract with a managed care organization (MCO). Eligibility criteria also include limits on the recipients' income and assets. All MEG1 Florida Medicaid recipients were eligible for but not all received MTM services.

Background on the MTM Program and Evaluation

The goals of the MTM program are to improve the quality of care and prescribing practices based on best-practice guidelines, to improve patient adherence to medication plans, to reduce clinical risk, and to lower prescribed drug costs and the rate of inappropriate spending for certain Medicaid prescription drugs for a high-risk population of Medicaid recipients eligible through Florida's Section 1115 MEDs-AD Research and Demonstration Waiver.

The active intervention study periods (SP-INT) for each cohort were: Cohort 1) June 1, 2011 to May 31, 2012, Cohort 2) June 1, 2012 to May 31, 2013, Cohort 3) June 1, 2013 to May 31, 2014 and Cohort 4) June 1, 2014 to December 31, 2014. Only the first seven months of the Cohort 4 intervention period were included in this study due to concerns about the completeness of data from January 2015 and beyond. Each SP-INT is preceded by a pre-intervention period (SP-PRI) of 12 months in order to contrast

MTM program metrics before and during the intervention. The evaluation team's (ET's) analysis contrasted the MTM-P group with a constructed comparison group(s) as deemed appropriate for each metric presented. Essentially, each cohort and comparison group was followed for up to two years and was comprised of recipients who maintained eligibility on a monthly basis as defined by the MEDs-AD Waiver for the MEG1 population.

Recruitment of the Intervention Population

Selection of recipients covered by the waiver to participate in the intervention was a multistep process involving Agency staff, the University of Florida College of Pharmacy (UF COP, the MTM program provider), and consent at two points in time by targeted Medicaid recipients. "Selection" refers to processes used by the Agency and the UF COP to produce a list of recipients for initial contact, from which a subset of these recipients provided their consent to participate in the MTM program. In essence, the Agency did not "select" MTM participants; rather, recipients self-selected into the intervention. Recipients who opted into the intervention and ultimately completed a Comprehensive Medication Review (CMR) formed the study's nominal MTM-P population.

Study Group Definitions and Size

The MEDs-AD Waiver MEG1 population at the core of this evaluation was a dynamic group with membership changing frequently due to lost or reinstated eligibility under the waiver throughout the course of the observation period. MEG1 population members were often observed across multiple study periods and sometimes transitioned in and out of the eligible study population. Recipients who received the intervention in one or more cohorts were identified and excluded from eligibility in subsequent comparison groups. Eligible MEG1 recipients who were never exposed to the intervention may have served as a member of a comparison group in more than one study period. The current analysis for combined Cohorts 1, 2, 3 and 4 used refined methods with more carefully defined inclusion and exclusion criteria for both intervention (MTM-P) and comparison group recipients as compared with previous reports.

Due to the complexity of the study, a nomenclature for referring to the study populations and their respective comparison groups for a given time period was desirable and is presented in Table 1. Table 1 also defines the study periods and cohort size for each nominal study population. These initial study groups, designated as MTM-P and MTM-NP for each cohort, are formed from recipients who consented to have their names forwarded to the UF COP for potential selection into the MTM intervention. They

are labeled as the "nominal" cohorts of size 651, 499, 846, and 686 for each cohort, respectively, as listed in the last row of Table 1. These cohorts are labeled as "nominal" because, in truth, they only existed as a complete population of size "n" for a short period of time. The observed study populations were much smaller in size (see Table 43 in Appendix IV). Accordingly, the evaluation team regards the impact of attrition on the observed study population and subsequently the intervention study period with significant concern. Additional detail about study nomenclature, observed cohort sizes, and attrition may be found in Appendix I.

Table 1. Overlapping enrollment periods and nominal cohort size for the Florida Medicaid MTM program evaluation, June 1, 2010 through December 31 2014

Study Period Begin	Study Period End	Nominal Cohort 1	Nominal Cohort 2	Nominal Cohort 3	Nominal Cohort 4	Study Year
6/1/2010	5/31/2011	Pre-intervention Period				1
6/1/2011	5/31/2012	Intervention Period	Pre-intervention Period			2
6/1/2012	5/31/2013		Intervention Period	Pre-intervention Period		3
6/1/2013	5/31/2014			Intervention Period	Pre-intervention Period	4
6/1/2014	12/31/2014				Intervention Period	5
Nominal Cohort Size* (MTM-P + MTM-NP)		n = 651	n = 499	n = 846	n = 686	

* Selected recipients in Cohorts 1-3 who meet additional inclusion criteria are members of subsequent cohorts due to ongoing participation in the MTM intervention.

UF COP Intervention and Data Collection Processes

Recipients in the nominal cohorts were required to provide additional consent via telephone and ultimately complete an interview with trained staff from the UF COP before entering into the study's intervention population. UF COP staff members conducted a Comprehensive Medication Review (CMR) during the initial interview as the first step in the intervention. A CMR involves collecting patient specific information on prescription medications and potential medication related problems, which if evident, entails creating an action plan to resolve those problems. Based on findings from the CMR, UF COP staff had the option to: 1) send the patient a Medication Action Plan (MAP), which included a medication list and possibly recommendations for behavioral change relevant to their condition and

medication, and/or 2) send a facsimile to the recipient's reported primary care provider (PCP) with recommendations for changes in medication. Any given intervention for the recipient may have included a MAP only, PCP FAX only, a MAP and a PCP FAX, or none of the post-CMR actions. Recommended actions were based on a pharmacist's expert opinion regarding over- or under-utilization of medication, medication interactions, or other issues related to the patient's treatment. The PCP may or may not have implemented recommendations the pharmacist offers. Subsequent to the CMR and post-CMR actions, participants were followed for an additional nine months. UF COP staff conducted reviews of patient medication claims records provided by the Pharmacy Benefit Management vendor for Florida Medicaid to determine if recommendations had been implemented or new problems had appeared. Occasionally, the quarterly reviews lead to another patient or PCP contact, which also may determine whether the recommendations were implemented.

Quantitative and Qualitative Study Evaluation Questions Addressed in this Final Report

Quantitative and Qualitative Evaluation Questions (EQ) addressed in this report are listed in Table 2. Questions are similar to those posed in previous reports.

Table 2. Evaluation questions addressed in this report, Florida MTM program evaluation, 2010-2014

Evaluation Question Number	**Quantitative Evaluation Questions**
EQ 1	What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P), comparison group 1 (MTM-NP), and comparison group 2 for utilization measures?
EQ 2	What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P), comparison group 1 (MTM-NP), and comparison group 2 for expenditure measures?
EQ 3	What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P), comparison group 1 (MTM-NP), and comparison group 2 for clinical outcomes?
EQ 4	What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P), comparison group 1 (MTM-NP), and comparison group 2 for demographic categories?
EQ 5	What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P), comparison group 1 (MTM-NP), and comparison group 2 for mortality and morbidity measures?
EQ 6	What are the differences in the pre-intervention and intervention periods within the intervention group for MTM process measures?

Evaluation Question Number	**Qualitative Evaluation Questions**
EQ 7	What are the most successful aspects of the MTM program based on participant perspectives?
EQ 8	What are the lessons learned from this program from the perspectives of Florida Medicaid Administrative Personnel (MCAP), MTM staff, recipients (i.e., participants), and PCPs?
EQ 9	How does this program impact recipients' (i.e., participants') ability to understand medications, take a more active part in their care, and understand the questions to ask their doctor or when to contact their doctor?
EQ 10	How do recipients view this program from individual perspectives?

Study Methods-Abridged

Detailed quantitative and qualitative study methods may be found in Appendices I and II, respectively.

Overall Study Design

The overall study design used quantitative and qualitative methods to address the EQs above. Quantitative analysis was based principally on secondary administrative data provided by the Agency and was supplemented by primary data that the UF COP collected from each cohort during the MTM intervention. Primary data for the qualitative analysis was collected via telephone interviews with recipients, and these responses represented their retrospective opinions of the MTM intervention. Some interviews with UF COP program staff were also conducted as part of the qualitative analysis.

Quantitative Design

This study used a retrospective observational examination with non-equivalent comparison groups of all Medicaid covered medical and prescription drug services provided to the four cohorts' study populations for the period June 1, 2010 through December 31, 2014 (55 months). The principal comparisons were for MTM-P versus MTM-NP (CG1) after applying inclusion-exclusion criteria by month, as addressed in EQs 1-3 and EQ5. EQ4 compares the *nominal* MTM-P and MTM-NP populations on demographic measures. EQ6 describes the UF COP process measures only. The use of the MTM-NP group is advantageous for CG1—everyone in the combined MTM-P and MTM-NP populations reached the second stage of the consent process at the UF COP, and some unobserved factors are likely more similar in recipients who initially provided consent compared to recipients who outright declined to participate.

Qualitative Design

The qualitative ET sought to understand the MEDs-AD (MTM) Demonstration project at the UF COP call center from participants' perspectives in efforts to identify how the MTM program impacted participants' ability to understand their medications, to take a more active part in their care, and to understand the questions to ask their doctor or when to contact their doctor. The ET from the Florida State University (FSU) College of Social Work conducted interviews with MTM participants and UF COP pharmacists for the analysis. The qualitative component of this mixed methods project lends a much deeper understanding of the underlying processes, providing a more nuanced evaluation of the MEDs-AD Waiver project based on MTM principles.

The ET associated with the qualitative evaluation effort consisted of a lead analyst and three graduate level Research Assistants (RAs). The lead analyst, an Assistant Professor at the FSU College of Social Work and a Co-PI of the project, is an expert in qualitative methodology and oversaw all interviews conducted by the ET RAs. Refer to Appendix II for a more detailed discussion of the qualitative design of this analysis.

Quantitative Evaluation Findings

Enrolled Days and Loss to Follow-up

The quantitative evaluation commences with a thorough review of MEDs-AD enrollment and loss to follow-up patterns. Table 3 presents the total enrolled days by study group for the MTM-P and MTM-NP (CG1) population by study period for the four study years during which Cohorts 1, 2, 3 and 4 were tracked after application of the inclusion/exclusion criteria. There were 479 and 1,672 persons in the MTM-P and MTM-NP study groups, respectively, during the pre-intervention period, but only 274 (MTM-P) and 836 (MTM-NP) persons remained in the intervention period. The study contact list is pulled in the spring before the start of each intervention year. It is possible for recipients from this list to receive the CMR, which takes place in the first three months of the intervention period, who then become completely ineligible in their intervention year due to satisfying one or more of the exclusion rules in all 12 months of SP-INT.

The mean enrollment duration of 7-7.5 months persisted between both study groups and periods. Enrollment during the pre-intervention period was higher in the MTM-P group (232 days on average) as compared with the MTM-NP group (211 days on average), and this difference was statistically significant. The difference remained to a lesser extent during the intervention period, as mean

enrollment was 228 days for MTM-P as compared with 215 days for MTM-NP, but in contrast, this difference was not statistically significant.

Table 3. Summary statistics for length of enrollment for recipients after applying inclusion and exclusion criteria for the MTM participant and MTM non-participant (CG1) study groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group*	Study Period*	No. Recips.	Sum Enrolled Days	Mean Enrolled Days	Std. Dev.	Min.	Median	Max.	Mean 95% LCL	Mean 95% UCL
MTM-P	SP-PRI	479	111,007	232	110	28	242	366	222	242
MTM-NP	SP-PRI	1,672	353,302	211	110	28	212	366	206	217
Sub-Total	SP-PRI	2,151	464,309	216	110	28	212	366	211	221
MTM-P	SP-INT	274	62,418	228	124	30	245	366	213	243
MTM-NP	SP-INT	836	179,743	215	128	30	214	366	206	224
Sub-Total	SP-INT	1,110	242,161	218	127	30	214	366	211	226
MTM-P	All Periods	753	173,425	230	115	28	243	366	222	239
MTM-NP	All Periods	2,508	533,045	213	116	28	212	366	208	217
Total	All Periods	3,261	706,470	217	116	28	212	366	213	221

*Study periods and groups are aggregated across all four cohorts. Unique recipients may be counted more than once if they participated in the intervention group or the comparison group in more than one cohort. The number of recipients in each Study Group/Study Period combination should be interpreted as recipient-periods rather than counts of unique recipients.

Readers should note that the nominal size of the MTM-P group in all four cohorts (n=618) declined to 479 recipients in the observed population during the pre-intervention study periods and to 274 recipients during the intervention periods (see Table 43). These counts indicate a decline of 22% and 56%, respectively, in the size of the MTM-P group across all four cohorts. Likewise, the nominal population size for the MTM-NP group (n=2,060) declined to 1,672 recipients in the pre-intervention and 836 recipients in the intervention periods (see also Table 43). This attrition rate represents a decline of 19% and 59%, respectively. The decline in both study groups is problematic for the internal validity[2] of the study, and the attrition rate from pre-intervention to intervention year of 43% in the MTM-P group seems to suggest that almost half of all recipients who received the CMR intervention were no longer eligible in the intervention year under the terms of the 1115 waiver. In reality, this

[2] Internal validity is the degree to which the statistical findings and the inferences made from them are true. Stated another way, were the observed changes in the intervention group due to the program or to other causes which may or may not be measureable. Evaluation design, including self-selection, and statistical methods employed can all influence internal validity of the findings. Here the concern is that those who continued to be observed for longer periods during the intervention period may be somehow different; specifically, the ET would like to know why their utilization is much lower, as compared with recipients who were lost to follow-up. If the characteristic that predicts who was lost to follow-up is also related to utilization, then there is a serious problem with the internal validity of the study, analysis, and findings.
See: http://www.socialresearchmethods.net/kb/intval.php.

decline is partially driven by the incompleteness of data from the intervention study period in Cohort 4, which resulted in $0 observed utilization (an exclusionary criterion) for a greater number of participants in this cohort compared to previous cohorts. See Appendix I for an extended discussion of this topic.

Readers should also note that some MTM-P recipients received the CMR intervention in more than one year. That is, they voluntarily agreed to be part of the next cohort's intervention group after initially completing the intervention. Of the recipients in the MTM-P group who crossed over into two study periods, 15 were in Cohorts 1 & 2; 14 were in Cohorts 2 & 3, and 14 were in Cohorts 3 & 4. In addition, 8 MTM-P recipients crossed over into three cohorts (four in Cohorts 1, 2, & 3 and 4 in Cohorts 2, 3, & 4).

Quantitative findings for EQ1 through EQ6, using MTM-NP comparison group CG1, follow and are organized by consecutive tables numbered 4 through 32 in the main body of the report. Key findings are presented as bullets above each table name and number. Regression models using Comparison Group 2 (CG2) are in Appendix III, Tables 36 to 42. CG2 is comprised of a subset of the CG1 population, restricted to persons with at least 150 days of enrollment in the pre-intervention and/or intervention study periods. Counts of enrolled days are included in all regression models where the outcome of interest has not been converted to a rate in order to adjust for differences in the length of enrollment between the MTM-P and MTM-NP comparison group over time.[3] Enrolled days are also included as the denominator in descriptive tables for counts of services or events and for expenditure amounts. The number of enrolled days for each population and time period are shown in these tables.

EQ1: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and CG1 (MTM-NP) for utilization measures?

Interpretation of Descriptive Tables EQ1

Descriptive measures of utilization include the number of services, number of hospitalizations, number of hospitalized days, and number of prescriptions filled. Total expenditures associated with these utilization measures are also included in the tables.

The ET chose to summarize outpatient and professional services by means of the Centers for Medicare & Medicaid Services' standard Berenson-Eggers Type of Service (BETOS) classification system. Coding claims based on this methodology affords a relatively stable, objective way to summarize the diversity of

[3] Coefficients for length of enrollment in these models are constrained to equal one and are not shown in the regression model tables.

services received in outpatient hospital facilities and private office settings. It is especially useful for analyzing the growth (or decline, in this instance) in average per member per year expenditures by service type. The next two tables summarize all services received by the two study groups in outpatient hospital facilities and private office settings. For services broken down by BETOS code type see Tables 44 and 45 in Appendix IV.

- The mean annualized expenditures for all outpatient BETOS service categories shown are similar for MTM-P and MTM-NP during the pre-intervention period ($4,092 versus $4,099) and during the intervention period ($3,266 and $3,283). The differences between study groups are not significant.
- The mean annualized expenditures for all outpatient BETOS service categories shown are lower in the intervention year compared with the pre-intervention year for both groups (MTM-P $3,266 from $4,092 and MTM-NP $3,283 from $4,099). The decline of about $800 from pre-intervention to intervention periods is similar in both study groups.

Table 4. Total and mean service counts and expenditures for *all* BETOS UB-04 outpatient hospital facility claims adjusted for enrolled days by claim type and by program period for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014.

Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditures ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditures Paid Out per Member ($)	Mean Annualized Amount 95% LCL ($)	Mean Annualized Amount 95% UCL ($)
MTM-P	SP-PRI	108,727	14,275	1,134,133	79	0	4,317	4,092	3,475	4,708
MTM-NP	SP-PRI	345,249	42,642	3,694,319	87	0	10,940	4,099	3,755	4,443
Sub-Total	SP-PRI	453,976	56,917	4,828,452	85	0	10,940	4,098	3,797	4,398
MTM-P	SP-INT	57,876	6,832	538,557	79	0	5,552	3,266	2,517	4,016
MTM-NP	SP-INT	167,731	16,816	1,429,395	85	0	9,664	3,283	2,802	3,765
Sub-Total	SP-INT	225,607	23,648	1,967,952	83	0	9,664	3,279	2,871	3,688
MTM-P	ALL	166,603	21,107	1,672,690	79	0	5,552	4,673	4,093	5,254
MTM-NP	ALL	512,980	59,458	5,123,714	86	0	10,940	4,713	4,365	5,062
Total	ALL	679,583	80,565	6,796,404	84	0	10,940	4,704	4,405	5,004

All BETOS Codes for outpatient claims include categories not shown in the appendix including “other”, “unclassifiable,” and “Durable Medical Equipment.”

- The mean annualized expenditures for all professional service BETOS categories shown are similar for MTM-P and MTM-NP during the pre-intervention period ($5,279 versus $5,256) and during the intervention period ($3,298 and $3,323). The differences between study groups in each period are not significant.
- The mean annualized expenditures for all professional service BETOS categories shown are significantly lower in the intervention year compared with the pre-intervention year for both groups (MTM-P $3,298 from $5,279 and MTM-NP $3,323 from $5,256). The decline of about $2,000 from pre-intervention to intervention periods is similar for MTM-P and MTM-NP.

Table 5. Total and mean service counts and expenditures for *all* BETOS CMS-1500 professional service claims adjusted for enrolled days by program period for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014.

Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditures ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditures Paid Out per Member ($)	Mean Annualized Amount 95% LCL ($)	Mean Annualized Amount 95% UCL ($)
MTM-P	SP-PRI	106,693	33,566	1,457,904	43	0	16,081	5,279	4,633	5,925
MTM-NP	SP-PRI	340,314	108,665	4,667,587	43	0	5,849	5,256	4,906	5,606
Sub-Total	SP-PRI	447,007	142,231	6,125,490	43	0	16,081	5,261	4,953	5,569
MTM-P	SP-INT	57,273	12,819	520,516	41	0	1,779	3,298	2,793	3,803
MTM-NP	SP-INT	165,425	35,085	1,547,520	44	0	13,702	3,323	3,008	3,638
Sub-Total	SP-INT	222,698	47,904	2,068,036	43	0	13,702	3,317	3,049	3,585
MTM-P	ALL	163,966	46,385	1,978,420	43	0	16,081	5,007	4,505	5,509
MTM-NP	ALL	505,739	143,750	6,215,106	43	0	13,702	5,028	4,746	5,311
Total	ALL	669,705	190,135	8,193,526	43	0	16,081	5,023	4,777	5,270

All BETOS Codes for professional services claims include categories not shown in the appendix including "other" and "unclassifiable."

A review of the mean annualized expenditures in both settings for MTM-P and MTM-NP (Tables 4 & 5) reveals that each study group received a comparable amount of services in terms of costs during the pre-intervention period. This similarity was maintained for each setting, although recipients in both groups accrued somewhat higher costs in private office settings than in outpatient care centers. The similarity in annualized expenditures during the pre-intervention periods is beneficial for the evaluation because it suggests the groups were similar at baseline.

The average decline in annualized expenditures between the pre-intervention and intervention period in each group was statistically indistinguishable. The fact that the average decline between study periods is similar in magnitude suggests that there was no MTM intervention effect on ambulatory service costs. Moreover, the decline in annualized costs between the two study periods may be a product of loss to follow-up, since those with higher costs in the pre-intervention period were more likely to be excluded from the SP-INT due to meeting one or more of the exclusion criteria in all 12 months of their intervention year.

Consequently, the more interesting question for this component of the evaluation may be – what is different about recipients who were not excluded from their SP-INT years due to ineligibility that led to them averaging significantly lower expenditures for outpatient and professional services compared to their counterparts who were lost to follow-up? This question is relevant to the matter of internal study validity and could also have important policy implications. Nevertheless, results from the multivariable models for expenditures with adjusting variables should be examined before addressing this question, much less concluding any significant difference between study periods.

Table 6 presents findings on the number and costs associated with inpatient hospitalizations in the study population.

- The mean annualized expenditures per recipient for inpatient care in the pre-intervention period was statistically comparable in the MTM-NP group with respect to the MTM-P group ($25,442 vs. $22,533). Hence, the two groups were similar on this measure at baseline.
- The mean annualized expenditures per recipient for inpatient care was similar in both groups during the intervention period ($7,370 for MTM-NP vs. $7,814 MTM-P), and the difference was not statistically significant. Based on unadjusted values, this result suggests no effect of the MTM program but needs to be verified by controlling for demographic and morbidity factors in the multivariable model.
- The decline in mean expenditures from pre-intervention to intervention period was larger in the MTM-NP group than in the MTM-P group ($18,072 versus $14,719).
    - Do these results also suggest there may be something different about those recipients who were not lost due to ineligibility that directly resulted in lower expenditures on average for inpatient discharges between time periods? Again, this question may be

relevant for internal study validity; however, results from the multivariable model for expenditures should be reviewed before reaching any conclusions.

Table 6. Total inpatient facility discharges and mean expenditures per discharge adjusted for enrolled days by program period for MTM participant and MTM non-participant study groups

Study Group	Study Period	No. Recipients with Discharge	Enrolled Days in the Inpatient Population	Total Expenditure Amount for All Discharges ($)	Mean Expenditure Amount per Discharge ($)	Min. Amount per Discharge ($)	Max. Amount per Discharge ($)	Mean Annualized Expenditures Paid Out for Inpatient Discharges per Member ($)	95% LCL Annualized Amount ($)	95% UCL Annualized Amount ($)
MTM-P	SP-PRI	189	69,792	4,308,643	22,797	1,216	180,837	22,533	16,912	28,154
MTM-NP	SP-PRI	660	226,854	15,812,438	23,958	0	305,433	25,442	19,469	31,414
Sub-Total	SP-PRI	849	296,646	20,121,081	23,700	0	305,433	24,757	18,866	30,649
MTM-P	SP-INT	42	39,755	851,109	20,265	1,125	129,122	7,814	4,504	11,124
MTM-NP	SP-INT	176	113,339	2,288,524	13,003	757	111,045	7,370	4,155	10,585
Sub-Total	SP-INT	218	153,094	3,139,633	14,402	757	129,122	7,485	4,246	10,725
MTM-P	All Periods	231	109,547	5,159,752	22,337	1,125	180,837	17,192	12,282	22,102
MTM-NP	All Periods	836	340,193	18,100,962	21,652	0	305,433	19,421	14,202	24,639
Total	All Periods	1,067	449,740	23,260,714	21,800	0	305,433	18,878	13,733	24,023

Table 7 presents findings on the mean number of inpatient days associated with inpatient hospitalizations in the study population.

- The mean inpatient hospital days in the pre-intervention period for the MTM-P group was 15 days as contrasted with 16 days for the MTM-NP group. This difference was not significant and indicates the two groups were similar on this measure at baseline.
- The mean inpatient hospital days for the MTM-P group was 13 days in the intervention period, as contrasted with 10 days in MTM-NP group.
- The decrease in mean days in the MTM-NP group (6 days) appears to be statistically significant, but the multivariable model should be examined before assessing potential differences between study periods.

Table 7. Mean inpatient days among recipients with one or more inpatient stays by program period for MTM participant and MTM non-participant study groups

Study Group	Study Period	Mean days in facility	Min days in facility	Max days in facility	95% LCL days in facility	95% UCL days in facility
MTM-P	SP-PRI	15	1	107	13	18
MTM-NP	SP-PRI	16	1	184	15	18
Sub-Total	SP-PRI	16	1	184	15	17
MTM-P	SP-INT	13	1	95	8	18
MTM-NP	SP-INT	10	1	76	8	12
Sub-Total	SP-INT	10	1	95	9	12
MTM-P	All Periods	15	1	107	13	17
MTM-NP	All Periods	15	1	184	14	16
Total	All Periods	15	1	184	14	16

Table 8 presents descriptive findings for prescription drug utilization and costs.

- The mean number of prescriptions during the pre-intervention period was 36 for the MTM-P group and 31 for the MTM-NP group.
- The mean number of prescriptions per recipient increased during the intervention period to 47 and 38 for the MTM-P and MTM-NP study groups, respectively.
    - This increase at least partially results from recipient loss to follow-up, such that additional analysis revealed recipients with lower pharmacy costs (and likely fewer prescriptions) were more likely to transition out of the study population before being tracked during the intervention period.
- The mean annualized expenditures per recipient for prescription drugs during the pre-intervention period was higher in the MTM-P than in MTM-NP group ($5,620 vs. $4,590); however, this finding reversed in the intervention period ($5,464 for MTM-P vs. $5,767 for MTM-NP). Annualized expenditures increased in the MTM-NP group and remained roughly the same in the MTM-P group. Results from the multivariable model will help determine if this difference in the change in costs between the two study groups arose due to a possible effect of the MTM program or due to differences in the demographics or morbidity levels of the remaining recipients in each group.

Table 8. Total and mean prescription counts and dollars adjusted for enrolled days by program period for MTM participant and MTM non-participant study groups

Study Group	Study Period	No. Recipients	Enrolled Days	Total Prescription Count	Mean Prescription Count per Recipient	Min. Prescription Count	Max. Prescription Count	Total Expenditure Amount ($)	Mean Expenditures per Day ($)	Mean Annualized Expenditures per Member ($)	95% LCL Annualized Expenditures ($)	95% UCL Annualized Expenditures ($)
MTM-P	SP-PRI	468	109,999	16,669	36	1	273	1,693,712	15	5,620	2,813	8,427
MTM-NP	SP-PRI	1,635	351,045	50,623	31	1	257	4,414,213	13	4,590	2,053	7,127
Sub-Total	SP-PRI	2,103	461,044	67,292	32	1	273	6,107,925	13	4,836	2,232	7,439
MTM-P	SP-INT	240	62,357	11,284	47	1	368	933,404	15	5,464	2,696	8,231
MTM-NP	SP-INT	784	179,317	30,065	38	1	300	2,833,294	16	5,767	2,923	8,611
Sub-Total	SP-INT	1,024	241,674	41,349	40	1	368	3,766,698	16	5,689	2,865	8,513
MTM-P	All Periods	708	172,356	27,953	39	1	368	2,627,117	15	5,563	2,770	8,357
MTM-NP	All Periods	2,419	530,362	80,688	33	1	300	7,247,507	14	4,988	2,343	7,632
Total	All Periods	3,127	702,718	108,641	35	1	368	9,874,624	14	5,129	2,447	7,811

Interpretation of Multivariable Models for EQ1

The multivariable regression models for EQ1 present findings for outcomes that may be counted, e.g., number of services or prescriptions, using negative binomial regression techniques appropriate for the distribution of the outcome. For more information on the methodology underlying models for EQ1 as well as subsequent EQs, see Appendix I.

Table 9 presents findings on the total number of services utilized per the outpatient and professional services files based on Health Care Procedure Coding System (HCPCS) and Current Procedural Terminology (CPT) codes.

- Mean total services used per person was similar for the MTM-P and MTM-NP study groups, and the effect of study group was not statistically significant.
- In both the base and difference-in-difference (DiD) models, mean total services used per person was lower for both the MTM-P and MTM-NP study groups in the intervention period as compared with the pre-intervention period ($p<.0001$). The decline was equal to about 20% fewer services used per month.

- The model did not provide evidence that the MTM program reduced the number of outpatient or professional services utilized per person.

Table 9. General Estimating Equation negative binomial model estimates and p-values for total CPT/HCPCS procedure codes in the CMS-1500 professional claims and the UB-04 outpatient claims files for the MTM-P and MTM-NP population groups

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr> |Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr> |Z|**
Intercept	-1.267	0.116	-1.494	-1.041	<.0001	-1.265	0.116	-1.493	-1.038	<.0001
MTM-P	0.059	0.053	-0.044	0.162	0.260	0.054	0.056	-0.056	0.164	0.334
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.100	0.045	-0.188	-0.012	0.027	-0.100	0.045	-0.188	-0.012	0.027
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	0.051	0.063	-0.073	0.174	0.424	0.051	0.063	-0.073	0.175	0.420
Hispanic	0.098	0.061	-0.022	0.217	0.110	0.098	0.061	-0.022	0.218	0.109
Other	0.115	0.063	-0.008	0.238	0.068	0.115	0.063	-0.008	0.239	0.067
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.004	0.002	-0.008	0.000	0.056	-0.004	0.002	-0.008	0.000	0.055
Intervention	-0.240	0.034	-0.306	-0.174	<.0001	-0.245	0.039	-0.321	-0.169	<.0001
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	0.228	0.344	-0.446	0.903	0.507	0.229	0.344	-0.446	0.904	0.506
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.398	0.014	0.370	0.425	<.0001	0.397	0.014	0.370	0.425	<.0001
Interaction Term*	-	-	-	-	-	0.021	0.078	-0.132	0.174	0.791

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

Table 10 presents findings for the number of combined inpatient facility stays and emergency department events.

- The MTM-P group had significantly lower combined inpatient and ED events than the MTM-NP group in the base model at the 0.05 significance level. However, the effect size was modest, indicating that compared to the number of inpatient and ED events MTM-NP experienced, MTM-P experienced about 10% fewer events in both study periods.
- No statistically significant declines in event rate were found between time periods.

- Accordingly, the model did not indicate that the MTM program leads to a reduction in inpatient stays or emergency department events.

Table 10. General Estimating Equation negative binomial model estimates and p-values for total inpatient facility and ED events for the MTM participant and MTM non-participant population groups

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr >|Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr > |Z|**
Intercept	-2.981	0.121	-3.218	-2.744	<.0001	-2.989	0.122	-3.228	-2.751	<.0001
MTM-P	-0.103	0.046	-0.193	-0.013	0.026	-0.079	0.055	-0.186	0.028	0.150
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	0.002	0.048	-0.092	0.096	0.966	0.002	0.048	-0.091	0.096	0.962
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	-0.150	0.056	-0.259	-0.042	0.007	-0.150	0.056	-0.259	-0.041	0.007
Hispanic	-0.170	0.048	-0.264	-0.075	0.000	-0.170	0.048	-0.265	-0.075	0.000
Other	-0.047	0.055	-0.155	0.060	0.389	-0.047	0.055	-0.154	0.061	0.394
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.003	0.002	-0.007	0.002	0.209	-0.003	0.002	-0.007	0.002	0.220
Intervention	-0.015	0.058	-0.129	0.100	0.804	0.007	0.071	-0.133	0.147	0.922
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	-0.277	0.055	-0.386	-0.169	<.0001	-0.277	0.056	-0.387	-0.167	<.0001
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.011	0.010	-0.009	0.030	0.279	0.010	0.010	-0.009	0.030	0.295
Interaction Term*	-	-	-	-	-	-0.098	0.092	-0.277	0.081	0.284

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

Table 11 presents findings for the mean number of outpatient prescriptions filled by the two study groups.

- The base model and the DiD model found no difference in the mean number of total prescriptions between study groups in either period.
- However, study period is significant and positive in both models, suggesting a slight increase in the number of prescriptions filled in both groups between the pre-intervention and intervention periods of about 5%.
- The DiD model found no significant interaction effect of study period by group, indicating there was no differential impact of the MTM program on the intervention group for this measure.

Table 11. General Estimating Equation negative binomial model estimates and p-values for total outpatient prescriptions for the MTM participant and MTM non-participant population groups

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr >|Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr >|Z|**
Intercept	-2.142	0.070	-2.279	-2.006	<.0001	-2.142	0.069	-2.278	-2.006	<.0001
MTM-P	-0.002	0.029	-0.059	0.056	0.953	-0.002	0.031	-0.062	0.058	0.946
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	0.090	0.026	0.040	0.140	0.000	0.090	0.026	0.040	0.140	0.000
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	-0.075	0.035	-0.143	-0.007	0.031	-0.075	0.035	-0.143	-0.007	0.031
Hispanic	-0.056	0.038	-0.131	0.018	0.139	-0.056	0.038	-0.131	0.018	0.139
Other	-0.044	0.035	-0.113	0.026	0.216	-0.044	0.035	-0.113	0.026	0.216
White or European American	0	.	.	.	.	0	.	.	.	.
Age	0.008	0.001	0.005	0.010	<.0001	0.008	0.001	0.005	0.010	<.0001
Intervention	0.053	0.013	0.028	0.079	<.0001	0.053	0.015	0.023	0.083	0.0004
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	-0.588	0.232	-1.042	-0.134	0.011	-0.588	0.232	-1.042	-0.134	0.011
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.036	0.007	0.022	0.051	<.0001	0.036	0.007	0.022	0.051	<.0001
*Interaction Term	-	-	-	-	-	0.001	0.028	-0.054	0.057	0.964

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

EQ2: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 1 (MTM-NP) for expenditure measures?

Interpretation of Descriptive Tables EQ2

Descriptive information on expenditure measures is included in Table 46 in Appendix IV. Descriptive information for pharmacy expenditures may be found in Table 8 under EQ1.

Interpretation of Multivariable Models for EQ2

The multivariable regression models for EQ2 present findings for log transformed expenditure outcomes using ordinary linear regression.

Table 12 presents findings for estimates of total recipient expenditures.

- No differences in total expenditures between the two groups were found in the base model, indicating no baseline differences in total expenditures between the two groups.
- Study period was significant (p=.03) and negative in the base model, indicating that per recipient total expenditures declined about 6% for both study groups from the pre-intervention to intervention period.
- The interaction indicator approached significance in the DiD model, suggesting that MTM-P may have experienced greater declines in total expenditures from the pre-intervention to intervention period when compared to their counterparts' declines in total expenditures between the two study periods.

Table 12. Robust log-level linear regression difference in difference model estimates and p-values for a model of total recipient expenditures for MTM participant and MTM non-participant population groups

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr > χ^2**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr > χ^2**
Intercept	2.761	0.067	2.629	2.893	<.0001	2.751	0.068	2.619	2.884	<.0001
MTM-P	-0.026	0.028	-0.081	0.030	0.362	0.006	0.035	-0.062	0.074	0.858
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.040	0.025	-0.089	0.008	0.102	-0.040	0.025	-0.089	0.008	0.105
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	0.08	0.03	0.02	0.14	0.01	0.08	0.03	0.02	0.14	0.01
Hispanic	0.07	0.04	0.00	0.14	0.04	0.07	0.04	0.00	0.14	0.04
Other	0.12	0.03	0.05	0.19	0.00	0.12	0.03	0.05	0.18	0.00
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.01	0.00	-0.01	0.00	<.0001	-0.01	0.00	-0.01	0.00	<.0001
Intervention	-0.06	0.03	-0.11	-0.01	0.03	-0.03	0.03	-0.09	0.03	0.26
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	1.527	0.256	1.026	2.028	<.0001	1.529	0.256	1.028	2.030	<.0001
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.481	0.009	0.464	0.498	<.0001	0.482	0.009	0.465	0.499	<.0001
Interaction Term*	-	-	-	-	-	-0.091	0.059	-0.207	0.024	0.122

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

Table 13 presents findings for estimates of total recipient pharmacy expenditures.

- The base model for pharmacy expenditures shows no significant difference between the two study groups, indicating they were similar at baseline.
- The base model and the interaction model for pharmacy expenditures indicates increased expenditures in the intervention period as compared with the pre-intervention period for both study groups (p<.0001). The increase is equal to about 29%.
- The lack of a significant interaction indicator in the DiD model indicates no MTM program effect on pharmacy expenditures.

Table 13. Robust log-level linear regression difference in difference model estimates and p-values for a model of total recipient pharmacy expenditures for MTM participant and MTM non-participant population groups

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr > X^2**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Pr > X^2**
Intercept	1.123	0.077	0.973	1.273	<.0001	1.125	0.077	0.975	1.276	<.0001
MTM-P	0.046	0.031	-0.016	0.107	0.146	0.036	0.039	-0.041	0.113	0.365
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	0.065	0.028	0.011	0.120	0.018	0.065	0.028	0.011	0.120	0.018
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	-0.158	0.037	-0.230	-0.086	<.0001	-0.158	0.037	-0.230	-0.086	<.0001
Hispanic	-0.035	0.039	-0.112	0.041	0.362	-0.035	0.039	-0.111	0.041	0.367
Other	0.024	0.039	-0.053	0.100	0.547	0.024	0.039	-0.053	0.101	0.535
White or European American	0	.	.	.	.	0	.	.	.	.
Age	0.004	0.001	0.001	0.006	0.011	0.004	0.001	0.001	0.006	0.011
Intervention	0.257	0.028	0.202	0.312	<.0001	0.250	0.033	0.185	0.314	<.0001
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	-1.578	0.412	-2.386	-0.770	0.000	-1.578	0.412	-2.386	-0.770	0.000
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.178	0.010	0.158	0.197	<.0001	0.178	0.010	0.158	0.197	<.0001
Interaction Term*	-	-	-	-	-	0.027	0.064	-0.099	0.153	0.674

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

EQ3: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 1 (MTM-NP) for clinical outcomes?

Interpretation of Descriptive Tables EQ3

Descriptive measures of clinical outcomes include measures of adherence to prescription drug regimens using a "filled" prescription as a proxy for a "consumed" prescription. The ET used two measures of prescription adherence calculated by the *Johns Hopkins Adjusted Clinical Groups System v.11 (ACG)®*, both of which are designed to determine if recipients' patterns of prescription fills suggest they have enough of their medication on hand to meet the daily dosage and strength requirements prescribed by their doctors. Ultimately, the ET found no differences in the mean adherence values for either measure between study groups or study periods. That is, MTM-P and MTM-NP, alike, maintained a high level of prescription adherence across the pre-intervention and intervention periods. Nevertheless, as proxy measures, these results should be interpreted with caution. For more information on the specific adherence measures employed in this evaluation, including descriptive tables and more detailed results, see Appendix IV.

Interpretation of Multivariable Models for EQ3

The multivariable regression models for EQ3 present findings for binary measures of clinical outcomes (inpatient hospitalizations and emergency department events) using logistic regression.

Table 14 presents findings for a predictive model of the likelihood of one or more inpatient hospitalizations among study population members.

- The base and DiD models (p=.001 and p=.02, respectively) indicate that MTM-P have a lower likelihood (≈18% lower odds) of one or more inpatient hospital events than MTM-NP comparison group members in both study periods.
- Moreover, the base model and the interaction model suggest that both groups experienced a decline in the likelihood of one or more hospitalizations in the intervention period as compared with the pre-intervention period (p<.0001 in each). In the base model this decline equates to approximately 59% lower odds.
- The interaction term in the DiD model indicates the decline was similar in both groups, revealing no effect of MTM intervention participation on lowering the likelihood of a hospitalization.

Table 14. Logistic regression model estimates and p-values for odds of one or more discharges from an inpatient hospital for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**Wald Chi-Square**	**PR > Chi-Sq**	**OR**	**EST**	**SE**	**Wald Chi-Square**	**PR > Chi-Sq**	**OR**
Intercept	-6.320	0.144	1932.087	<.0001	0.002	-6.333	0.144	1930.726	<.0001	0.002
MTM-P	-0.205	0.062	10.823	0.001	0.814	-0.164	0.069	5.643	0.018	0.849
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.320	0.051	39.191	<.0001	0.726	-0.321	0.051	39.316	<.0001	0.726
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	0.194	0.067	8.360	0.004	1.214	0.193	0.067	8.248	0.004	1.212
Hispanic	-0.071	0.081	0.782	0.377	0.931	-0.075	0.081	0.856	0.355	0.928
Other	0.124	0.069	3.218	0.073	1.132	0.123	0.069	3.176	0.075	1.131
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.001	0.003	0.084	0.772	0.999	-0.001	0.003	0.070	0.792	0.999
Intervention	-0.880	0.066	179.495	<.0001	0.415	-0.831	0.074	125.905	<.0001	0.436
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	1.6873	0.3163	28.4663	<.0001	5.40508	1.6867	0.3165	28.4111	<.0001	5.40189
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.482	0.016	881.081	<.0001	1.619	0.482	0.016	882.261	<.0001	1.620
Interaction Term*	-	-	-	-	-	-0.219	0.160	1.888	0.169	0.803

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

Table 15 presents findings for a predictive model of the likelihood of one or more emergency department (ED) visits among study population members.

- The base and DiD models (p=.008 and p=.04, respectively) found the odds of an ED event were significantly lower in the MTM-P group compared to the odds in the MTM-NP group. The participant indicator from the base model suggests MTM-P have approximately 29% lower odds of an ED event compared to MTM-NP.
- Both study groups had large and significant declines in the likelihood of an ED visit from the pre-intervention to the intervention period (p<.0001). In fact, the odds declined by over 60% in both groups.

- The interaction term was not significant indicating that, although there were large declines in both groups, the difference between the MTM-P group's decline and that of the MTM-NP study group was not large enough to be statistically significant.

Table 15. Logistic regression model estimates and p-values for odds of one or more discharges from a hospital emergency department for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**Wald Chi-Square**	**PR > Chi-Sq**	**OR**	**EST**	**SE**	**Wald Chi-Square**	**PR > Chi-Sq**	**OR**
Intercept	-7.347	0.267	757.720	<.0001	0.001	-7.370	0.269	750.651	<.0001	0.001
MTM-P	-0.339	0.127	7.157	0.008	0.712	-0.293	0.139	4.437	0.035	0.746
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.199	0.098	4.102	0.043	0.819	-0.197	0.098	4.016	0.045	0.821
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	-0.211	0.143	2.184	0.139	0.810	-0.211	0.143	2.186	0.139	0.810
Hispanic	-0.098	0.152	0.418	0.518	0.906	-0.100	0.152	0.429	0.513	0.905
Other	0.069	0.131	0.275	0.600	1.071	0.069	0.131	0.277	0.599	1.072
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.005	0.005	0.967	0.325	0.995	-0.005	0.005	0.884	0.347	0.995
Intervention	-0.989	0.134	54.404	<.0001	0.372	-0.942	0.147	41.152	<.0001	0.390
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	1.768	0.444	15.865	<.0001	0.171	1.766	0.444	15.790	<.0001	5.845
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.362	0.020	345.656	<.0001	1.436	0.364	0.020	342.067	<.0001	1.439
Interaction Term*	-	-	-	-	-	-0.247	0.327	0.572	0.450	0.781

*Change in MTM-P outcomes between study periods compared to the change MTM-NP outcomes between periods.

EQ4: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 1 (MTM-NP) for demographic categories?[4]

Interpretation of Descriptive Tables EQ4

Descriptive information on the demographic characteristics of the four cohorts that received the MTM program intervention from June 2011 through December 2014 is presented. Tests of binomial probabilities were conducted, and adjustments were applied for multiple tests within the same table to determine the required p-values to achieve significance. The results from these tests are intended to highlight any significant demographic differences between MTM-P and MTM-NP study groups within or across the four cohorts. Each demographic measure is presented in two tables; the first presents the distribution of the measure, and the second presents the pairwise tests of proportions between all cohort pairs (1 vs. 2, 1 vs. 3, 1 vs. 4, 2 vs. 3, 2 vs. 4, and 3 vs. 4) adjusted for repeated tests.

Table 16 presents the age distributions for the MTM-P and MTM-NP study groups across all four cohorts. Table 17 presents the pairwise tests of differences in proportionality between all cohort pairs adjusted for repeated tests. The statistical tests referred to in the bullets below may be found in Table 17. In this case, because there are 60 tests, a p-value less than or equal to 0.0008 is employed to establish statistical significance.

- The age groups 41-50, 51-55, 56-60, and 61-65 are roughly equally sized. The 21-40 age group was significantly smaller. There was a negligible number of persons under 21 and over 65 years of age.

MTM-P

- The proportion of recipients in the 56-60 years age group in Cohort 4 was significantly larger than the proportion in Cohort 3.

MTM-NP

- The proportion of recipients in the 21-40 years age group was significantly larger in Cohort 4 versus 1 and Cohort 2 versus 3.
- The proportion of recipients in the 51-55 years age group in Cohort 2 was significantly smaller than the proportions in Cohorts 3 and 4.

[4] No multivariable models were created to address EQ4.

- The proportion of recipients in the 56-60 years age group in Cohort 2 was smaller than the proportion of recipients in this age group in the other three cohorts and was significantly smaller than the proportion in Cohort 3.
- The proportion of recipients in the 61-65 years age group was larger in Cohort 1 compared to the proportion of recipients in this age group in the other three cohorts and was significantly larger than the proportion in Cohorts 3 and 4.

Table 16. Frequency and proportion of patients categorized by their age on the last day of the pre-intervention study period in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Age Group	Freq. COH1	Pct. COH1	Freq. COH2	Pct. COH2	Freq. COH3	Pct. COH3	Freq. COH4	Pct. COH4	Total All 4 Cohorts	Pct. All 4 Cohorts
MTM-P	< 20	1	0.7	0	0.0	2	1.5	0	0.0	3	0.5
MTM-P	21-40	13	8.8	17	9.9	16	11.7	23	14.3	69	11.2
MTM-P	41-50	32	21.8	26	15.2	28	20.4	25	15.5	111	18.0
MTM-P	51-55	38	25.9	49	28.7	33	24.1	36	22.4	156	25.3
MTM-P	56-60	38	25.9	40	23.4	24	17.5	45	28.0	147	23.9
MTM-P	61-65	25	17.0	39	22.8	33	24.1	32	19.9	129	20.9
MTM-P	> 65	0	0	0	0	1	0.7	0	0.0	1	0.2
MTM-P	Sub-total	147	100	171	100	137	100	161	100	616	100
MTM-NP	< 20	1	0.2	8	2.5	2	0.3	8	1.7	19	0.9
MTM-NP	21-40	66	13.1	60	18.5	94	13.3	86	18.5	306	15.3
MTM-NP	41-50	109	21.6	87	26.9	168	23.7	100	21.5	464	23.2
MTM-NP	51-55	92	18.2	53	16.4	153	21.6	106	22.8	404	20.2
MTM-NP	56-60	111	22.0	58	17.9	164	23.1	103	22.2	436	21.8
MTM-NP	61-65	125	24.8	58	17.9	120	16.9	62	13.3	365	18.2
MTM-NP	> 65	1	0.2	0	0.0	8	1.1	0	0.0	9	0.4
MTM-NP	Sub-total	505	100	324	100	709	100	465	100	2,003	100
	Grand Total	652		495		846		626		2,619	

Table 17. Binomial test of proportions outcomes of patients categorized by their age on the last day of the pre-intervention study period NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Age Category	P-value, Binomial (Two-sided) Coh. 1 vs. 2	P-value Binomial (Two-sided) Coh. 1 vs. 3	P-value Binomial (Two-sided) Coh. 1 vs. 4	P-value, Binomial (Two-sided) Coh. 2 vs. 3	P-value Binomial (Two-sided) Coh. 2 vs. 4	P-value Binomial (Two-sided) Coh. 3 vs. 4
MTM-P	< 20	0.267	0.000	0.267	0.267	.	0.267
MTM-P	21 - 40	0.613	0.242	0.015	0.497	0.065	0.303
MTM-P	41 - 50	0.038	0.706	0.055	0.088	0.909	0.122
MTM-P	51 - 55	0.402	0.637	0.312	0.237	0.077	0.608
MTM-P	56 - 60	0.463	0.026	0.543	0.104	0.172	0.001

Study Group	Age Category	P-value, Binomial (Two-sided) Coh. 1 vs. 2	P-value Binomial (Two-sided) Coh. 1 vs. 3	P-value Binomial (Two-sided) Coh. 1 vs. 4	P-value, Binomial (Two-sided) Coh. 2 vs. 3	P-value Binomial (Two-sided) Coh. 2 vs. 4	P-value Binomial (Two-sided) Coh. 3 vs. 4
MTM-P	61 - 65	0.044	0.015	0.333	0.575	0.375	0.147
MTM-P	> 65	-	0.267	-	0.267	-	0.267
MTM-NP	< 20	0.000	0.614	0.000	0.000	0.298	0.000
MTM-NP	21 - 40	0.004	0.881	0.001	0.000	0.989	0.001
MTM-NP	41 - 50	0.021	0.172	0.967	0.058	0.009	0.267
MTM-NP	51 - 55	0.386	0.020	0.011	0.000	0.000	0.524
MTM-NP	56 - 60	0.076	0.459	0.929	0.000	0.017	0.616
MTM-NP	61 - 65	0.003	0.000	0.000	0.916	0.010	0.008
MTM-NP	> 65	0.267	0.000	0.267	0.000	-	0.000
Bonferroni correction for multiple tests 0.05/60=0.0008							

Table 18 presents the race and ethnicity distributions for the MTM-P and MTM-NP study groups across all four cohorts. Table 19 presents the pairwise tests of differences in proportionality between all cohort pairs adjusted for repeated tests. The statistical tests referred to in the bullets below may be found in Table 19. In this case, because there are 48 tests, a p-value less than or equal to 0.001 was employed to establish statistical significance.

- The White or European American racial/ethnic group was the largest at 53% in the MTM-P study group and 43% in the MTM-NP study group across all four cohorts, followed by the Black or African American group at 25% and 22%, then Hispanic at 8% and 18%, in the MTM-P and MTM-NP groups, respectively. The smaller proportion of Hispanic recipients in the MTM-P study group may be driven by the need for additional Spanish-speaking recruiters and should be rectified for future study participant recruitment efforts.

MTM-P

- The proportion of Black or African American recipients in Cohort 4 was significantly smaller than the proportion in Cohort 2.

MTM-NP

- The proportion of Hispanic recipients in Cohort 4 was smaller than the proportion of Hispanic recipients in the other three cohorts and was significantly smaller than the proportion in Cohorts 1 and 2.
- The proportion of White or European American recipients in Cohort 4 was larger than the proportion of recipients in this racial/ethnic group in the other three cohorts and was significantly larger than the proportion in Cohort 2.

Table 18. Frequency and proportion of patients categorized by race and ethnicity in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Race	Freq. COH1	Pct. COH1	Freq. COH2	Pct. COH2	Freq. COH3	Pct. COH3	Freq. COH4	Pct. COH4	Total All 4 Cohorts	Pct. All 4 Cohorts
MTM-P	Black or African American	32	21.8	55	32.2	34	24.8	30	18.6	151	24.5
MTM-P	Hispanic	7	4.8	12	7.0	13	9.5	15	9.3	47	7.6
MTM-P	Other	22	15.0	22	12.9	16	11.7	32	19.9	92	14.9
MTM-P	White or European American	86	58.5	82	48.0	74	54.0	84	52.2	326	52.9
MTM-P	Sub-total	147	100	171	100	137	100	161	100	616	100
MTM-NP	Black or African American	110	21.8	82	25.3	154	21.7	99	21.3	445	22.2
MTM-NP	Hispanic	98	19.4	64	19.8	131	18.5	60	12.9	353	17.6
MTM-NP	Other	73	14.5	57	17.6	128	18.1	77	16.6	335	16.7
MTM-NP	White or European American	224	44.4	121	37.3	296	41.7	229	49.2	870	43.4
MTM-NP	Sub-total	505	100	324	100	709	100	465	100	2,003	100
	Grand Total	652		495		846		626		2,619	

Table 19. Binomial test of proportions outcomes of patients categorized by their race and ethnicity in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Race	P-value Binomial (Two-sided) Coh. 1 vs. Coh. 2	P-value Binomial (Two-sided) Coh. 1 vs. Coh. 3	P-value Binomial (Two-sided) Coh. 1 vs. Coh. 4	P-value, Binomial (Two-sided) Coh. 2 vs. Coh. 3	P-value Binomial (Two-sided) Coh. 2 vs. Coh. 4	P-value Binomial (Two-sided) Coh. 3 vs. Coh. 4
MTM-P	Black or African American	0.001	0.387	0.335	0.066	0.000	0.069
MTM-P	Hispanic	0.166	0.009	0.007	0.257	0.253	0.941
MTM-P	Other	0.441	0.281	0.081	0.678	0.008	0.001
MTM-P	White or European American	0.005	0.286	0.103	0.156	0.284	0.639
MTM-NP	Black or African American	0.124	0.968	0.797	0.028	0.046	0.822
MTM-NP	Hispanic	0.874	0.532	0.000	0.393	0.000	0.002
MTM-NP	Other	0.108	0.006	0.197	0.747	0.558	0.402
MTM-NP	White or European American	0.011	0.162	0.034	0.015	0.000	0.001
Bonferroni correction 0.05/48 = 0.001							

Table 20 presents the gender distributions for the MTM-P and MTM-NP study groups across all four cohorts. Table 21 presents the pairwise tests of differences in proportionality between all cohort pairs adjusted for repeated tests. The statistical tests referred to in the bullets below may be found in Table 21. In this case, because there are 24 tests, a p-value less than or equal to 0.002 was employed to establish statistical significance.

- Females outnumbered males in both study groups across all four cohorts, roughly 55% to 45%. This disparity was driven by Cohorts 1 and 2.

MTM-NP

- The ratio of females to males was significantly greater in Cohorts 1 and 2 compared to the ratios in Cohorts 3 and 4, which both had an even distribution of females and males.

Table 20. Frequency and proportion of patients categorized by sex in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Gender	Freq. COH1	Pct. COH1	Freq. COH2	Pct. COH2	Freq. COH3	Pct. COH3	Freq. COH4	Pct. COH4	Total All 4 Cohorts	Pct. All 4 Cohorts
MTM-P	Male	64	43.5	77	45.0	63	46.0	72	44.7	276	44.8
MTM-P	Female	83	56.5	94	55.0	74	54.0	89	55.3	340	55.2
MTM-P	Sub-total	147	100	171	100	137	100	161	100	616	100
MTM-NP	Male	207	41.0	113	34.9	355	50.1	231	49.7	906	45.2
MTM-NP	Female	298	59.0	211	65.1	353	49.8	233	50.1	1,095	54.7
MTM-NP	Unknown	0	0.0	0	0.0	1	0.1	1	0.2	2	0.1
MTM-NP	Sub-total	505	100	324	100	709	100	465	100	2,003	100
	Grand Total	652		495		846		626		2,691	

Table 21. Binomial test of proportions outcomes of patients categorized by gender in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Gender	P-value Binomial (Two-sided) Coh. 1 vs. 2	P-value Binomial (Two-sided) Coh. 1 vs. 3	P-value Binomial (Two-sided) Coh. 1 vs. 4	P-value, Binomial (Two-sided) Coh. 2 vs. 3	P-value Binomial (Two-sided) Coh. 2 vs. 4	P-value Binomial (Two-sided) Coh. 3 vs. 4
MTM-P	Male	0.6940	0.563	0.762	0.822	0.937	0.747
MTM-P	Female	0.6940	0.563	0.762	0.822	0.937	0.747
MTM-NP	Male	0.0253	0.000	0.000	0.000	0.000	0.878
MTM-NP	Female	0.0253	0.000	0.000	0.000	0.000	0.878
Bonferroni correction 0.05/24 = 0.002							

Table 22 presents the language preference distributions for the MTM-P and MTM-NP study groups across all four cohorts. Table 23 presents the pairwise tests of differences in proportionality between all

cohort pairs adjusted for repeated tests. The statistical tests referred to in the bullets below may be found in Table 23. In this case, because there are 24 tests, a p-value less than or equal to 0.002 is employed to establish statistical significance.

- Ninety-five percent of recipients indicated English was their preferred language in the MTM-P group compared to 86% with this language preference in the MTM-NP group. A majority of the remainder in both study groups preferred Spanish, and 1% preferred a third, unspecified language in both groups.

MTM-NP

- The proportion of recipients with a Spanish language preference in Cohort 4 was significantly smaller compared to the proportion of recipients with this language preference in Cohorts 1, 2, and 3.
- Conversely, the proportion of recipients with an English language preference in Cohort 4 was significantly larger compared to the proportion of recipients with this language preference in the other three cohorts.

Table 22. Frequency and proportion of patients categorized by language preference in NOMINAL Cohorts 1, 2, 3, and 4 for the initial MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 – December 31, 2014

Study Group	Language	Freq. COH1	Pct. COH1	Freq. COH2	Pct. COH2	Freq. COH3	Pct. COH3	Freq. COH4	Pct. COH4	Total All 4 Cohorts	Pct. All 4 Cohorts
MTM-P	English	138	93.9	159	93.0	129	94.2	158	98.1	584	94.8
MTM-P	Spanish	7	4.8	10	5.8	7	5.1	2	1.2	26	4.2
MTM-P	Other Language	2	1.4	2	1.2	1	0.7	1	0.6	6	1.0
MTM-P	Sub-total	147	100	171	100	137	100	161	100	616	100
MTM-NP	English	420	83.2	263	81.2	611	86.2	433	93.1	1,727	86.2
MTM-NP	Spanish	79	15.6	57	17.6	88	12.4	30	6.5	254	12.7
MTM-NP	Other Language	6	1.2	4	1.2	10	1.4	2	0.4	22	1.1
MTM-NP	Sub-total	505	100	324	100	709	100	465	100	2,003	100
	Grand Total	652		495		846		626		2,691	

Table 23. Binomial test of proportions outcomes of patients categorized by preferred language in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Language	P-value Binomial (Two-sided) Coh. 1 vs. 2	P-value Binomial (Two-sided) Coh. 1 vs. 3	P-value Binomial (Two-sided) Coh. 1 vs. 4	P-value, Binomial (Two-sided) Coh. 2 vs. 3	P-value Binomial (Two-sided) Coh. 2 vs. 4	P-value Binomial (Two-sided) Coh. 3 vs. 4
MTM-P	English	0.625	0.890	0.024	0.589	0.010	0.031
MTM-P	Spanish	0.505	0.848	0.036	0.713	0.013	0.026
MTM-P	Other Language	0.829	0.524	0.418	0.632	0.517	0.871
MTM-NP	English	0.337	0.032	0.000	0.001	0.000	0.000
MTM-NP	Spanish	0.334	0.018	0.000	0.000	0.000	0.000
MTM-NP	Other Language	0.938	0.585	0.131	0.672	0.116	0.073
Bonferroni correction 0.05/24 = 0.002							

EQ5: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 1 (MTM-NP) for mortality and morbidity measures?[5]

Interpretation of Descriptive Tables EQ5

Descriptive measures of mortality and morbidity assess the number of deaths and the rate of death in each study group and period as well as the number and percentage of recipients with multiple chronic conditions. T-tests and chi-squared tests were used to test for differences between groups.

Table 24 presents findings for the number of deaths and the mortality rate in the MTM-P and MTM-NP population study groups.

- The MTM-NP study group's mortality rate during the pre-intervention period was higher than the MTM-P group's mortality rate during this period because the MTM-P group experienced no deaths, whereas the MTM-NP group experienced 20 deaths.
- The MTM-P and MTM-NP study groups both experienced a modest increase in their mortality rates between the pre-intervention and intervention year, with the MTM-P group experiencing an increase from zero to 0.047 deaths per person-year and the MTM-NP group experiencing an

[5] No multivariable models were created to address EQ5.

increase from .021 to 0.057 deaths per person-year. Both increases were statistically significant at the $p < .05$ level.

- Mortality rates were higher in the MTM-NP group during the pre-intervention and intervention periods.
- Overall, mortality appears to be similar in both study groups over time.

Table 24. Summary statistics for number of deaths and annualized mortality rate for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 – December 31, 2014

Study Group	Study Period	No. Recipients	Number of Deaths	Sum Enrolled Days	Death Rate Per Year	95% LCL	95% UCL
MTM-P	SP-PRI	479	0	111,007	0.0000	-	-
MTM-NP	SP-PRI	1,672	20	353,302	0.0207	0.0200	0.0216
Sub-Total	SP-PRI	2,151	20	464,309	0.0157	0.0152	0.0165
MTM-P	SP-INT	274	8	62,418	0.0468	0.0438	0.0518
MTM-NP	SP-INT	836	28	179,743	0.0569	0.0555	0.0589
Sub-Total	SP-INT	1,110	36	242,161	0.0543	0.0532	0.0558
MTM-P	All Periods	753	8	173,425	0.0168	0.0158	0.0186
MTM-NP	All Periods	2,508	48	533,045	0.0329	0.0323	0.0336
Total	All Periods	3,261	56	706,470	0.0289	0.0285	0.0295

Table 25 presents findings for the number of recipients with two or more chronic conditions in the MTM-P and MTM-NP population study groups based on the 21 conditions tracked by the *Johns Hopkins ACG System*.

- The binomial test indicates there was no significant difference in the proportion of people with two or more chronic conditions (MCC) between the MTM-P and MTM-NP groups in either study period.
- The two study groups experienced a comparable decrease in the percentage of recipients with two or more MCCs between the pre-intervention and intervention year.
- These results indicate that the comorbidity levels in the populations were similar at baseline, which was a design strength for this study.

Table 25. Summary statistics for number of persons with two or more chronic conditions (MCC) as tracked by the Johns Hopkins ACG System for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 – December 31, 2014

Study Group	Study Period	No. Recipients	Number of Persons with MCC	Percent of Persons with MCC	Z	Pr < Z
MTM-P	SP-PRI	479	439	91.6	-	-
MTM-NP	SP-PRI	1,672	1,478	88.4	-0.024	0.490
Sub-Total	SP-PRI	2,151	1,917	89.1	-	-
MTM-P	SP-INT	274	233	85.0	-	-
MTM-NP	SP-INT	836	666	79.7	-0.042	0.483
Sub-Total	SP-INT	1,110	899	81.0	-	-
MTM-P	All Periods	753	672	89.2	-	-
MTM-NP	All Periods	2,508	2,144	85.5	-0.028	0.489
Total	All Periods	3,261	2,816	86.4	-	-

Table 26 presents findings for the mean number of chronic conditions in the MTM-P and MTM-NP population study groups based on the conditions tracked by the *Johns Hopkins ACG System*.

- There was a significant difference in the mean number of chronic conditions in the MTM-P group compared to the MTM-NP group's mean in the pre-intervention study period, such that on average, MTM-P displayed a higher number of chronic conditions than MTM-NP displayed. Although statistically significant, the difference of 0.6 conditions is probably not large enough to be meaningful.
- Conversely, there was no significant difference in the mean number of chronic conditions between the two study groups in the intervention study period.
- Both groups' means decreased between the pre-intervention and intervention periods, and the MTM-P experienced a sharper decline for this measure. However, because this analysis does not serve as a true comparison of within group differences, it is not clear if the reductions were motivated by factors attributable to attrition or by an actual reduction in the recipients' chronic condition counts.

Table 26. Summary statistics for the mean number of chronic conditions tracked by the Johns Hopkins ACG System for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 – December 31, 2014

Study Group	Study Period	No. Recipients	Mean Number of Chronic Conditions	Minimum	Maximum	Mean 95% LCL	Mean 95% UCL	T-test of CCC mean MTM-P vs. MTM-NP	
								T	Pr < |t|
MTM-P	SP-PRI	479	6.39	0	21	6.03	6.74		
MTM-NP	SP-PRI	1,672	5.77	0	21	5.59	5.95	-3.18	0.002
Sub-Total	SP-PRI	2,151	5.91	0	21	5.75	6.06		
MTM-P	SP-INT	274	5.37	0	16	4.93	5.81		
MTM-NP	SP-INT	836	4.98	0	20	4.73	5.24	-1.47	0.142
Sub-Total	SP-INT	1,110	5.08	0	20	4.86	5.30		
MTM-P	All Periods	753	6.02	0	21	5.74	6.29		
MTM-NP	All Periods	2,508	5.51	0	21	5.36	5.65	-3.25	0.001
Total	All Periods	3,261	5.63	0	21	5.50	5.76		

Table 53 in Appendix IV presents comparisons of ACG risk score (disease burden) for the MTM-P and MTM-NP (CG1) population in the two study periods.

- Mean ACG risk scores were very similar between study groups in the pre-intervention period but diverged in the intervention period due to a sharper decline in the MTM-NP group (MTM-P 1.42 SP-PRI, 1.33 SP-INT, decline of 6.3%; versus MTM-NP 1.43 SP-PRI, 1.21 SP-INT, decline of 15.4%).
- Based on T-tests (not shown) of the mean scores in the pre-intervention vs. the intervention period in each group, the decline in ACG score was non-significant in the MTM-P group and significant in the MTM-NP group at the $p < .05$ level. This significant reduction likely represents the effect of attrition, as opposed to an actual decline in mean ACG score, within the MTM-NP group between the two study periods but cannot be stated with certitude pending additional tests.

EQ6: What are the differences in the pre-intervention and intervention periods within the intervention group for MTM process measures?

Interpretation of Descriptive Tables EQ6

Descriptive measures of the UF COP process measures for the MTM-P intervention group are summarized below. Most data was extracted from the MTM program annual 4th quarter summary documents provided by the UF COP to the Agency. In the case of the Morisky Adherence Scale, which

measures the quality of patients' medication taking habits, the data was extracted from individual patient charts maintained by the UF COP.

Tables that report the findings of the Morisky Adherence Scale survey given to MTM-P recipients by UF COP staff after the completion of the CMR, and in some cases during the 60 day follow-up contact, are available for Cohorts 1, 2, and 4 only. The Morisky survey was not administered to Cohort 3 participants. See Appendix I for an explanation of this lapse.

Table 27 presents findings on which interventions and processes were used in each cohort and on which resolutions were achieved at least once during the MTM program. A checkmark (✓) in the field indicates the process/resolution was encountered/employed by UF COP staff at least once during a given cohort's intervention. The UF COP MTM program identified a variety of drug related contraindications, opportunities to improve adherence, and social-behavioral issues related to the participants' general health, such as poor dietary habits or smoking. Staff tracked these processes and outcomes effectively, which likely had a beneficial impact on individual recipients in the short-term, to the extent that recipient-reported data is accurate.

Table 27. Comparison of total interventions recorded by the UF COP pharmacy staff for all Cohort 1, 2, 3, and 4 MTM participants, Florida MTM program evaluation June 1, 2011 to December 31, 2014

List of All Possible Interventions and Processes Performed and Resolutions Achieved, UF COP MTM Program 2011-2014	Cohort 1 SP-INT	Cohort 2 SP-INT	Cohort 3 SP-INT	Cohort 4 SP-INT
30-60 day CMR Follow-Up, Unable to Reach		✓	✓	✓
Contraindication (Drug - Disease) RESOLVED		✓		
Contraindication (Drug - Drug) RESOLVED		✓		
Counseled on Use of Multiple Pharmacies	✓			
Counseled on Utilization of Multiple Primary Physicians	✓			
Disconnected Phone Number		✓		
Generic Alternative Recommendation ACCEPTED		✓		
Lack of Efficacy RESOLVED		✓	✓	✓
Lack of Therapy (Indication) RESOLVED		✓	✓	✓
Over-the-Counter (OTC) Therapy Recommendation ACCEPTED		✓		
Patient Interaction (Non-MTM Service Request/Inquiry)	✓	✓	✓	✓
Patient Medication List Faxed to Prescriber	✓			
Patient No Longer Active with Medicaid		✓		
Prescriber Interaction/Response		✓		
Recommended Preferred Drug List Alternative ACCEPTED		✓	✓	✓
Unnecessary Therapy (Lack of Indication) RESOLVED		✓		✓
Wrong Phone Number		✓		
30 to 60-day CMR Check-Up	✓	✓	✓	✓
Adverse Drug Event Identified	✓	✓	✓	✓
Adverse Drug Event RESOLVED	✓	✓	✓	✓

List of All Possible Interventions and Processes Performed and Resolutions Achieved, UF COP MTM Program 2011-2014	Cohort 1 SP-INT	Cohort 2 SP-INT	Cohort 3 SP-INT	Cohort 4 SP-INT
Alternative Dosage Form ACCEPTED	✓	✓	✓	✓
Alternative Dosage Form Recommended	✓	✓	✓	✓
CMR Completed	✓	✓	✓	✓
CMR Scheduled	✓	✓	✓	✓
CMR- NOTHING CLINICALLY SIGNIFICANT TO ADDRESS	✓	✓		
Combination Therapy Recommendation ACCEPTED (decreased pill burden)	✓	✓	✓	✓
Combination Therapy Recommended (decreased pill burden)	✓	✓	✓	✓
Contacted Ancillary Healthcare Resource	✓	✓		
Contacted Prescriber by Fax	✓	✓		
Contacted Prescriber by Mail	✓	✓		
Contacted Prescriber by Phone	✓	✓		
Contraindication Identified (Drug - Disease)	✓	✓		
Contraindication Identified (Drug - Drug)	✓	✓		
Counseled on Diet/Exercise	✓	✓	✓	✓
Counseled on Lifestyle Modifications	✓	✓	✓	✓
Counseled on Medication (general, side effects, indication, etc.)	✓	✓	✓	✓
Counseled on Medication Adherence/Compliance	✓	✓	✓	✓
Counseled on Medication Administration/Technique	✓	✓	✓	✓
Counseled on Preventative Screenings/Vaccinations	✓	✓	✓	✓
Counseled on Smoking Cessation	✓	✓	✓	✓
Counseled on Weight Loss	✓	✓	✓	✓
Crisis Situation Encountered	✓	✓		
Dietary Change/Exercise Recommendations IMPLEMENTED	✓	✓		
Drug-Age Interaction Identified (Beers List)	✓	✓	✓	✓
Drug-Age Interaction RESOLVED	✓	✓	✓	✓
Drug-Allergy Interaction IDENTIFIED	✓	✓	✓	✓
Drug-Allergy Interaction RESOLVED	✓	✓	✓	✓
Drug-Disease Interaction Identified	✓	✓	✓	✓
Drug-Disease Interaction RESOLVED	✓	✓	✓	✓
Drug-Food Interaction Identified	✓	✓	✓	✓
Drug-Food Interaction RESOLVED	✓	✓	✓	✓
Drug-Pregnancy Interaction Identified	✓	✓	✓	✓
Drug-Pregnancy Interaction RESOLVED	✓	✓		
Duplicate Therapy Identified	✓	✓	✓	✓
Duplicate Therapy RESOLVED	✓	✓	✓	✓
Educated on Asthma/Chronic Obstructive Pulmonary Disease (COPD)	✓	✓	✓	✓
Educated on Coverage Gap	✓	✓	✓	✓
Educated on Diabetes	✓	✓	✓	✓
Educated on Disease State (other)	✓	✓	✓	✓
Educated on Dyslipidemia	✓	✓	✓	✓
Educated on Gastroesophageal Reflux Disease (GERD)	✓	✓	✓	✓
Educated on Heart Failure	✓	✓	✓	✓
Educated on Hypertension	✓	✓	✓	✓
Excessive Dosage Identified	✓	✓	✓	✓

List of All Possible Interventions and Processes Performed and Resolutions Achieved, UF COP MTM Program 2011-2014	Cohort 1 SP-INT	Cohort 2 SP-INT	Cohort 3 SP-INT	Cohort 4 SP-INT
Excessive Dosage RESOLVED	✓	✓	✓	✓
Excessive Duration of Therapy Identified	✓	✓	✓	✓
Excessive Duration of Therapy RESOLVED	✓	✓	✓	✓
Excessive Pill Burden Identified (multiple tablets of lower strength)	✓	✓	✓	✓
Explained MTM Program to Patient	✓	✓	✓	✓
Gap in Therapy - Diabetic without a Statin	✓	✓	✓	✓
Gap in Therapy - Diabetic without an ACE-I or ARB	✓	✓	✓	✓
Gap in Therapy - Heart Failure without a Beta-Blocker	✓	✓	✓	✓
Gap in Therapy - Heart Failure without an ACE-I or ARB	✓	✓	✓	✓
Gap in Therapy - Lack of Controller Medication/Beta-Agonist Overuse Asthma	✓	✓	✓	✓
Gap in Therapy - Lack of Rescue Medication in Asthma	✓	✓	✓	✓
Gap in Therapy - Long-Term Steroid without Antiresorptive Agent	✓	✓	✓	✓
Gap in Therapy – Potentially Inappropriate Beta-Blocker Selection in Heart Failure	✓	✓	✓	✓
Gap in Therapy RESOLVED - Diabetic without a Statin	✓	✓	✓	✓
Gap in Therapy RESOLVED - Diabetic without an ACE-I or ARB	✓	✓	✓	✓
Gap in Therapy RESOLVED - Heart Failure without a Beta-Blocker	✓	✓	✓	✓
Gap in Therapy RESOLVED - Heart Failure without an ACE-I or ARB	✓	✓	✓	✓
Gap in Therapy RESOLVED - Lack of Controller Medication/Beta-Agonist Overuse in Asthma	✓	✓	✓	✓
Gap in Therapy RESOLVED - Lack of Rescue Medication in Asthma	✓	✓	✓	✓
Gap in Therapy RESOLVED - Long-Term Steroid without Antiresorptive Agent	✓	✓	✓	✓
Gap in Therapy RESOLVED - Potentially Inappropriate Beta-Blocker Selection in Heart Failure	✓	✓	✓	✓
Generic Alternative Recommended	✓	✓	✓	✓
Insufficient Dosage Identified	✓	✓	✓	✓
Insufficient Dosage RESOLVED	✓	✓	✓	✓
Insufficient Duration of Therapy Identified	✓	✓	✓	✓
Insufficient Duration of Therapy RESOLVED	✓	✓	✓	✓
Lack of Efficacy Identified	✓	✓	✓	✓
Lack of Therapy (Indication) Identified	✓	✓	✓	✓
Level 1 Clinically Significant Drug-Drug Interaction Identified	✓	✓	✓	✓
Level 1 Clinically Significant Drug-Drug Interaction RESOLVED	✓	✓	✓	✓
Level 2 Clinically Significant Drug-Drug Interaction Identified	✓	✓	✓	✓
Level 2 Clinically Significant Drug-Drug Interaction RESOLVED	✓	✓	✓	✓
Level 3 Clinically Significant Drug-Drug Interaction Identified	✓	✓	✓	
Level 3 Clinically Significant Drug-Drug Interaction RESOLVED	✓	✓	✓	
Level 4 Clinically Significant Drug-Drug Interaction Identified	✓	✓	✓	
Level 4 Clinically Significant Drug-Drug Interaction RESOLVED	✓	✓		
Lifestyle Modifications ACCEPTED/IMPLEMENTED	✓	✓		
Medication Action Plan (MAP) Mailed to Patient	✓	✓		

List of All Possible Interventions and Processes Performed and Resolutions Achieved, UF COP MTM Program 2011-2014	Cohort 1 SP-INT	Cohort 2 SP-INT	Cohort 3 SP-INT	Cohort 4 SP-INT
Medication Action Plan (MAP) Refused by Patient	✓	✓		
Medication Adherence/Compliance IMPROVED	✓	✓		
Medication Administration/Technique IMPROVED	✓	✓		
Multiple Pharmacies IMPROVED/RESOLVED	✓	✓		
Multiple Pharmacies Identified	✓	✓	✓	✓
Multiple Prescribers IMPROVED/RESOLVED	✓	✓		
Multiple Prescribers Identified	✓	✓	✓	✓
Needs Preventative Screening/Immunizations	✓	✓	✓	✓
Over-the-Counter (OTC) Therapy Recommended	✓	✓	✓	✓
Patient Deceased	✓	✓		
Patient Refused Consultation (during CMR scheduling or CMR call)	✓	✓	✓	✓
Pill Burden REDUCED	✓	✓	✓	✓
Preventative Screening/Immunizations ACQUIRED	✓	✓		
QFUR - NOTHING CLINICALLY SIGNIFICANT TO ADDRESS	✓	✓	✓	
QFUR 3-month - Quarterly Follow-up WITHOUT Encounter	✓	✓	✓	
QFUR 3-month - Quarterly Follow-up with Encounter	✓	✓	✓	✓
QFUR 6-month - Quarterly Follow-up WITHOUT Encounter	✓	✓	✓	
QFUR 6-month - Quarterly Follow-up with Encounter	✓	✓	✓	✓
QFUR 9-month - Quarterly Follow-up WITHOUT Encounter	✓	✓	✓	
QFUR 9-month - Quarterly Follow-up with Encounter	✓	✓	✓	✓
Questionable Narcotic Use Identified	✓	✓	✓	✓
Questionable Narcotic Use RESOLVED	✓	✓	✓	✓
Recommended Preferred Drug List Alternative	✓	✓	✓	✓
Renal Dosing Recommendation ACCEPTED	✓	✓	✓	✓
Renal Dosing Recommended	✓	✓	✓	✓
Smoking Cessation ACHIEVED	✓	✓		
Unable to Reach (appointment scheduling) - 1st Attempt	✓	✓	✓	✓
Unable to Reach (appointment scheduling) - 2nd Attempt	✓	✓	✓	✓
Unable to Reach (appointment scheduling) - 3rd Attempt	✓	✓	✓	✓
Unable to Reach (CMR)	✓	✓	✓	✓
Unable to Reach Prescriber	✓	✓		
Undeliverable Address Recognized (NCOA)	✓	✓		
Unnecessary Therapy (lack of indication) Identified	✓	✓	✓	✓
Utilized Caregiver	✓	✓		
Utilized Translator	✓	✓		
Weight Loss ACHIEVED	✓	✓		
Total Possible Interventions by Cohort	125	135	100	94
Nominal MTM Participant Cohort Size Receiving a CMR	147	171	137	161

Table 28 presents findings for the number of problems identified and the percentage of those resolved by cohort. The mean number of drug problems identified was 0.7, 1.3, 0.4, and 0.5 for Cohorts 1-4, respectively. There does not appear to be a consistent pattern of problems occurring more often than others across all four cohorts. Duplicate Therapy, gaps in therapy for various conditions, Lack of Therapy

(indication), and Level 2 Clinically Significant Drug-Drug Interaction were identified at least once in each cohort. Adverse drug events (7) were only identified in Cohort 4. The percentage of identified problems that were resolved was 40.4%, 32.7%, 25.9% and 40.5% for Cohorts 1-4, respectively. Nationally, MTM programs often report resolution rates around 40 percent. The mean for this MTM program across four cohorts was 35.0%.

Table 28. Comparison of identified and resolved medication therapy problems for 25 selected MTM interventions in the MTM evaluation study group for Cohorts 1, 2, 3, and 4 Florida MTM program evaluation June 1, 2011 to December 31, 2014

Drug Related Problems Identified	Cohort 1 (Nominal n=147)			Cohort 2 (Nominal n=171)			Cohort 3 (Nominal n=137)			Cohort 4 (Nominal n=161)		
	Identified	Resolved	Pct. Resolved	Identified	Resolved	Pct. Resolved	Identified	Resolved	Pct. Resolved	Identified	Resolved	Pct. Resolved
Adverse Drug Event	-	-	-	-	-	-	-	-	-	7	4	57.1
Drug-Age Interaction (Beers List)	0	0	-	0	0	-	1	1	100	1	0	0
Drug-Disease Interaction	8	6	75	1	1	100	0	0	-	1	1	100
Drug-Pregnancy Interaction	0	0	-	0	0	-	-	-	-	0	0	-
Excessive Dosage	0	0	-	0	0	-	0	0	-	1	0	0
Level 1 Clinically Significant Drug-Drug Interaction	8	4	50	6	2	33.3	0	0	-	1	1	100
Level 2 Clinically Significant Drug-Drug Interaction	15	7	46.7	24	7	29.2	1	0	0	11	3	27.3
Level 3 Clinically Significant Drug-Drug Interaction	0	0	-	1	1	100	2	0	0	-	-	-
Level 4 Clinically Significant Drug-Drug Interaction	0	0	-	0	0	-	-	-	-	-	-	-
Combination Therapy Recommended (decreased pill burden)	13	3	23.1	7	1	14.3	2	0	0	0	0	-
Duplicate Therapy	4	2	50	16	8	50	1	1	100	3	3	100
Gap in Therapy - Diabetic without an ACE-I or ARB	4	1	25	11	3	27.3	2	0	0	8	3	37.5
Gap in Therapy - Diabetic without a Statin	9	1	11.1	22	5	22.7	4	2	50	10	1	10
Gap in Therapy - Heart Failure without a Beta-Blocker	1	0	0	1	0	0	0	0	-	5	3	60
Gap in Therapy - Potentially Inappropriate Beta-Blocker Selection in Heart Failure	1	0	0	4	1	25	0	0	-	0	0	-
Gap in Therapy - Heart Failure without an ACE-I or ARB	2	0	0	5	0	0	0	0	-	3	1	33.3
Gap in Therapy - Long-Term Steroid without Antiresorptive Agent	2	0	0	9	2	22.2	2	1	50	2	1	50
Gap in Therapy - Lack of Rescue Medication in Asthma	0	0	-	4	3	75	0	0	-	4	3	75
Gap in Therapy - Lack of Controller Medication/Beta-Agonist Overuse in Asthma	3	3	100	7	5	71.4	8	1	12.5	5	2	40
Insufficient Dosage	11	13	-	15	6	40	2	2	100	0	0	-
Insufficient Duration of Therapy	2	2	100	16	6	37.5	1	1	100	0	0	-
Excessive Duration of Therapy	-	-	-	-	-	-	-	-	-	2	2	100
Lack of Efficacy	-	-	-	-	-	-	-	-	-	2	0	0
Lack of Therapy (indication)	21	0	0	65	19	29.2	1	0	0	7	2	28.6
Unnecessary Therapy (Lack of Indication) Identified	-	-	-	-	-	-	-	-	-	1	0	0
Total	104	42	40.4	214	70	32.7	54	14	25.9	74	30	40.5
Mean per person	0.71	0.29	-	1.25	0.41	-	0.4	0.10	-	0.46	0.19	-

The Morisky Adherence Scale asks MTM program participants 8 questions about their medication taking practices and behaviors. The eight questions follow in Table 29 along with the scoring rubric. The survey was administered after the CMR and was generally answered by nearly all participants. It was administered a second time if there was a telephone contact made during the 30-60 day follow-up and review.

Table 29. Morisky Adherence Scale (MAS) questions administered by UF COP staff to all participants completing the Comprehensive Medication Review (CMR) and to a subset of participants after the 30-60 day follow-up contact, Florida MTM program evaluation June 1, 2011 to December 31, 2014

Morisky Adherence Scale (MAS) Questions	Recoded Score Value
Do you sometimes forget to take your medicine?	Yes=1
People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?	Yes=1
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	Yes=1
When you travel or leave home, do you sometimes forget to bring along your medicine?	Yes=1
Did you take all of your medicine yesterday?	No=1
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	Yes=1
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	Yes=1
How often do you have difficulty remembering to take all of your medicine?	Any response other than "never/rarely"=1
Perfect MAS score=0 "high adherence"; High MAS score=8 "poor adherence"	0 to 8

Source: UF COP patient charts submitted to the Florida Agency for Health Care Administration (AHCA)

Table 30 reports results from the Morisky Adherence Survey (MAS) conducted immediately following completion of the CMR among consenting participants. Mean values for the adherence scale are presented for Cohort 1 (2.14), Cohort 2 (1.54) and Cohort 4 (0.59). Higher values indicate poorer adherence. Adherence in Cohort 4 appears to be higher than in previous cohorts. Pairwise tests of all cohort pairings (1 vs. 2, 1 vs. 4 and 2 vs. 4) are presented. The mean differences were 0.60, 1.55, and 0.95 for the three comparisons listed, respectively. All three cohorts tested as statistically different from one another, indicating differences in the adherence behaviors of the MTM-P cohorts at the beginning of the intervention period.

Table 30. Comparison of group mean Morisky Adherence Scores (MAS) recorded by UF COP pharmacy staff for all Cohort 1, 2 and 4 participants with a completed questionnaire immediately after the first CMR, Florida MTM program evaluation June 1, 2011 to December 31, 2014

Morisky Adherence Scores	N	Administration Time Points Being Compared	Mean	Std. Dev.	Minimum	Maximum
Cohort 1	145	Post CMR	2.14	1.73	0	7
Cohort 2	168	Post CMR	1.54	1.62	0	7
Cohort 4	153	Post CMR	0.59	1.07	0	5
Difference (Cohort 1 vs. 2)	-	-	0.60	-	-	-
Comparison of Means	-	Method: Pooled	Variances	DF	t Value†	Pr > |t|
			Equal	311	3.21	0.001
Difference (Cohort 1 vs. 4)	-	-	1.55	-	-	-
Comparison of Means	-	Method: Unpooled	Variances	DF	t Value†	Pr > |t|
			Unequal	237	9.28	<.0001
Difference (Cohort 2 vs. 4)	-	-	0.95	-	-	-
Comparison of Means	-	Method: Unpooled	Variances	DF	t Value†	Pr > |t|
			Unequal	291	6.24	<.0001

†Post-Hoc test using independent samples t-test with Bonferroni adjustment and equal or unequal variance assumptions as appropriate. Source: UF COP patient charts submitted to AHCA. Note: The number of completed MAS interviews immediately following the CMR (N) may vary slightly from reported CMRs if participants refused to take the MAS survey.

Table 31 presents a comparison of the results of the MAS survey completed immediately following the CMR with the results of the MAS survey completed for a subset of MTM program participants who had a second contact with UF COP staff 30-60 days after the initial telephone interview and review. The number of recipients completing both surveys by cohort was 65, 98, and 73 for Cohorts 1, 2, and 4, respectively. The significant statistical test indicating a lower MAS for Cohorts 1 and 2 reflects better self-reported adherence behaviors at the time of the second interview as compared to the first interview. Improvement was equal to a decline of 0.74 and 0.79 points on the eight point MAS scale. The 73 recipients with two MAS surveys in Cohort 4 did not show any change from the first to second survey, most likely due to their already high levels of adherence at the onset of the intervention.

Table 31. Comparison of paired mean Morisky Adherence Scores (MAS) recorded by UF COP pharmacy staff for MTM participants with two completed questionnaires (after the first CMR and after the 30-60 day follow-up contact) for all Cohort 1, 2 and 4 MTM participants, Florida MTM program evaluation June 1, 2011 to December 31, 2014

Morisky Adherence Scores	N	Administration Time Points Being Compared	Mean Difference	Std. Dev.	Minimum Difference	Maximum Difference
Cohort 1	65	Post 30-60 day follow-up vs. Post CMR	-0.74†	1.57	-5	3
Cohort 2	98	Post 30-60 day follow-up vs. Post CMR	-0.79††	1.23	-4	2
Cohort 4	73	Post 30-60 day follow-up vs. Post CMR	+0.10†††	0.96	-3	3

† Paired t-test of mean difference t= -3.78 p= .0002; †† Paired t-test of mean difference t= -6.33 p<.0001; ††† Paired t-test of mean difference t= 0.85 p= 0.40. Source: UF COP patient charts submitted to AHCA.

Table 32 presents the findings of the satisfaction survey administered by UF COP staff immediately following the initial CMR. The UF COP MTM program and staff generally received high scores for satisfaction, including the usefulness of the review and the information provided by pharmacy staff. Ratings ranged from 76% to 98% positive.

Table 32. Patient satisfaction with UF COP processes during the CMR, Florida MTM program evaluation June 1, 2011 to December 31, 2014

Question	Cohort 1 (n=147)		Cohort 2 (n=171)		Cohort 4 (n=161)		All Cohorts (n=479)	
	Yes	No	Yes	No	Yes	No	Yes	No
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
CMR 1. Did you find this appointment helpful?	113 (77)	34 (23)	167 (98)	3 (2)	145 (92)	12 (8)	425 (90)	49 (10)
CMR 2. Did this interview help clarify any concerns you may have had with your medications?	140 (95)	7 (5)	148 (87)	22 (13)	137 (87)	20 (13)	425 (90)	49 (10)
Check-up 1. Did you find the mailed documents to be helpful?	39 (91)	4 (9)	89 (97)	3 (3)	61 (76)	19 (24)	189 (88)	26 (12)
Check-up 2. Did participating in the phone call increase your understanding of your medication regimen?	63 (95)	3 (5)	97 (94)	6 (6)	72 (90)	8 (10)	232 (93)	17 (7)

Source: UF COP quarterly reports submitted to AHCA

Quantitative Evaluation Summary and Recommendations

The current literature on MTM suggests that many patients receiving MTM counseling see improved health outcomes that include: 1) better medication adherence, 2) reduced exposure to potential drug-drug or drug-disease interactions, 3) reduced instances of over or under medication, and 4) better

control of their conditions as reflected by fewer inpatient hospitalizations and visits to the ED. Payers have reportedly observed lower medical and prescription drug expenditures for populations that receive an MTM intervention. However, the majority of published studies evaluating MTM programs were conducted on populations of working age adults covered by private insurance through their employer or within the covered population of private insurance companies providing Medicare Part D coverage to an elderly Medicare population. Typically, these published evaluations included a large number of patients who received MTM counseling and were followed for at least one year.

The object of this evaluation was to examine the effectiveness of an MTM program in the context of a publicly funded Medicaid population of mostly working age adults who were not working due to the impact their disease or condition had on their ability to function in the workplace. All of the Medicaid recipients in this population have received a disability determination from the Social Security Administration.

A variety of utilization, expenditure, and clinical outcomes of interest were compared in the current evaluation, while controlling for demographic factors, chronic disease burden, and length of enrollment. All utilization, expenditure, and clinical outcomes were tested with at least two DiD models to control for baseline differences in the outcome between MTM-P and MTM-NP (CG1). Moreover, some models were repeated using more restrictive criteria for inclusion in the comparison group.

The results of this evaluation of the Florida Medicaid MTM program for all four cohorts of MTM-P recipients receiving the MTM intervention between June 1, 2011 and December 31, 2014 found no statistically significant improvements in the intervention group after receiving the intervention when contrasted with either of the comparison groups. One important finding related to study design is that the MTM-P and MTM-NP (CG1) study populations were similar on many outcomes of interest during the pre-intervention period (baseline). These similarities suggest that CG1 is a suitable comparison group; nevertheless, there are other measured and unmeasured factors that may influence that assessment.

One finding from the multivariable models employed in this evaluation approached significance for perhaps the broadest outcome, total per person expenditures. Mean total expenditures per person declined more in the MTM-NP (CG1) comparison group than in the MTM-P intervention group. However, the results of the multivariable model indicate that mean total expenditures per person may have declined more in the MTM-P intervention group than in the MTM-NP (CG1) comparison group—with a p-value of .12—after adjusting for demographic covariates, comorbidity, and enrolled days.

Additional inquiry into this finding should reveal whether this difference is truly non-significant regardless of attrition or potentially significant after controlling for loss to follow-up.

While positive results from DiD analysis would provide the strongest evidence of a difference between the intervention and comparison group(s), examination of the outcomes of interest in simple descriptive tables that report a given outcome for both groups during both study periods is a less rigorous way to analyze changes from the pre-intervention to the intervention period. Positive findings in these tables may be associated with group membership but also could be related to other influences in the environment that impacted both groups equally. Changes in outcome measures may also be a function of which recipients continued to be observed for longer periods or at all during the intervention. For example, if healthier people were more likely to remain under observation, then their outcome measures may have been more positive than corresponding outcomes observed in the larger group during the pre-intervention period. The following results from two by two tables (study group by time period) are presented taking into account the context outlined above.

Many of the two-by-two tables found significant improvement in outcomes in one or both of the study groups from the pre-intervention to intervention period. These findings are not adjusted for demographic and comorbidity factors but are generally adjusted for length of enrollment.

- Mean total annualized expenditures per recipient declined considerably in both study groups between study periods (down $13,169 for MTM-P and $14,552 for MTM-NP; this difference is negligible and not significant.).
- Annualized inpatient hospital expenditures in the MTM-P intervention group declined from about $22,500 per person during the pre-intervention period to approximately $8,000 during the intervention period. This measure in the MTM-NP study group declined from about $25,500 in the pre-intervention period to approximately $7,500 during the intervention period.
- Mean annualized services received per recipient from an outpatient facility were 48 and 45 in the pre-intervention period for MTM-P and MTM-NP, respectively. They declined to 43 and 37 per recipient in the intervention period for the MTM-P and MTM-NP study groups, respectively.
- Mean annualized professional services received per recipient from a community office setting were 115 and 117 in the pre-intervention period for MTM-P and MTM-NP, respectively. They declined to 82 and 77 per recipient in the intervention period for the MTM-P and MTM-NP study group, respectively.

    - Pre-intervention and intervention period differences between groups were not significantly different; however, both groups had substantial and significant per recipient declines in these services between study periods (a decrease of 29% for MTM-P and 34% for MTM-NP).
    - The fully adjusted regression model of all outpatient and office-based professional services found that both groups had large and significant declines in service utilization from the pre-intervention to intervention study period, but between study group differences were not significant.
    - The reason for the declines and their magnitude are unclear.
- Mean prescriptions filled per person was different at baseline, 36 for MTM-P and 31 for MTM-NP, and both groups had a sizeable increase in prescription use during the intervention year (a 30% increase for MTM-P and a 23% increase for MTM-NP). Findings for total prescription expenditures paralleled these findings for MTM-NP but not for MTM-P. The increased pharmacy use was seen in previous reports, although no statistically significant effect related to group membership was found in fully adjusted multivariable models.
    - The discrepancy between the increase in prescription use and stagnancy in annualized prescription expenditures in the MTM-P study group is peculiar and requires further investigation. The multivariable model suggests no main effect of group or interaction effect of group by study period.

Although no direct comparison group is available for the purpose of gauging UF COP MTM services, UF COP staff identified many problems among the four cohorts of MTM-P (nominal n=616).

- 66 clinically significant Level 1 or 2 drug interaction problems were identified; 24 were resolved.
- 46 instances where pill burden could be decreased by use of combination therapy, removal of duplicate therapies, or excessive duration of therapies were identified; 20 were resolved.
- 185 instances of a gap in therapy, insufficient dosage, insufficient duration of therapy, or a lack of therapy were identified; 72 were resolved.
- 94 instances where lack of therapy by indication were identified; 21 were resolved.
- The total number of problems identified across all four cohorts of the MTM-P group was 446; 156 (35%) were resolved.

- On average, the MTM-P population was prescription adherent, as self-reported on the Morisky Adherence Scale and corroborated by the ACG System possession metrics for filled prescriptions.
- These MTM services on the face of it are beneficial to the recipients and may contribute to financial, clinical, or humanistic outcomes that were too small to measure or were not measured, e.g., quality of life.

Collectively the MTM-P and MTM-NP study groups were similar on many measures at baseline, as evidenced by these findings, and were fairly similar on measures of morbidity, enrolled days, and demographics. These similarities are advantageous for the analytic design because they reduced the need to adjust for initial intervention and comparison group differences. However, since the intervention period outcomes were also similar, the declines cannot be attributed to the intervention. Moreover, the magnitude of some of the declines, taken together with the large attrition in the study population between study periods, is of concern because it may suggest an issue with the internal validity of the study. The issue is whether persons who were lost to follow-up during the intervention period were missing at random or whether they were systematically missing based on some unobserved factor. If that factor is also associated with the evaluation outcomes of interest, then the internal validity of the study could be criticized. Econometricians address this type of problem using instrumental variable analysis, but finding an appropriate instrument that is associated with loss to follow-up that is not associated with the outcomes of interest can be difficult.

Limitations

This study used a quasi-experimental design to examine the relationship between providing telephone-based MTM program counseling to an intervention group as compared with a non-equivalent comparison group that received no programmatic medication counseling service. The gold standard research design for program effectiveness using random assignment to the intervention and control group was not possible because Medicaid recipients were not required to participate in the intervention.

Use of the longitudinal design eliminates some of the weaknesses of a cross-sectional study and therefore augments confidence that positive outcomes actually indicate that improvements in the intervention group were due to ("caused by") the MTM intervention. However, this increased confidence does not preclude alternative explanations for positive findings based on observed measures

because potential confounding factors could surface due to unmeasured factors that are different in the intervention and comparison groups. While descriptive analysis of study outcomes suggests that the two groups were quite similar during the pre-intervention period, as defined by tests of statistical significance, the ET still employed multiple mechanisms to curtail possible confounding factors. Differences between the two study groups that could be measured, e.g., demographic indicators, comorbidity, and length of enrollment, were controlled for by statistical adjustment in the multivariable models. The difference-in-difference analytic approach further controls for different starting points in the metrics of interest prior to the intervention. The ET also structured data for the regression models using monthly time increments, rather than yearly time increments as in past reports. Monthly increments provide enhanced resolution for the measures of interest and amplify the variance in the data that could be explained via multivariable modeling.

Nevertheless, as reported in past reports, the large attrition in the population between pre-intervention and intervention periods is of concern due to its potential influence on the study's internal validity. Internal validity is a concept that pertains to whether findings accurately reflect the success of the intervention (or lack thereof). Much of the attrition is clearly due to recipients transitioning into programs or service utilization types that were exclusionary criteria for the MEDs-AD waiver as defined in the waiver document signed by CMS and the Agency. Additional information on the recipients' disability determination dates and reasons for affirmative determinations of disability status by the Social Security Administration (SSA) would be helpful for judging how to address the attrition problem with statistical modeling. In other words, models should be developed for the conditions that predict subsequent ineligibility under the waiver definition, including reasons for and timing of health and/or programmatic changes.

The large and unexplained magnitude of changes in some outcome measures of utilization and expenditures for both study groups suggests that something other than programmatic changes may be influencing which recipients remain eligible and therefore continue to be observed in the study population. Mortality is fairly low. Specific health conditions, total morbidity, reason for disability determination, and time since the determination may help to explain which recipients are retained and why they are consuming fewer services and resources. The morbidity measures created by the ACG system suggest that comorbidity, as measured by the software, does not change dramatically between the two time periods. Different categorizations of morbidity might be helpful, e.g., indicators for lifelong developmental and congenital conditions, as opposed to chronic disease or injuries that occurred as an

adult, and may also add explanatory power. Further characterization of the differences in loss of eligibility due to Medicare eligibility, use of long-term care services, or joining a managed care plan should be instituted as well.

Given the additional information mentioned above, it may be possible to successfully implement more sophisticated analytic tools, e.g., instrumental variables analysis, propensity score analysis, and panel data models to tease out additional information and provide stronger evidence for the internal study validity.

Evaluation Next Steps

Two actions, if taken, will enable stakeholders to better understand both the effectiveness and limitations of the MTM program; i) improve the internal validity of the study design, and ii) increase the scope of the qualitative portion of the study. Supplementary actions, if taken, will improve the evaluation process itself.

1. To address the issue of attrition and internal validity, the Agency should work with the Florida Department of Health to provide additional information to the evaluation team on the disability history of the MEDs-AD eligible recipients regarding determination dates and outcomes as well as reasons for affirmative disability determinations, history of Supplemental Security Income (SSI) cash benefit supports, history of cash Old-Age, Survivors, and Disability Insurance (OASDI) payments, and information on additional insurance benefits available to recipients, e.g., private insurance or Veterans Administration. Moreover, the Agency should work with the ET to establish a basis for providing complete encounter records for recipients who transition into the Florida Long-term Care (LTC) managed care program during the study period. The ET would use this data to assess whether or not the outcomes of recipients who transition out of the study population before the start of the intervention period are systematically different from those who remain in the study pool during the SP-INT.
2. Implement Agency program processes that may mitigate loss of study participants due to attrition and lead to a more representative sample, as recommended in more detail in previous reports.
    a. More effectively exclude persons who are (or will soon be) eligible for Medicare due to age or due to the approaching end of the 24 month waiting period between the disability determination and earliest Medicare eligibility date.

b. Fairly and proportionally sample and contact recipients on the original query by region and racial/ethnic characteristics.

3. Given the potential severity of confounding factors to the internal validity of the quantitative evaluation, increase the scope of the qualitative analysis by i) analyzing voice recordings of patient/pharmacist telephone interactions during the CMR and ii) beginning the qualitative interviews with recipients concurrent with completion of their CMR, rather than a year or more after the CMR.

4. Implement the recently discussed three-year contract with the evaluation team. This action would streamline the evaluation process, as outlined below, by making qualitative interviews, data requests, and analysis and deliverables year-round activities.

    a. This action would result in the programmatic benefit of interviewing MTM program recipients directly following their CMR, while they are still active in the MTM program, rather than a year in arrears as currently implemented. It would permit more in-depth interviews with some participants, especially for the purpose of targeting persons with self-reported adherence issues to identify their nature and potential for change.
    b. Make data requests at regular intervals throughout the year and allow more detailed analysis to be conducted into the spring and submitted as addendums to final reports that are currently due in December/January. This schedule would rationalize planning and processing for the annual evaluation cycle and provide the time for more sophisticated analytic techniques that cannot be completed in time for December/January deliverables.
    c. Take steps to make the evaluation a more collaborative process between the evaluation team, UF COP, the Agency's contract team, pharmacy program personnel, and data experts. Minimally these steps should include more regular conversations about the EQs of interest, the availability of data to address the questions, an expansion of the best methods for measuring evaluation metrics in the Medicaid data, and consideration of potential changes to the MTM program that may benefit recipients and the Agency.

Recommendations

1. Consider approaches that allow UF COP staff to record, classify, and provide referrals for issues in the MTM-P population that are broadly categorized as social determinants of health and have

negative consequences for access to care, recipient well-being, and satisfaction. Anecdotal reports from UF COP staff and MTM participants suggest this process already occurs informally.

2. Improve physician engagement with the MTM program to increase the number of problems identified and resolved by the UF COP. A pilot study between UF COP and the affiliated UF physician network in their area would appear to be a good place to start.
3. Streamline the Agency's process for selection into the study pool to maintain consistency across study years.
    a. Create written processes and protocols (a manual) for the creation and implementation of the eligible sample "original query" for initial contact and subsequent referral to the UF COP for CMR scheduling.
    b. Notify the evaluation team regarding the status of previous recommendations or changes to the program protocols.

Qualitative Evaluation Findings Informing Evaluation Questions #7-- #10

The qualitative evaluation focuses on four interrelated EQs , as noted below:

EQ7: What are the most successful aspects of the MTM program based on participant perspectives?

EQ8: What are the lessons learned from this program from the perspectives of Florida Medicaid Administrative Personnel (MCAP), MTM staff, recipients (i.e., participants), and PCP?

EQ9: How does this program impact recipients' (i.e., participants') ability to understand medications, take a more active part in their care, and understand the questions to ask their doctors or when to contact their doctor?

EQ10: How do recipients view this program from individual perspectives?

To give the most comprehensive and accurate presentation of both the MTM and pharmacist participants' experiences and perceptions, the data were examined holistically and are presented in an integrated manner for each participant group. Findings in this section inform each of the EQs noted above.

MTM Participant Interview Findings

The ET conducted interviews with a sample selected from the universe of MEDs-AD participants (n = 162) who had a completed CMR in Cohort 4 (June 1, 2014 to May 31, 2015). These findings are drawn

from seventeen interviews that were completed with MEDs-AD MTM participants who remembered being part of the MTM program. Participants included 7 (41.2%) women and 10 (58.8%) men. Ages ranged from 40 to 66 years of age.

Themes discussed by the MTM participants are presented within four categories: 1) Evaluation of the pharmacist; 2) Evaluation of the MTM program; 3) Best practices; and 4) Recommendations.

Evaluation of the Pharmacist

It was not an unusual experience for participants to start explaining how much they liked the pharmacist during the initial screening to determine eligibility to participate in the telephone interview. Participants frequently spoke glowingly of the pharmacist and described the pharmacists as kind, nice, sweet, passionate, and/or caring. They were appreciative of the pharmacists' assistance as is evident in the words of one participant: "I appreciate the time and effort that they took in-in trying to get to know how the medications were working for me, the suggestions that she put out, the fact that she took the time to listen to my concerns." It was evident that the participants valued the pharmacists caring for them. One participant explained: "I just appreciate the concern; just the participation of someone reaching out. Yeah, I like that." It is interesting to note that participants valued the relationship with the pharmacist they spoke to and felt a true connection despite the fact that most of the participants only spoke with the pharmacist a single time.

The helpfulness of the pharmacist with the CMR was mentioned consistently by participants. Multiple participants explained that the pharmacist reviewed each medication individually. Several discussed how pharmacists answered questions they had about the medications. They talked about instances where pharmacists listened to their concerns about medication and gave them the information they needed.

Participants stressed the pharmacists' knowledge about medications and their ability to convey the information to the participants. One participant shared that a strength of the MTM program was: "everybody, they seem very knowledgeable about everything." Participants explained that through their conversation with the pharmacist, they learned more about their medications including what the medications were for, proper dosages, and what time of day they should take the medications.

Evaluation of the MTM Program

Participants valued the MTM program, specifically mentioning the time pharmacists spent with them, the individual attention, and the information provided to them. One participant explained the CMR was helpful because: "the doctor doesn't have time to go over everything." After talking with the pharmacist, the participant said he felt reassured and more confident in using his medications. Another participant explained: "I appreciate it for somebody to actually take time to explain; nobody ever did that before, and I just really appreciate it."

The individual attention that participants received from the pharmacists was mentioned several times by participants. Participants enjoyed having the pharmacists to talk to, as one participant shared a favorite part of the program was: "having someone one-on-one that you could sit and you know take a minute and talk to." Several participants specifically mentioned having the "one-on-one" conversation with a pharmacist about their medication helped them understand their medication better. Likewise, in the conversation, they were able to have their questions answered. It was evident that the pharmacists were perceived as patient and available to the participants.

Helpful information about medication was frequently cited by participants as one of the best parts of the MTM program. One participant explained: "You can get more information about exactly what the medication is." Several participants mentioned learning things about their medication that they did not previously know. A couple of participants indicated that prior to the CMR they had been confused about their medication and as a result of the CMR they now understood how and when they were to take their medication. One participant shared how the CMR helped: "it helped me greatly knowing what a person is and is not allowed to do with their medications; … I wasn't aware that I could divide up my dosages throughout the day instead of taking them all at once. And I wasn't aware that I could do combinations of my medications, instead of like trying to figure out which one is safer to take with which one and things like that." Participants frequently expressed gratitude and relief that a pharmacist had reviewed their medication with them.

Participants felt the MTM program positively impacted their lives. In addition to increased knowledge about their medication and health, participants talked about how the CMR assisted them with feeling in control of their health. One participant shared the benefit of the MTM program was: "…having more of the knowledge and you know, just having somebody that you can actually sit down and take time and talk to about it and everything…. it makes you feel more in control." Other participants pointed out

concrete ways the MTM assisted them such as taking their medication at a certain time of day or not taking two medications together. One participant explained that the CMR: "made it easier for me to keep track of my medication." Another participant described how the MTM program helped her relationships with her doctors: "[The pharmacist] added a little more information and made me feel more comfortable with my doctors." A couple of participants stressed that the information mailed to them was very helpful, as one participant explained: "Well to me, what I think was the best part of it was having the list of, you know, all the medications.… because sometimes, you know, people have all this medication, but they don't have it all in one place."

A significant majority of the participants mentioned that the MTM program positively impacted their lives. Many gave specific examples. One participant explained using the information from the CMR to talk with a doctor and the long-term benefit of learning about medication through the MTM program: "[After talking to the doctor] adjustments were made and … I was able to approach my doctor better… I think [the MTM program] helped me to think better about the medications that I was taking and to be more conscientious of it. It also helped me to plan out my-my dosages better. And for example there was a time when I was taking all of these medications and I was taking 'em in a bunch and it had me end up going to the emergency room in an awful mental state."

Best Practices

When asked about the best part of the MTM program, participants often indicated there was no best part as they appreciated and liked all aspects of the program. The response of one participant captures the general sentiment: "I thought [the CMR] was a great idea. And basically it was it-it felt like-like it was something that that would help in my situation or anybody's situation for that matter in reference to them being able to get to know their medications and how it makes them feel better or not better or when improvements need to be done. I think that's a great idea." With further probing, participants indicated that the strength of the program was the pharmacists. Specifically, participants appreciated the pharmacists' knowledge about medication and caring demeanor. Participants valued the one-on-one attention and assistance with understanding their medication.

Recommendations

Most of the participants did not have a recommendation for how to improve the MTM program. The typical response is captured in the words of a participant: "I wouldn't change anything. I think it's the way its set and the way [pharmacists] explained everything. I would keep it just the way it is. Because

you got a good group of people, that are smart, that are trying to better everybody's lives. I'm mean you can't put a price on that, you know that's great." Participants were satisfied with the service they received and thought the program should continue. If anything, participants wanted the MTM program to continue and to be expanded. Several of the participants indicated it would be helpful to have more ongoing contact with the pharmacist.

Some participants reported not receiving information in the mail, and three participants shared that they did not find the information they received in the mail to be helpful. While it was not explicitly raised as a recommendation, the fact that some participants did not view the mailed information to be as helpful as the phone call, this may be an area where improvement could be made. Also, finding a way to ensure that mailed information reaches all participants and meets the needs of participants could be another area to improve upon in the future.

While participants did not explicitly recommend that the MTM program expand to provide assistance beyond the CMR, many participants recounted problems they were having that were impacting their health. These issues, which included issues outside the scope of Medicaid, included access to transportation, prescription coverage, and paying bills. In discussing the problems, a lack of money was frequently mentioned. One person was unable to participate in the ET interview as her pay-as-you-go cell phone did not have enough minutes for the call. Participants clearly desired assistance and had unmet social/financial needs. They sometimes asked the ET interviewers for referrals and resources.

Additional Findings

Participants' responses to the closed-ended questions were consistent with their open-ended responses and reflected positive experiences. These findings indicate that most participants considered the information they received on the phone and in the mail to be helpful. After the call they had a better understanding of their medication. Overall, they were pleased with the service they received from the pharmacist in the MTM program. Responses to the five closed-ended (yes/no) questions are summarized in Table 33.

Table 33. MTM Participant Responses to Close-Ended Interview Survey Questions

	YES N (%)	NO N (%)
Was the CONTACT NAME [1] *(or the pharmacist)* from the University of Florida who talked to you about your medicines respectful?	17 (100)	0
Did CONTACT NAME[1] *(or the pharmacist)* go through your medications and provide helpful information about your medications?	17 (100)	0
Were you happy with the assistance CONTACT NAME[1] *(or the pharmacist)* provided?	17 (100)	0
Did you feel that you had a better understanding of your medications after your Medication Therapy call?	16 (94.1)	1 (5.9)
Did you find the information that CONTACT NAME[1] *(or the pharmacist)* sent you in the mail helpful?	14 (82.4)	3 (17.6)

[1] In order to enhance recognition of the program, whenever possible, interviewers used the name of the pharmacist who had conducted the CMR if the participant had recognized the name of the pharmacist.

Participants were asked to assess the program overall and rate the care they received in the MTM Program on a five point scale (very poor, poor, fair, good, very good). These results of participants' global evaluation are indicated in the Table 34.

Table 34. MTM Participants' Global Evaluation of the MEDs-AD Demonstration Project

	Very Poor N (%)	Poor N (%)	Fair N (%)	Good N (%)	Very Good N (%)
How would you rate the overall care that you experienced with the medication program?	0 (0)	0 (0)	0 (0)	5 (29.4)	12 (70.6)

Summary of Findings from MTM Participants

In the ET interviews, MEDs-AD MTM program participants reported being pleased with the MTM program and found the information provided during the CMR helpful. They provided global support for the MEDs-AD MTM program. All participants rated the program good or very good overall. They recommended that the program continue.

Pharmacist Participant Interview Findings

The ET lead investigator conducted interviews with all three of the UF COP Call Center pharmacists who had conducted CMRs in the MEDs-AD MTM program during summer 2015 and one pharmacist who had conducted CMRs for the program during summer 2014. One of the individuals interviewed had been involved in MEDs-AD MTM since its inception at UF COP. The findings presented are from the four interviews.

Themes discussed by the pharmacists are presented within three categories: 1) Evaluation of the MTM Program; 2) Best Practices; and 3) Recommendations.

Evaluation of the MTM Program

Each of the pharmacists spoke passionately about their work with the MTM program. They discussed how the MTM program had the potential to impact people's lives. Each pharmacist recounted many stories of how the CMR assisted participants. Some participants had not known that some of the symptoms they were experiencing could be adverse effects of the medication. Other participants had unknowingly been taking duplicative medication. One pharmacist shared how one MTM participant was on multiple cholesterol medications and explained how this sometimes happens: "Patients…come into the hospital and they're on one thing. They're put on something different in the hospital 'cause that's what's on their formulary. They're discharged with these prescriptions, and they go home. And they have old bottles at home; now they have new bottles, and they don't know what to take; they don't know what to do. So there's a lot of confusion and that's what we see. We'll see people on two cholesterol medications." The pharmacists explained that the confusion about duplicative medication stemmed from the fact that MTM participants were seeing multiple physicians and using multiple pharmacies. It may be the case, one pharmacist explained, that a participant had their prescriptions filled at the place most convenient to the person who was providing their transportation rather than a specific pharmacy.

The pharmacists explained that the CMR provided information to participants. Pharmacists reported that sometimes patients lacked the basic information of what a specific prescription was for, as well as information regarding how to take the medication. One pharmacist shared an example: "We're providing [participants] advice on the proper way of taking medication or just, you know, helping them out with adherence because they don't understand that they need to be taking the medication every day because it's for blood pressure and they don't feel bad because their blood pressure is high, but

they may not understand that, you know, they're not gonna feel the detrimental effects until it's really too late." In their interviews, pharmacists discussed how participants sometimes were overwhelmed with the number of medications and instructions and it was clear that no one had assisted them with figuring out the medications.

The pharmacists shared that they often encountered difficulties reaching participants by phone and by mail. One explained: "I know I do a lot of hunting down telephone numbers and you know now with the cellphone world people are changing numbers quite a bit." Phone numbers often were disconnected and changed. One pharmacist estimated she was only able to reach half of the people during the 30 to 60 day follow-up calls. When pharmacists reached participants and administered a CMR, they verified a mailing address to send information. However, it was not unusual for the medication list mailed within the next day to be returned due to the participant not being at the address despite the fact it was the verified address provided by the MTM participant only days ago. During the 30 to 60 day follow-up calls, pharmacists said that some participants reported not receiving the medication lists. A pharmacist explained that sometimes participants were staying somewhere temporarily and some of them were actually homeless and could only provide "the address where they think they're going to be."

Best Practices

The pharmacists stressed the value of providing an individualized CMR to MTM participants. They explained that talking with the MTM participants about their medication and taking time to go over the prescription details was something that no one had ever done with them. One pharmacist shared: "Because [participants] say, 'You know, nobody's ever told me this. Nobody's ever sat here and talked to me like this." The pharmacists shared that MTM participants may not have had time or felt comfortable talking with their doctors or the pharmacists where they picked up their prescription. One pharmacist described how MTM participants may previously not have had all of the medication bottles collected in one place, so the CMR provided a unique opportunity to review all of each participant's medications. A couple of pharmacists mentioned that the fact the CMR was conducted over the phone may have made the MTM participants more comfortable as they may have felt less likely to be judged since they were not talking to someone face-to-face.

Relationships and connections were central to the MTM program according to the pharmacists. The pharmacists explained that although they sometimes only spoke to a person once for a short period of time, there was often a strong connection with the MTM participants. It was evident in the way they

spoke as well as the examples they gave that the pharmacists also valued their relationships with the participants and felt a connection with many participants. Several pharmacists discussed how the MTM participants seemed to value the attention and appreciate someone taking time to assist them. A couple of the pharmacists mentioned that sometimes MTM participants seemed to need someone to listen to them.

Recommendations

When asked for recommendations to change the MTM program, some of the pharmacists responded with suggestions to increase the contact with participants. One of them mentioned that being able to visit participants in their home could potentially help provide better services. Another stressed the importance of prolonged engagement and follow-up with MTM participants after the initial CMR. The point was made that often there was a lot of information to provide in the call, and if there were multiple calls, information could be spread across the calls rather than forced into one long call.

Another recommendation was to somehow ensure that the CMR was available to all those who needed it. Each pharmacist indicated that many of the MTM participants had few resources. The pharmacists stressed that participants often disclosed having unmet basic needs such as housing, transportation, and money for medication. Sometimes people had their phones disconnected or could not "afford the minutes" on their cell phone. One recommendation was that a phone card or compensation could be sent to MTM participants to ensure that finances were not a barrier to receiving a CMR. Several times pharmacists mentioned that participants' health was being adversely impacted by poverty and lack of resources and suggested that there was a need for participants to have access to social workers and case managers. Pharmacists shared that during the CMR call they sometimes provided phone numbers to Medicaid resources and case managers to assist participants. Several pharmacists expressed a desire to be able to assist participants more. One pharmacist explained: "I was limited to give out the number, like, the phone number of the case manager. Most of the time when…a patient had a question, it was more, more about, 'can I take an advantage of the transportation?', 'Can I, I'm not sure if my Medicaid is covered with, my, like, glasses or shoes, diabetes shoes.' And on my side, I was limited on that information, so sometimes I had to run off to [the supervisor] to learn more about it." Pharmacists suggested that having social workers to refer participants to would be beneficial since issues often arose outside of medication during the CMR. One pharmacist shared, "Most of the time it's not just about the medication. I will have more of a medication question if I find some drug interactions or adherence problem. But for them, it's more about access to the health care. So I guess my role here as a

pharmacist is to go over their medication, but I could also take a role as a social worker to see if I can provide the service they need in providing referral numbers of those the participants could actually reach out to."

Summary of Findings from Pharmacist Participants

In the interviews, UF COP pharmacists reported viewing the MTM program as beneficial. They perceived the information provided during the CMR helpful to MTM participants. The pharmacists valued the connection and relationship with the participants. One recommendation offered was to increase and continue contact with participants beyond the single CMR phone call.

Integrating Findings from MTM Participants and UF COP Pharmacists

The MTM participants and UF COP pharmacists were very consistent in their responses about the MTM program. The CMRs were perceived to be helpful to the MTM participants in providing information about their medication that often the MTM participants had previously not known. Both the pharmacists and the MTM participants stressed the importance of personal connections and relationships. The MTM participants and pharmacists both shared that there were often unaddressed issues—many of which were related to lack of resources—that impacted the MTM participants' health. Often MTM participants requested referrals for assistance. One recommendation made by both MTM participants and pharmacists was to have more contact beyond the initial CMR.

Contextualizing Findings

Previous Findings from Evaluations

This is the fourth year of the evaluation of the MEDs-AD MTM program. In the three previous years, in addition to interviewing 62 MEDs-AD MTM participants, the ET interviewed a total of nine key informants (three UF COP staff, two Medicaid Administrative Personnel [MCAP] staff, and four primary care physicians [PCPs] who had MTM-P or MTM-NP patients) and 20 persons eligible for, but who declined to participate in the MTM program. The findings from the current evaluation can be contextualized and compared with previous findings of the MTM participants and key informants.

The themes in the previous three years discussed by the MTM participants fall within four categories: 1) Evaluation of the pharmacist(s); 2) Evaluation of the MTM program; 3) Best practices; and 4) Recommendations. The overall responses from MTM participants were overwhelmingly positive about the pharmacists and MTM program. Participants appreciated the pharmacists' respect and concern for them as well as the help they provided. In the evaluation of the MTM program, participants discussed

that the CMR identified problems with their medication, increased their understanding of medications, and improved their medication adherence. A best practice according to MTM participants was increasing their understanding of their medication. When asked about recommendations to improve the MEDs-AD MTM program, many participants stated that they would not change anything. Other participants expressed that additional contact and continuity with the pharmacist would improve the program. The responses to the close-ended questions from the MTM participants from the previous three years reflected that participants were satisfied with the program and the CMR they received from UF COP pharmacists. In their global assessment of the MTM program, all participants rated the program good or very good overall.

The interviews with the key informants on the UF COP staff and MCAP staff produced the following themes: value added; training and implementation; continuity and connection; and special circumstances. Informants described how the MTM program added value through providing information to participants, taking time with participants, treating participants with respect, expressing genuine concern for participants' well-being, and the UF COP staff being asked by recipients for assistance with non-medication issues. One of the strengths of the MTM program was the training and implementation that included a structured protocol that allowed flexibility to develop and incorporate feedback and the needs of participants (e.g., implement a 30-90 day follow-up call). Strategies to increase participants' participation (e.g., participants collecting medication prior to CMR) were shared with UF COP staff and integrated into training. UF COP staff discussed the connections and relationships formed with participants. They also expressed a desire to provide longer and more frequent follow-up. Calls to MTM program participants could present special circumstances. UF COP staff used a crisis management protocol, yet still encountered circumstances (e.g., suicide ideation, end-of-life circumstances) where they had to make quick judgments and unique responses. Often the unique circumstances included requests for referrals beyond medical needs.

The themes that were derived from interviews with the primary care physicians (PCPs) can be summarized as follows. Interviews with PCPs found that PCPs were knowledgeable about the MTM process, although usually from experience with insurance or funding sources other than Medicaid. PCPs often did not, however, remember individual patients. Overall, PCPs supported the idea of MTM for Medicaid patients, yet they held some reservations. PCPs welcomed an initial contact regarding individual participants of MTM through the MTM program.

These findings indicate that qualitative methods provide information that is not available from other sources. Furthermore, the findings from these previous interviews are helpful in contextualizing the findings from the MEDs-AD MTM participants in the current evaluation.

Integrating Findings

There were no discernible differences in the findings from the current evaluation and previous evaluations. The findings of the current study echo the previous evaluations. MTM participants were overwhelmingly positive about their experiences with the pharmacist and the CMR. The interviews with the pharmacists, as well as MTM participants, demonstrated that the pharmacists were genuinely concerned about the well-being of MTM participants and that MTM participants appreciated the connection with the pharmacists. Participants valued the relationship with the pharmacist who they felt expressed genuine concern. The information that pharmacists provided during the CMR was perceived as helpful, and participants appreciated the time that the pharmacists spent to assist them in understanding their medication.

As was the case in previous evaluations, findings of the current study indicated that MTM participants were overwhelmingly pleased with the services they received and thought the CMR was helpful. Also, like in previous evaluations, MTM participants and pharmacists believed that ongoing contact may be beneficial.

Limitations

These findings are limited by the small sample size and retrospective nature of the interviews. As the interviews occurred approximately a year or more after the CMR, MTM participants may have had difficulty recalling details of their involvement with the MEDs-AD MTM program. However, the ET sought to overcome the issue of memory by being certain that participants remembered the program. Interviews did not occur if participants did not clearly remember the MEDs-AD MTM program. Another limitation of the study is the sample bias often associated with interviews or surveys conducted with people who choose to participate. Those with the strongest opinions are the most likely to respond and complete the interview process. An additional potential limitation of the study is that pharmacists interviewed were providing CMRs in 2015, not 2014, the year in which the MTM participants received the CMR. In the conversations with the UF COP pharmacists, programmatic changes had not occurred between the years; therefore, it is unlikely that this impacts the data.

Conclusions from Qualitative Evaluation

MTM participants gave overwhelmingly positive feedback in qualitative interviews about how the MTM program was administered and found the information provided during the CMR to be helpful. Participants credited the CMR for increasing their knowledge about their medications and positively impacting their health. They provided global support for the MTM program. Their recommendation that the program continue provides insight into MTM participants' desire for support in addressing their complex medical issues and echoes the statements of UF COP pharmacists who wished to keep in touch beyond the initial CMR. These findings are particularly robust in that they are consistent across multiple cohorts of participants.

Qualitative Evaluation Summary and Recommendations

The qualitative interviews with MTM program participants indicate positive benefits. Participants reported increased knowledge of their medications, being more active in their health care and improved health. MTM participants shared generally positive responses to the pharmacists' interest in their well-being. Pharmacists shared that MTM participants often reported needs beyond a CMR and indicated that these needs often impacted their health. Participants reported that the mailed information was not always received. Pharmacists echoed this concern. Therefore, there are three recommendations resulting from the qualitative evaluation of the MTM Program:

1. Increase the amount of contact between the pharmacists and the participants by:
    a. Increasing the number of phone calls required per protocol; and/or
    b. Extending the program for more than the current one-year interval.
2. Add social workers or case managers to the UF call center staff to meet the needs of MTM participants that extend beyond the mission of the MTM program.
3. Streamline the information provided to MTM participants by mail and explore options to ensure participants receive the information.

Appendix I Detailed Quantitative Methods

Data Sources and Preparation

Agency Administrative Data

Source data for this report include Agency claims and recipient demographic files associated with Medicaid recipients in all four cohorts of the MEDs-AD Waiver MEG1 population. Claims and enrollment files for the years January 1, 2010 through December 31, 2014 were parsed into 55 monthly periods and demarcated for each cohort's pre-intervention and intervention years as outlined in Table 1.

The Agency administrative claims data were provided to the FSU College of Medicine organized by facility (UB-04 standard claim form) and professional services (CMS-1500 standard claim form). The UB-04 facility data included short-term acute care hospital claims (Provider Type Code 01), other facility claims with various Provider Type Codes, and outpatient services provided by these same facilities. Separate CMS-1500 professional services claims were provided for pharmacy drugs dispensed, professional services by physicians and other professionals, and CMS-1500 waiver-specific services. The CMS-1500 waiver services and UB-04 claims for facilities not labeled as Provider Type 01 were not available for previous reports under this evaluation. Claims were assigned to a study month and period based on the ending date of service in each claim and labeled by study group (MTM-P or MTM-NP) according to definitions previously described. Enrolled days by study period and study group were calculated by month.

Claims files were merged with demographic information found in the recipient demographic file, benefit plan file, assignment plan file, and the aid category file to determine periods of enrollment and periods of excluded enrollment under the MEDs-AD Waiver. Recipients are included in the study groups based on criteria defined by the 1115 Waiver (see Table 35). Enrolled days were calculated on a month-by-month basis using the aid category file after exclusions. The claims and enrollment data used for this report are believed to represent nearly all Medicaid recipient utilization for the period January 1, 2010 to December 31, 2014. However, claims for Cohort 4 during the intervention period June 1, 2014 to December 31, 2014 may be less complete since providers have a full year to submit claims to the Agency. Because the evaluation team excludes from the analysis any enrollee who has $0 utilization in a given study period, many recipients were excluded from Cohort 4's intervention period. Moreover, for this reason, included recipients' recorded utilization during this time period is prone to additional error.

Additionally, the statewide Medicaid Managed Medical Assistance (MMA) program staggered regional rollout began on May 1, 2014. The MMA program moved most recipients from legacy Agency Medicaid programs to private managed care plans. This may have led to attrition in the number of recipients eligible to continue to receive the MTM intervention, since membership in a private managed care plan was an exclusionary criterion in the approved 1115 Waiver.

Diagnosis and Procedure Codes

Florida Medicaid procedure codes include standard *International Classification of Disease, Version 9 Clinical Modification* (ICD-9-CM) codes used for hospital and other facility claims and national *Current Procedural Terminology* (CPT3) codes used for outpatient services as well as Florida local codes for some procedures. These codes represent a large number of potentially covered services for Medicaid recipients and are used by providers when billing Medicaid. Many of these services are not used often or represent service utilization of limited interest. In order to present service use in a more useful manner, Berenson-Eggers Type of Service (BETOS) codes[6] were assigned to procedure codes used for outpatient claims and professional service claims. This coding system collapses procedures into a smaller number (8) of combined categories. Some claims in the BETOS code files were assigned procedure codes via HCPCS; in most cases these codes are the same as CPT codes. The BETOS coding system covers all CPT3/HCPCS codes, assigns a procedure code to only one BETOS category, consists of readily understood clinical categories (as opposed to statistical or financial categories), consists of categories that permit objective assignment, is stable over time, and is relatively immune to minor changes in technology or practice patterns.

Standard ICD-9-CM diagnosis codes were used to identify certain chronic conditions of interest and to risk-adjust scores by program year for every recipient in the MTM-P and MTM-NP study groups. Risk adjustment scores were computed by the *Johns Hopkins University ACG® Software System*. Relevant data from the *ACG System* were output and merged with administrative claims and demographic information.

UF COP Intervention Processes Data

Additional data sources utilized include the UF COP MTM participant lists for Cohorts 1 through 4, individual patient charts with data collected from recipients in the MTM-P group for all four cohorts, and UF COP quarterly reports for each intervention year provided to the Agency. Patient charts for Cohorts

[6] See http://www.cms.gov/Medicare/Coding/HCPCSReleaseCodeSets/BETOS.html

1, 2, and 4 were compiled in the form of individual Excel spreadsheets with 16 tabs containing a variety of detailed content, including participants' prescription information, CMRs, and intervention actions. UF COP patient information for Cohort 3 was provided in five Excel files with information for all patients included on each tab. The ET used the participant lists to assign recipients to their respective cohorts, while process information was extracted from the other UF COP files and merged with the Agency-provided recipient demographic information.

In the summer of 2012 the UF COP introduced proprietary software designed specifically for managing a population receiving MTM services. The new system placed some constraints on data collection. For example, the Morisky Adherence Scale (MAS)[7] questions were not administered to Cohort 3 recipients. The new system also placed constraints on the content and format of information that could be exported outside the system. Consequently, the information provided to FSU College of Medicine for this evaluation was not as detailed for Cohort 3 as compared with Cohorts 1, 2 and 4, and as a result, the UF COP ceased using the software after the completion of Cohort 3's intervention.

Additionally, during the course of extracting the Morisky scores from patient charts for Cohort 1, the ET identified two issues that needed to be corrected. First, the embedded formula provided by the UF COP in the Excel spreadsheets used to calculate the first Cohort's Morisky scores was incorrect. The scale is intended to reflect high adherence with a score of zero and low adherence with larger values (up to a score of 8), but the formula essentially calculated the scores in the opposite manner. Therefore, the scale in Cohort 1 spreadsheets needed to be reformulated to code all positive responses as a "0" and all negative responses as a "1." It appears the UF COP resolved this issue in later cohorts' charts. Second, the UF COP spreadsheets default to a value of 2 when no recipient responses are entered for any of the eight questions. This problem persists across the charts compiled for each cohort. Therefore, the findings related to Morisky Scores in the tables in the main body of the report (tables 30 & 31) were revised from the previously reported Cohort 1 and 2 findings.

Data Structure

The eligible enrollment, utilization, expenditure, and other outcome data for each Medicaid recipient by cohort were characterized by up to 24 monthly records in the analytic data files. The master file also

[7] Morisky, D. E., Ang, A., Krousel-Wood, M., & Ward, H. J. (2008). Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens.(Greenwich.), 10(5), 348-354. An 8-item questionnaire administered by pharmacy staff to measure the adherence behaviors of patients.

included binary indicators for the applicable study group and period for each recipient's monthly record. Any given recipient may have less than 24 months of observation after inclusion and exclusion criteria were applied.

Study Participants

Recruitment of the Intervention Population

Selection of recipients covered by the waiver to participate in the intervention is a multistep process involving Agency staff, the UF COP (the MTM program provider), and consent at two points in time by targeted Medicaid recipients. The word "selection" refers to processes used by the Agency and UF COP to produce a list of recipients for initial contact, after which a subset of these recipients provide their consent to participate in the MTM intervention group. In essence, the Agency does not "select" MTM participants; rather, recipients self-select into the intervention. Recipients who opt into the intervention and ultimately complete a Comprehensive Medication Review (CMR) form the study's nominal MTM-P population. All recipients were selected from a master list of 24,002 recipients that were eligible for the MEDs-AD waiver for at least one month during the January 1,2010 to December 31, 2014 period.

Steps in the selection and intervention processes were as follows. Step 1: A list of recipients currently enrolled in the MEDs-AD MEG1 population was created by the Agency staff in the spring (March to May) before the start of each intervention year on June 1st. The number of recipients in this "original query" ranged from approximately 3,300 to 3,600 for each of the four cohorts. Efforts were made to screen ineligible recipients, e.g., Medicare beneficiaries, from the original query. Step 2: Pharmacy staff at the Agency (Cohorts 1 & 2) or UF COP (Cohorts 3 & 4) contacted recipients on the "original query" list to obtain consent for later telephone contact by the UF COP for the purpose of offering the opportunity to participate in the MTM intervention. The number of recipients giving consent at Step 2 ranged from approximately 650 to 850 across the four cohorts. Contact information for recipients giving consent at Step 2 was used by UF COP staff to schedule a Comprehensive Medication Review (CMR). Step 3: UF COP staff made telephone contact(s) with recipients, confirmed their continued interest and consent to participate, and scheduled a future telephone interview during the June to August period of each intervention year. Occasionally, CMRs were conducted during the scheduling telephone call. Step 4: Upon completion of the telephone CMR, recipients were designated as MTM-P. Recipients giving the first consent at Step 2 who did not complete a CMR were designated as MTM-NP and were used to construct comparison group one (CG1). Step 5: Any problems identified by UF COP staff were discussed with the recipients, and the CMR document and recommendations were typically faxed to each

recipient's physician. A copy of the MAP was also sent to the recipient unless declined. Step 6: UF COP staff followed up with MTM program participants by telephone and/or review of electronic claims records at least every 90 days to identify any resolutions to previous recommendations or any new problems. The intervention period ends May 31st of the year following the start of the intervention year.

The ET has some concerns about the selection process, as already outlined in the Limitations section of the main body of the report. If the recruitment process was conducted in a non-random manner, bias may be introduced into the study population for both study groups equally, affecting generalizability, or for one of the two study groups differentially, affecting comparability. Furthermore, the defined "nominal" cohorts begin shrinking in size due to lost eligibility almost immediately, and additional losses continue throughout the intervention year. This loss is partially an artifact of the timing of the selection process beginning in the spring quarter before each intervention year starts (which is the 4th quarter of each cohort's SP-PRI) and ending when all CMRs are completed by the UF COP by the start of the 2nd quarter of the intervention year. The ET is working with the Agency and the UF COP in an attempt to ensure that future queries result in an initially random sample of recipients derived from the MEG1 population and to mitigate attrition in the study population due to the timing of the selection process.

Inclusion-Exclusion Criteria

Table 35 lists the inclusion-exclusion criteria used to limit the study population for each month of the study period to recipients who were eligible for MEDs-AD and therefore the MTM program using criteria listed in the 1115 Waiver.

- Step 1: claims and enrollment history that occurred before June 1, 2010 and after December 31, 2014 were removed.
- Step 2: potential MEDs-AD Waiver population members for this evaluation were identified using the Agency's Aid Category codes (inclusion criterion).
- Step 3: persons with no observed utilization in an entire study period were removed.
- Steps 4 -7: persons were excluded based on factors by month that, per 1115 Waiver criteria, made them ineligible for the MEDs-AD Waiver for this study population. Recipients were excluded for any given month in which they were enrolled in Medicare or a Managed Care Plan, received LTC or hospice services, or were covered under the HCBS waiver.

- Steps 8-10: persons were excluded who had 0 enrolled days during a given study month or whose date of death occurred in or before the month in question. Candidates for CG1 who received the MTM intervention in a previous study period were also excluded.

Table 35. Criteria and steps used to identify recipients for inclusion and exclusion from the evaluation study population (SP) for the Florida Medicaid MTM program evaluation, 2010 to 2014

Step	Inclusion-Exclusion Condition Type	Filtering Variable Applied by SP	Filtering Variable Source	Action Description	Domain	Why is Action Taken?
1	Exclude claims and enrollment before SP=1 or beyond 12/31/2014	SP Indicator	Created using date ranges for SP's	Exclude if SP indicator is from before 6/1/2010 or after 12/31/2014	Study Design Requirement for PRE & INT SPs	Keep all study period enrollment/ claims and remove any outside of defined SP
2	MEDs-AD Waiver MEG1	Aid Category Inclusion	Agency Program Codes	Include if present	Aid Category Inclusion	Identify potential MEG1 population members
3	No Utilization	Utilization Indicator by SP	Calculated amount of utilization by SP	Include if utilization >0	Utilization	Remove recipients with no utilization in entire SP
4	Medicare	Benefit Exclusion Category	Agency Program Codes	Exclude Dual Eligibles	Medicare eligibility	Medicare in SP month excludes recipients from MEDs-AD Waiver
5	HCBS	Aid Category Exclusion	Agency Program Codes	Exclude if evidence of HCBS waiver enrollment	Aid Category Exclusion	HCBS in SP month excludes recipients from MEDs-AD Waiver
6	MCO	Assignment Plan Exclusion	Agency Program Codes	Exclude if evidence of MCO enrollment (except for Primary Care Case Management)	Assignment Plan Exclusion	MCO in SP month excludes recipients from MEDs-AD Waiver
7	LTC & Hospice Utilization	LTC Utilization Indicator	Utilization	Exclude if evidence of LTC in SP	LTC & Hospice Plan of Service (POS) Codes	LTC in SP month excludes recipients from MEDs-AD Waiver
8	Death	Death Status	Calculated using date of death, SP dates	Exclude if died in SP and for future SPs	Death	Number of deaths is small
9	Previous Intervention	Cohort Study Group Categories	Identified 1st occurrence of MTM-P & exclude from future SPs	Exclude MTM-P recipients if observed in future SPs	Study Design Requirement	Restrict MTM-P recipients to one pre-intervention SP
10	No MEDs-AD Waiver MEG1 Enrollment	Aid Category Inclusion	No observed enrollment	Exclude if 0 MEDs-AD Waiver MEG1 months in SP	Aid Category Inclusion	Utilization but no enrollment

Analysis

Analytic methods fall into two categories: 1) simple univariate and bivariate comparisons and 2) multivariable regression models using a difference-in-difference (DiD) analysis.

Univariate and Bivariate Comparisons

Univariate (single variable) and bivariate (two variables) analysis is useful for identifying the range and distribution of measured values in the study population. It is also useful for examining how similar the intervention and comparison groups are at baseline on some measure of interest. The descriptive tables in this report are important for assessing the validity of more complex models that address the EQs directly. They may also provide information in an easy to use format that can be compared to other Agency data for corresponding measures. Analysis in EQs 1, 2, 3, & 5 utilized simple univariate and bivariate comparisons for selected utilization, expenditure, and enrollment measures from Medicaid administrative data files with tests for statistical differences between defined groups using chi-squared tests, t-tests, and z-scores, as appropriate. EQ4 and EQ6 used univariate analysis to assess demographic differences in the nominal populations and UF COP process measures, respectively.

Multivariable DiD Models

Multivariable models examine a single outcome of interest, e.g., expenditures, simultaneously in the intervention and comparison group. The models include other variables (hence multivariable) that may be associated with the outcome of interest and that may differ in magnitude between the intervention and comparison group. The models, therefore, can adjust statistically for baseline and demographic differences in the two populations when computing the size of the effect of the intervention on the MTM-P group as compared with the MTM-NP comparison group. The multivariable analysis for this study's models include measures of age, race and ethnicity, sex, *ACG* risk score, length of enrollment, and an indicator for recipient death in addition to the principal predictors of interest, time period (pre-intervention versus intervention period) and study group (MTM-P versus MTM-NP).

The type of multivariable regression model used to address each component of an EQ is determined by the nature of the outcome or dependent variable. Multivariable models with expenditures in dollars as the dependent variable used linear regression to model differences in costs. Multivariable regression models for total procedures, length of stay, or other count measures used negative binomial models to account for the non-normal distribution of these outcomes. Multivariable logistic regression models for discrete events were used to model binary outcomes such as one or more hospitalizations. All multivariable models were fully adjusted for the covariates listed above.

Multivariable Model Interpretation and Identification of the Intervention Effect

EQs 1, 2, and 3 were all addressed with difference-in-difference (DiD) analysis using the multivariable method appropriate to the dependent variable of interest, and all multivariable models presented in this

evaluation include a base and interaction model with results presented in the same table. The principal finding of interest is whether the interaction term for group and time period is significant. A p-value of less than or equal to 0.10 is considered significant for this coefficient. Categorical variables in the regression models have a zero (0) in the estimate field and periods (.) in other fields to indicate the particular value that is used as the reference category, e.g., White/European American is the reference category for the other racial/ethnic categories. Comparison categories have been removed for the interaction term.

The interaction, i.e., DiD, model provides evidence for differences between the MTM-P intervention group and the MTM-NP comparison group in both the dependent variable outcome and the independent variable predictors. In all cases, the statistical test of significance and the effect size in the intervention versus the comparison group was identified through an interaction term in the model that crosses group membership (MTM versus MTM-NP CG1) with time period (pre-intervention versus intervention periods). The coefficient on the interaction term is, therefore, the net effect of the intervention after accounting for different starting points in the pre-intervention period for the MTM-P intervention group as compared with the MTM-NP CG1 group. The NP group is called a non-equivalent comparison group because the MTM intervention was not assigned at random to recipients. Random assignment, which results in an intervention and comparison group that are the same on all characteristics other than the intervention, was not possible for the MTM program. However, every attempt was made to reduce differences in the characteristics of the MTM-P intervention group and the comparison group chosen for each model via the inclusion-exclusion process as well as by statistically controlling for demographic characteristics, morbidity burden, and length of observed enrollment.

Measure Transformation: Accounting for zero utilization and expenditures

There are three common, interrelated issues with the analysis of health care expenditures. First, insured persons have differing lengths of enrollment. This issue is typically resolved by normalizing expenditure and other utilization data as a rate per member per year or rate per member month. However, the ET resolved this issue in the current study by entering the length of enrollment as a constant, or offset, in the models. Second, expenditure data for health data is notoriously skewed. This problem is typically addressed by transforming (in this case log transforming) the dependent variable in dollars to a different scale, but individuals with zero values present a third problem for this method, outlined below.

Log transformation is a mathematical technique for changing the scale of a measure by computing the natural logarithm of the value. The transformation does not change inferences made about outcome measures in multivariable models and is a desirable approach for modeling expenditures because it shrinks the high expenditure outliers toward a more normal distribution. Persons with high expenditures and service counts typically have a long right side tail in their distribution; i.e., there is a large number of persons with low or moderate levels of utilization and a smaller proportion with extremely high levels of utilization. Log transformation can improve the precision of multivariable estimates by reducing the standard errors and, therefore, the uncertainty of an estimate.

However, log transformation cannot accommodate persons with zero expenditures because the log of zero is mathematically undefined. There were a very small number of persons with zero dollars in monthly expenditures. These person-months were dropped from models in which the outcome was log transformed dollars.

Finally, when possible, the evaluation team applied robust standard error adjustments to account for unequal variance (heteroscedasticity) in the dependent variable across levels of the independent variables.

Johns Hopkins School of Public Heath ACG System Measures®

Risk Adjustment

The *Johns Hopkins Adjusted Clinical Groups System v.11 (ACG) ®* is a risk adjustment methodology that measures the morbidity burden of patient populations based on disease patterns, age, and sex. The *ACG System* is a statistically valid, diagnosis-based, case-mix methodology that allows healthcare providers, healthcare organizations, and public-sector agencies to describe or predict a population's past or future healthcare utilization and costs. It is based on diagnostic and/or pharmaceutical code information found in insurance claims or other computerized medical records. The ACG System scores were incorporated into the multivariable models to account for differences in disease burden between recipients and the two study groups.

The *ACG System* computes three types of risk adjustment weights: local concurrent weights, reference unscaled concurrent weights, and reference rescaled concurrent weights. The rescaled concurrent weight was used for this analysis.

For all weights, scores greater than 1.0 indicate that a recipient's disease burden is higher than the average recipient's disease burden in the MEG1 population for that program year, while scores less than 1.0 indicate less disease burden. All regression models used in this evaluation include the ACG reference rescaled weight.

Medication Adherence Measures

The ACG System also reports two population-based measures of adherence to drug regimens relevant to EQ3, the Medication Possession Ratio (MPR) and the Continuous, Single-interval Measure of Medication Availability (CSA). The MPR is calculated as the total number of days medication is dispensed (excluding final prescription) divided by the total number of days between the first and last prescription; it is sensitive to large gaps between prescription fills. The CSA is calculated as the number days medication was supplied divided by the number of days until the next prescription, averaged for each prescription; it is sensitive to frequent gaps between prescription fills.

These measures are only computed if a recipient has one of the chronic conditions tracked by the *ACG System* based on algorithms using ICD9-CM diagnosis codes and prescription drug therapeutic categories recognized as appropriate for each condition. The values for MPR and CSA range from zero (low adherence) to 1.0 (perfect adherence). A CSA or MPR value of 0.80 is considered good and may be interpreted to mean that the recipient had enough of their prescriptions on hand 80% of the time to meet the dosage and strength per day as indicated by their doctor's prescription(s). A value of 1.0 suggests the required amount was available 100% of the time observed. Values above 1.0 are possible if prescriptions are filled too close together or when a prescription is changed, resulting in duplication due to the overlap between the new and old prescription in the same time period. The two ratios are calculated by study period and summarize adherence for up to 17 chronic conditions tracked for these measures by the ACG System.

Appendix II Detailed Qualitative Methods

An Overview of the Qualitative Evaluation Team Effort

The qualitative component of this mixed methods project lends a much deeper understanding of the underlying processes, providing a more nuanced evaluation of the MEDs-AD Waiver project based on MTM principles. The data for this evaluation emanates from a series of personal interviews conducted by our evaluation team with MCAP, UF COP, and randomly selected MTM recipients who consent to participation.

The Evaluation Team (ET) associated with the qualitative evaluation effort consists of a lead analyst and three graduate level Research Assistants (RAs). The lead analyst, an Assistant Professor at the FSU College of Social Work and a Co-PI of the project, is an expert in qualitative methodology and oversaw all interviews conducted by the ET RAs. The previous lead analyst, an Associate Professor at the College of Social Work, along with Florida A&M University (FAMU) pharmacists with an expertise in MTM and geriatrics, constructed the original interview guides, which were used for interviewing MTM participants. The previous lead analyst consulted on the creation of the interview guides with the pharmacist.

The original ET included the Associate Chair of Research in the Department of Medical Humanities and Social Science at the FSU College of Medicine, a clinical psychologist and expert in health behavior, the Associate Dean of Research at the FSU College of Social Work, and an interdisciplinary scholar who brought extensive research experience in health care. Their insights into health behavior were utilized in formulating the evaluation design and measures. Furthermore, key informant interviews (a series of interviews with MTM staff at the UF COP Call Center and MCAP) completed in the first year of the project were instrumental in developing appropriate recruitment materials (e.g., letters, scripts) as well as interview guides and closed-ended questions.

Data Sources

Primary data sources for the qualitative evaluation consisted of a series of interviews with MTM program participants and primary care providers of participants.

It is the very essence of this evaluation to hear the opinions of MTM program participants, often in their own words, that provide information not available from any other source. Indeed, the participants are the true experts on the effectiveness and meaning of the MTM program. It was the decision of the ET, in

consultation with AHCA, to include the voices of the MTM program participants in this segment of the evaluation.

MTM Participant Interviews

Interviews were conducted with 17 MEDs-AD MTM participants who received a CMR and were part of Cohort 4 (June 1, 2014 to May 31, 2015) of the MEDs-AD MTM Demonstration project. The ET conducted telephone interviews with participants using an interview guide that was used in previous evaluations of the MEDs-AD MTM Demonstration project. The original work plan projected 20 interviews randomly selected from the MEDs-AD MTM participants.

Recruitment. The ET mailed a letter explaining the study and invited participation to each potential participant. The letters were written in easily understandable language and, whenever possible, included the name of the UF COP staff member who had conducted the CMR. This method was designed to aid participants in understanding the specific program referenced in the letter and the consequent interview. Furthermore, the letter stated that findings would be kept confidential and that neither participation nor refusal would have any effect on their Medicaid benefits. The letter was followed by a phone call that included additional information, an opportunity for potential participants to ask questions, and informed consent for those participants who wished to participate.

Interview Protocol. The ET used a semi-structured interview guide that had been established at the inception of the evaluation with questions and prompts based on a literature review, input from MCAP and the UF COP Call Center staff, and approved by AHCA personnel. Interviewers used screening questions to determine that the participant was the person identified and an additional question to determine if they remembered the MTM program. There were four overarching, open-ended questions:

1. How would you describe the medication management program in which (CONTACT NAME) asked you about your medicines?
2. What do you see as the best part of the program?
3. If you could change one thing about the program, what would it be?
4. How do recipients view this program from individual perspectives?

In addition, the interviewers followed up on new areas and topics mentioned by the MTM program participants, in accordance with standard interview conduct. Finally, there were five closed-ended (yes/no) questions and one global rating item. The RAs audiotaped each interview with permission of

the participants. AHCA and Institutional Review Boards approved all interview protocols, surveys, and scripts prior to implementation. All interviews were conducted by telephone and scheduled for the convenience of the MTM program participants.

Pharmacist Interviews

As it became evident that the response rate of MEDs-AD MTM participants was lower than projected for Cohort 4, the decision was made in consultation with the AHCA to incorporate interviews with UF COP pharmacists who are involved with the MTM Program. The ET developed an interview protocol for the UF COP pharmacists which AHCA approved. The ET conducted interviews with a purposive sample drawn from UF COP pharmacists who had completed CMR for participants in the MEDs-AD MTM Demonstration project in 2014 or 2015.

Recruitment. The lead analyst of the qualitative study communicated with the UF COP clinical assistant professor who supervises the pharmacists administering the MTM program about the purpose of the study. The UF COP clinical assistant professor explained the evaluation and recruited the pharmacists involved with the MEDs-AD MTM program to participate in interviews. The lead analyst visited UF COP and spoke individually to each pharmacist interested in participating in the study to answer any remaining questions. One pharmacist was unavailable the day the lead analyst was at the UF COP and followed up with the lead analyst by telephone to complete the interview. Those who consented to be in the study were interviewed.

Interview Protocol. The ET used a semi-structured interview guide with questions based on the interview guide for the MEDs-AD MTM participants and approved by AHCA personnel. The protocol was designed to capture the pharmacists' thoughts as well as their insights about the perceptions of the MEDs-AD participants in the MTM program. There were eight open-ended questions in the interview guide:

1. What is your role in the medication management program?
2. How would you describe the medication management program?
3. What do you see as the best part of the program?
4. What do you believe the participants in the medication management program perceive as the best part?
5. If you could change one thing about the program, what would it be?

6. What do you believe the participants in the medication management program would change if they could change one thing about the program?

7. Our research team is currently experiencing challenges reaching participants in the medication management program who are willing and able to participate in an interview. Do you have any insights about why we may be encountering this issue?

8. Is there anything that you would like to tell us about your work in the medication management program?

Additionally, the protocol was designed for the interviewer to follow up on new topics mentioned by the participants, in accordance with standard interview conduct. The lead analyst conducted all of the interviews with the UF COP staff. Individual interviews were conducted on November 12, 2015 in private offices at UF COP. An additional individual interview was conducted by telephone on November 18, 2015. The interviewer audio recorded each interview with each participant's permission. AHCA and Institutional Review Boards approved all interview protocols, surveys, and scripts prior to implementation.

Data Protocols

Data Collection

Interviews were digitally recorded with permission of the participants and transcribed verbatim. As thoughts arose about the data, ET wrote memos to refine their thinking and understanding about the participant's experiences and perceptions. After two transcripts were completed, everyone in the ET read both of the transcripts and wrote memos about their thoughts about the themes.

Data Management

The ET maintained a tracking database in Microsoft ACCESS throughout the project to record pertinent information regarding contacts made with participants. Interviews were digitally recorded with permission of the participants and transcribed verbatim by RAs. All audio files and transcriptions were kept on password-protected computers with access limited to the ET. Transcripts were uploaded to NVivo10 qualitative data analysis software which organizes and allows multiple people to analyze datasets of multiple transcripts.

Data Analysis

To analyze the data from the interviews with the MEDs-AD MTM participants, the ET conducted a thematic analysis which allowed the ET to identify themes (patterns or meanings) within the data and the relationships among the themes. There are six phases of conducting thematic analysis: 1) becoming

familiar with the data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and 6) producing the report. Data analysis is an iterative recursive process and the phases of a thematic analysis are not necessarily linear.

Qualitative Data Analysis Software

The ET used NVivo10 qualitative data analysis software to manage and analyze the transcripts. The software serves as a tool for analysis, yet all analytic decisions (e.g., the prevalence or relevance of a theme) remain with the ET. A common metaphor explaining the role the software has is that PowerPoint no more creates a presentation than NVivo conducts an analysis. Qualitative data analysis software is simply a tool to assist an ET

Coding Techniques

Generating Initial Codes

Each ET member worked independently to identify initial codes, which can be conceptualized as succinct labels, within the two transcripts. Throughout this process, the ET wrote memos about their thoughts about and understanding of the codes and potential themes.

Searching for Themes

The ET met to discuss the initial codes ET team members had individually identified. The discussion included how the initial codes are theoretically connected and how they answer the research questions. The team discussed the broader patterns of meaning (themes) in the data. In the meeting, the ET developed an initial list of codes for each question. Afterwards, each ET member wrote a memo about their thoughts of the codes and the emerging themes. An initial list of codes and their definitions was created. Each ET member reviewed the list of codes and consensus was reached on the definitions. The codes and their definitions were entered into NVivo10, the qualitative data analysis software used on the project.

Reviewing Themes

Using NVivo software, the ET coded the data using the codes and definitions created in the ET meeting. As necessary, additional codes were created during the process. Each transcript was coded independently by two different ET members. Through constant comparison, the ET explored how well the themes fit the data. Reviewing themes involved checking themes against one another and the data to determine if there is a coherent story in the data. Themes are refined and combined as necessary to ensure they represent the data. Throughout the review process, the ET wrote memos about their

thoughts of the themes and insights about the data. Additionally, the ET discussed the themes within the data. NVivo software query functions were used to explore the prevalence and patterns in the themes. The ET created a framework to understand the data based on the themes. This includes a detailed exploration of each theme and determining the "story" or relevance of each theme.

Strategies for Rigor

The rigor of qualitative research increases through triangulation of data and methods. Triangulation seeks corroboration between at least two data sources and interpretation. Triangulation can include the use of multiple types and sources of data. The various types and sources of data in this study add to the clarity and verification of interpretations. This qualitative portion of the study incorporated multiple types of triangulation. First, there were multiple sources of data with 17 MTM participants and four UF COP Pharmacists completing interviews. The MTM participants were asked both open-ended and closed-ended questions which provided different opportunities to collect information from the participants.

During the data analysis process, the ET met regularly to discuss their understanding of the data. The discussions provided opportunities to thoroughly examine the data. Two ET members independently coded each transcript of interviews, thus providing analytic triangulation. Since qualitative data analysis software was used, comparisons could be made to see the agreement in coding among the ET. Interdisciplinary triangulation occurred as both a pharmacist and a qualitative methodological expert developed the interview guide for MTM participants.

Another strategy for rigor is that the findings of the qualitative evaluation are contextualized with the findings of previous evaluation of the MEDs-AD MTM Demonstration project. As will be discussed and presented later, at the completion of the qualitative component of the evaluation, data and findings were integrated with the quantitative component of the MEDs-AD MTM Demonstration project evaluation.

Appendix III Comparison Group 2 (CG2) Regression Models

Comparison group 2 (CG2) is comprised of a subset of the CG1 population restricted to persons with at least 150 days of enrollment in the pre-intervention and/or intervention study periods. All interaction terms in the tables represent the net effect of the intervention on the MTM-P group contrasted with the change in the MTM-NP group between both study periods, while controlling for baseline differences.

EQ1: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and CG2, for utilization measures?

- Results for CG2 in Table 36 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 36. General Estimating Equation negative binomial model estimates and p-values for total CPT/HCPCS procedure codes in the CMS-1500 professional claims and the UB-04 outpatient claims files for the MTM-P and MTM-NP (CG2) population groups, Florida MTM program June 1, 2010 - December 31, 2014

	Base Model						Difference in Difference (Interaction) Model					
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**
Intercept	-1.254	0.133	-1.514	-0.994	-9.450	<.0001	-1.248	0.133	-1.509	-0.987	-9.360	<.0001
MTM-P	0.064	0.057	-0.048	0.175	1.120	0.262	0.047	0.060	-0.071	0.165	0.780	0.438
MTM-NP	0	.	.	.	.	.	0	.	.	.	.	.
Female	-0.038	0.050	-0.135	0.060	-0.760	0.446	-0.038	0.050	-0.135	0.060	-0.750	0.451
Male	0	.	.	.	.	.	0	.	.	.	.	.
Black or African American	0.100	0.072	-0.041	0.242	1.390	0.166	0.102	0.072	-0.040	0.244	1.410	0.158
Hispanic	0.122	0.069	-0.013	0.257	1.770	0.076	0.122	0.069	-0.012	0.257	1.780	0.075
Other	0.060	0.062	-0.061	0.180	0.960	0.335	0.060	0.062	-0.061	0.181	0.980	0.328
White or European American	0	.	.	.	.	.	0	.	.	.	.	.
Age	-0.007	0.002	-0.012	-0.003	-3.110	0.002	-0.007	0.002	-0.012	-0.003	-3.120	0.002
Intervention	-0.195	0.038	-0.268	-0.121	-5.200	<.0001	-0.212	0.043	-0.297	-0.127	-4.890	<.0001
Pre-Intervention	0	.	.	.	.	.	0	.	.	.	.	.
Alive	-0.194	0.489	-1.151	0.764	-0.400	0.691	-0.196	0.491	-1.158	0.767	-0.400	0.690
Died												
ACG Risk Weight	0.420	0.015	0.391	0.449	28.280	<.0001	0.419	0.015	0.390	0.449	28.250	<.0001
Interaction Term	-	-	-	-	-	-	0.067	0.086	-0.101	0.236	0.780	0.434

- Results for the CG2 comparison group in Table 37 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 37. General Estimating Equation negative binomial model estimates and p-values for total inpatient facility and ED events for the MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 - December 31, 2014

	Base Model						Difference in Difference (Interaction) Model					
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**
Intercept	-3.096	0.110	-3.312	-2.880	-28.10	<.0001	-3.103	0.110	-3.318	-2.888	-28.28	<.0001
MTM-P	-0.118	0.051	-0.218	-0.017	-2.290	0.022	-0.089	0.063	-0.212	0.033	-1.430	0.154
MTM-NP	0	.	.	.	.	.	0	.	.	.	.	.
Female	0.037	0.053	-0.066	0.141	0.710	0.478	0.038	0.053	-0.065	0.141	0.720	0.469
Male	0	.	.	.	.	.	0	.	.	.	.	.
Black or African American	-0.179	0.056	-0.289	-0.068	-3.170	0.002	-0.178	0.056	-0.288	-0.067	-3.150	0.002
Hispanic	-0.181	0.051	-0.281	-0.080	-3.510	<.001	-0.183	0.052	-0.284	-0.081	-3.540	<.001
Other	-0.058	0.061	-0.177	0.062	-0.950	0.343	-0.059	0.060	-0.177	0.060	-0.970	0.330
White or European American	0	.	.	.	.	.	0	.	.	.	.	.
Age	-0.001	0.002	-0.005	0.003	-0.560	0.578	-0.001	0.002	-0.005	0.003	-0.550	0.580
Intervention	-0.016	0.065	-0.143	0.111	-0.250	0.805	0.009	0.079	-0.147	0.164	0.110	0.913
Pre-Intervention	0	.	.	.	.	.	0	.	.	.	.	.
Alive	-0.353	0.062	-0.475	-0.231	-5.680	<.0001	-0.347	0.063	-0.472	-0.223	-5.480	<.0001
Died	0	.	.	.	.	.	0	.	.	.	.	.
ACG Risk Weight	0.021	0.016	-0.010	0.051	1.310	0.189	0.021	0.016	-0.010	0.051	1.350	0.178
Interaction Term	-	-	-	-	-	-	-0.111	0.101	-0.310	0.088	-1.100	0.273

- Results for the CG2 comparison group in Table 38 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 38. General Estimating Equation negative binomial model estimates and p-values for total outpatient prescriptions for the MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 - December 31, 2014

	Base Model						Difference in Difference (Interaction) Model					
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**	**EST**	**SE**	**95% LCL**	**95% UCL**	**Z**	**Pr > |Z|**
Intercept	-2.169	0.082	-2.330	-2.009	-26.48	<.0001	-2.170	0.082	-2.331	-2.010	-26.51	<.0001
MTM-P	-0.009	0.033	-0.075	0.056	-0.28	0.777	-0.008	0.035	-0.077	0.061	-0.22	0.823
MTM-NP	0	.	.	.	.	.	0	.	.	.	.	.
Female	0.090	0.029	0.033	0.147	3.09	0.002	0.090	0.029	0.033	0.146	3.09	0.002
Male	0	.	.	.	.	.	0	.	.	.	.	.
Black or African American	-0.048	0.041	-0.128	0.031	-1.19	0.234	-0.048	0.041	-0.128	0.031	-1.19	0.233
Hispanic	-0.048	0.043	-0.132	0.035	-1.13	0.257	-0.048	0.043	-0.132	0.035	-1.14	0.255
Other	-0.039	0.040	-0.117	0.040	-0.97	0.3322	-0.039	0.040	-0.117	0.039	-0.97	0.332
White or European American	0	.	.	.	.	.	0	.	.	.	.	.
Age	0.008	0.002	0.006	0.011	5.68	<.0001	0.008	0.002	0.006	0.011	5.69	<.0001
Intervention	0.062	0.015	0.033	0.091	4.16	<.0001	0.064	0.018	0.028	0.099	3.55	<.001
Pre-Intervention	0	.	.	.	.	.	0	.	.	.	.	.
Alive	-0.887	0.169	-1.218	-0.555	-5.24	<.0001	-0.886	0.170	-1.219	-0.554	-5.22	<.0001
Died	0	.	.	.	.	.	0	.	.	.	.	.
ACG Risk Weight	0.041	0.010	0.023	0.060	4.36	<.0001	0.041	0.009	0.023	0.060	4.37	<.0001
Interaction Term	-	-	-	-	-	-	-0.005	0.032	-0.069	0.058	-0.16	0.874

EQ2: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 2 (CG2) for expenditure measures?

- Results for the CG2 comparison group in Table 39 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 39. Robust log-level linear regression difference in difference model estimates and p-values for a model of total recipient expenditures for MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 - December 31, 2014

	Base Model						Difference in Difference (Interaction) Model					
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**X^2**	**Pr > X^2**	**EST**	**SE**	**95% LCL**	**95% UCL**	**X^2**	**Pr > X^2**
Intercept	2.793	0.072	2.653	2.933	1527.17	<.0001	2.784	0.072	2.644	2.925	1506.01	<.0001
MTM-P	-0.039	0.030	-0.097	0.020	1.69	0.194	-0.010	0.036	-0.081	0.061	0.08	0.780
MTM-NP	0	.	.	.	.	.	0	.	.	.	.	.
Female	-0.012	0.026	-0.063	0.039	0.22	0.640	-0.012	0.026	-0.063	0.039	0.21	0.650
Male	0	.	.	.	.	.	0	.	.	.	.	.
Black or African American	0.087	0.035	0.019	0.156	6.30	0.012	0.087	0.035	0.019	0.155	6.30	0.012
Hispanic	0.083	0.037	0.010	0.155	4.95	0.026	0.081	0.037	0.008	0.154	4.78	0.029
Other	0.105	0.036	0.034	0.176	8.31	0.004	0.103	0.036	0.032	0.174	8.00	0.005
White or European American	0	.	.	.	.	.	0	.	.	.	.	.
Age	-0.008	0.001	-0.010	-0.005	33.16	<.0001	-0.008	0.001	-0.010	-0.005	33.00	<.0001
Intervention	-0.022	0.027	-0.075	0.032	0.62	0.433	0.000	0.032	-0.062	0.063	0.00	0.990
Pre-Intervention	0	.	.	.	.	.	0	.	.	.	.	.
Died	1.096	0.394	0.324	1.867	7.75	0.005	1.104	0.394	0.332	1.875	7.87	0.005
Alive	0	.	.	.	.	.	0	.	.	.	.	.
ACG Risk Weight	0.478	0.010	0.459	0.496	2504.27	<.0001	0.478	0.010	0.460	0.497	2506.29	<.0001
Interaction Term	-	-	-	-	-	-	-0.082	0.062	-0.203	0.040	1.75	0.187

- Results for the CG2 comparison group in Table 40 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 40. Robust log-level linear regression difference in difference model estimates and p-values for a model of total recipient pharmacy expenditures for MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 - December 31, 2014

	Base Model						Difference in Difference (Interaction) Model					
Parameter	**EST**	**SE**	**95% LCL**	**95% UCL**	**X^2**	**Pr > X^2**	**EST**	**SE**	**95% LCL**	**95% UCL**	**X^2**	**Pr > X^2**
Intercept	1.123	0.077	0.973	1.273	215.22	<.0001	1.125	0.077	0.975	1.276	214.38	<.0001
MTM-P	0.046	0.031	-0.016	0.107	2.12	0.146	0.036	0.039	-0.041	0.113	0.82	0.365
MTM-NP	0	.	.	.	.	.	0	.	.	.	.	.
Female	0.065	0.028	0.011	0.120	5.59	0.018	0.065	0.028	0.011	0.120	5.58	0.018
Male												
Black or African American	-0.158	0.037	-0.230	-0.086	18.65	<.0001	-0.158	0.037	-0.230	-0.086	18.65	<.0001
Hispanic	-0.035	0.039	-0.112	0.041	0.83	0.362	-0.035	0.039	-0.111	0.041	0.81	0.367
Other	0.024	0.039	-0.053	0.100	0.36	0.547	0.024	0.039	-0.053	0.101	0.38	0.535
White or European American	0	.	.	.	.	.	0	.	.	.	.	.
Age	0.004	0.001	0.001	0.006	6.54	0.011	0.004	0.001	0.001	0.006	6.53	0.011
Intervention	0.257	0.028	0.202	0.312	82.79	<.0001	0.250	0.033	0.185	0.314	57.82	<.0001
Pre-Intervention	0	.	.	.	.	.	0	.	.	.	.	.
Died	-1.578	0.412	-2.386	-0.770	14.65	0.0001	-1.578	0.412	-2.386	-0.770	14.64	0.0001
Alive	0	.	.	.	.	.	0	.	.	.	.	.
ACG Risk Weight	0.178	0.010	0.158	0.197	315.1	<.0001	0.178	0.010	0.158	0.197	314.23	<.0001
Interaction Term	-	-	-	-	-	-	0.027	0.064	-0.099	0.153	0.18	0.674

EQ3: What are the differences in the pre-intervention and intervention periods between the intervention group (MTM-P) and comparison group 2 (CG2) for clinical outcomes?

- Results for the CG2 comparison group in Table 41 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 41. Logistic regression model estimates and p-values for odds of one or more discharges from an inpatient hospital for MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 – December 31, 2014

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**Wald Chi-Square**	**PR > X^2**	**OR**	**EST**	**SE**	**Wald Chi-Square**	**PR > X^2**	**OR**
Intercept	-6.419	0.161	1598.403	<.0001	0.002	-6.427	0.161	1594.948	<.0001	0.002
MTM-P	-0.231	0.069	11.263	0.001	0.794	-0.205	0.077	7.202	0.007	0.814
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.282	0.057	24.885	<.0001	0.754	-0.282	0.057	24.942	<.0001	0.754
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	0.190	0.075	6.454	0.011	1.209	0.189	0.075	6.393	0.012	1.208
Hispanic	-0.162	0.091	3.147	0.076	0.851	-0.164	0.091	3.235	0.072	0.849
Other	0.100	0.075	1.775	0.183	1.106	0.100	0.075	1.749	0.186	1.105
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.002	0.003	0.378	0.539	0.998	-0.002	0.003	0.361	0.548	0.998
Intervention	-0.839	0.072	135.492	<.0001	0.432	-0.809	0.082	97.742	<.0001	0.445
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	1.158	0.476	5.917	0.015	3.182	1.160	0.476	5.926	0.015	3.188
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.506	0.018	778.229	<.0001	1.659	0.507	0.018	778.480	<.0001	1.660
Interaction Term	-	-	-	-	-	-0.130	0.172	0.574	0.449	0.878

- Results for the CG2 comparison group in Table 42 do not differ substantively on the policy question from CG1 analysis in the main body of the report.

Table 42. Logistic regression model estimates and p-values for odds of one or more discharges from a hospital ED for MTM participant and MTM non-participant (CG2) population groups, Florida MTM program June 1, 2010 – December 31, 2014

	Base Model					Difference in Difference (Interaction) Model				
Parameter	**EST**	**SE**	**Wald Chi-3 Square**	**PR > Chi-Sq**	**OR**	**EST**	**SE**	**Wald Chi-Square**	**PR > Chi-Sq**	**OR**
Intercept	-7.746	0.315	604.048	<.0001	0.000	-7.763	0.318	595.765	<.0001	0.000
MTM-P	-0.504	0.150	11.323	0.0008	0.604	-0.472	0.166	8.103	0.0044	0.624
MTM-NP	0	.	.	.	.	0	.	.	.	.
Female	-0.232	0.112	4.294	0.038	0.793	-0.231	0.112	4.253	0.039	0.794
Male	0	.	.	.	.	0	.	.	.	.
Black or African American	-0.131	0.163	0.642	0.423	0.877	-0.131	0.163	0.644	0.422	0.877
Hispanic	-0.079	0.174	0.206	0.6498	0.924	-0.080	0.174	0.211	0.646	0.923
Other	0.135	0.146	0.850	0.3565	1.144	0.134	0.146	0.839	0.356	1.143
White or European American	0	.	.	.	.	0	.	.	.	.
Age	-0.001	0.006	0.009	0.924	0.999	0.000	0.006	0.005	0.946	0.100
Intervention	-0.926	0.150	38.020	<.0001	0.396	-0.896	0.164	29.914	<.0001	0.408
Pre-Intervention	0	.	.	.	.	0	.	.	.	.
Died	0.505	1.035	0.238	0.626	1.656	0.504	1.035	0.237	0.626	1.657
Alive	0	.	.	.	.	0	.	.	.	.
ACG Risk Weight	0.390	0.024	271.389	<.0001	1.476	0.391	0.024	265.080	<.0001	1.479
Interaction Term	-	-	-	-	-	-0.161	0.376	0.184	0.668	0.851

Appendix IV Additional Tables

Additional Tables – Introduction

Table 43 elaborates on study group nomenclature and highlights the impact of attrition on defining both study groups for the analysis. The nominal cohort sizes are listed in column one. The last two rows of Table 43 demonstrate how severe the shrinkage is in this study population.

Table 43. Nominal cohort size per the list of names transmitted to the UF COP before June 1st of each intervention year and the observed population size by study period and cohort for the evaluation of the Florida Medicaid MTM program, June 2010 to December 2014

Cohort	Nominal Study Population Size	Observed Study Population Size for Pooled Analysis [a] in SP-PRI	Observed Study Population Size for Pooled Analysis [a] in SP-INT
		SP 1	SP 2
Cohort 1 MTM-P	147	127	82
Cohort 1 MTM-NP	504	420	263
Cohort 1 Sub-total	651	547	345
		SP 2	SP 3
Cohort 2 MTM-P	171	123	88
Cohort 2 MTM-NP	324	238	147
Cohort 2 Sub-total	495	361	235
		SP 3	SP 4
Cohort 3 MTM-P	137	97	63
Cohort 3 MTM-NP	709	601	318
Cohort 3 Sub-total	846	698	381
		SP 4	SP 5
Cohort 4 MTM-P	163	132	41
Cohort 4 MTM-NP	523	413	108
Cohort 4 Sub-total	686	545	149
		SP-PRI	SP-INT
All Cohorts MTM-P	618	479	274
All Cohorts MTM-NP	2,060	1,672	836

a) After exclusions or attrition due to death, loss to follow-up, or ineligibility under the MEDs AD 1115 waiver.

Additional Tables EQ1

Outpatient and Professional Services BETOS Categories

The next two tables summarize services received by BETOS category for the two study groups in outpatient hospital facilities and private office settings. Four BETOS categories are presented for outpatient facility settings, and five categories are presented for professional office settings. Procedures classified as "other" or were unclassifiable are not shown in either table. The Durable Medical Equipment category is not shown for the outpatient hospital settings due to low occurrence. Thus, the number of services and their associated expenditures are shown for Evaluation and Management, Procedures, Imaging, Laboratory Tests, and Durable Medical Equipment (Table 45 only). These tables are intended to supplement Tables 4 and 5 in the main body of the report, which show summary statistics for all BETOS codes combined. Tests were the most common service by far, while the highest expenditure rates were for procedures and imaging in outpatient facilities and evaluation/management in private office settings.

Table 44. Total and mean service counts and expenditures for CMS-1500 professional service claims by BETOS code category adjusted for enrolled days by program period for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014.

Outpatient Ambulatory BETOS Category Name	Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditures ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditure Rate per Member-Year ($)	Mean Annualized Rate 95% LCL ($)	Mean Annualized Rate 95% UCL ($)
Evaluation and Management	MTM-P	SP-PRI	108,727	883	100,779	114	0	338	359	295	422
Evaluation and Management	MTM-NP	SP-PRI	345,249	2,730	325,599	119	0	500	354	320	389
Evaluation and Management	Sub-Total	SP-PRI	453,976	3,613	426,377	118	0	500	355	325	386
Evaluation and Management	MTM-P	SP-INT	57,876	461	48,758	106	0	338	288	209	367
Evaluation and Management	MTM-NP	SP-INT	167,731	1,129	138,097	122	0	361	324	258	389
Evaluation and Management	Sub-Total	SP-INT	225,607	1,590	186,855	118	0	361	315	262	369

Outpatient Ambulatory BETOS Category Name	Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditures ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditure Rate per Member-Year ($)	Mean Annualized Rate 95% LCL ($)	Mean Annualized Rate 95% UCL ($)
Evaluation and Management	MTM-P	ALL	166,603	1,344	149,537	111	0	338	461	394	528
Evaluation and Management	MTM-NP	ALL	512,980	3,859	463,695	120	0	500	472	429	515
Evaluation and Management	Total	ALL	679,583	5,203	613,232	118	0	500	470	433	506
Procedures	MTM-P	SP-PRI	108,727	1,329	176,829	133	0	1,400	656	443	869
Procedures	MTM-NP	SP-PRI	345,249	4,272	627,417	147	0	1,661	693	585	801
Procedures	Sub-Total	SP-PRI	453,976	5,601	804,246	144	0	1,661	685	588	781
Procedures	MTM-P	SP-INT	57,876	639	66,151	104	0	399	442	287	598
Procedures	MTM-NP	SP-INT	167,731	2,190	297,905	136	0	1,436	646	479	813
Procedures	Sub-Total	SP-INT	225,607	2,829	364,056	129	0	1,436	599	465	733
Procedures	MTM-P	ALL	166,603	1,968	242,979	123	0	1,400	815	607	1,022
Procedures	MTM-NP	ALL	512,980	6,462	925,323	143	0	1,661	944	813	1,075
Procedures	Total	ALL	679,583	8,430	1,168,302	139	0	1,661	915	804	1,027
Imaging	MTM-P	SP-PRI	108,727	1,179	144,426	122	0	416	485	395	576
Imaging	MTM-NP	SP-PRI	345,249	3,690	496,628	135	0	503	516	460	573
Imaging	Sub-Total	SP-PRI	453,976	4,869	641,054	132	0	503	509	461	558
Imaging	MTM-P	SP-INT	57,876	586	70,440	120	0	482	399	306	491
Imaging	MTM-NP	SP-INT	167,731	1,396	183,349	131	0	520	390	323	457
Imaging	Sub-Total	SP-INT	225,607	1,982	253,789	128	0	520	392	336	448
Imaging	MTM-P	ALL	166,603	1,765	214,866	122	0	482	619	529	709
Imaging	MTM-NP	ALL	512,980	5,086	679,977	134	0	520	645	587	704
Imaging	Total	ALL	679,583	6,851	894,842	131	0	520	639	590	689
Tests	MTM-P	SP-PRI	108,727	6,093	84,427	14	0	362	299	247	352
Tests	MTM-NP	SP-PRI	345,249	18,371	332,209	18	0	940	371	298	444
Tests	Sub-Total	SP-PRI	453,976	24,464	416,636	17	0	940	355	297	413
Tests	MTM-P	SP-INT	57,876	2,547	38,217	15	0	338	248	168	328
Tests	MTM-NP	SP-INT	167,731	7,150	121,758	17	0	820	281	196	365
Tests	Sub-Total	SP-INT	225,607	9,697	159,974	16	0	820	273	206	341
Tests	MTM-P	ALL	166,603	8,640	122,644	14	0	362	370	313	427
Tests	MTM-NP	ALL	512,980	25,521	453,966	18	0	940	447	373	520
Tests	Total	ALL	679,583	34,161	576,610	17	0	940	429	371	488

Table 45. Total and mean service counts and expenditures for CMS-1500 professional service claims by BETOS code category adjusted for enrolled days by program period for MTM participant and MTM non-participant population groups, Florida MTM program June 1, 2010 – December 31, 2014.

Professional Services BETOS Category Name	Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditure Amount ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditure Rate per Member-Year ($)	Mean Annualized Rate 95% LCL ($)	Mean Annualized Rate 95% UCL ($)
Evaluation and Management	MTM-P	SP-PRI	106,693	9,246	613,555	66	0	1,575	2,429	2,058	2,799
Evaluation and Management	MTM-NP	SP-PRI	340,314	29,715	1,985,892	67	0	1,238	2,370	2,179	2,560
Evaluation and Management	Sub-Total	SP-PRI	447,007	38,961	2,599,447	67	0	1,575	2,383	2,213	2,552
Evaluation and Management	MTM-P	SP-INT	57,273	3,359	211,539	63	0	403	1,333	1,073	1,593
Evaluation and Management	MTM-NP	SP-INT	165,425	8,927	594,412	67	0	371	1,339	1,184	1,493
Evaluation and Management	Sub-Total	SP-INT	222,698	12,286	805,950	66	0	403	1,337	1,204	1,470
Evaluation and Management	MTM-P	ALL	163,966	12,605	825,093	65	0	1,575	2,273	1,987	2,559
Evaluation and Management	MTM-NP	ALL	505,739	38,642	2,580,304	67	0	1,238	2,259	2,105	2,414
Evaluation and Management	Total	ALL	669,705	51,247	3,405,397	66	0	1,575	2,263	2,127	2,398
Procedures	MTM-P	SP-PRI	106,693	2,245	312,523	139	0	2,256	1,132	909	1,354
Procedures	MTM-NP	SP-PRI	340,314	7,630	985,312	129	0	1,630	1,075	944	1,206
Procedures	Sub-Total	SP-PRI	447,007	9,875	1,297,835	131	0	2,256	1,088	974	1,201
Procedures	MTM-P	SP-INT	57,273	666	107,301	161	1.59	1,377	687	479	895
Procedures	MTM-NP	SP-INT	165,425	2,128	267,204	126	0	1,500	545	448	642
Procedures	Sub-Total	SP-INT	222,698	2,794	374,505	134	0	1,500	578	489	667
Procedures	MTM-P	ALL	163,966	2,911	419,824	144	0	2,256	1,303	1,086	1,519
Procedures	MTM-NP	ALL	505,739	9,758	1,252,516	128	0	1,630	1,201	1,077	1,324
Procedures	Total	ALL	669,705	12,669	1,672,340	132	0	2,256	1,224	1,116	1,331
Imaging	MTM-P	SP-PRI	106,693	3,177	109,690	35	0	1,152	393	328	459
Imaging	MTM-NP	SP-PRI	340,314	10,314	368,131	36	0	1,152	405	366	444
Imaging	Sub-Total	SP-PRI	447,007	13,491	477,821	35	0	1,152	402	369	436

Professional Services BETOS Category Name	Study Group	Study Period	Enrolled Days	BETOS Code Count	Total Expenditure Amount ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max. Expenditure Amount ($)	Mean Annualized Expenditure Rate per Member-Year ($)	Mean Annualized Rate 95% LCL ($)	Mean Annualized Rate 95% UCL ($)
Imaging	MTM-P	SP-INT	57,273	1,074	4,5205	42	0	1,150	302	230	375
Imaging	MTM-NP	SP-INT	165,425	3,084	143,677	47	0	1,152	315	265	366
Imaging	Sub-Total	SP-INT	222,698	4,158	188,882	45	0	1,152	312	270	354
Imaging	MTM-P	ALL	163,966	4,251	154,895	36	0	1,152	447	383	510
Imaging	MTM-NP	ALL	505,739	13,398	511,807	38	0	1,152	468	430	506
Imaging	Total	ALL	669,705	17,649	666,703	38	0	1,152	463	430	496
Tests	MTM-P	SP-PRI	106,693	15,975	120,623	8	0	630	406	347	465
Tests	MTM-NP	SP-PRI	340,314	51,022	363,250	7	0	1,694	389	362	416
Tests	Sub-Total	SP-PRI	447,007	66,997	483,873	7	0	1,694	393	368	418
Tests	MTM-P	SP-INT	57,273	5,792	55,688	10	0	463	358	275	442
Tests	MTM-NP	SP-INT	165,425	15,798	154,676	10	0	1,694	328	283	372
Tests	Sub-Total	SP-INT	222,698	21,590	210,365	10	0	1,694	335	296	374
Tests	MTM-P	ALL	163,966	21,767	176,311	8	0	630	462	406	519
Tests	MTM-NP	ALL	505,739	66,820	517,927	8	0	1,694	437	409	465
Tests	Total	ALL	669,705	88,587	694,237	8	0	1,694	443	417	468
Durable Medical Equipment	MTM-P	SP-PRI	106,693	1,314	103,085	78	0	16,081	321	197	444
Durable Medical Equipment	MTM-NP	SP-PRI	340,314	4,724	320,722	68	0	4,062	319	243	395
Durable Medical Equipment	Sub-Total	SP-PRI	447,007	6,038	423,807	70	0	16,081	319	254	385
Durable Medical Equipment	MTM-P	SP-INT	57,273	842	55,045	65	1.43	1,779	331	231	432
Durable Medical Equipment	MTM-NP	SP-INT	165,425	2,575	170,994	66	0	5,412	344	265	422
Durable Medical Equipment	Sub-Total	SP-INT	222,698	3,417	226,039	66	0	5,412	341	276	405
Durable Medical Equipment	MTM-P	ALL	163,966	2,156	158,129	73	0	16,081	443	322	565
Durable Medical Equipment	MTM-NP	ALL	505,739	7,299	491,717	67	0	5,412	449	370	527
Durable Medical Equipment	Total	ALL	669,705	9,455	649,846	69	0	16,081	447	381	514

Additional Tables EQ2

Total Expenditures

- The mean annualized total expenditures per recipient in the pre-intervention period is very similar and not significantly different for the MTM-P ($32,580) and the MTM-NP ($33,330) study groups.
- The decline in mean annualized total expenditure per recipient is large in both groups, $13,169 and $14,552 for MTM-P and MTM-NP respectively. This difference is negligible and non-significant.

Table 46. Summary statistics for total expenditures in the MTM participant and MTM non-participant (CG1) study groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Study Period	No. Recips.	Sum Enrolled Days	Total Expenditures ($)	Mean Expenditure Amount ($)	Min. Expenditure Amount ($)	Max Expenditure Amount ($)	Mean Annualized Expenditure Rate per Member-Year ($)	95% LCL Annualized Rate ($)	95% UCL Annualized Rate ($)
MTM-P	SP-PRI	479	111,007	9,908,639	20,686	12	202,621	32,580	25,821	39,339
MTM-NP	SP-PRI	1,672	353,302	32,262,102	19,296	4	332,330	33,330	26,494	40,167
Sub-Total	SP-PRI	2,151	464,309	42,170,741	19,605	4	332,330	33,151	26,333	39,969
MTM-P	SP-INT	274	62,418	3,319,474	12,115	8	167,971	19,411	14,194	24,628
MTM-NP	SP-INT	836	179,743	9,247,184	11,061	2	347,284	18,778	13,647	23,909
Sub-Total	SP-INT	1,110	242,161	12,566,658	11,321	2	347,284	18,941	13,788	24,095
MTM-P	All Periods	753	173,425	13,228,113	17,567	8	202,621	27,841	21,593	34,089
MTM-NP	All Periods	2,508	533,045	41,509,286	16,551	2	347,284	28,423	22,110	34,736
Total	All Periods	3,261	706,470	54,737,400	16,785	2	347,284	28,280	21,983	34,577

Additional Tables EQ3

Mean Continuous Single-Interval Measure of Availability for Medication Adherence

- Mean CSA values are similar in the MTM-P and MTM-NP groups in both study periods; they range from 1.0 to 1.07.
- The slight differences in mean CSA values between the two study groups in the pre-intervention period appear to be driven by outliers in the MTM-NP group.
    - 3.6% of CSA scores from recipients in the MTM-NP pre-intervention group were outliers (2 standard deviations or higher) versus a 1.9% outlier rate in the MTM-P pre-intervention group. Moreover, 6 of the 7 extreme outliers (a score of 5 or higher) in the pre-intervention period originated from the MTM-NP group.
    - The reasons for this anomaly are not clear, as the magnitude of the outliers is much higher than in previous evaluation years.

Table 47. Mean Continuous Single-Interval Measure of Availability (CSA) medication adherence score for the 17 chronic conditions tracked by the John's Hopkins ACG System for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 – December 31, 2014

Study Group	Study Period	No. Recipients	Mean CSA	Min CSA	Max CSA	Lower 95% CSA	Upper 95% CSA
MTM-P	SP-PRI	203	1.00	0.40	4.00	0.95	1.05
MTM-NP	SP-PRI	568	1.07	0.46	20.85	0.99	1.15
Sub-Total	SP-PRI	771	1.05	0.40	20.85	0.99	1.12
MTM-P	SP-INT	130	0.98	0.60	2.80	0.93	1.04
MTM-NP	SP-INT	308	1.01	0.36	5.68	0.96	1.06
Sub-Total	SP-INT	438	1.00	0.36	5.68	0.96	1.04
MTM-P	All Periods	333	0.99	0.40	4.00	0.96	1.03
MTM-NP	All Periods	876	1.05	0.36	20.85	1.00	1.11
Total	All Periods	1209	1.03	0.36	20.85	0.99	1.08

Mean Medication Possession Ratio for Medication Adherence

- Mean MPR values are similar in the MTM-P and MTM-NP groups in both study periods, about 0.9.
- These means are similar to findings in previous evaluation reports, which suggest that most recipients are adherent whether they are in the MTM program or not. It is not knowable if the drugs are taken as prescribed from this measure; however, the Morisky Adherence Scale that

UF-COP administers to the MTM-P group also suggests high self-reported adherence. Results for the Morisky Scale are reported under EQ6.

Table 48. Mean Medication Possession Ratio (MPR) adherence score for the 17 chronic conditions tracked by the John's Hopkins ACG System for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 – December 31, 2014.

Study Group	Study Period	No. Recipients	Mean MPR	Min MPR	Max MPR	Lower 95% MPR	Upper 95% MPR
MTM-P	SP-PRI	203	0.885	0.397	1.280	0.867	0.904
MTM-NP	SP-PRI	568	0.890	0.388	4.615	0.870	0.910
Sub-Total	SP-PRI	771	0.889	0.388	4.615	0.873	0.904
MTM-P	SP-INT	130	0.875	0.458	1.515	0.848	0.903
MTM-NP	SP-INT	308	0.876	0.318	1.607	0.856	0.896
Sub-Total	SP-INT	438	0.876	0.318	1.607	0.860	0.892
MTM-P	All Periods	333	0.881	0.397	1.515	0.866	0.897
MTM-NP	All Periods	876	0.885	0.318	4.615	0.870	0.900
Total	All Periods	1209	0.884	0.318	4.615	0.873	0.895

Additional Tables EQ4

Demographic Tables for Age, Race/Ethnicity, Sex, and Language for MTM-P and MTM-NP

Table 49. Frequency and proportion of patients categorized by their age on the last day of the most recent pre-intervention study period in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups versus All MED-AD Waiver recipients, Florida MTM program June 1, 2010 - December 31, 2014

Age Group*	Total MTM-P All 4 Cohorts	Pct. MTM-P All 4 Cohorts	Total MTM-NP All 4 Cohorts	Pct. MTM-NP All 4 Cohorts	Total MEDs-AD not in study	Pct. MEDs-AD not in study	Total All MEDs-AD Waiver Recips.	Pct. All MEDs-AD Waiver Recips.
< 21	3	0.5	19	0.9	182	0.8	204	0.8
21 - 40	69	11.2	306	15.3	3,034	14.1	3,409	14.1
41 - 50	111	18.0	464	23.2	3,597	16.7	4,172	17.3
51 - 55	156	25.3	404	20.2	3,379	15.7	3,939	16.3
56 - 60	147	23.9	436	21.8	4,201	19.5	4,784	19.8
61 - 65	129	20.9	365	18.2	4,393	20.4	4,887	20.2
> 65	1	0.2	9	0.4	2,735	12.7	2,745	11.4
Total	616	100	2,003	100	21,521	99.9	24,140	99.9

*Age on 05/31/2014 or at date of death

Table 50. Frequency and proportion of patients categorized by race and ethnicity in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups versus All MED-AD Waiver recipients, Florida MTM program June 1, 2010 - December 31, 2014

Race	Total MTM-P All 4 Cohorts	Pct. MTM-P All 4 Cohorts	Total MTM-NP All 4 Cohorts	Pct. MTM-NP All 4 Cohorts	Total MEDs-AD not in study	Pct. MEDs-AD not in study	Total All MEDs-AD Waiver Recips.	Pct. All MEDs-AD Waiver Recips.
Black or African American	151	24.5	445	22.2	4,043	18.8	4,639	19.2
Hispanic	47	7.6	353	17.6	4,902	22.8	5,302	22.0
Other	92	14.9	335	16.7	3,087	14.3	3,514	14.6
White or European American	326	52.9	870	43.4	9,489	44.1	10,685	44.3
Total	616	100	2,003	100	21,521	100	24,140	100.1

Table 51. Frequency and proportion of patients categorized by sex in NOMINAL Cohorts 1, 2, 3, and 4 for the MTM-P and MTM-NP population groups versus All MED-AD Waiver recipients, Florida MTM program June 1, 2010 - December 31, 2014

Gender	Total MTM-P All 4 Cohorts	Pct. MTM-P All 4 Cohorts	Total MTM-NP All 4 Cohorts	Pct. MTM-NP All 4 Cohorts	Total MEDs-AD not in study	Pct. MEDs-AD not in study	Total All MEDs-AD Waiver Recips.	Pct. All MEDs-AD Waiver Recips.
Male	276	44.8	906	45.2	10,147	47.1	11,329	46.9
Female	340	55.2	1,095	54.7	11,366	52.8	12,801	53.0
Unknown	0	0.0	2	0.1	8	0.04	10	0.04
Total	616	100	2,003	100	21,521	99.9	24,140	99.9

Table 52. Frequency and proportion of patients categorized by language preference in NOMINAL Cohorts 1, 2, 3, and 4 for the initial MTM-P and MTM-NP population groups versus All MED-AD Waiver recipients, Florida MTM program June 1, 2010 – December 31, 2014

Language	Total MTM-P All 4 Cohorts	Pct. MTM-P All 4 Cohorts	Total MTM-NP All 4 Cohorts	Pct. MTM-NP All 4 Cohorts	Total MEDs-AD not in study	Pct. MEDs-AD not in study	Total All MEDs-AD Waiver Recips.	Pct. All MEDs-AD Waiver Recips.
English	584	94.8	1,727	86.2	17,248	80.1	19,559	81.0
Spanish	26	4.2	254	12.7	4,081	19	4,361	18.1
Other Language	6	1.0	22	1.1	192	0.9	220	0.9
Total	616	100	2,003	100	21,521	100	24,140	100

Additional Tables EQ5

ACG Scores – Comorbidity

- Mean ACG risk scores are very similar between study groups in the pre-intervention period but diverge in the intervention period due to a sharper decline in the MTM-NP group (MTM-P 1.42 SP-PRI, 1.33 SP-INT, decline of 6.3%; versus MTM-NP 1.43 SP-PRI, 1.21 SP-INT, decline of 15.4%).
- Based on T-tests (not shown) of the mean scores in the pre-intervention vs. the intervention period in each group, the decline in ACG score was non-significant in the MTM-P group and significant in the MTM-NP group at the $p < .05$ level. This significant reduction likely represents the effect of attrition, as opposed to an actual decline in mean ACG score, within the MTM-NP group between the two study periods but cannot be stated with certitude until additional analysis is conducted.
- The t-test indicates no significant difference in the mean ACG scores between the MTM-P and MTM-NP groups in either study period.

Table 53. Summary statistics for the mean ACG score by the Johns Hopkins ACG System for the MTM-P and MTM-NP (CG1) study groups, Florida MTM program June 1, 2010 - December 31, 2014

Study Group	Study Period	No. Recipients	Mean ACG Score	Minimum	Maximum	Mean 95% LCL	Mean 95% UCL	T-test of ACG mean MTM-P vs. MTM-NP	
								T	Pr < |t|
MTM-P	SP-PRI	479	1.42	0.02	3.79	1.30	1.54	-	-
MTM-NP	SP-PRI	1,672	1.43	0.02	3.79	1.36	1.49	0.02	0.9863
Sub-Total	SP-PRI	2,151	1.42	0.02	3.79	1.37	1.48	-	-
MTM-P	SP-INT	274	1.33	0.02	16.78	1.11	1.55	-	-
MTM-NP	SP-INT	836	1.21	0.02	16.78	1.09	1.34	-0.88	0.3802
Sub-Total	SP-INT	1,110	1.24	0.02	16.78	1.13	1.35	-	-
MTM-P	All Periods	753	1.39	0.02	16.78	1.28	1.50	-	-
MTM-NP	All Periods	2,508	1.35	0.02	16.78	1.29	1.42	-0.53	0.5951
Total	All Periods	3,261	1.36	0.02	16.78	1.31	1.42	-	-

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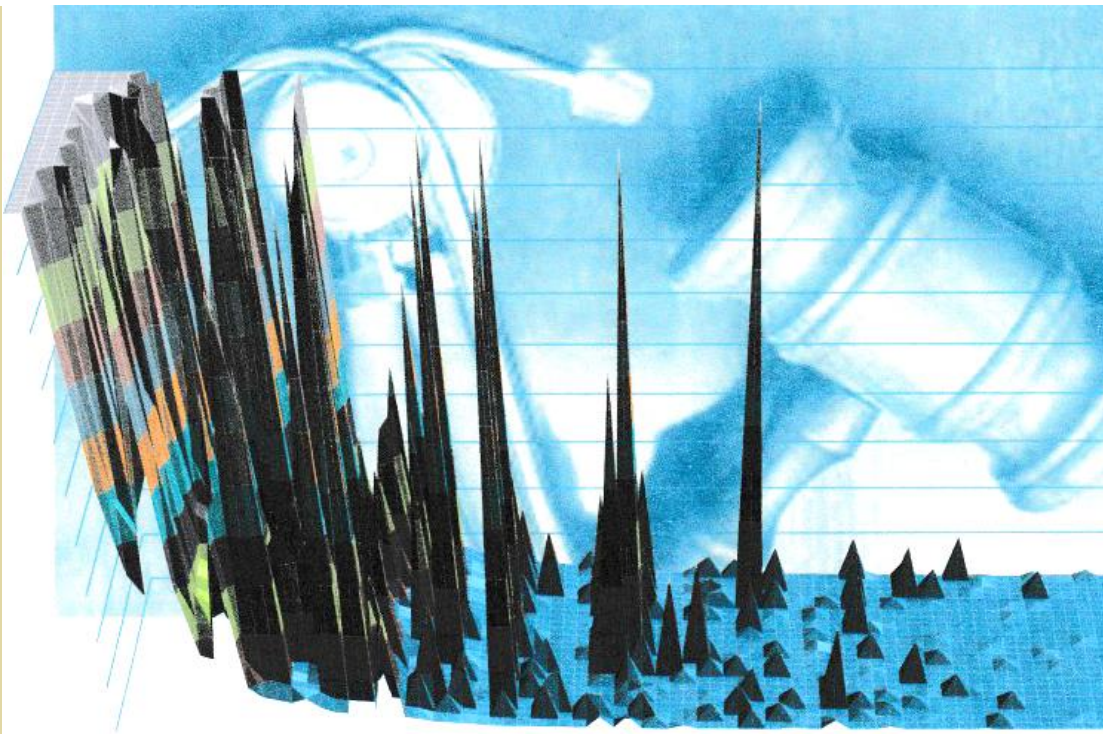
Appendix C
Data Mining Activities Evaluation
Final Report

MEDs-AD Waiver Evaluation:

Data Mining Activities Evaluation – Final Report



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EXECUTIVE SUMMARY

This report presents an evaluation of the Florida MEDs-AD Waiver: Data Mining Activities approved on July 15, 2010. With respect to this evaluation, the principal research question is:

> **Did the Data Mining Initiative (DMI) at the Medicaid Fraud Control Unit (MFCU) of the Florida Office of the Attorney General (FL OAG) add significantly to the results of Medicaid fraud investigations in the State of Florida?**

Data mining refers to the practice of electronically sorting Medicaid Management Information Systems claims through sophisticated statistical models and intelligent technologies to uncover patterns and relationships contained within the Medicaid claims and history files. Data mining has the goal of identifying abnormal utilization and billing practices that are potentially fraudulent within the Medicaid system.

The analyses conducted for this evaluation recognize that the Data Mining Initiative (DMI) cannot be seen as separate or isolated from all the other activities conducted within the MFCU at the FL OAG to detect fraud perpetrated against the Medicaid program. Additionally, the timeframe for the analyses, October 2010 through September 2015, (i.e., Federal Fiscal Years (FFY 2010-11 through FFY 2014-15), is rather short given the lengthy legal and administrative actions required to develop fraud recovery cases. Because of this relatively short timeframe, only a limited set of data proved useful for further analyses to properly represent the position of the data mining activities within the MFCU. It should be noted that most fraud cases identified through the data mining initiative are still pending adjudication.

Analyses of the quantitative data provided and key informant interviews resulted in the following findings regarding data mining activities in FFY 2014-15:

- MFCU opened 114 complaints and 55 full-case investigations.
- Four individuals have been convicted of Medicaid Fraud, four individuals have pled no contest to Medicaid Fraud, and three individuals have been arrested and are awaiting trial.
- Criminal restitution ordered in criminal cases is $1,381,337, while civil recoveries to date are $209,719.
- 24 MFCU referrals were provided to AHCA/MPI for further action.
- Communications between the two organizations, MFCU and AHCA MPI, have further improved according to stakeholders in both organizations.
- In addition to case adjudications, and as a result of MFCU data mining experience, the MFCU is recommending revisions to procedures and protocols contained in the Mental Health Targeted Case Management Handbook, Dated July 2006. Both AHCA/MPI and MFCU acknowledge that the data mining activities are increasingly important in "front-end" fraud prevention (i.e. closing legal loopholes and improving existing legal language).
- Although data mining has become a more integral component of the MFCU staff's daily activities, the MFCU specialty "brand" of data mining needs to be further developed going forward.
- A substantive finding regarding the investment in data mining is that, on average per FFY (FFY 2010-11 through FFY 2014-15), approximately $143,946 was budgeted and approximately $47,699 (or 33.1%) was actually spent on Medicaid fraud data mining within the MFCU.

List of Acronyms

AHCA = Florida Agency for Health Care Administration

CCEB = Complex Civil Enforcement Bureau

CMS = Centers for Medicare and Medicaid Services

DMAR = Data Mining Analyst Report

DMG = Date Mining Grant

DMI = Data Mining Initiative

DOH = Florida Department of Health

DSS = Decision Support System

FFP = Federal Financial Participation

FFY = Federal Fiscal Year

FL AG = Florida Attorney General

FL OAG = Florida's Office of the Attorney General

FTE = Full Time Equivalent

MEDs-AD = Medicaid Medications for Aged and Disabled

MFCU = Medicaid Fraud Control Unit

MOU = Memorandum of Understanding

MPI = Bureau of Medicaid Program Integrity

NC = Number of Complaints

OB = Obstetrical

OLS = Ordinary Least Squares

ONFC = Opened New Fraud Cases

PANE = Patient Abuse, Neglect, and Financial Exploitation

SCCP = Structure-Conduct-Performance Paradigm

SFY = State Fiscal Year

TAMR = Total Amounts of Monies Recovered

YTD = Year-To-Date

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1. Background and Perspective

Estimated Medicaid expenditures for State Fiscal Year 2014-15 (July 2014 through June 2015) were approximately $23.5 billion.[1] While the vast majority of those expenditures were for services needed, some of the expenditures were the result of fraudulent or abusive billing.

> **Fraud may be defined as**: A knowing or intentional deception or misrepresentation made by a Medicaid provider with the knowledge that the deception could result in some unauthorized benefit to oneself or some other person.
>
> **Abuse may be defined as**: Provider practices that are inconsistent with generally accepted business or medical practices and that result in an unnecessary cost to the Medicaid program or in reimbursement for goods or services that are not medically necessary or that fail to meet professionally recognized standards for health care.

In Florida, the investigation of suspected Medicaid fraud falls under the auspices of the Florida Attorney General (FL AG) at its Medicaid Fraud Control Unit (MFCU), while cases of suspected abuse of the Medicaid program are handled by the Bureau of Medicaid Program Integrity (MPI),[2] located in the Office of the Inspector General of AHCA. Staff from AHCA, MFCU, and the Department of Health (DOH), the agency responsible for licensing professionals such as physicians and therapists, meet regularly to discuss major issues, strategies, joint projects, and other matters concerning Medicaid care.

Suspected fraudulent billing practices can be discovered in various ways, one of which is analysis of paid Medicaid claims using AHCA's Decision Support System (DSS), which is a subset of the Medicaid Management Information System Claims Database. Data mining is usually defined as an extension of traditional data analyses and statistical approaches, incorporating analytical

[1] Estimate retrieved from http://edr.state.fl.us/content/conferences/medicaid/medltexp.pdf

[2] Authorized by Section 409.913, Florida Statutes, MPI audits and investigates providers suspected of overbilling or defrauding Florida's Medicaid program, recovers overpayments, issues administrative sanctions and refers cases of suspected fraud for criminal investigation to the FL AG.

techniques drawn from a range of disciplines. Data mining by itself is only a tool since it does not eliminate the need to know the business being performed, to understand the data and the analytical methods involved, nor does it indicate a value to the results of the data mining activity. Therefore, data mining outcomes or results always need translation into meaningful information. In essence, there are two types or approaches in data mining: approaches in which data is analyzed based on overall patterns or settings, and approaches seeking to identify departures from the norm. To locate these overall or specific patterns, instructions or decision rules (also algorithms) are often used. There are many data mining methodologies[3] and each involves an assessment or evaluation of the specific approach used.[4]

As the designated "single-state-agency" responsible for administering the Florida Medicaid program, AHCA's data mining activities are supported by federal funding through the Federal Financial Participation (FFP) program. The FFP, however, was not previously available to support data mining activities by staff at the MFCU. The MFCU and AHCA jointly requested that this prohibition be waived through the MEDs-AD Waiver, which was approved by the Centers for Medicare and Medicaid Services (CMS) on July 15, 2010.

The MEDs-AD Waiver provides Medicaid coverage for aged or disabled residents of the State of Florida with incomes at or below 88 percent of the federal poverty level and assets at or below $5,000 for an individual or $6,000 for a couple.[5] The MEDs-AD Waiver authorized inclusion of activities related to data mining by MFCU. In particular, the amendment states:

[3] Such as SEMMA for SAS and CRISP-DM for SPSS.
[4] For further reading see e.g. Jackson, J. (2002). Data-mining: A Conceptual Overview, Communications of the Association for Information Systems (Volume 8, 2002) 267-296, or
Chung, H.M., and Gray, P. Current Issues in Data-mining, Journal of Management Information Systems, forthcoming. Retrieved from http://www.csulb.edu/~imats/hmchung/rp1.htm
[5] Retrieved from http://www.fdhc.state.fl.us/medicaid/MEDS-AD/index.shtml

- The evaluation of the MEDs-AD will be revised to include tracking costs of data mining activities and the related recoveries or measurable cost avoidance directly attributable to analysis performed by MFCU analysts in this demonstration.
- The state's reporting schedule will continue and also include the status and progress of data mining activities related to this amendment. Tracking costs and recoveries will be submitted by the state annually within 60 days of the end of each waiver year.

On September 13, 2010, AHCA and the FL AG MFCU entered into a Memorandum of Understanding (MOU) that specifies the roles and responsibilities of the two organizations relative to data mining activities. Included in the MOU are the following provisions:[6]

- Coordinate all data mining activities with AHCA, prior to commencement, to ensure actions are not duplicated.
- Approximately biweekly, but not less than monthly, designated personnel with the parties will meet in-person to discuss data mining projects.
- At or before such meetings, MFCU personnel will present AHCA personnel with written proposals for data mining projects by the MFCU to review whether the proposed data mining objectives duplicate AHCA data mining projects. Meetings will also provide an opportunity to interpret data output generated by mining projects and to exchange information regarding potential projects that will enhance the productivity and efficiency of MFCU and AHCA resources.
- By approximately the next biweekly meeting, or within one month, AHCA will provide the MFCU with written verification about whether the MFCU's data mining objectives are duplicative of an existing or recently completed AHCA data mining project. AHCA may also suggest a coordinated effort between the parties with respect to proposed data mining objectives.

In October 2010, the MFCU at the FL AG commenced data mining activities.

[6] MOU Section IV.A.11 and Section VI A.2 and A.3 in particular.

Report Overview

This is an evaluation of Florida's Section 1115 Medicaid Medications for Aged and Disabled Research and Demonstration Waiver (MEDs-AD Waiver): Data Mining Activities approved by the Centers for Medicare and Medicaid Services on July 15, 2010, and builds on previous findings presented in 2013, 2014, and March 2015.

The purpose of the evaluation is to determine if activities by the FL OAG MFCU through the MEDs-AD Waiver have resulted in the recovery of Medicaid funds that were paid in conjunction with fraudulent activity on the part of Medicaid providers.

This evaluation takes into account several important considerations. First, Data Mining Initiative (DMI) activities cannot be seen apart or in isolation from the activities conducted within the entire MFCU organization (i.e., data mining is not a separate functional unit within the MFCU). Therefore, data mining activities can only be measured in relationship to the office's overall performance (see the MFCU organizational chart in Appendix 1 where the regional offices are depicted on the left hand side of the chart. Data mining specialists are placed within these MFCU regional offices: North – Tallahassee, Central – Orlando, and South – Miami, respectively). In addition, given the MOU, this performance reflects on both the FL OAG and AHCA.

Although other state and federal agencies and/or offices may be involved in Medicaid fraud detection activities, the focus of this evaluation will be at the level of MFCU and on the areas of understanding between the two parties associated with the MOU: AHCA and MFCU. In particular, this evaluation concentrates on the MEDs-AD Waiver provision regarding limiting duplication of effort and the opportunity to discuss, interpret, and exchange information on potential projects to enhance the productivity and efficiency of both MFCU and AHCA resources.

Second, the evaluation covers only October 2010 through September 2015 (i.e., FFY 2010-11 through FFY 2014-15). Given that it takes time to build and adjudicate legal cases, sometimes long after data mining is completed, results which can be attributed to the DMI may not be readily available in the reporting period for this evaluation.

Third, MFCU activities related to patient abuse, neglect, and financial exploitation (PANE) of patients residing in long-term care facilities are not included in this evaluation since they do not pertain specifically to the DMI.

For purposes of this evaluation, data mining is recognized as a tool adding a new dimension to the work structure within the FL OAG's MFCU Office. Data mining is also an opportunity to add to the inter-agency activities of the FL OAG, AHCA, and possibly other state and federal agencies. The full impact of the DMI will be recognized in time by the recovery of funds attributed to these sophisticated data analysis techniques.

In order to provide a comprehensive evaluation of the DMI, several quantitative and qualitative evaluation methods were used, each chosen for their appropriate application. These evaluation methods include: comparative analyses, observation of key management meetings, stakeholder and key informant interviews, literature reviews, as well as case file reviews to gather information and develop insights for this report. In addition, repeated rounds of information requests were submitted and honored by MFCU and AHCA MPI staffs without reservation. Given that any organization or institution is represented by a set of purposeful actions and intentions by a group of individuals, available information is analyzed from a perspective of an Input-Throughput-Output-Outcome model, allowing for some measures of efficiency and effectiveness of agency resource allocation.

With respect to the evaluation of data mining activities, the principal research question is:[7]

Did the DMI at the MFCU of the FL OAG add significantly to the results of Medicaid fraud investigations in the State of Florida?

In principle, this demands a comparison of MFCU outcomes with and without the MEDs-AD Waiver. As illustrated in Figure 1, this means comparing MFCU outcomes including or excluding the colored field named DMI. This brings a hypothetical element to the evaluation, which is to value and compare outputs under different scenarios: allocating or assigning efforts to DMI, knowing that DMI is an integral part of MFCU.

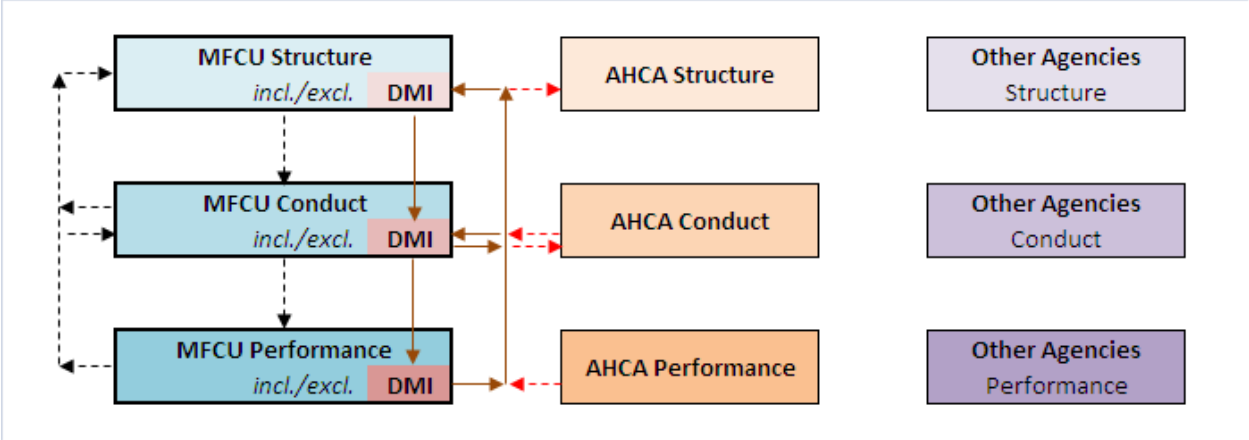


Figure 1: Structure-Conduct-Performance Paradigm (SCPP) transposed on MFCU/DMI, AHCA and Other State and or Federal Agencies

[7] A stricter definition in terms of significantly adding to recovery of Medicaid funds, which are paid as a result of fraudulent activity on behalf of Medicaid providers, would have been preferable. However, for FFY 2013-14 only one recovery in monetary terms has been reported, while for FFY 2014-15 five DMI assigned cases resulted in recoveries. No attempt is made to generalize findings based on the two data points only. Therefore, a broader definition in terms of significantly adding to the results of Medicaid fraud investigations is used instead.

The overall framework depicted in Figure 1 is the Structure-Conduct-Performance Paradigm (SCPP) by Edward S. Mason.[8] According to this framework, an organization's performance depends on the conduct of its employees, which in turn depends on the structure of the organization. Conversely, once performance is determined or known, conduct and/or structure of the organization will, in turn, change.

By implementing data mining activities or capacity authorized under the MEDs-AD Waiver and MOU, not only does the MFCU organizational structure change, but its organizational conduct and performance are also potentially enhanced. In addition, the structural relationship between MFCU and AHCA changes, as well as the respective conduct and performance of each. The MEDs-AD Waiver, the MOU, and in particular, the biweekly referral meetings and monthly data mining meetings, enhance the productivity and efficiency of MFCU and AHCA's fraud and abuse intelligence resources. (Note: the red dashed arrows indicate the AHCA contributions at the various levels, as far as they pertain to the added DMI). Other agencies are also depicted in Figure 1, given that other agencies are part of the Medicaid network and are consulted by the MFCU. However, links to the other agencies were omitted since these effects fall outside the scope of this evaluation.

The results presented in this evaluation reflect the long period of time, often years, between data mining and legal adjudication, criminal judgement, and orders for financial restitution.

In section 2, some descriptive statistics are presented relevant to the fraud investigation activities of the MFCU, including statistics on recent data mining activities (budget, allocated FTEs including training, complaints, opened new cases, cases investigated, and disposition of cases, as well as monies retrieved). Section 3 covers significant case and referral highlights from Data

[8] The paradigm was originally developed by Edward S. Mason of Harvard University in the 1930's. Since then, it has been developed by J.S. Bain and other Market Structuralists in the field of Industrial Organization. It is also used in the study of Economic Systems and in the study of Management and Organization.

Mining Analyst Report (DMAR) cases during FFY 2014-15. Interviews conducted with key informants on the DMI and data mining activities are the focus of section 4. These in-person interviews were held to capture the more qualitative aspects of the DMI. The foci of the interviews were: potential issues with data miner turnover, the developing position of the DMI within the MFCU, the communication and institutionalization of the inter-agency cooperation, and the evolving impact of data mining detection to prevent Medicaid fraud and abuse. Last, section 5 covers the overall evaluation findings.

2. Data Mining Activities Statistics

This section focuses on descriptive statistics based on data requests submitted to the FL OAG. It covers general statistics on the Medicaid Fraud Control Unit (MFCU) as well as specific statistics relating to the data mining activities within the MFCU. The purpose of presenting statistics on both levels is to view the data mining activities in their proper context relative to the MFCU (as per Figure 1), as well as to present possible variables for the DMI analyses and evaluation.

Figure 2 assists with obtaining a better understanding of the numerous variable categories in their proper setting. Given the variables, comparing input and output provides a measure of efficiency, while comparing input with outcome provides a measure of effectiveness. The presentation of data is by FFY, October 1st through September 30th.

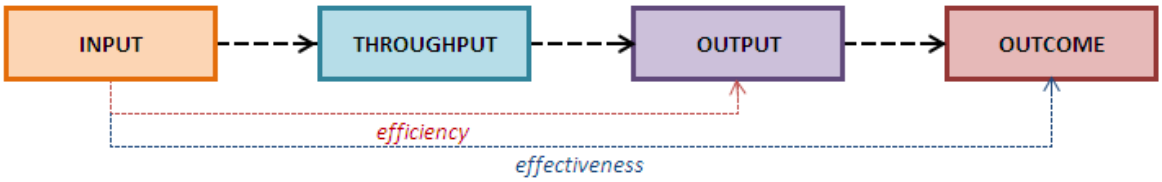


Figure 2: Input – Throughput – Output – Outcome Model

Descriptive statistics relevant to the fraud investigation activities of the MFCU are presented, including statistics on recent data mining activities such as: budget, allocated FTEs, complaints, opened new cases, cases investigated, and disposition of cases as well as monies retrieved.

2.1 Input: Budget, FTEs, and Training

The MFCU is financed, in-part (75%), by federal grant funding based on Federal Financial participation (FFP). Federal statutes and regulations concerning FFP require that the remaining part (25%) be financed by the State of Florida, which matches the federal grant with the State of Florida's General Revenue Fund and Program Income account. The total MFCU budget for Federal Fiscal Year (FFY) 2014-2015 is $20.4 million, including $206,692 for the MFCU Data Mining Initiative (DMI). Figure 3 depicts the annual MFCU budgets, including the FFP grants and the state matching funds, for FFY 2008-09 through FFY 2014-15. In addition, the MFCU funds provided through the FFP Data Mining Grant (DMG) with matching state funds are included, and noted separately for FFYs 2010-11 through FFY 2014-15.

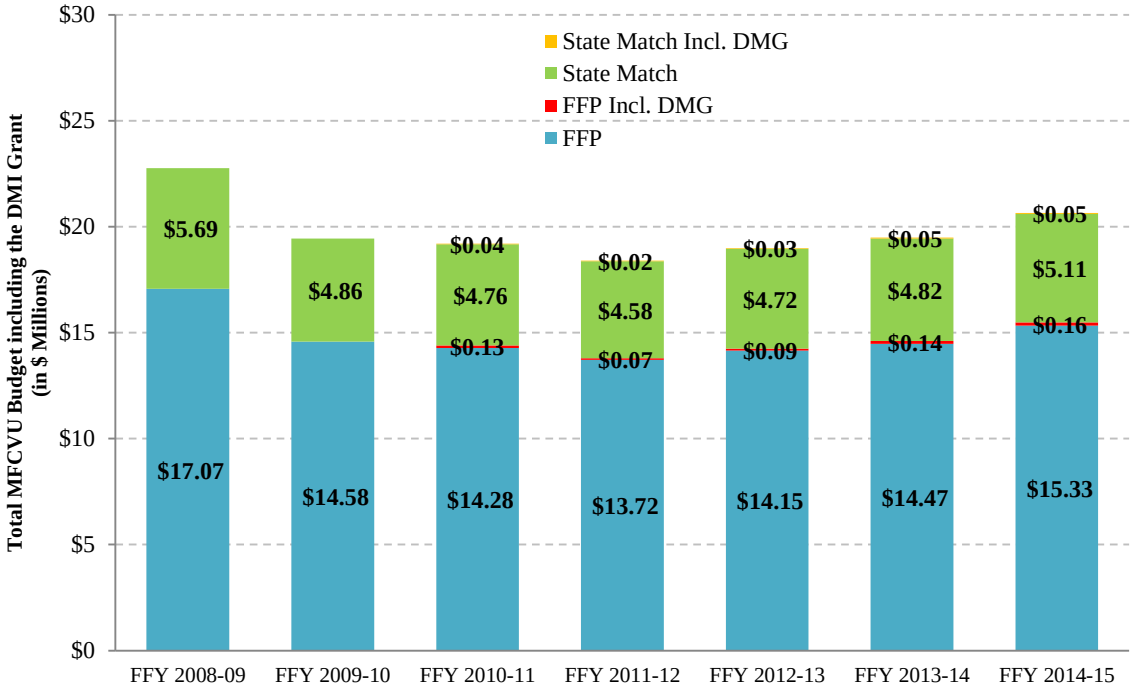


Figure 3: MFCU Budget, MFCU Grant, and Data Mining Grant (FFP and Florida State Matching Funds), FFY 2008-09 through FFY 2014-15

As can be derived from Figure 3 data, the overall average annual MFCU budget over the years depicted is $19.7 million, with $14.8 million coming from the MFCU Grant and $4.9 million from Florida state matching funds. The total MFCU budget over the recent three FFYs seems to relatively improve after the budget low in FFY 2011-12. The average growth for the period FFY 2011-12 through FFY 2014-15 is approximately 3.8 percent annually.

The added DMGs (both FFP funds and Florida state matching funds) since FFY 2010-11 are rather marginal with regards to the annual budgets (adding 1% to the overall MFCU budget). However, the DMG budget in FFY 2014-15 of $206,692 indicates an increase of 11.4 percent over the previous year's budget, as can be seen from the data in Figure 3a. The overall DMG budget average over the years depicted is $143,946. The average growth for the period FFY 2011-12 through FFY 2014-15 is approximately 27.6 percent annually.

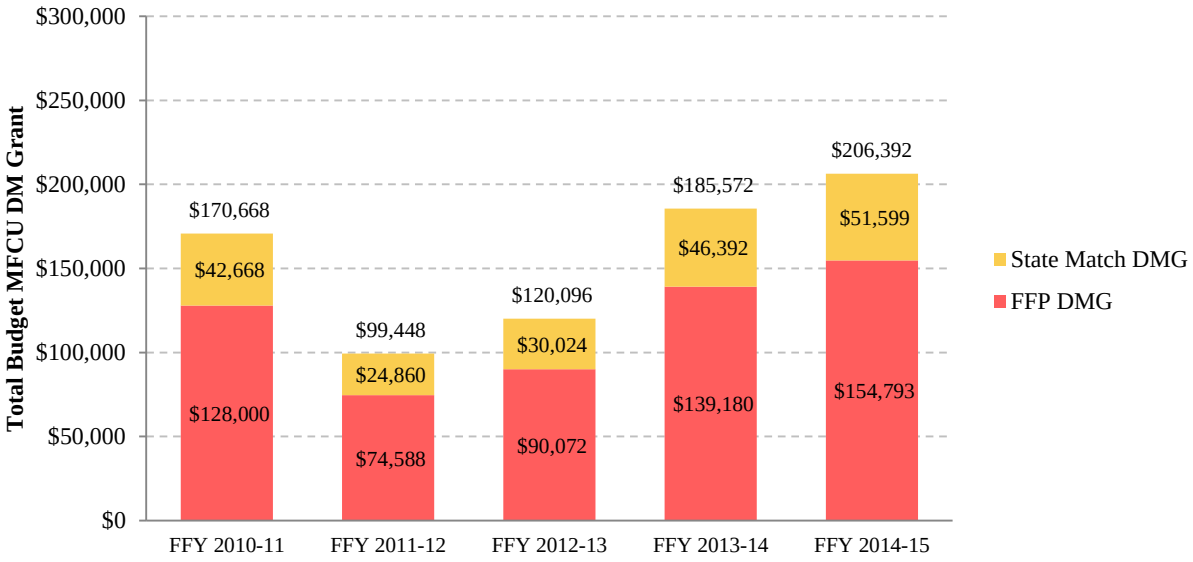


Figure 3a: MFCU DMI Budget (Federal DMG and Florida State Matching Funds), FFY 2010-11 through FFY 2014-15

The lion's share, or 62.4 percent, of the FFY 2014-15 data mining budget is allocated to "personnel" and "fringe benefits". The remainder is taken by "other" and "indirect" at 31.5 and 6.1 percent, respectively.[9]

Although budgets are used as a means of measuring input, it is the actual expenditures of funds that are most relevant as a direct input measurement. Figure 4 depicts the differences between the budgets and expenditures for MFCU and Figure 4a depicts the same for the DMI. For comparative purposes, the expenditures are shown with the budgets from Figures 3 and 3a as a backdrop. Both Figures 4 and 4a show that actual expenditures are significantly less than their respective budgets.

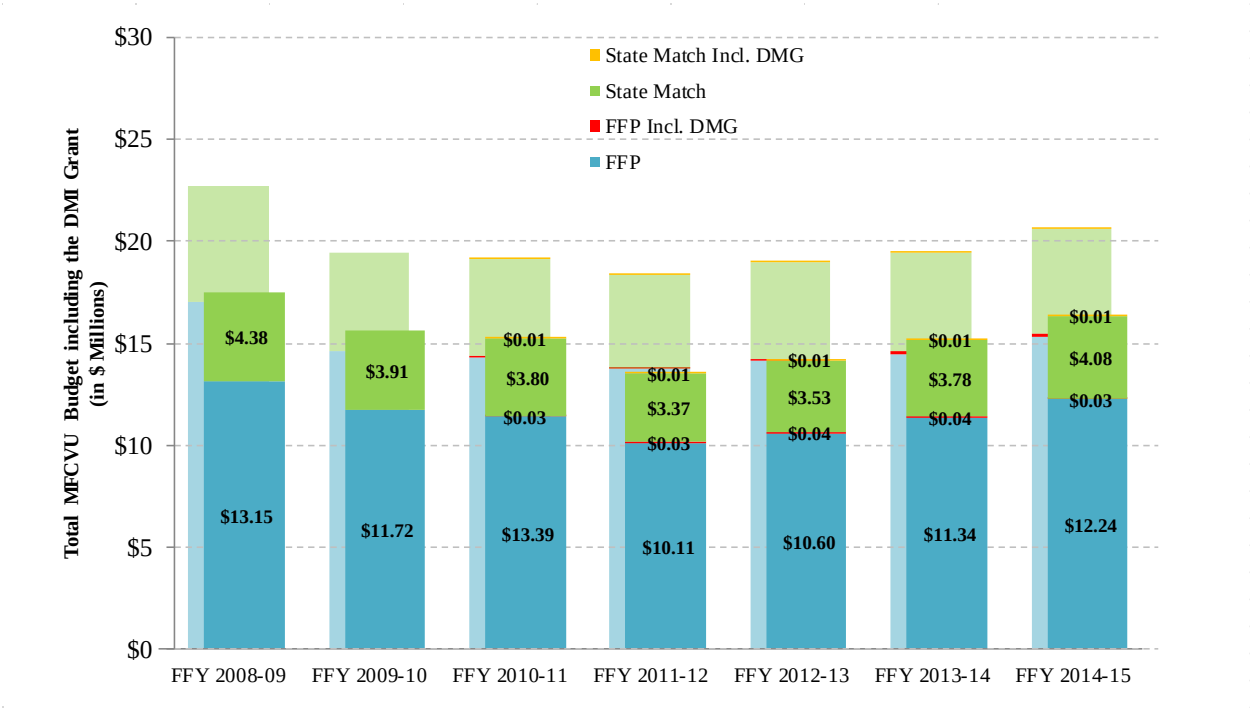


Figure 4: MFCU Budget and Expenditures, MFCU Grant and DMG (FFP and Florida State Matching Funds), FFY 2008-09 through FFY 2014-15

[9] Percentages are based on the operational budget.

Total expenditures by MFCU, on average, were approximately 77.4 percent of the respective fiscal year budgets, with a low of 73.5 percent for FFY 2011-12. For FFY 2014-15, the expenditures comprised 79.3 percent of the MFCU budget. The lower level of expenditure as compared to the budget is, in part, due to unfilled or unfunded positions within MFCU.[10]

Figure 4a depicts the DMI allocated budgets and expenditures for the FFYs 2010-11 through FFY 2014-15. Similarly, and for comparative purposes, the expenditures are shown with the budgets from Figure 3a as a backdrop.

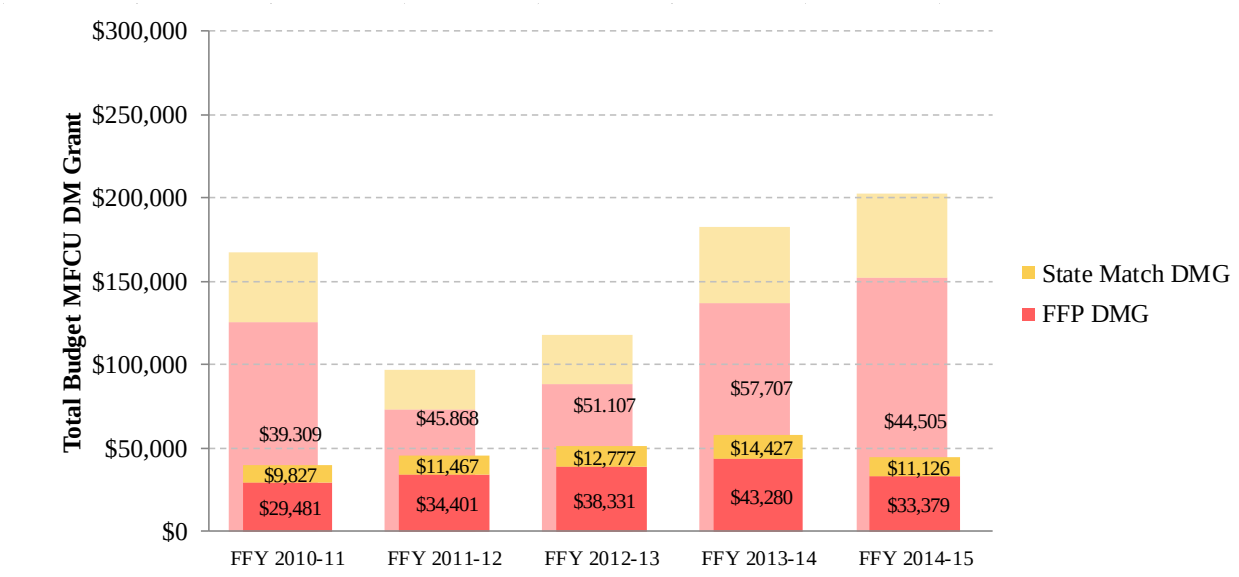


Figure 4a: MFCU DMI Budget and Expenditures (Federal DMG and Florida State Matching Funds), FFY 2010-11 through FFY 2014-15

For the DMI, total expenditures shown in figure 4a for FFY 2014-15 were only $44,505, or approximately 21.6 percent of the fiscal year's total budget. The annual average of expenditures

[10] The MFCU had some unfilled staff and support positions throughout the last couple of years.

for the five years depicted is $47,699, i.e., approximately 33.1 percent of the available respective budgets. Average growth of expenditures for the same years is 3.2 percent annually.

Table 1 presents the total FTEs budgeted and applied for the MFCU by employee categories for FFY 2008-09 through FFY 2014-15. The table also shows the respective reserve positions.[11]

Table 1: MFCU FTE Employment including Data Mining Analysts, Budgeted versus Applied, FFY 2008-09 through FFY 2014-15

		FFY 2008-09	FFY 2009-10	FFY 2010-11	FFY 2011-12	FFY 2012-13	FFY 2013-14	FFY 2014-15
Total	**Budgeted**	**232**	**217**	**214**	**210**	**210**	**210**	**210**
	Attorneys	26	27	27	27	27	27	27
	Investigators	106	101	100	97	97	115	112
	Auditors	7	7	10	10	10	10	13
	Support Staff	63	52	52	53	53	58	58
	of which Data Mining Analysts			***0.45***	***0.75***	***0.75***	***2.25***	***2.25***
Reserve	Attorney	1	-	-	-	-	-	5
Reserve	Investigators	24	24	19	19	19	19	30
Reserve	Auditors	-	-	-	-	-	-	5
Reserve	Support Staff	5	6	6	4	4	4	10
		-30	-30	-25	-23	-23	-23	-50
TOTAL FTEs Applied		**202**	**187**	**189**	**187**	**187**	**187**	**160**

Given the table's applied FTEs for FFY 2014-15, it is noted that there were 50 unfilled positions or vacancies: five vacant positions for attorneys, thirty for investigators, five for auditors, and ten others, totaling employment at 160 Full Time Equivalents (FTE). The figures in red show the six staff data miners FTEs associated with the DMI, at 0.375 each. Table 1a provides a further regional breakdown of data mining analysts by Florida MFCU region.

[11] Reserve positions are authorized positions, to be filled at the discretion of management of the organization.

Table 1a: MFCU FTE Data Mining Analysts and Approximate Hours Devoted to Data Mining, per MFCU Region, FFY 2010-11 through FFY 2014-15

DATA MINING GRANT					
		Region / Hours[12] devoted to DMI			
	DMI Analysts	North Hours (%)	Central Hours (%)	South Hours (%)	Total Hours
FFY 2010-11	**0.45**	313 (15)	313 (15)	313 (15)	940
FFY 2011-12	**0.75**	522 (25)	522 (25)	522 (25)	1,566
FFY 2012-13	**0.75**	522 (25)	522 (25)	522 (25)	1,566
FFY 2013-14	**2.25**	1,566 (75)	1,566 (75)	1,566 (75)	4,698
FFY 2014-15	**2.25**	1,566 (75)	1,566 (75)	1,566 (75)	4,698

As shown in Tables 1 and 1a, the FTEs assigned to data mining analyst tasks in the first three FFYs represent only a marginal fraction of the overall MFCU employment, adding on average, approximately 0.34 percent to the total MFCU employment. In FFY 2013-14 the three DMI analysts were set at 2.25 FTE (0.75 FTE each), while the same 2.25 FTE in FFY 2014-15 is split over six data mining staff (or 0.375 FTE each).

2.2 Output: Complaints, Opened New Cases, Cases Investigated, and Disposition of Cases

Output measures include number of complaints (NC),[13] number of fraud complaints, MFCU opened new fraud cases (ONFC), cases investigated, and cases closed/disposed. Complaints serve here as the initial base for evaluation. Data on number of complaints (horizontal axis) versus number of opened new fraud cases (vertical axis) for the last five FFYs is depicted in Figure 5.

[12] Hours calculation based on 2,087 standard state hours per FTE.
[13] A complaint is an allegation that a person or provider may have committed an offense that may constitute a violation of state or Federal law.

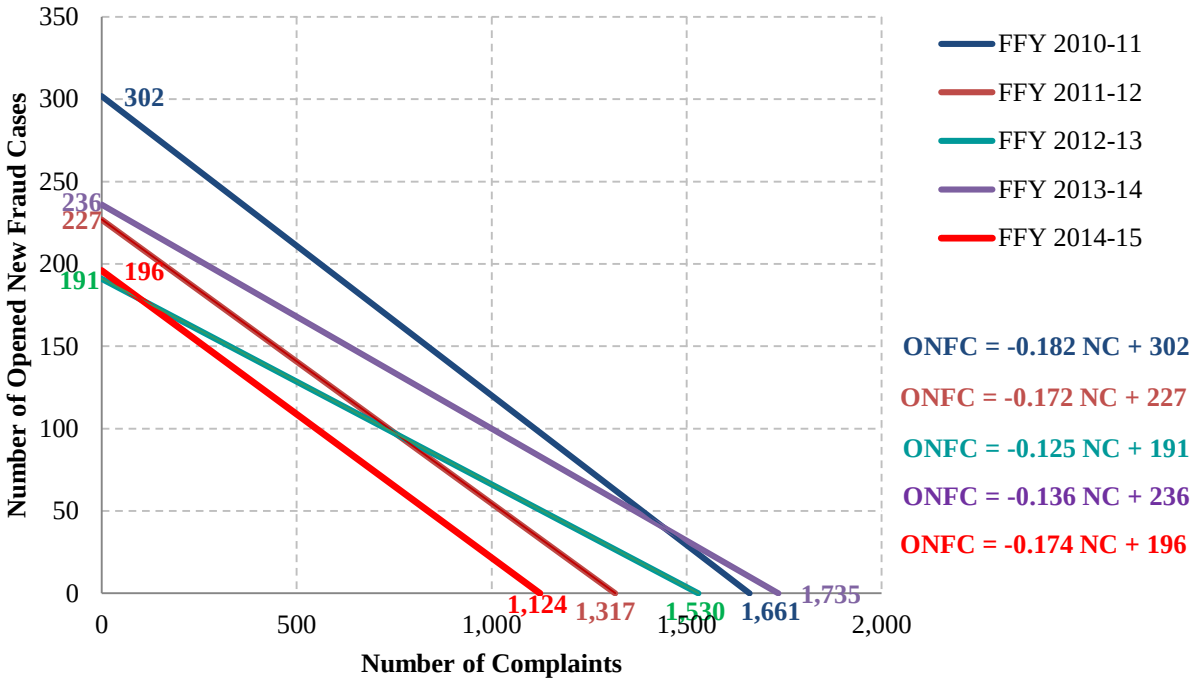


Figure 5: MFCU Opened New Fraud Cases from Complaints, FFY 2010-11 through FFY 2014-15

From the data and information presented in Figure 5, it can be observed that in FFY 2010-11 the MFCU received 1,661 complaints and opened a total of 302 new fraud cases (ratio of ONFC / Complaints x 100% = 18.2%). In FFY 2011-12, the MFCU received 1,317 complaints, while 227 (17.2%) new fraud cases were opened. In FFY 2012-13 a total of 1,530 complaints were received, and 191 (12.5%) new fraud cases were opened. Total complaints received in FFY 2013-14 tallied 1,735, while 236 new fraud cases were opened (13.6%). Finally, in FFY 2014-15 there were 1,124 complaints and 196 new fraud cases opened (17.4%). On average this amounts to 1,473 complaints per year with 230 opened new fraud cases or a ratio of 15.6 percent. Clearly the ratio of 17.4 percent in FFY 2014-15 was higher than the annual average of 15.6 percent, indicating a higher yield in terms of opened new fraud cases from complaints.

Table 2 below provides an overview of the number of complaints received by the MFCU, delineated by source, for FFY 2010-11 through FFY 2014-15. Major sources of complaints are depicted in shades of red. As shown in Table 3, the number of complaints received as a result of the MFCU DMI for FFY 2014-15 was 12 or 1.1 percent of the total number of complaints. This number is lower than the same measure in previous years, namely 27, 16, 16, and 43 (or 3.2%, 2.3%, 1.9%, 5.4%), respectively, for FFYs 2010-11 through 2013-14. Table 3 provides a selection of the same data; i.e., the top eight sources of complaints with the MFCU DMI ranking as ninth largest source, based on aggregate levels for the five years. In FFY 2014-15, MFCU DMI became the eighth largest source of all complaints (was sixth in FFY 2013-14). The average number of fraud complaints over the years depicted was 754.

Table 2: The Number of Fraud Complaints Received by the MFCU by Source, FFY 2010-11 through FFY 2014-15

Source:	FFY 2010-11	FFY 2011-12	FFY 2012-13	FFY 2013-14	FFY 2014-15	Source:	FFY 2010-11	FFY 2011-12	FFY 2012-13	FFY 2013-14	FFY 2014-15
AHCA Bureau of Managed Care						FBI - Federal Bureau of Investigations	4		3	3	
AHCA - District Office	7	1	1	1	2	FDLE - Florida Dept. of Law Enforcement	2		1	3	
AHCA - Fraud Prevention & Compliance Unit (FPCU)	2	8	1			Government Employee	2	1	2	1	
AHCA - Health Quality Assurance	13	8	9	2	2	HHS - Health & Human Services	5	4			
AHCA - Medicaid Program Integrity	61	30	25	25	56	HHS - OIG Health & Human Services Inspector	11	7	9	17	6
AHCA - Office of Inspector General/General Council	3	3		2	1	HMO - Investigative Unit	11	5	2		
AHCA - Other Units	3	1		1	2	Insurance Company	2	1		2	
AHCA - Third Party Liability/Recovery	1		1			Joint Task Force	4	1	1	2	1
Anonymous (FFY 2010-11) / Attorney (FFY 2013-14)	13			7		Law Enforcement Agency	7	7	3	7	4
APD - Agency for Persons with Disabilities	20	10	10	7	10	Managed Care Contractor/Provider/SIU				7	9
APS - Adult Protective Services	17	5	4	5	6	Medicaid Provider	28	21	44	31	29
Attorney					4	Medicaid Recipient	50	108	225	169	116
Citizen	301	198	143	104	76	MFCU - Other than Florida	4	3	1	3	
CMS - Center for Medicare & Medicaid Services	2			6	1	MFCU - Statewide Intel Team	2				
Confidential Informant	6	3				**MFCU Data Mining Initiative**	**27**	**16**	**16**	**43**	**12**
Consumer Protection Agency	1		1			NAAG - National Association of Attorney Generals	1	1			
Contractor for Center for Medicare & Medicaid	7	8	1		1	NAMFCU - National Association of MFCU					
County Health Department		1				Non-Profit Organization			1		
DEA - U.S. Drug Enforcement Agency			1			Operation Spot Check		1			
Dept. of Children & Families - IG Office	2	4		2	0	OSWP - Office of Statewide Prosecution		1			
Dept. of Elder Affairs	1					Press Report / Media Report	2	4		2	2
DFS - Dept. of Fin. Services Div. of Insurance Fraud				2	3	Qui Tam	127	80	119	102	80
DOH - Dept. of Health	1	2	1	3	1	SAO - State Attorney's Office	1				2
DOH - Medical Quality Assurance	1	2		1		Spinoff Case	31		18	21	9
DOJ - Dept. of Justice	3					SSA - Social Security Administration	1	20			
DPAF - Dept. of Public Assistance Fraud		1				State Agency - Other	2		2	1	
Elected Official	2				1	Umbrella Complaint-Case					10
Employee	29	58	63	83	57	USAO - U.S. Attorney's Office		1			
EOMB Explanation of Medicaid Benefits					2	Veteran Affairs			1		
Family Member	22	82	147	134	61						
Transport						**Total Number of Complaints**	**842**	**707**	**856**	**799**	**566**

Table 3: The Top Eight Sources by Number of Fraud Complaints Received by the MFCU by Source, FFY 2010-11 through FFY 2014-15

Source:	FFY 2010-11	FFY 2011-12	FFY 2012-13	FFY 2013-14	FFY 2014-15	Total FFY 2010-11 through FFY 2014-15	Average Percentage FFY 2010-11 through FFY 2014-15
Citizen	301	198	143	104	76	**822**	21.4%
Medicaid Recipient	50	108	225	169	116	**668**	17.8%
Qui Tam	127	80	119	102	80	**508**	13.4%
Family Member	22	82	147	134	61	**446**	11.8%
Employee	29	58	63	83	57	**290**	7.9%
AHCA - Medicaid Program Integrity	61	30	25	25	56	**197**	5.5%
Medicaid Provider	28	21	44	31	29	**153**	4.1%
MFCU Data Mining Initiative	**27**	**16**	**16**	**43**	**12**	**114**	**3.0%**
Sub-Total	**645**	**593**	**782**	**691**	**487**	**3,198**	**84.9%**
Other	**197**	**114**	**74**	**108**	**79**	**572**	15.1%
Total Number of Complaints	**842**	**707**	**856**	**799**	**566**	**3,770**	**100.0%**

Table 4 provides the same data on all fraud and other complaints broken out by region.

Table 4: The Number of all Complaints Received by the MFCU by region FFY 2014-15

Complaint Opened by Region	Abuse & Neglect	Fraud	Patient Funds	Grand Total
CCEB		84		84
Central	119	102	16	237
Directors Office	11	185		196
Northern	100	54	7	161
Southern	273	141	31	445
Grand Total	**503**	**566**	**54**	**1,123**

Table 5 displays the top five provider types of fraud complaints received by the MFCU, by provider, for FFY 2010-11 through FFY 2014-15. Shading is provided on recurring provider categories. As evidenced by the table, four provider categories represent the majority of fraud complaints.

Table 5: Top Five Provider Types in Number of MFCU Fraud Complaints, FFY 2010-11 through FFY 2014-15

Provider Type	# MFCU Fraud Complaints by Provider Type Top 5	Cumulative Percentage of Total Top 5
FFY 2010-11		
Physician (MD)	153	18%
Home and Community Based Service	111	31%
Pharmaceutical Manufacturer	92	42%
Pharmacy	64	50%
None*	43	55%
Other	**379**	**100%**
TOTAL FFY	**842**	
FFY 2011-12		
Physician (MD)	123	17%
Home and Community Based Service	99	31%
Pharmacy	64	40%
None*	48	47%
Dentist	46	54%
Other	**327**	**100%**
TOTAL FFY	**707**	
FFY 2012-13		
Physician (MD)	162	19%
Dentist	72	27%
Pharmacy	69	35%
General Hospital	65	43%
Home and Community Based Service	58	50%
Other	**430**	**100%**
TOTAL FFY	**856**	
FFY 2013-14		
Physician (MD)	133	17%
Home and Community Based Service	76	26%
Dentist	57	33%
Pharmacy	51	40%
Case Management Agency	43	45%
Other	**439**	**100%**
TOTAL FFY	**799**	
FFY 2014-15		
Physician (MD)	97	17%
Home and Community Based Service	76	31%
Pharmacy	38	37%
General Hospital	28	42%
Pharmaceutical Manufacturer	28	47%
Other	**299**	**100%**
TOTAL FFY	**566**	

*No Provider Type assigned

Data from table 5 show that in FFY 2014-15 the majority of fraud complaints relate to "Physician (MD)" with a total of 97 fraud complaints or 17 percent of total fraud complaints. Next highest source is "Home and Community Based Service" at 76 fraud complaints (or 14% of total fraud complaints). The provider type category "Physician (MD)" ranks highest in terms of the number of MFCU fraud complaints received for the four prior years depicted (18%, 17%, 19%, 17% and 17% of total fraud complaints received, respectively). Both "Home and Community Based Service" (13%, 14%, 7%, 9% and 13%, respectively), and "Pharmacy" (8%, 9%, 8%, 7% and 7%, respectively) appear in the top five of all five years presented. The last column in Table 5 provides cumulative percentages of the top five fraud complaint sources. The annual top five represents 55, 54, 50, 45 percent, and 47 percent, respectively, of total fraud complaints received during each of the five years represented. The slightly downward trend in the top five cumulative percentage indicates a diversion into other provider types.

Of the fraud complaints mentioned, only a subset may be elevated to investigative case status. Table 6 provides information on MFCU cases investigated (caseload) and opened new cases by source (defined per agency/category) for FFY 2007-08 through FFY 2014-15. Shading is provided to highlight the major sources (red).

Table 6: MFCU Cases Investigated and Opened New Fraud Cases by Source, FFY 2007-08 through FFY 2014-15

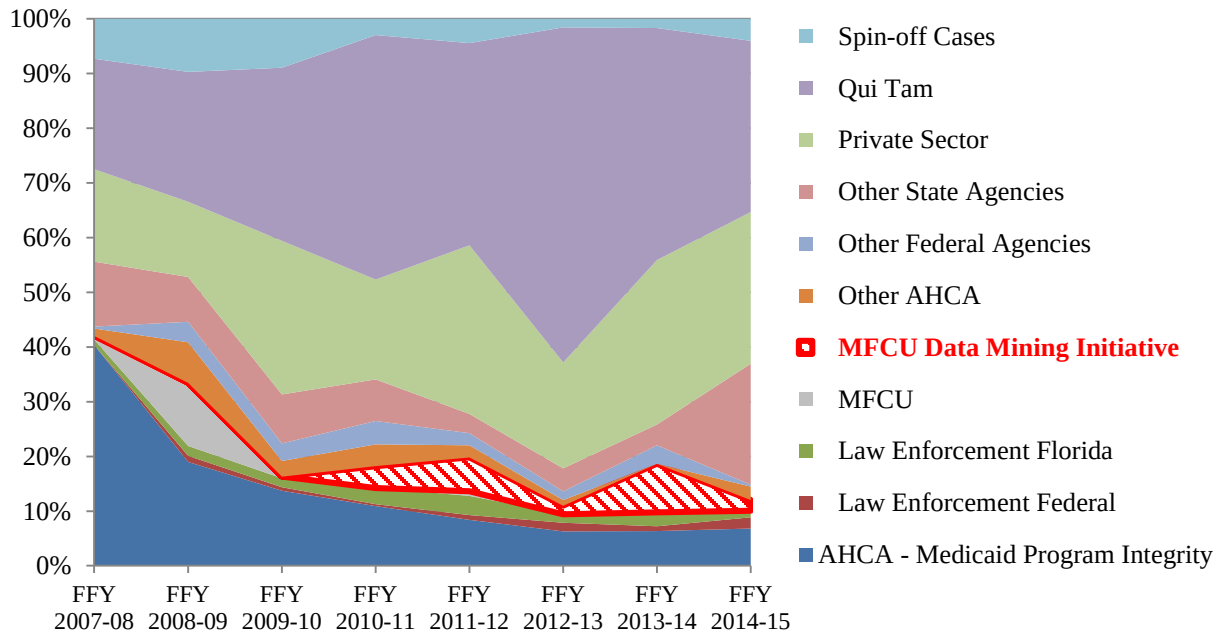
	Federal Fiscal Years							
	FFY 2007-08	FFY 2008-09	FFY 2009-10	FFY 2010-11	FFY 2011-12	FFY 2012-13	FFY 2013-14	FFY 2014-15
Caseload*	922	927	906	930	872	877	962	917
Cases: Opened New During FFY	302	269	313	302	227	191	236	249
Cases: Sources of New Opened Cases (sources defined by agency):								
AHCA - Medicaid Program Integrity	122	51	43	33	19	12	15	17
Law Enforcement Federal		3	2	1	2	3	2	5
Law Enforcement Florida	3	5	5	9	8	3	6	2
MFCU	2	31	1		2	0		1
MFCU Data Mining Initiative				**12**	**14**	**3**	**21**	**5**
Other AHCA	4	20	9	12	5	2		6
Other Federal Agencies	1	10	10	13	5	3	8	1
Other State Agencies	36	22	28	23	8	8	9	55
Private Sector	51	37	88	55	70	37	71	69
Qui Tam	61	64	99	135	84	117	100	78
Spin-off Cases	22	26	28	9	10	3	4	10

*Caseload is a snapshot of the number of cases on the last day of the FFY.

As shown in Table 6, the caseload for FFY 2014-15 was 917 cases. The annual average number of cases investigated for the eight-year period shown was 914 cases per year, and 912 for the MEDs-AD Waiver period of FFY 2010-11 through FFY 2013-14. Similarly, the opened new cases in FFY 2014-15 were 249, while the average for the eight-year period was 261 new cases opened and 241 cases for the last four FFYs or MEDs-AD Waiver period only. The major sources overall with respect to opened new cases are *Qui Tam*[14] and Private Sector sources (e.g.; citizens,

[14] Qui tam is a lawsuit brought by a private citizen (popularly called a "whistle blower") against a person or company who is believed to have violated the law in the performance of a contract with the government or in violation of a government regulation, when there is a statute which provides for a penalty for such violations. Qui tam suits are brought for "the government as well as the plaintiff." In a *qui tam* action the plaintiff (the person bringing the suit) will be entitled to a percentage of the recovery of the penalty (which may include large amounts for breach of contract) as a reward for exposing the wrongdoing and

employees, providers, recipients, contractors, media) at relative averages of 35.3 percent and 22.9 percent, respectively. The third largest source of opened new cases was AHCA, with a relative average of 14.9 percent. MFCU DMI source in opened new cases was reported at a relative average of 2.6 percent. DMI added 4.0 percent (12/302 x 100%) to the sub-total of opened new cases in FFY 2010-11, 6.2 percent (14/227 x 100%) of opened new cases in FFY 2011-12, 1.6 percent (3/191 x 100%) in FFY 2012-13, 8.9 percent (21/236 x 100%), and 2.0 percent (5/249 x 100%) of opened new cases in FFY 2014-15. Complaints were, by far, the prime driver of new activities as opened new cases. The same data as Table 6, on opened new cases by MFCU per source, is depicted in Figure 6 in relative terms.



** In FFY 2007-08, biweekly briefings began between AHCA MPI and MFCU with an emphasis on the quality of referrals being made to MFCU.*

Figure 6: Relative Shares of Opened New Fraud Cases by Source, FFY 2007-2008 through FFY 2014-15

recovering funds for the government. Sometimes the federal or state government will intervene and become a party to the suit in order to guarantee success and be part of any negotiations and conduct of the case. This type of action is generally based on significant violations which involve fraudulent or criminal acts, and not technical violations and/or errors. Description retrieved from http://dictionary.law.com/default.aspx?selected=1709

Table 7 provides a further breakdown on opened new cases by region: DMI opened new cases versus all other sources of opened new cases, FFY 2010-11 through FFY 2014-15.

Table 7: Opened New Fraud Cases by Region; DMI and Other Sources, FFY 2010-11 through FFY 2014-15

	FFY 2010-11		FFY 2011-12		FFY 2012-13		FFY 2013-14		FFY 2014-15		Total	
Central DMI opened	7	**58%**	6	**43%**	3	**100%**	3	14%	1	20%	20	**36%**
Other opened	54	35%	47	38%	25	36%	39	30%	38	35%	203	34%
Northern DMI opened	3	25%	7	**50%**	0	0%	5	24%	2	**40%**	17	31%
Other opened	56	36%	42	34%	21	30%	32	24%	31	28%	182	31%
Southern DMI opened	2	17%	1	7%	0	0%	13	**62%**	2	**40%**	18	33%
Other opened	45	29%	35	28%	24	34%	61	46%	40	37%	205	35%
Total DMI opened	**12**		**14**		**3**		**21**		**5**		**55**	
Total Other opened	**155**		**124**		**70**		**132**		**109**		**590**	
Total CCEB	135		89		118		104		82		528	
Grand Total	**302**		**227**		**191**		**257**		**196**		**1173**	

As denoted in Table 7, the Complex Civil Enforcement Bureau (CCEB)[15] is the largest single source for opened new cases, with a relative average of 45.0 percent (528/1,173) of total MFCU opened new cases for FFY 2010-11 through FFY 2014-15. The spread of opened new cases over the MFCU regions was quite even, with Central Florida at a relative average of 19.0 percent ((20+203)/1,173), North Florida at 17.0 percent ((17+182)/1,173), and South Florida at 19.0 percent ((18+205)/1,173). The percentages in the second columns under each FFY in Table 7 indicate relative shares of opened new cases per region, excluding the CCEB opened new cases (e.g., first column 7/12 = 58%; 54/155 = 35%, etc.). The relative shares indicated in red designate that the regional DMIs added relatively more of the DMI opened new cases to the region, than did

[15] Florida's civil investigations are handled by the Attorney General's Complex Civil Enforcement Bureau, which is part of the Medicaid Fraud Control Unit.

all other sources. The variable "opened new fraud cases" is used for further evaluation in section 5 (and Appendix 2).

Table 8 provides a list of the top five Medicaid provider types for Medicaid fraud cases ranked from most to least frequency of fraud. Shading is provided on recurring provider categories.

Table 8: Top Five Medicaid Opened New Fraud Cases by Provider Type, FFY 2010-11 through FFY 2014-15

Opened New Fraud Cases by Provider Type				
FFY 2010-11	**FFY 2011-12**	**FFY 2012-13**	**FFY 2013-14**	**FFY 2014-15**
• Pharmaceutical Manufacturer	• Home & Community Based Service	• Physician (MD)	• Physician (MD)	• Home & Community Based Service
• Home & Community Based Service	• Pharmaceutical Manufacturer	• Dentist	• Case Management Agency	• Pharmaceutical Manufacturer
• Physician (MD)	• Physician (MD)	• Pharmacy	• Pharmaceutical Manufacturer	• Physician (MD)
• Pharmacy	• Pharmacy	• General Hospital	• Home & Community Based Service	• Pharmacy
• General Hospital / Therapist	• Medical Equipment Manufacturer	• Home & Community Based Service	• Pharmacy	• Independent Lab

Information in Table 8 shows that "Home and Community Based Service" is most frequent in the number of opened new fraud cases according to rank in FFY 2014-15. As shown in the table, four provider type categories clearly represent the majority of fraud cases opened over the period FFY 2010-11 through FFY 2014-15. Of cases attributed to the DMI, the main category for opened new fraud cases by provider type in FFY 2014-15 was "Physician (MD)" with 4 cases, followed by "Dentist" with one case. Given that cases by provider type can only be measured in frequency or rank number, this variable will not be used for further evaluation in section 5.

Data in Table 9 gives an overview of the disposition of MFCU cases closed, FFY 2010-11 through FFY 2014-15. Shading is provided to highlight the major sources (red for MFCU and orange in the last five columns with cases attributable to the DMI).

Table 9: Disposition of MFCU Closed Fraud Cases and Subset of Closed Cases Attributed to the DMI, FFY 2010-11 through FFY 2014-15

	MFCU					of which: DMI				
Cases: Disposition of Closed Cases	**FFY 2010 -11**	**FFY 2011 -12**	**FFY 2012 -13**	**FFY 2013 -14**	**FFY 2014 -15**	**FFY 2010 -11**	**FFY 2011 -12**	**FFY 2012 -13**	**FFY 2013 -14**	**FFY 2014 -15**
Administrative Closure	32	2	9	2	6					
Administrative Referral	65	55	49	37	34	1	2	3	4	4
Assistance to Other Agencies		1	11	1	2		1	1		
Case Dismissed	22	11	28	23	44					
Case Remanded	3									
Civil Intervention Declined	5	1	2							
Civil Judgment	2	2	1	3	3					1
Civil Settlement	45	14	37	32	28					2
Consolidated	16	3	11	5	1					
Conviction	24	9	11	14	19					1
Defendant Deceased			1							
Defendant Filed Bankruptcy	1									
Deferred Prosecution			1	1	2					
Fugitive Defendant			16	7	1					
Investigated by another Law				7	8				2	
Lack of Evidence	28	23	37	23	13	4	3	4	4	2
Nolle Prosequi	2		1							
Not a Medicaid provider					1					
Plea Agreement	7	10	25	20	2				1	
Pretrial Intervention	3	2	6	1	2					
Probation			11	4						
Prosecution Declined		6	9	1						
Resolved with Intervention	1	2	1	2	2					
Unfounded	18	25	27	12	17		1	3	3	
Unsubstantiated				1	1					
Voluntary Dismissal	11	21	36	36	81					
Grand Total Closed Cases	**285**	**187**	**330**	**232**	**267**	**5**	**7**	**11**	**14**	**10**

As can be shown in from the table, 267 cases were closed in FFY 2014-15, including 10 attributable to the DMI. It is noted that in FFY 2014-15 only a subset of 49 MFCU cases, or 18.4 percent out of the total number of closed cases, led to civil settlements, convictions, or plea agreements (marked with a darker blue shade in the index column). Similarly, over the five FFYs, these categories total 297 cases or 22.8 percent of the total number of closed cases. Among other categories, "Administrative Referral" was highest with 240 cases overall for the five-year period shown, or 18.4 percent of total MFCU cases. Second and third highest categories on overall disposed cases was "Voluntary Dismissal", and "Case Dismissed" with 185 cases and 128 cases, respectively, or 14.2 and 9.8 percent, respectively, of the total cases dismissed. For the DMI, "Administrative Referral" was the highest category in FFY 2014-15. Over the five-year period, the category "Lack of Evidence" was the prime reason for disposition with a total of 17 cases or 36.2 percent of the cases. The second highest overall disposition category was "Administrative Referral" with 14 cases or 29.8 percent of total cases. The third highest category for disposition of closed fraud cases was "Unfounded" in a total of 7 cases or 14.9 percent of cases.

2.3 Outcomes: Monies Recovered

A longer term perspective on outcomes of activities by the MFCU, in terms of the total amount of monies recovered, is presented in Figure 7.

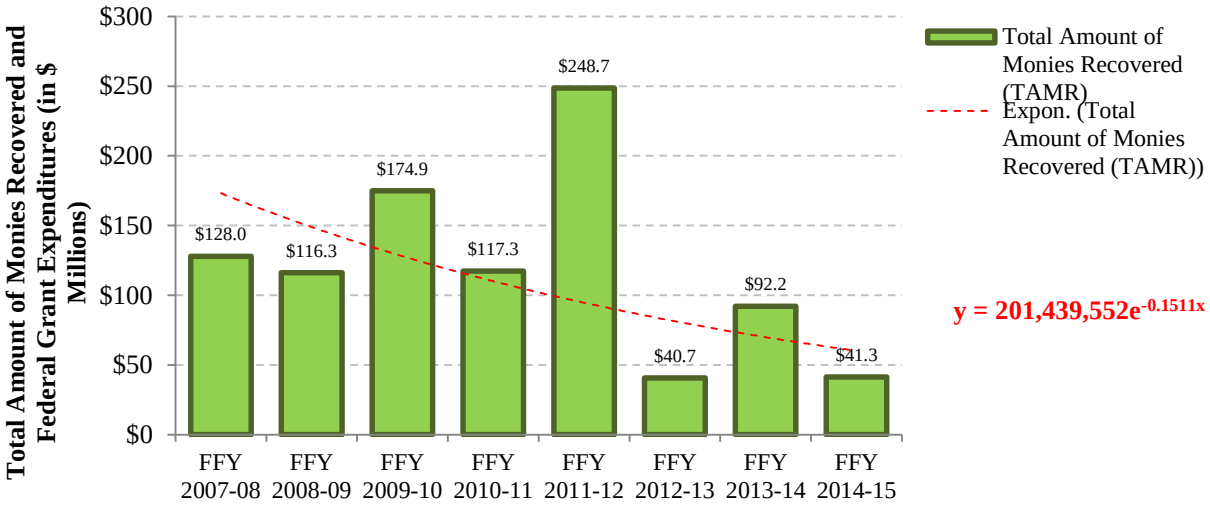


Figure 7: Total Amount of Monies Recovered by MFCU, FFY 2007-08 through FFY 2014-15

Total amount recovered in FFY 2014-15 was $41.3 million. Data in Figure 7 provides an average annual amount of monies recovered of $119.9 million for the eight years shown. Based on the same data, the compound rate of growth in the amount of recoveries, over the years depicted, is approximately minus 15 percent annually (as evidenced by the exponential trend).

Figure 8 compares the number of cases investigated or the caseload (horizontal axis) to the total amount of monies recovered (vertical axis) by MFCU. For the timeframe FFY 2007-08 through FFY 2009-10, only the average is given (AVG FFY 2007-10). For the timeframe FFY 2010-11 though FFY 2014-15, both individual years and the average are given (AVG FFY 2010-15).

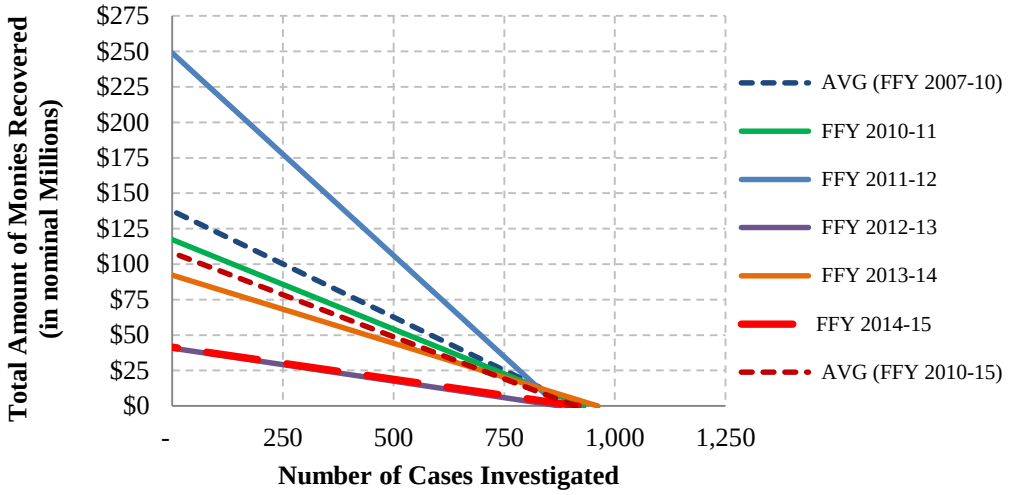


Figure 8: Number of Cases Investigated Relative to the Total Amount of Monies Recovered in Millions, Averages FFY 2007-10 and FFY 2010-15, and Individual Years FFY 2010-11 through FFY 2014-15

As shown in Figure 8, MFCU recovered a total of $41.3 million on 917 investigated cases in FFY 2014-15, which is almost an equal amount as in FFY 2012-13 ($40.7 million with 877 investigated cases). The number of cases investigated remains rather stable over the years depicted, with an overall average of 912 cases (horizontal axis). Monies recovered, on the other hand, show a spread in outcomes (vertical axis) on a year-to-year basis. Obviously, cases investigated or the work-load is rather constrained or determined by input, while the results are independent or vary according to case specifics. Taken on average however, the amount of value recovered for the FFY periods from FFY 2007-08 through FFY 2009-10 as compared to FFY 2010-11 through FFY 2014-15 showed roughly similar outcomes. The blue bold dashed line in Figure 8 represents the average ratio of Total Amount of Monies Recovered (TAMR) of $139.7 million with 918 cases on average for FFYs 2007-08 through FFY 2009-10, resulting in an average (or ratio) of $152,139 per case. Similarly, the bold red dashed line represents the average ratio of monies retrieved during the MEDs-AD Waiver evaluation period for FFY 2010-11 through FFY 2014-15, with an average of

912 cases investigated at a total value of $108.0 million, or an average, per case, value of $118,519. In comparing the two periods, the number of cases investigated declined by approximately 0.65 percent, while the total value of monies recovered declined by 22.7 percent. Effectively, this results in a decline of 22.1 percent of value recovered per case investigated during the MEDs-AD Waiver evaluation timeframe.

Figure 9 depicts the TAMR per FFY 2007-08 through FFY 2014-15 next to the respective Federal Grant Expenditures (Fed Share).

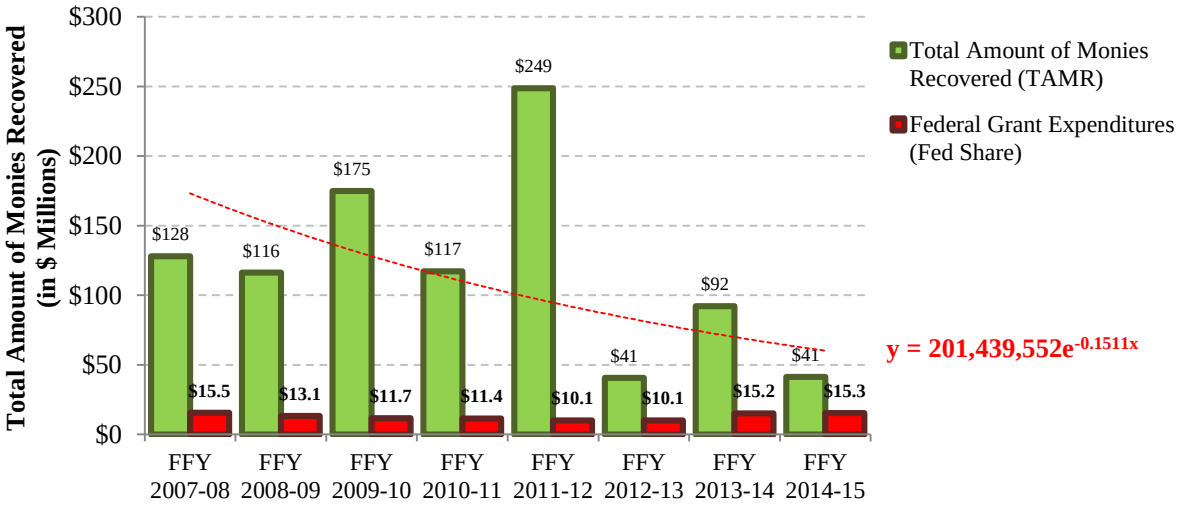


Figure 9: Total Amounts of Monies Recovered and Federal Grant Expenditures, FFY 2007-08 through FFY 2013-14

In FFY 2010-11, the Total Amounts of Monies Recovered **(**TAMR) by the MFCU was $117.3 million. Part of the recoveries generated through penalties imposed and interest charged were deposited into the State of Florida's General Revenue Fund. For FFY 2011-12, $248.7 million was recovered by the state, while the total amount of monies recovered for FFY 2012-13 was $40.7 million. For FFY 2013-14 the total recoveries amounted to $92.2 million. Included in the $92.2 million was one DMI assigned criminal case which ended in a plea agreement and resulted in a

$329,665.17 recovery. Finally, for FFY 2014-15, the MFCU recoveries amounted to a total of $41.3 million, including $1.6 million for Data Mining alone.

Detail on the DMI FFY 2014-15 results are provided in Table 10.

Table 10: DMI Case Results FFY 2014-15, Money Ordered and Collected.

Region	Complaint Opened	Complaint Closed	Case Opened	Case Closed	Comments	All Money ordered by Court or Settlement	Collected
Northern	12/30/2010	2/15/2011	2/15/2011	8/20/2014	1 defendant arrested	$ 329,665.17	$ 365.40
Central	4/3/2012	5/10/2012	5/10/2012	1/13/2015	Civil Settlement	$ 73,883.93	$ 73,883.93
Southern	2/19/2014	3/21/2014	3/21/2014	8/17/2015	3 defendants arrested	$ 1,082,916.01	$ 1,755.00
Central	3/4/2014	3/31/2014	3/31/2014	9/30/2015	Civil Judgment	$ 31,877.77	$ 31,877.77
Northern	7/17/2014	2/10/2015	2/10/2015	8/24/2015	Civil Settlement	$ 114,470.99	$ 114,470.99
					Total Dollars Ordered	**$ 1,632,813.87**	**$ 222,353.10**

Given the data in Figure 9, the benefit-cost ratio for every FFP dollar spent, in FFY 2014-15, was approximately 2.70. This means that for every federal dollar spent, MFCU generated approximately $2.70 (i.e., a return on investment of 170%). In FFY 2013-14 every federal dollar spent, MFCU generated approximately $5.06. In FFY 2012-13, the benefit-cost ratio was approximately $4.03. Similarly, the same return on FFP dollars spent in FFY 2011-12 and FFY 2010-11 was $23.53 and $9.27, respectively. The annual benefit-cost ratio over the FFYs depicted was 9.95. Split in averages, FFY 2007-10 and FFY 2011-15 (the MEDs-AD Waiver) was 10.7 versus 9.5, respectively. Using the same methodology, the FFY 2014-15 benefit-cost ratio for DMI, based on the case ending in a plea agreement, was 36.7 (Federal share recovery / Federal share of expenditures = 0.75 x $1,632,814 / $33,379) (i.e., a return on investment of 3569%). Comparatively, the same benefit-cost ratio for the DMI in FFY 2013-14, based on the case ending in a plea agreement, was 5.71 (Federal share recovery / Federal share of expenditures = 0.75 x $329,665 / $43,280) (i.e.; a return on investment of 471%).

3. Significant Case Highlights – Case Summaries

Data Mining Analyst Report Summaries:

This section contains a summary of Data Mining Analyst Report (DMAR) projects and the resulting complaints/cases attributed to the DMI initiative since the March, 2015 report. Next to titles and DMAR numbers, short summaries are given on the projects, objectives, date of service range and conclusions. DMAR projects can lead to more than one MFCU complaint/case. While some DMAR projects are complete and closed, others are active and ongoing.

DMAR-018 Large Amounts of Dental Billings

Objective: This data mining initiative involved comparing billings to other dental providers to determine if billings are higher than average under procedure codes: D7310, D7120, and D2751.

Date of Service Range: 4/1/2012 – 8/31/2014

Conclusion: This is an active DMAR with the assigned analyst continuing to review data. To date MFCU has opened four complaints. Two were converted to cases and remain active. Two complaints were consolidated into active ongoing cases that have now been closed. Six providers were referred to AHCA for their administrative follow up.

DMAR-019 Complex Office Visits

Objective: To determine if overbilling of complex office visits has occurred. Compare the typical amount of time defined in the Current Procedural Terminology Manual for the specific code to the number of procedure codes billed for the date of service by the rendering provider.

Date of Service Range: 12/01/12 – 11/30/2014

Conclusion: This data mining initiative identified two provider outliers that were opened as MFCU cases. This DMAR remains active with additional providers under review.

DMAR-025 Obstetrical (OB) Urinalysis Unbundled

Objective: The objective was to identify unbundled urinalysis procedure codes for Obstetrical Care Services.

Date of Service Range: 1/1/2008 – 6/30/2011

Conclusion: This data mining initiative identified four providers as being outliers for which the MFCU opened four complaints. One complaint was converted to a case and resulted in a civil settlement agreement. MFCU recovered $63,883.00 for the Medicaid Program plus $10,000.00 in investigative costs. Three complaints were referred to AHCA/MPI for their administrative follow up.

DMAR -032 OB 626 Diagnosis Ultrasounds

Objective: The objective was to identify procedure codes for Obstetrical Care Services that may be padded and/or up coded. Billing for non-obstetrical ultrasound procedure codes where obstetrical ultrasound procedure codes are appropriate.

Date of Service Range: 11/01/2012 – 10/31/2014

Conclusion: This is an active DMAR with the assigned analyst continuing to review data. To date MFCU has opened two complaints. Both of these complaints are now closed. DMAR-032 is now closed

DMAR-038 Evaluation Management New Patient Codes Analysis

Objective: To determine and identify those providers that bill an Evaluation and Management Code for a "New Patient Visit" on a recipient that has been provided professional care by the provider group within the three-year time frame. The following were the procedure codes reviewed: 99201, 99202, 99203, 99204, and 99205.

Date of service range: 1/1/ 2009 – 01/31/2015

Conclusion: This data mining initiative identified five providers as being outliers for which MFCU opened 5 complaints. One complaint was closed as unfounded, one closed as an administrative referral to AHCA, one consolidated into an active investigation and one is an ongoing active investigation. One additional complaint was opened as a case and closed with a civil settlement of $114,470.00.

DMAR-052 Questionable Billing for Portable X-Ray suppliers

Objective: To identify outliers for portable X-Ray suppliers that have questionable billing patterns that may be associated with inappropriate Medicaid payments. Procedure codes under review: 71010, 71020, 73500, 73510, R0070.

Date of Service Range: 01/01/2009 to 08/20/14

Conclusion: In analyzing all the compiled data, it was determined that there are not enough substantiated outliers and/or data to continue investigation at this time. This DMAR was closed with no further action taken.

DMAR-054 – Procedure Code to Place of Service Code Conflict

Objective: To identify psychiatrists who bill and are reimbursed for place of service 32 'Nursing Facility" or 31 "Skilled Nursing Facility."

Date of Service Range: 1/1/09 – 12/31/13

Conclusion: Due to the change in AHCA policy regarding psychiatrists billing in nursing home settings, it is recommended closing this DMAR. No further action is taken.

DMAR-055 DME Respiratory Codes- Monthly Rental Equipment

Objective: To determine if rental equipment is being billed by two providers for the same equipment, for the same recipient, at the same time. Procedure codes under review: E0424, E0431, E0434, E0439, E0441, E0442, E0443, E0444, E0450, E0460, E0470, E0472, E0500,

E0550, E0560, E0561, E0562, E0565, E0571, E0572, E0574, E0575, E0585, E0600, E0601, E1390, E1392, E1405, and E1406

Date of Service Range: 1/1/10 – 9/9/14

Conclusion: Two complaints were opened and subsequently closed as unfounded. DMAR-055 has been closed.

DMAR-070 Targeted Case Management

Objective: To identify the highest paid providers for this provider type statewide and to conduct an analysis and research claims data to determine if providers are overbilling for targeted case management which would lead to billing for services not rendered.

Date of Service Range: 1/1/2011 – 6/30/2014

Conclusion: There have been 29 cases opened under this DMAR. Of these 29 cases, five have been consolidated into other active investigations, two were closed due to lack of evidence, three were deemed as unfounded and 10 were referred to AHCA-MPI for administrative review. Eight cases remain active and one complaint remains active. One case was closed with the conviction of the three officers of the company. All were guilty of Medicaid Fraud, 1st degree felony and Organized scheme to Defraud, 1st degree felony. One defendant received 60 days in jail, the second defendant received 24 months' prison time and the third received 30 months' prison time. All are on 5 years' probation. Restitution, carrying both joint and several liability, in the amount of $1,033,332.00 was ordered. Additionally, they must pay $27,662.00 cost of investigation and $3,448.00 court cost. All three are excluded from future participation in the Medicare/Medicaid Programs. One case, while still active, has had seven arrests to date. Four of the defendants have pled no contest to Medicaid Fraud, 3rd degree felony and have entered into pretrial intervention. Collective restitution in the amount of $18,340.00 has been ordered for these four defendants. One case has been being settled under a civil forfeiture action with a recovery of $31,366.00

DMAR-073 V2025 Deluxe Frames (Metal) v. V2020 Frames Purchases (Plastic)

Objective: To identify V2025 and V2020 claims paid to providers that dispense eyeglasses from their practice within the Florida Medicaid program. A majority of claims should fall under procedure code V2020 for new or replacement; plastic frames ($9.50), versus procedure code V2025 for deluxe frames new or replacement; metal frames ($12.50

Date of Service Range: 1/1/10 – 12/31/14

Conclusion: This DMAR remains active and under review. One complaint was opened and closed as unfounded.

DMAR-074 Post Void Residual Urine Retention, Procedure Code 76857 v. 51798

Objective: To identify any Medicaid providers with a higher reimbursement rate for procedure code 76857 than procedure code 51798.

The American Urology Association (AUA) provided further clarification on the use of both 76857 and 51798. The AUA3 specifically stated that if the sole purpose of the test is to measure post-void residual urine retention, then providers are to bill 51798 regardless of the type of ultrasound used. There is a significant financial incentive to bill 76857, thus identifying an up-coding scheme.

Date of Service Range: 1/1/12 – 12/31/13

Conclusion: To date one complaint has been opened. This DMAR remains active and under review.

The highlighted cases demonstrate that the data mining activities have led to MFCU opening 114 complaints. Fifty-five (55) complaints have been closed, four (4) have an ongoing active status and fifty-five (55) complaints were converted to full case investigations by the MFCU. Of the fifty-five (55) case investigations opened – thirty-nine (39) have been closed and sixteen (16) cases have an ongoing active status. Four (4) individuals have been convicted of Medicaid Fraud, while another four (4) individuals have pled no contest to Medicaid Fraud and have entered into pretrial

intervention programs. An additional three (3) individuals have been arrested and are awaiting trial.

The overall criminal restitution ordered in the criminal cases is $1,381,337. The overall civil recoveries to date are $209,719. There have been a total of 24 MFCU complaints or cases referred to AHCA/MPI for any action they deem necessary.

PROSPECTIVE DATA MINING PROJECTS

There were seven DMARs submitted to AHCA during the time period 10/01/2013 through 09/30/2014. All were denied by AHCA because of duplication of efforts.

DMAR-075: Fraudulent Dispensing/Prescribing of Ketamine HCL

Objective: Identify the outlying dispensers of Ketamine.
Date of Service Range: 01/01/2010 - 12/31/2013
Conclusion: This DMAR was denied by AHCA.

DMAR-076: Auto-Refills

Objective: Identify providers from provider type – pharmacy with the highest dollar amount denied from claims for recipients with a date of death predating the date of service.
Date of Service Range: 01/01/2010 - 12/31/2013
Conclusion: This DMAR was denied by AHCA.

DMAR-077: Up-Coding Well Child Checkups

Objective: Identify physicians (MD or DO) who were billing for well child checkups when the service was performed by an ARNP or PA.
Date of Service Range: 01/01/2010 - 12/31/2013
Conclusion: This DMAR was denied by AHCA.

DMAR-078: Community Alcohol/Drug/Mental Health Psychosocial Rehabilitation

Objective: Identify the highest paid to providers for this provider type statewide, and conduct an analysis and research claims data to determine if providers are overbilling for psychosocial rehabilitation, which could lead to billing for services not rendered.

Date of Service Range: 01/01/2012 - 12/31/2014

Conclusion: This DMAR was denied by AHCA.

DMAR-079: Review of Prolonged Office or Other Outpatient Services

Objective: Identify the highest paid to providers who bill for procedure codes 99354 and/or 99354, which are prolonged office or outpatient visits that are in addition to the billing for the regular office visit for the same recipient and on the same service date.

Date of Service Range: 01/01/2012 - 12/31/2014

Conclusion: This DMAR was denied by AHCA.

DMAR-080: Dentists Over-Prescribing Narcotics

Objective: Identify the dentists who are prescribing the most narcotic drugs for possible drug diversion. Once the highest prescribing dentists have been identified, determine the recipients who were allegedly prescribed the medication. Then obtain the claims data for the recipients to determine if the billing for the narcotics is medically necessary. It is probable a file review would have to be conducted in order to make this decision. Another outlier to consider would be to look for dentists who prescribed this medication for more than 10 days and/or on a continuous basis for their recipients.

Date of Service Range: 01/01/2012 - 12/31/2014

Conclusion: This DMAR was denied by AHCA.

- **DMAR-081: High volume of denture repairs and adjustments compared to low volume of dentures billed and paid. Additionally, review high volume billing of comprehensive oral evaluations.**

Objective: Identify the dental providers who have high paid amounts and high volume billing for denture repairs and adjustments, and low paid amounts and low volume billing for dentures and/or partials.

Date of Service Range: 01/01/2012 - 12/31/2014

Conclusion: This DMAR was denied by AHCA.

4. Data Mining Activities: Key Informant Experiences

Qualitative data for this evaluation comes from a series of personal interviews conducted by the principal investigator with specifically selected DMI stakeholders and key informants within the Medicaid Fraud Control Unit (MFCU) and the AHCA Bureau of Medicaid Program Integrity (MPI). In addition, one inter-agency DMAR meeting was attended. The objective of the interviews was to provide a more nuanced evaluation beyond a quantitative data analysis and evaluation and to provide further insights into developments made with regard to the position and role of data mining within the MFCU and the FL OAG.

The following describes insights from interviews held with MFCU personnel. Second, the researcher's observations from attending a DMAR meeting are given. Finally, a report is presented of interviews held with representatives of the AHCA MPI.

Medicaid Fraud Control Unit

AHCA initiated the MEDs-AD Waiver on behalf of the MFCU, and with it, Florida was the first state to have a waiver of this kind granted. Prior to the MEDs-AD Waiver, MFCU was only allowed to data mine under *qui tam* lawsuits. *Qui tam* lawsuits (popularly called "whistle blower lawsuits") are initiated by Florida private citizens. Any other data mining done by MFCU prior to the waiver was not allowed. The first and foremost concern in granting the MEDs-AD Waiver was ensuring there was no duplication in data mining efforts by the two agencies. Since the granting of the MEDs-AD Waiver, there has been a substantial and growing interaction between the two agencies: AHCA MPI and FL OAG MFCU. It was mentioned by interviewees that inter-organization communications and cooperation are now routine and productive.

Presently, there are six persons at MFCU conducting data mining activities, for a total of 2.25 FTE (6 x 0.375 FTE), where previously there were three data miners (3 x 0.75 FTE). This provides added leverage to data mining activities and capabilities within the MFCU since the 2014 report,

referencing the prior issue of turnover among data miners. It also permits MFCU to more easily accommodate normal personnel issues such as medical or personal leave and attrition. While there are only 2.25 FTE devoted to data mining, it has become an integral and consistent part of staff activities for the MFCU.

Most experienced data miners are put on priority as well as current cases established by MFCU's leadership team. Unfortunately, the relatively modest data mining time of the six MFCU data miners is consumed by priority cases, fieldwork, and other assigned duties, leaving little concentrated or focused time to data mine and/or develop new activity. While there have been several convictions and orders for financial restitution resulting from MFCU data mining, it appears that DMAR backlog is lengthening while time for new analyses is tight at best. Although the integration of data mining into regular work activity seems to have worked, the question arises as to its efficiency or role with respect to other MFCU activities. Mention was made that given the data mining specialty, demanding time and concentration to work data bases, it may be advisable to have two full time data miners instead.

An unintended consequence of the DMI is that the subset of data under review by the MFCU makes it unavailable to the AHCA MPI for their unique data mining activities for however long the MFCU is reviewing the specific data subset. In other words, in an effort to prevent duplication of effort, certain data subsets may be tied up for long periods of time - often for years as evidenced in Figure 10.

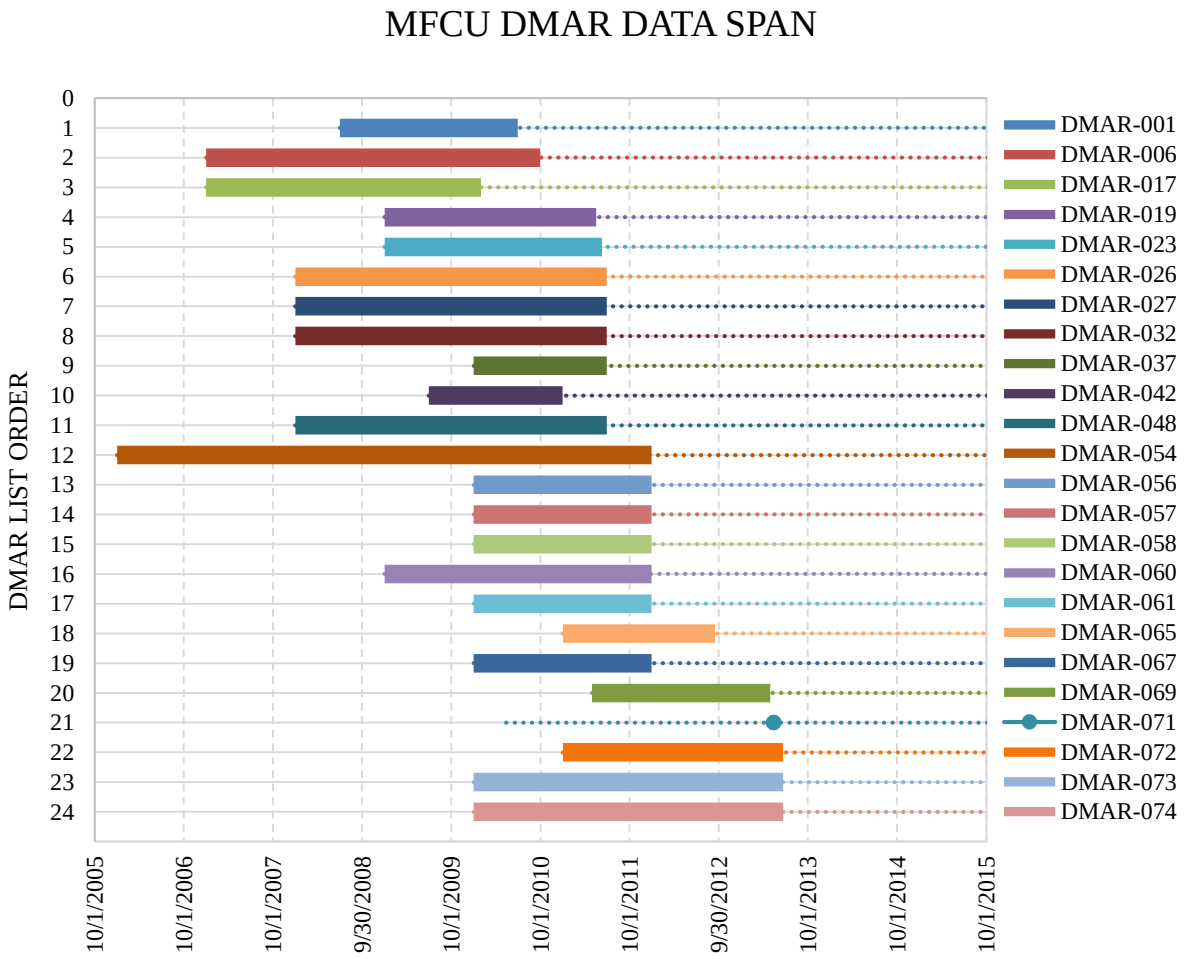


Figure 10: Data Mining Analyst Requests and their Respective Data Mining Time-Spans.[16]

Figure 10 shows that almost half of the DMARs have been with the MFCU for over 4 years. This issue is currently under discussion with MFCU and MPI. On the one hand, legal procedure limits may need to be set for a to-be-determined time limit or cut-off time span before the DMAR is returned to MPI. On the other hand, data requests may need to be defined more specifically or

[16] DMAR-017 and DMAR-054 are presently closed, while DMAR-068 couldn't be mapped given dates specific to recipient's history, DMAR-070 is confined to the last two years and DMAR-071 ranges from most recent 3 full years DOS to the present i.e. 5/15/2013.

confined to smaller data sets, possibly in the format of MPI referral. The MOU language however, does not define duplication of efforts. In a strict interpretation, only a similar data mining query syntax could be dubbed duplication, while a broader interpretation of duplication of efforts doesn't seem to fit setting aside data for each organization to run queries on.

Much is learned from the adjudicated cases, and realization is sinking in that data mining within MFCU is a specialty on its own, compared to MPI data mining. The MFCU specialty "brand" of data mining needs to be further developed going forward.

In addition to case adjudication, and as a result of MFCU data mining experience, the MFCU is recommending revisions to procedures and protocols contained in the Mental Health Targeted Case Management Handbook, dated July 2006, to enhance "front-end" fraud prevention. Other legal issues are referred back to the legislature under a "call for suggestions" or "program recommendations."

Bureau of Medicaid Program Integrity / Medicaid Fraud Control Unit Data Mining Analyst Report (DMAR) Meeting

For purposes of this evaluation, one AHCA MPI/MFCU DMAR meeting was attended. The meeting experienced some technical communication difficulties resulting in less than full participation by the joint-agency team. Nevertheless, a couple of DMARs were reviewed expeditiously, especially regarding DMAR status and expectations.

Currently, there are 24 active DMARs as listed in Figure 10. Some of the DMARs are at the raw data level, while others are still in review. The colored bars shown in Figure 10 represent data spans or subsets of potentially actionable data covering a specific period of time being analyzed by the MFCU data miners. The baseline argument for continuation of "reviewed" status seems to be whether there is still potential for establishing fraud that warrants further data analyses by MFCU.

Data spans for analyses on present DMARs (as observed in Figure 10) was mentioned more than once during the observed meeting. As was observed, the MFCU requested and "reserved" date spans on active DMARs are becoming increasingly dated. Although time is neither necessary nor sufficient as an argument for closing a DMAR, it is noted by MPI that if nothing is found thus far on a specific "older" DMAR, the probability on finding something going forward is questionable.

Florida Agency for Health Care Administration (AHCA)

The MPI unit conducts extensive research on providers, medical practices, claims, billings, and payments, using its expertise in health care administration, legislation, and medical practice. Presently, of the 96 FTEs assigned to the MPI, 6 FTEs are assigned to MPI's data mining activities. The results of the data mining activities of these 6 FTEs are given to a "detection group" and, in turn, forwarded to the "case management group" within the MPI unit. The case management group decides the future disposition of cases under active investigation. Upon their direction, a project may be dropped, additional record requests made, and/or projects or cases referred to the MFCU for law enforcement and legal action.

AHCA MPI stakeholders confirmed the growth in routine communications and increased productivity between the agencies. A level of synergy and sense of common goals continues to be present within the unit.

Previously mentioned in the March 2015 Data Mining Activities Evaluation report was the initiation of the AHCA – SAS vendor agreement[17]. The SAS vendor is turning out lists of data anomalies, based on the vendor developed data mining algorithms. None of these anomalies, however, based on further checks and more detailed analyses by AHCA MPI, have proven to be productive leads yet. Expectations remain high, given that this is a relatively new initiative.

[17] SAS is the data environment provider to AHCA.

The MPI stakeholders emphasized that there is a lot of work for DMs in both MPI and MFCU, and stressed the point of prioritizing scarce DM resources to productive ends. MPI stakeholders suggested that a more explicit division of labor or specialization between MFCU and MPI needs to be put in place. They also mentioned focusing on smaller subsets or more specifically defined datasets, concentrating on three to five DMARs in preferably recent date ranges. It was observed that the extended list and length of DMAR determination shown in Figure 10 is having the unintended consequence of keeping MPI from investigating the relevant data spans which may yield a return on investment not yet realized.

5. Conclusion

This evaluation suggests that the intentions of the DMI authorized under the MEDs-AD Waiver are being met. Closer coordination between the two agencies exists because the DMI and the State of Florida are better positioned to more expeditiously address emerging changes in Medicaid fraud threats. The correct metrics of operation or modus operandi on data mining may not have been determined yet, especially pertaining to specialization within the Medicaid Fraud Control Unit (MFCU). It is recognized that both organizations are learning how to incorporate and to make the best use of the DMI.

The total MFCU budget for Federal Fiscal Year (FFY) 2014-2015 was $20.4 million, including $206,692 for the MFCU Data Mining Initiative (DMI). Total employment in FFY 2014-15 was 160 Full Time Equivalents (FTE) with 50 unfilled positions or vacancies: five vacant positions for attorneys, thirty for investigators, five for auditors, and ten others. Included in the 160 are 2.25 DMI FTEs.

There were 1,123 complaints and 249 newly opened fraud cases (22.2%) in FFY 2014-15. On average, from FFY 2010-11 through FFY 2014-15, this amounts to 1,473 complaints per year with 241 opened new fraud cases or a ratio of 16.4 percent. The number of fraud complaints received by MFCU in FFY 2014-15 was 566.

DMI was the eighth largest source of complaints received in FFY 2014-15 (was sixth in FFY 2013-14). The case summaries in Section 3 of this report show that data mining activities (FFY 2010 - 2015) have led to MFCU opening 114 complaints, 4 of which have an ongoing active status while 55 complaints have been converted to full case investigations by the MFCU. Of the 55 case investigations, 39 have been closed and 16 cases have an ongoing active status. Four (4)

individuals have been convicted of Medicaid Fraud, four (4) individuals have pled no contest to Medicaid Fraud, and three (3) individuals have been arrested and are awaiting trial.

MFCU recovered a total of $41.3 million and investigated 917 cases in FFY 2014-15. Overall criminal restitution ordered in the criminal cases was $1,381,337, while overall civil recoveries to date are $209,719. There have been a total of 24 MFCU complaints or cases referred to AHCA/MPI for any action they deem necessary.

The benefit-cost ratio for every FFP dollar spent in FFY 2014-15 was approximately 2.70. This means that for every federal dollar spent, MFCU generated approximately $2.70. Similarly, the benefit-cost ratio for DMI, based on the case ending in a plea agreement, was 36.7.

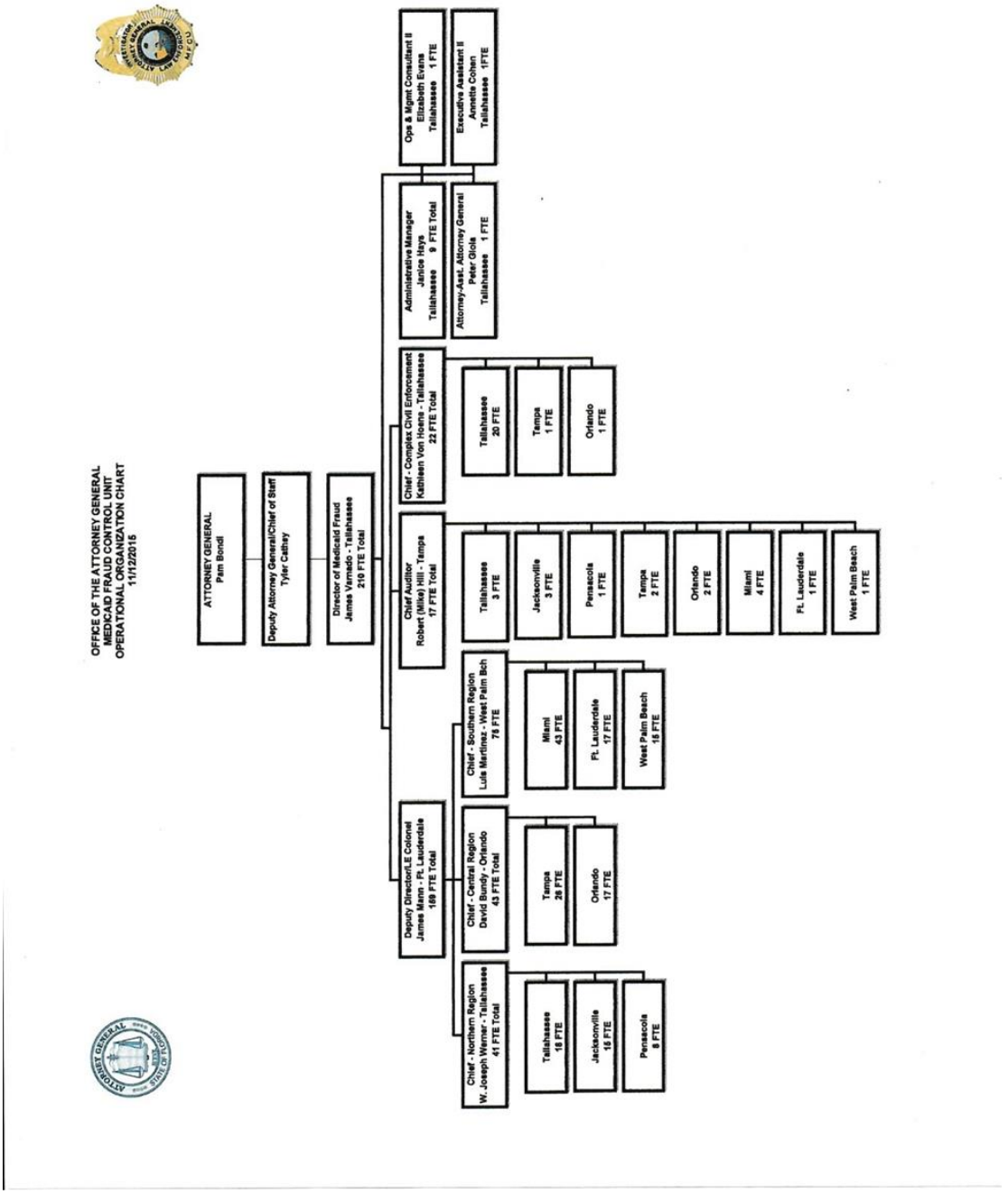
The most experienced data miners are put on priority as well as current cases established by MFCU's leadership team, leaving little concentrated or focused time to data mine and/or develop new activity. It appears that DMAR backlog is lengthening while time for new analyses is tight at best. It may be advisable to have two full time data miners instead.

The key informant interviews revealed that the non-duplication "clause" or principle, mentioned in the Waiver and which is tied to the Medicaid Fraud Control Unit Data Mining Analyst Report (DMAR) Meetings, may have been interpreted too generally or widely. A data mining analyst request is used to inform both MFCU and AHCA MPI to potential data mining activities for a subset of data, such that no duplicate activities may occur. In neither the Waiver nor the MOU is it stipulated that the same data subset (targeted by the request) is "off limits" to the other data mining activity. However, in practice, if MFCU obtains the data subset, that same subset may not be looked at by AHCA MPI until it is released back to AHCA MPI. The present practice seems to hinder operations by either organization.

In addition to case adjudication, and as a result of MFCU data mining experience, the MFCU is recommending revisions to procedures and protocols contained in the Mental Health Targeted Case Management Handbook, dated July 2006, to enhance "front-end" fraud prevention. Other legal issues are referred back to the legislature under a "call for suggestions" or "program recommendations."

Much has been learned from the adjudicated cases, and realization is sinking in that data mining within MFCU is a specialty on its own, compared to MPI data mining. The MFCU specialty "brand" of data mining needs to be further developed going forward. Finally, data mining activities should not be seen as one and the same activity being conducted by both organizations. Given that data mining by both MPI and MFCU are different in nature, the division between the organizations is one of specialization. In general, MPI's focus is on abuse, both in broad (i.e., database wide) and non-specific or general respects. MFCU's focus is on fraud, with data mining to be conducted on smaller subsets (given a deeper research into the data) and toward more specific ends. This specialization will leave room for each party to do its data mining simultaneously, but well-coordinated, to ensure non-duplication of effort.

Appendix 1: Operational Organizational Chart Office of the Attorney General Medicaid Fraud Control Unit



Appendix 2: Explanatory Analyses

In principle, an evaluation looks from plan to budget, and, in particular, to program execution and output. It brings out cost and quantity differences (efficiency), as well as with respect to market results, price and quantity differences (effectiveness). In following the concept of input, throughput, output, and outcome, Figure 11 on the following page provides a recap of some key output data points, or achievements, from section 2 of this report that led to meaningful conclusions. Figure 11 depicts, at one glance, the Medicaid Fraud Control Unit (MFCU) back-to-back ratios from complaints to cases ending in settlement, conviction, or plea agreement (counter clock-wise). The right-hand side of the horizontal axis shows two scales; the upper scale is the number of complaints, while the lower scale depicts cases ending in settlement, conviction, or plea agreement. The top part of the vertical axis shows the number of fraud complaints, while the left hand side of the horizontal axis shows the number of opened new fraud cases, the bottom of the vertical axis shows the number of cases disposed, and finally, the right hand side of the horizontal axis shows the cases ending in settlement, conviction, or plea agreement. The number on each axis represent actual counts, while the lines represent the ratios between the successive counts. It is noted however that the numbers represent annual counts and not causal counts from complaint to disposition.

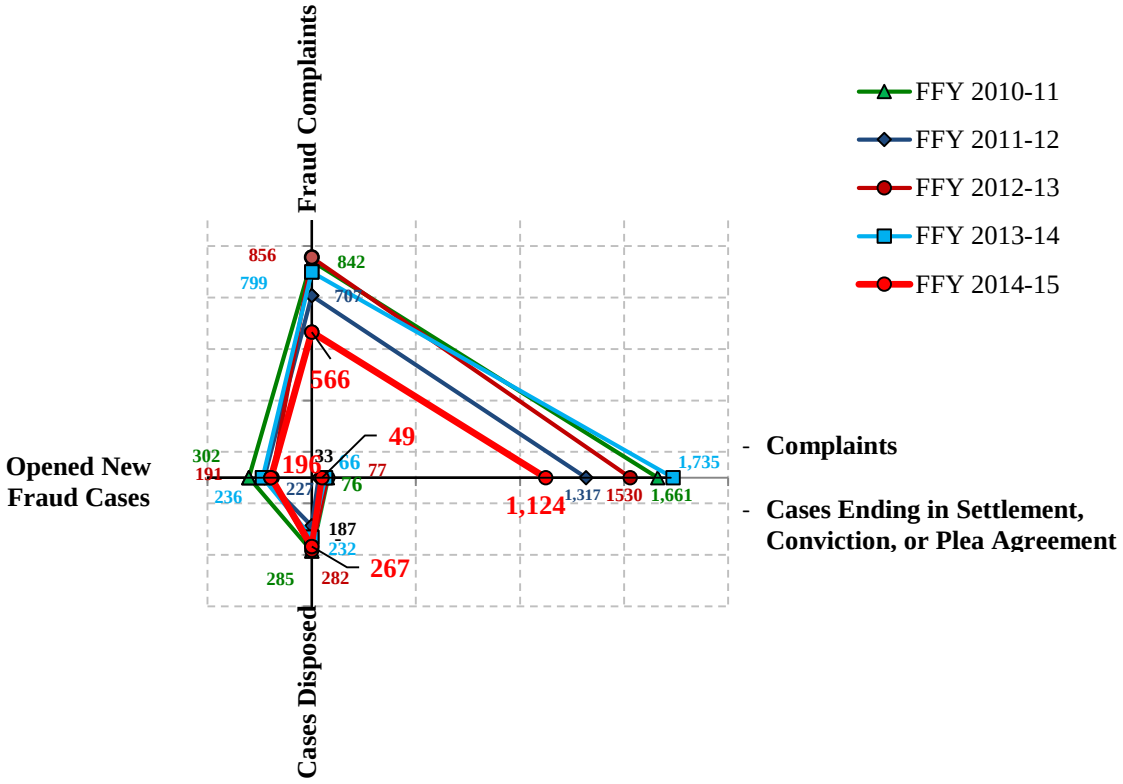


Figure 11: Number of Complaints, Opened New Fraud Cases, Disposition of Cases, and Cases Ending in Settlement, Conviction, or Plea Agreement, MFCU, FFY 2010-11 through FFY 2014-15

From the data presented in Figure 11, for FFY 2014-15, reading the figure counter clockwise, a total of 1,123 complaints are received, 566 fraud complaints are handled, 196 new fraud cases are opened, 267 cases are disposed, while 49 cases ended in settlement, conviction or plea agreement. The same data, but in relative or ratio terms, leads to: 566/1,124 = 0.5036 (or 50.4%), 196/566 = 0.3463 (or 34.6%), 267/196 = 1.3622 (or 1.36%)[18], and 49/267 = 0.1835 (or 18.35%). Similarly, data for other years depicted can be expressed in ratios. The ratios, as well as the overall five-year

[18] If the data were causal none of the percentage would surpass 100%. The fact that a ratio or percentage exceeds 1 indicates that counts were taken from the prior year(s) inventory. In other words, the data is take in an annual parallel manner.

average ratios, are recapped in percentages in Table 11. Shading is provided to express the relative preferable outcomes per column (darker is better).

Table 11: MFCU Case Statistics per Stage of Process, from Complaints to Cases Ending in Settlement, Conviction, or Plea Agreement, FFY 2010-11 through FFY 2014-15

	Fraud Complaints / Complaints	Opened New Fraud Cases / Fraud Complaints	Cases Disposed / Opened New Fraud Cases	Cases ending in Settlement, Conviction, or Plea Agreement / Cases Disposed	Cases ending in Settlement, Conviction, or Plea Agreement / Complaints
FFY 2010-11	50.7%	35.9%	94.4%	26.7%	4.6%
FFY 2011-12	53.7%	32.1%	82.4%	17.6%	2.5%
FFY 2012-13	55.9%	22.3%	147.6%	27.3%	5.0%
FFY 2013-14	46.1%	29.5%	98.3%	28.4%	3.8%
FFY 2014-15	50.4%	34.6%	136.2%	18.4%	4.4%
Averages	51.4%	30.9%	111.8%	23.7%	4.1%
Averages Linked		*15.9%*	*17.7%*	*4.2%*	

The data presented in Table 11, shows that the five-year period ratio of fraud complaints over complaints is 51.4 percent. Similarly, the ratio of opened new fraud cases over fraud complaints is 30.9 percent. Next the ratio of cases disposed over opened new cases is 111.8 percent. Finally, the ratio of cases ending in Settlement, Conviction, or Plea Agreement over Cases Disposed is 23.7 percent. In other words, Figure 10 and Table 11 map the year-to-year activities of the MFCU on all fronts; activities to which time and other resources are allocated, to review, refer, and work with the investigative team, etc. Given that the process leading to potential adjudication may take several years, and provided that a trend may be at stake in the time series, these ratios may cautiously be interpreted as causal averages. In this case, cumulatively some 4.2 percent of complaints lead to Settlement, Conviction, or Plea Agreement, as depicted in both the last column as well as in the bottom row of Table 11.

A similar set-up for the MFCU DMI attributed cases is given in Figure 12, with the recap of ratios (in percentages) in Table 12.

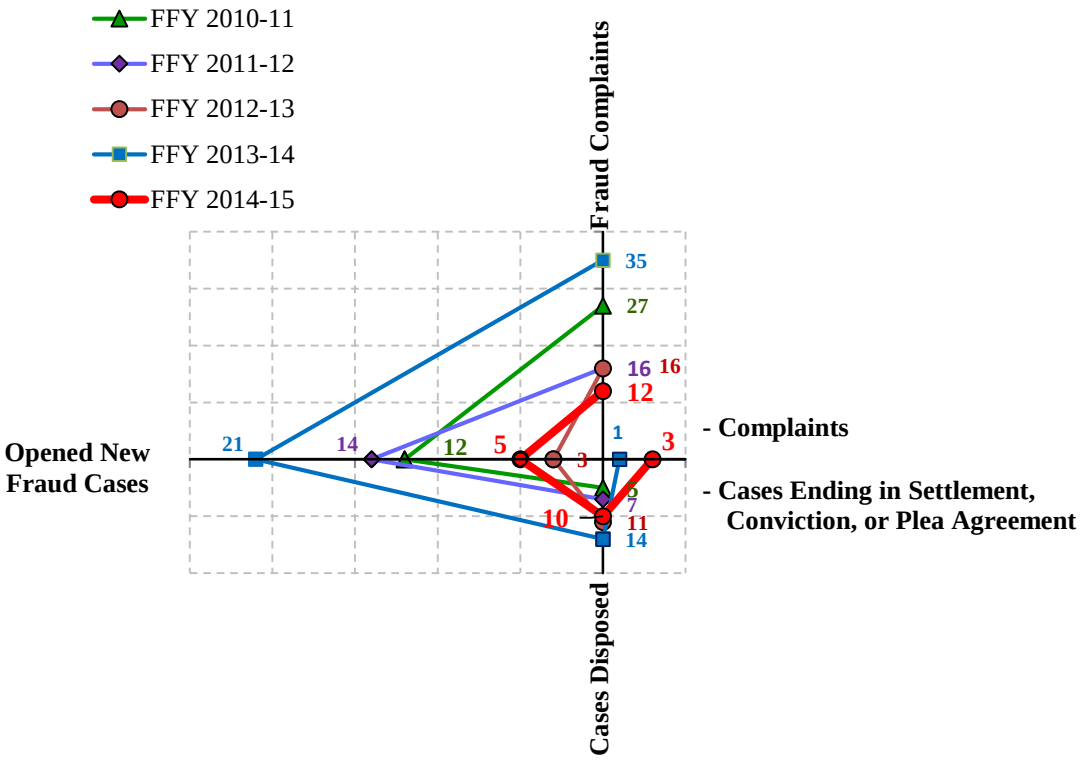


Figure 12: Number of Complaints, Opened New Fraud Cases, Disposition of Cases, and Cases Ending in Settlement, Conviction, or Plea Agreement, Attributed to DMI, FFY 2010-11 and FFY 2014-15

From the data presented in Figure 12, for FFY 2014-15, reading the figure counter clockwise, a total of 12 fraud complaints are received, 5 new fraud cases are opened, 10 cases are disposed, while 3 ended in settlement, conviction or plea agreement. Likewise, the same data, but in relative or ratio terms, leads to: 5/12 = 0.4167 (or 41.7%), 10/5 = 2 (or 200%), and 3/10 = 0.3 (or 30%). Similarly, data for the other years depicted can be expressed in ratios. The ratios as well as the

overall five-year average ratios are recapped as percentages in Table 12. Shading is provided to express relative preferable outcomes per column (darker is better).

Table 12: DMI Assigned Case Statistics per Stage of Process, from Complaints to Cases Ending in Settlement, Conviction, or Plea Agreement, FFY 2010-11 through FFY 2014-15

	Fraud Complaints / Complaints	Opened New Fraud Cases / Fraud Complaints	Cases Disposed / Opened New Fraud Cases	Cases ending in Settlement, Conviction, or Plea Agreement / Cases Disposed	Cases ending in Settlement, Conviction, or Plea Agreement / Fraud Complaints
FFY 2010-11		44.4%	41.7%		
FFY 2011-12		87.5%	50.0%		
FFY 2012-13		18.8%	366.7%		
FFY 2013-14		60.0%	66.7%	7.1%	2.9%
FFY 2014-15		41.7%	200.0%	30.0%	25.0%
Average		50.5%	145.0%	18.6%	13.9%
			73.2%	13.6%	

The data presented in Table 12, shows that the five-year period ratio of opened new fraud cases over fraud complaints was 50.5 percent. Next the ratio of cases disposed over opened new cases was 145,0 percent. Finally, the ratio of cases ending in Settlement, Conviction, or Plea Agreement over Cases Disposed was 18.6 percent. In other words, Figure 11 and Table 12 map the year-to-year activities of the MFCU DMI on all fronts; activities to which time and other resources were allocated, to review, refer, and work with the investigative team, etc. Given that the process leading to potential adjudication may take several years, and provided that a trend may be at stake in the time series, these ratios may cautiously be interpreted as causal averages. In this case, cumulatively some 13.6 to 13.9 percent of fraud complaints lead to Settlement, Conviction, or Plea Agreement, as depicted in both the last column as well as in the bottom row of Table 12.

In comparing the ratios from Table 11 with those of Table 12, both five year averages in the columns Opened New Fraud Cases / Fraud Complaints, as well as in the column Cases Disposed / Opened New Fraud Cases in Table 12, show significantly higher outcomes[19]. This means that the MFCU DMI efficiency scores better in the two stages of activities than the MFCU overall.

[19] Taken are the mean and standard deviation on the ratios of MFCU total from Table 12. The comparable two ratios on the DMI from Table 12 have a probability of occurring by chance less than five times out of 100 (designated by convention as $p > .05$) and thus differ significantly, provided the four data points from Table 12 only.

State of Florida
Rick Scott, Governor

Agency for Health Care Administration
Elizabeth Dudek, Secretary

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Mission Statement
Better Healthcare for All Floridians.