Disease Management Pilot Program in California: Evaluation Report

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Executive Summary

Introduction

Nearly half of US healthcare spending is made up of expenditures for only five chronic conditions—asthma, diabetes, heart disease, hypertension, and mood disorders.[1] Disease management (DM) programs are increasingly popular with employers and private and public health insurance plans as a method of reducing unnecessary medical care that results in higher health care utilization rates and expenditures. In addition to seeking more cost-effective care by increasing appropriate use of services, DM programs seek to improve patients' health outcomes.[2]

Typically targeting specific chronic conditions such as asthma, diabetes, congestive heart failure, and hypertension, DM programs use risk stratification to identify higher risk patients for more intensive interventions.[3] Engagement strategies range from educating patients about proper self-monitoring and self-care to shaping specialized plans that coordinate care for patients with multiple chronic conditions.[4] Best practices dictate that DM programs include eight elements:

- patient population identification process,
- patient risk identification and matching of intervention with need,
- evidence-based guidelines,
- collaborative practice models including physician and support-service providers,
- patient self-management education,
- routine reporting/feedback,
- appropriate use of information technology, and
- process and outcome measurement, evaluation, and management.[3]

In 2004, the Centers for Medicare and Medicaid Services (CMS) issued guidance to states encouraging them to implement DM programs within their Medicaid fee for service (FFS) program.[5] Preceding this guidance in 2003, the California Legislative Analysts' Office (LAO) recognized that a significant factor driving growth in costs to California's Medicaid program (called "Medi-Cal") was the rise in prevalence of chronic diseases and their associated costs.[6] The LAO concluded that the Medi-Cal FFS system is a fragmented and

uncoordinated approach to the delivery of care, and is not well suited for the care of individuals suffering from chronic medical conditions. In response to CMS' recommendations and the LAO's findings, California passed Welfare and Institutions Code (W&I Code) Section 14132.27, authorizing the State to:

> *Test the efficacy of providing a disease management benefit to beneficiaries under the Medi-Cal program. A disease management benefit shall include, but not be limited to, the use of evidence-based practice guidelines, supporting adherence to care plans, and providing patient education, monitoring, and healthy lifestyle changes*.[7]

In 2006, the California Department of Health Care Services (DHCS) began preparations to conduct a three-year pilot for FFS Medi-Cal beneficiaries, primarily targeting seniors and persons with disabilities (SPDs). DHCS initiated a single integrated DM program for Medi-Cal beneficiaries with any of six common chronic conditions, including asthma, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), coronary artery disease (CAD), atherosclerotic disease syndrome (ADS), and diabetes. After a competitive bidding process, McKesson Health Solutions (MHS) was selected as the DM vendor for this program serving the eligible Medi-Cal population.

The goal of this Disease Management Pilot Program (DMPP) was to test the efficacy of providing a DM benefit to FFS Medi-Cal beneficiaries with chronic conditions, with regard to:

1. The provision of DM services as a cost neutral benefit during the pilot program;
2. Health outcomes for DM Members during the pilot program; and,
3. Projected future program savings that may result from continuing the DM benefit.[8]

The DM intervention was designed as an opt-out telephonic and mail-based program, and was risk stratified based on patient-specific, claims-based indicators. Risk stratification was based primarily on total medical expenditures. The precise frequency and timing of telephonic intervention from MHS varied according to proprietary guidelines for each disease group and risk level. MHS received a monthly capitated payment of $17.55 for each enrolled member in Alameda County and specific areas of Los Angeles County, with a maximum contracted payment amount of $4 million per year over the three-year program period for a total possible payment of $12 million.

The state contracted with the University of California, Los Angeles (UCLA) Center for Health Policy Research to fulfill DHCS's requirement for an independent evaluation of DMPP. UCLA established an evaluation plan utilizing a pre-post design, and comparing the intervention population to a control population. UCLA designed the evaluation to meet DHCS's requirements and provide a rigorous analysis of program success in the following

areas:

1. Program implementation;
2. Quality of care, including changes in process and outcome measures among participants;
3. Patient satisfaction and quality of life; and,
4. Financial outcomes, including cost savings and return on investment.[9]

As evaluator of DMPP, we received and analyzed data from DHCS including claims and eligibility history data for the intervention and control groups. We also used data provided by MHS, including monthly enrollment status reports, intervention delivery data including call logs, self-reported clinical status for enrollees engaged in telephonic intervention, and patient satisfaction data. We also conducted a quality of life survey with a subset of respondents to MHS' patient satisfaction survey.

Findings, Conclusions, and Recommendations

Given all aspects of the DMPP evaluation, we draw the following conclusions and recommendations related to the program goals.

Program Implementation:

- A total of 54,051 individuals were ever eligible for DMPP (excluding individuals in the low-risk wait list established in Program Year Three). The opt-out program design led to successful enrollment of the eligible population with an overall 6% opt-out rate.

- The overall rate of active engagement was about 10% per program year. Inaccuracies in enrollee contact information and delays in availability of utilization data may have contributed to this rate of engagement. Furthermore, the intensity of the intervention among the actively engaged population was low with approximately 2.7 to 3.4 monitoring calls per person during the full duration of their eligibility. Our findings highlight the importance of complete data on the delivery of services in DM interventions.

Utilization of Health Services:

- There is no consistent evidence of systematic change in health care utilization among enrollees due to the intervention. Multivariate analysis of utilization identified disease-specific changes in select measures, but both descriptive and multivariate analysis failed to identify systematically favorable patterns in utilization that can be attributed to the intervention. The lack of consistency in outcomes implies that effects of the intervention, if present, were specific to particular subgroups. Our findings highlight

the importance of conducting the evaluation of DM programs on utilization separately for each disease condition rather than for all conditions combined.

Quality of Care:

- During the Program Years, we observed several favorable trends in quality of care within the intervention group. However, for many clinical services concurrent or comparable changes were found among beneficiaries in the control group, suggesting that some effects may not be attributable to the intervention. Improvements in the intervention group are not indicative of program impact if comparable changes occurred in the control group during the same time period or differences are a continuation of baseline patterns. The paucity of findings related to clinical improvements in the intervention area alone may be partially due to limited availability of data documenting health outcomes among active enrollees, including small sample sizes, limited repeated measurements, and reliance on self-reported clinical outcomes. Our findings highlight the importance of reliable and valid outcome measures for assessment of quality of care in DM programs.

Member Satisfaction:

- Member quality of life, and satisfaction with the DM program, health care in general, and the nurse advice line were generally high, as is consistent with results of satisfaction surveys in various settings in the literature. In addition, there was some evidence of improvement in member satisfaction with the program(six out of 49 unique measures) and quality of life indicators (two out of four). There was no evidence of improvement in satisfaction in general health care or provider satisfaction with the program over time.

- The nurse advice line achieved a number of desired outcomes for those who used it by diverting patients to their primary care providers and encouraging self-care. Limitations to survey data included: self-selection bias, loss to follow up, and small sample sizes. The results indicate the need for assessing patient's experiences and outcomes in DM programs and can identify areas in need of further improvement.

Health Services Expenditures and Cost Neutrality:

- Using the specific return on investment (ROI) methodology agreed to by DHCS, MHS, and UCLA for determining cost-neutrality of the intervention, our findings indicate that the program saved an average of $37.16 PMPM within the original program intervention group. We identified large variation in savings between the disease groups, with the highest level of savings found among those with CHF. The net savings were approximately $31.8 Million after accounting for vendor fees, which constitutes

about 4.4% of total Medi-Cal expenditures for the intervention group during the three-year program intervention period. Beneficiary groups in additional aid codes that became eligible for the program in the final year were excluded from this analysis due to lack of comparability and based on an agreement with DHCS and MHS. This newly eligible population was analyzed separately.

- The ROI method was intended to provide expenditure targets for MHS prospectively, and to assess interim program performance and savings in the absence of full claims data. The ROI did not account for potential confounders and other threats to validity. Therefore, as stipulated in the evaluation design, we also conducted a comprehensive assessment of the impact of DMPP on program expenditures that used multivariate methods to account for enrollee characteristics (e.g., age, gender, chronic conditions, comorbidity), eligibility (e.g., aid code and duration), variations in county systems of care, and intercorrelation between multiple observations from the same enrollee in claims data. After controlling for these threats to validity, we found limited evidence of differences in expenditures between the intervention and control groups, despite the ROI finding of savings.

- These analyses highlight the importance of identifying an appropriate and standardized methodology for measuring the return on investment of DM programs, as different methods may produce divergent findings.

The overall findings of the evaluation indicate that delivery of a DM benefit to FFS Medicaid beneficiaries may produce some desired effects, such as reductions in expenditures, improved quality, and higher levels of satisfaction with care. However, effects were frequently limited to specific diagnoses and measures. Similar DM programs that primarily focus on improving the population's self-care practices using mail and telephonic interventions may produce limited cost savings or improvements in quality of care or patient satisfaction. In general, success of such DM programs depends on availability and quality of program implementation data including claims and eligibility information. In the absence of accurate, reliable, and timely eligibility and claims data, DM programs implemented by third-party vendors face substantial operational challenges.

The barriers posed by accuracy and timeliness of operational data can be addressed in part through sustained and high-intensity effort by the DM vendor to reach the eligible population and their medical providers. Increased emphasis on outreach to providers may be an effective mechanism for coordinating care delivery and obtaining timely information on enrollees' health status and utilization profile in the absence of current claims data.

Furthermore, targeting of high risk enrollees can be improved, to promote a model that provides high-intensity intervention to all individuals with high need, including those who experience barriers to accessing care and therefore would not be classified as high risk based on historical expenditures alone. Missing or inaccurate contact information for beneficiaries may necessitate higher intensity effort by the vendor.

Finally, future DM programs should make a concerted effort to gather data on the full scope of the intervention delivered, as well as reliable data to assess the clinical outcomes of the program. Future programs should allocate time before program implementation to map data systems, determine what data the vendor will need and what the vendor will do with that data, and what data the vendor will supply to document program operations and outcomes. There were significant gaps in the data available for the evaluation, which are noted throughout the report. In the absence of complete, accurate, and reliable data, conclusive evidence of DM effectiveness will continue to be elusive.

Chapter 1: Introduction

Disease management (DM) programs have become popular tools, employed by both private and public health plans, aimed at reducing unnecessary medical episodes that result in higher health care utilization rates and expenditures. In addition to seeking more cost-effective care, DM programs seek to increase patients' appropriate use of health services and improve health outcomes.[2] These programs use interventional processes to build collaborative relationships between health care providers, case managers, and their patients to effectively distribute the responsibilities of managing ongoing care. DM programs identify an eligible participant population with costly chronic conditions and encourage the participant's adherence to self-management or coordinated-care regimes.[10] Typically targeting specific chronic conditions such as asthma, diabetes, congestive heart failure, and hypertension, DM programs use risk stratification to identify higher risk patients for more intensive interventions.[3] Engagement strategies range from educating patients about proper self-monitoring and self-care to shaping specialized plans that coordinate care for patients with multiple chronic conditions.[4] Best practices dictate that DM programs include eight elements:

- patient population identification process,
- patient risk identification and matching of intervention with need,
- evidence-based guidelines,
- collaborative practice models including physician and support-service providers,
- patient self-management education,
- routine reporting/feedback,
- appropriate use of information technology, and
- process and outcome measurement, evaluation, and management.[3]

The Institute of Medicine (2001) argues that healthcare systems designed to deal with acute episodes do not attend to the needs of those with chronic conditions well. Moreover, more than 75% of the $2.6 trillion spent annually on medical care can be attributed to 50% of the non-institutionalized population with one or more chronic conditions.[4] Expenditures on only five chronic conditions—asthma, diabetes, heart disease, hypertension, and mood disorders—make up nearly half of US healthcare spending.[1]

Consequently, when nearly 40% of Americans have at least one chronic condition[11] and more than 75% of all U.S. health care costs are attributable to chronic illness,[12] containing and decreasing the utilization and costs associated with chronic conditions are essential steps toward reducing healthcare expenditures and raising the quality of healthcare.

More than half of all adult Medicaid enrollees have been diagnosed with a disabling or chronic illness and these individuals account for 80% of Medicaid spending.[13] Medi-Cal, California's Medicaid program, is the main source of health insurance for 6.8 million people, or 16% of California's population.[14] The prevalence of chronic conditions among Medi-Cal enrollees similar to national figures: 18.5% have asthma, 21.4% have Type I or Type II diabetes, and 20.4% have previously been diagnosed with heart disease.[15] In 2003, the California Legislative Analysts' Office (LAO) recognized that a significant factor driving growth in costs to Medi-Cal was the rise in prevalence of chronic diseases and their associated costs.[6] The LAO concluded that the Medi-Cal fee-for-service (FFS) system is a fragmented and uncoordinated approach to the delivery of care, and is not well suited for the care of individuals suffering from chronic medical conditions. Thus, DM programs designed to increase self-management and care coordination, especially among Medi-Cal patients suffering from chronic diseases, have the potential to yield both wide-spread cost savings and positive health outcomes.

California's Disease Management Pilot Program

In 2004, the Centers for Medicare and Medicaid Services (CMS) issued guidance to states encouraging them to implement DM programs within their Medicaid FFS program.[5] In response to CMS' recommendations and the LAO's findings related to chronic conditions in Medi-Cal, California passed Welfare and Institutions Code (W&I Code) Section 14132.27, authorizing the State to:

> *Test the efficacy of providing a disease management benefit to beneficiaries under the Medi-Cal program. A disease management benefit shall include, but not be limited to, the use of evidence-based practice guidelines, supporting adherence to care plans, and providing patient education, monitoring, and healthy lifestyle changes.*[7]

Although the authorizing legislation allowed California to apply for a waiver of federal law to test the provision of DM benefits in Medi-Cal, the State, in conjunction with CMS, opted to implement a DM pilot program through an administrative model that would not require federal approval.[16] In 2006, the California Department of Health Care Services (DHCS) began preparations to conduct a three-year pilot for FFS Medi-Cal beneficiaries, primarily targeting seniors and persons with disabilities (SPDs). DHCS initiated a single integrated DM program for Medi-Cal beneficiaries with any of six common chronic conditions,

including asthma, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), coronary artery disease (CAD), atherosclerotic disease syndrome (ADS), and diabetes.

In March of 2006, DHCS released Request for Proposals (RFP) #05-45889 for the disease management pilot program (DMPP) to serve Medi-Cal FFS beneficiaries with eligible chronic conditions, as authorized by W&I Code Section 14132.27.[7, 8] The goals of the program were to test innovative strategies to better manage costs while simultaneously improving the health status of its Medi-Cal beneficiaries. After a competitively bidding process, McKesson Health Solutions (MHS) was selected to provide DM services to the eligible Medi-Cal population.

To maximize enrollment, DMPP was designed as an opt-out program in which eligible beneficiaries were automatically enrolled in the pilot program, but could choose not to participate. Two counties were selected for DMPP implementation: Alameda, and specific regions of Los Angeles. MHS was contractually obligated to enroll a minimum of 250 DMPP members in each of the six disease categories in each county and year to ensure a statistically valid sample size for the evaluation.

Disease Management Pilot Program Goals

The goal of DMPP was to test the efficacy of providing a DM benefit to FFS Medi-Cal beneficiaries with chronic conditions, with regard to:

1. The provision of DM services as a cost neutral benefit during the pilot program;
2. Health outcomes for DM Members during the pilot program; and,
3. Projected future program savings that may result from continuing the DM benefit.[8]

Eligibility Criteria

Eligible beneficiaries were identified by Department of Health Care Services Information Technology Services Division (DHCS-ITSD) based on Medi-Cal eligibility data and Medi-Cal claims history. Individuals were only eligible for DMPP during the months they were eligible for Medi-Cal, and if they met the program inclusion and exclusion rules.[8]

Original inclusion criteria for the program included:

- Adult 22 years of age or older;
- Current Medi-Cal eligibility in Aid Codes 10, 16, 1E, 1H, 20, 26, 2E, 36, 60, 66, 6E, 6G, 6H, 6N, or 8G;
- At least one paid claim for any of the six following conditions since March 1, 2004:

  - Diabetes : primary or secondary diagnosis codes of 250:250.99
  - Asthma: primary or secondary diagnosis codes of 493:493.99
  - COPD: primary diagnosis or secondary codes of 492:492.89, 496
  - CAD: primary diagnosis or secondary codes of 410:410.00 (Acute Myocardial Infarction) and 413:413.99 (Angina Pectoris)
  - CHF: primary diagnosis codes of 428:428.9.
  - ADS: primary or secondary diagnosis codes of 440.0:440.9, 441.0:441.9, 411.0:412, 414:414.9.
- Residence in Alameda County or selected zip codes within Los Angeles County.

In June 2009, DHCS and MHS agreed to expand the program inclusion criteria to three additional Aid Codes: 14, 24, and 64. This expansion was implemented in August 2009.

To ensure DMPP effectiveness would not be confounded by expenses and effects of other conditions and situations, certain populations among eligible Medi-Cal beneficiaries were excluded from DMPP:

- Restricted scope/emergency only Medi-Cal;
- Medicare eligibility;
- Retroactive only Medi-Cal eligibility, or eligibility of less than three months;
- Participation in specified excluded Medicaid waiver program;
- Developmentally disabled, or residence in an intermediate care facility for the developmentally disabled;
- Residence in Long Term Care or Nursing facilities;
- Clients with hospice service restrictions;
- Receipt of comparable DM services from another coverage source, such as Medi-Cal Managed Care;
- Receipt of comparable case management (CM) services from another program, such as Medical Case Management (MCM) or AIDS Case Management Program;
- Primary or secondary diagnosis of HIV/AIDS; and,
- American Indian race/ethnicity.

Additional rules led to exclusion of otherwise eligible enrollees who developed specific "medical exclusion" criteria, including end-stage renal disease (ERSD), active cancer, severe trauma (defined as those who received more than $250,000 in medical care within a 12-month period), or organ transplantation. If an individual had already been enrolled in the program before beginning treatment for one of these excluded conditions, the member could be disenrolled, but only at the request of MHS or the beneficiary.

Detailed inclusion and exclusion criteria are listed in Appendix 1, Table 1: Inclusion criteria and Appendix 1, Table 2: Exclusion Criteria.

The Planned Disease Management Intervention

The intervention plan is described in detail in MHS' proposal to DHCS. DMPP was implemented in Alameda County and 122 specific zip codes of Los Angeles County, and took place over a 36-month period.

Upon identification of an eligible individual, MHS allowed a 30-day opt-out period before beginning intervention. Thereafter, MHS utilized telephonic nurse outreach, mail-based education, and a 24-hour triage system to improve patient self-management of illness.

MHS's approach to disease management within DMPP was condition-driven, meaning that DMPP members were assessed and coached according to their condition. MHS and DHCS employed a hierarchy for the six possible chronic conditions, based on order of clinical and financial risk.

Exhibit 1: DMPP Program Disease Hierarchy

Ranking	Condition
1	Congestive Heart Failure (CHF)
2	Chronic Obstructive Pulmonary Disease (COPD)
3	Asthma
4	Coronary Artery Disease (CAD)
5	Atherosclerotic Disease Syndrome (ADS)
6	Diabetes

Therefore, beneficiaries with comorbidities were managed by their primary condition, which is the highest ranked condition in the hierarchy. For those without comorbidities, their primary condition was the chronic condition that made them eligible for DMPP.

Enrollees who developed additional chronic conditions after their initial assignment could be reassigned to a new primary condition based on the hierarchy. For example, if an individual was already enrolled in asthma and was later diagnosed with COPD, the person was then assessed and managed under COPD as the primary condition, although all chronic illnesses were managed. For purposes of this report, we analyzed enrollees based on the most severe condition to which they were assigned.

The DM intervention was risk stratified; enrollees were classified into three levels of risk, which determined the intensity of intervention received. MHS expected to assign about 50% of active participants to Risk Level One (the lowest risk group), 30% to Risk Level Two, and 20% to Risk Level Three. These risk levels of were based on patient-specific, claims-based indicators of medical expenditures. For instance, individuals with significant claims costs and risks scores related to one or more chronic conditions were assigned to

Risk Level Three as high cost/high risk and were eligible to receive the most frequent and comprehensive intervention (Exhibit 2). The risk stratification method is discussed in further detail in the findings related to program operations (Chapter 2A).

Although the program design indicated that only a proportion of high risk (Risk Level Two and Three) enrollees would be targeted for proactive outbound telephonic intervention, it was possible for individuals in Risk Level One to request a more intensive intervention and receive outbound calls (Exhibit 2). The precise frequency and timing of outbound telephonic intervention from MHS varied according to proprietary guidelines for each disease group and risk level.[17]

Exhibit 2: Level of Planned Intervention by Risk Stratification Group.

	Risk Level One	Risk Level Two	Risk Level Three
Outbound calls	Only if requested by member	Yes; approximately quarterly if selected for active engagement	Yes; monthly or bi-monthly if selected for active engagement
Mail-based education	Yes	Yes	Yes
24-hour telephone triage system	Yes	Yes	Yes

MHS dedicated approximately 14 full-time equivalent (FTE) registered nurses (RNs) to administer initial assessment, monitoring, and reassessment phone calls. The intervention also used Local Medical Advisors (2 FTEs), a Medi-Cal Care Coordinator (1 FTE), Lay Community Health Workers (4 FTEs), a Pharmacist (1FTE), and a Behavioral Health Specialist (1 FTE).[17] MHS enrolled, educated, and engaged members through member mailings. The mailings for each member included: program announcement letter, program introduction mailing (letter of explanation, member services booklet, and magnet with triage/assessment inbound phone number), various educational mailings (frequency not specified), and assessment letter with action plan for those in higher risk groups.

A 24-hour telephone triage line was also made available to members through MHS. The line was staffed with RNs to help members determine the appropriate level of care they should seek for their medical concerns. The telephone triage system was an existing product maintained by MHS; it was not created specifically for DMPP in California.

MHS received a monthly payment of $17.55 for each enrolled member in Alameda and Los Angeles counties, with a maximum contracted payment amount of $4 million per year over the three-year program period for a total maximum payment of $12 million. MHS was at

risk for all members regardless of their risk level or intervention status. In the event that the program budget neutrality analysis resulted in a net loss due to increased Medi-Cal expenditures, MHS would be required to return fees in the amount of the loss, up to the maximum amount they were paid.

Evaluation of the Disease Management Pilot Program

Evaluation Goals

The state contracted with the University of California, Los Angeles (UCLA) Center for Health Policy Research to fulfill DHCS's requirement for an independent evaluation of DMPP. UCLA established an evaluation plan designed to meet DHCS's requirements and provide a rigorous analysis of program success in the following areas:

1. Program implementation;
2. Quality of care, including changes in process and outcome measures among participants;
3. Patient satisfaction and quality of life; and,
4. Financial outcomes, including cost savings and return on investment. [9]

Evaluation Design

The evaluation utilizes a pre-post design, and compares the intervention population to a control population. Eight control group counties were selected based on the similarity of their demographic characteristics and utilization patterns to the pilot areas; these counties were San Joaquin, San Diego, Fresno, San Francisco, Riverside, San Bernardino, Sacramento and Santa Clara. Individuals included in the control group would have been eligible based on inclusion and exclusion criteria if the program had been implemented in those areas, and therefore provide a comparison population for the intervention counties. A more extensive explanation of the methodology employed to identify the control group areas is provided in further detail in Appendix 1: Methodology.

Wherever possible, the evaluation assesses findings for each DMPP condition separately. Due to a relatively low number of beneficiaries having ADS and CAD, and because the clinical treatment guidelines for these conditions are highly comparable, we combined individuals with these conditions into one category referred to as CAD/ADS.

Evaluation Data

UCLA used a total of 72 months of data in the evaluation: three years of pre-program "baseline" data and three years of program period data. The three baseline years are: Baseline Year One (September 2004-August 2005); Baseline Year Two (September 2005-August 2006); and, Baseline Year Three (September 2006-August 2007). The three program years are: Program Year One (September 2007-August 2008); Program Year Two (September 2008-August 2009); and Program Year Three (September 2009-August 2010).

Based on the evaluation design, this report contains information and analyses drawn from a range of data sources available to UCLA. The primary data sources for this report are DHCS data and MHS data and reports. Data received from DHCS include: Medi-Cal claims data for intervention and control groups and program eligibility lists created from Medi-Cal claims and eligibility warehouse data. Data received from MHS include: program enrollment lists ('PCM Member List') including demographic, risk stratification, and basic intervention data; telephonic intervention logs ('PCM Call Log'); self-reported clinical process and outcome measures for each disease group gathered during assessment calls conducted with actively engaged members ("clinical assessment data"); satisfaction survey data for members and for providers; and, MHS quarterly and annual reports to DHCS including information on program implementation. In addition, this report incorporates health status and quality of life data for the intervention group gathered by UCLA to complement MHS satisfaction survey results, and qualitative data gathered by UCLA throughout the program operational period.

All claims data analyses include a seven-month run-out period. The run-out period is necessary due to the delay between service provision and claim payment in Medi-Cal, a standard characteristic of claims data. To establish a consistent level of claims data completeness, UCLA used all claims paid within seven months of the date of service for both the baseline and program periods. Furthermore, in Medi-Cal, the process of producing data files based on claims creates a three-month delay in data availability, referred to as a claims lag.

All analyses contained in this report are subject to quality of data and documentation provided to UCLA by MHS and DHCS. UCLA cannot independently verify the accuracy or completeness of source data received from MHS and DHCS. Analyses contained in this report are based on methodologies implemented by UCLA for a rigorous and comprehensive evaluation, and represent independent findings that summarize the implementation and outcomes of DMPP. For a detailed description of the evaluation design, data sources, and selection of the control population, see Appendix 1: Methodology.

The remainder of this report is organized to present findings for each of the evaluation areas. Chapter 2A examines program structure and implementation, including the

sequence of enrollment and engagement, characteristics of the eligible population, enrollment and opt-out rates, engagement of high-risk enrollees in active intervention, as well as the frequency and intensity of the delivered intervention. Chapter 2B uses descriptive and multivariate methods to examine changes in health care utilization and expenditures between beneficiaries in intervention and control counties, before and after program implementation and controlling for possible covariates such as demographic characteristics. Chapter 2C examines differences in clinical outcome measures, including impacts on health status (e.g., adherence to diet/exercise and HbA1c levels) and clinical process measures (e.g., frequency of appropriate procedures performed). Chapter 2D examines patient satisfaction among a sample of enrollees in DMPP. Chapter 2E assesses the financial performance of the program through the contractually required cost-neutrality return-on-investment analysis. Finally, Chapter 3 presents overall conclusions and recommendations regarding DMPP.

Accompanying this report are two appendices: Appendix 1: Methodology and Appendix 2: Supplemental Findings and Analysis. Both appendices contain additional materials that support or detail the information presented in the body of this report.

Chapter 2: Findings

A. Implementation Processes and Operational Factors

In this chapter, we review the implementation of DMPP by MHS. The operational processes of program implementation are critical to program success. These processes and outcomes include eligibility determination, enrollment and disenrollment; delivery of member services; and, characteristics of the participant population. These factors directly influence the success of the program in meeting clinical, economic, utilization, satisfaction, and financial goals, and are an essential component of program evaluation.

Data Sources

The sources of information available for evaluation of operational activities and outcomes include:

- Monthly eligibility and claims data generated by DHCS;
- Monthly PCM Member List data generated by MHS;
- Detailed PCM Call Log data generated by MHS;
- Meeting minutes from weekly or bi-weekly operations teleconferences (DHCS Systems of Care staff and Information Technology Systems Division Staff, MHS, and UCLA);
- MHS quarterly and annual reports to DHCS;
- MHS satisfaction surveys with DMPP enrollees;
- UCLA satisfaction surveys with DMPP enrollees; and
- UCLA interviews with MHS staff.

To evaluate program operations, all data and datasets were independently managed and processed by UCLA, with guidance from both DHCS and MHS.

Implementation Timeline

Exhibit 3 displays a timeline of DMPP implementation, from the release of the program request for proposals (RFP) in March 2006 to the completion of the program in August 2010. Evaluation- and data-related milestones are also included.

In general, the program was implemented in a timely manner with few instances of operational delays. The RFP for the pilot program was issued by DHCS in March 2006, and MHS submitted the winning proposal on May 5, 2006 (not shown). The contract between DHCS and MHS was approved in February 2007. Program launch occurred in August 2007, and enrollment began in the following month with outbound services delivered to members who did not opt out during the initial 30 days after notice of eligibility. Services started for the first beneficiary on September 1, 2007. Several milestones in the delivery of the intervention occurred throughout the program period, including:

- MHS established a program advisory board (PAB) (January 2008). The PAB, made up of local stakeholders, including members from Medicaid managed care plans, county safety net providers, and clinical leadership, met quarterly throughout the remaining program period.
- During 2008, DHCS undertook a conversion of the Medi-Cal data warehouse, which significantly delayed delivery of claims data to UCLA and MHS. Specifically, this conversion:
    - Delayed MHS's ability to re-stratify the eligible population according to risk and to use claims in member management.
    - Delayed interim cost savings analyses conducted by UCLA.
    - Reduced the claims lag experienced in the old claims warehouse by approximately one-month, resulting in more timely claims data availability after the conversion was completed in June 2008.
- Several months after program launch, low levels of engagement were noted, and MHS initiated several strategies to improve member participation:
    - Targeted outreach to Armenian community due to low enrollment in this group (August 2008).
    - Aggressive engagement efforts reported by MHS to increase the proportion of members receiving proactive outbound calls (December 2008).
    - Addition of new eligibles to the program population through expansion of the inclusion criteria authorized by DHCS-MEDS (July 2009). Three new Aid Codes were added to the original 15 DMPP-eligible Aid Codes.

The addition of three new Aid Codes to the eligibility criteria in August 2009 increased enrollment in the program significantly (Exhibit 8). As a result, in March 2010 MHS and DHCS agreed to establish a "Risk Level Zero" classification. Enrollees stratified into the

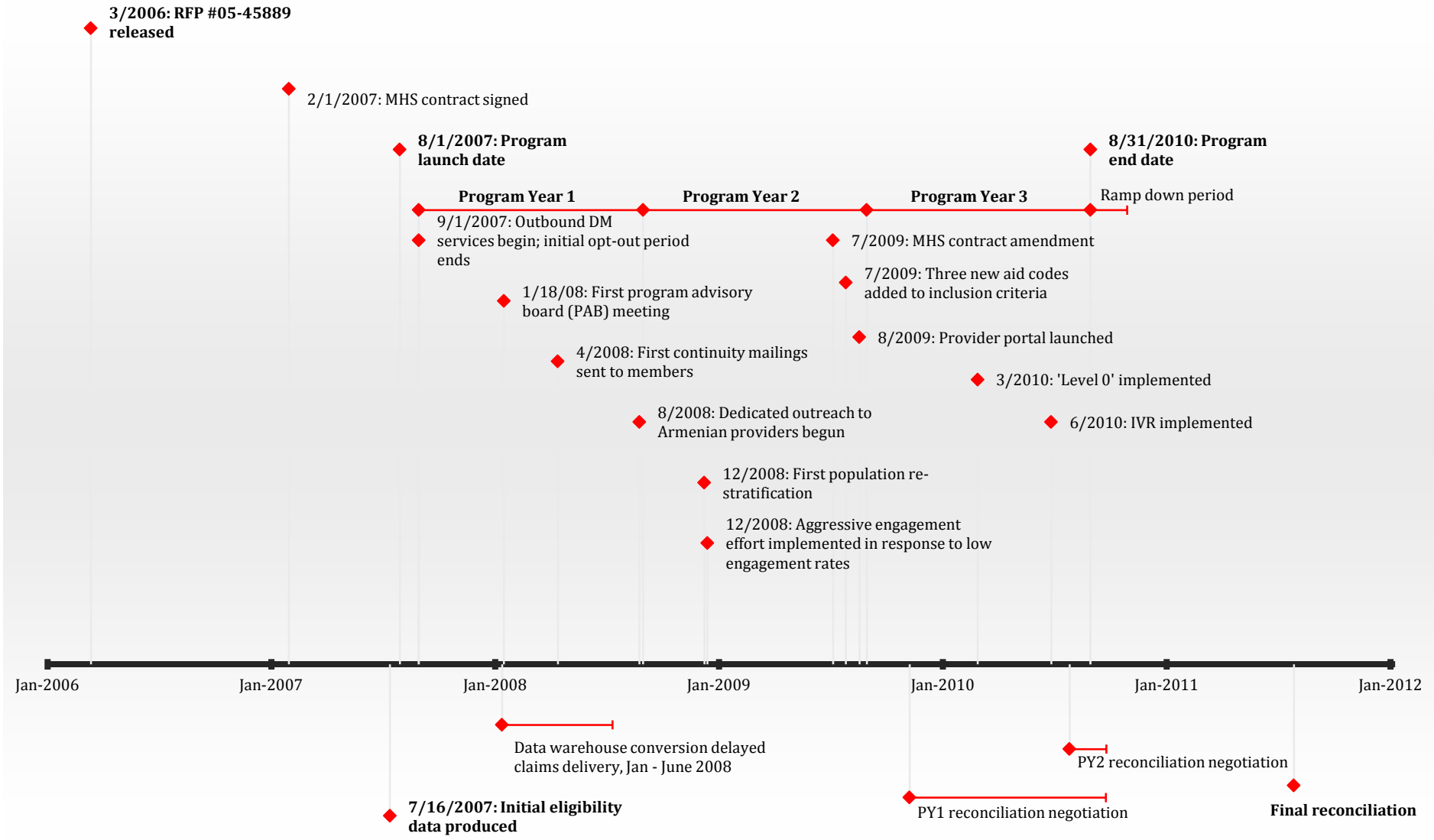
Level Zero group were held in a waiting status and did not receive intervention. MHS was not paid management fees for Level Zero beneficiaries but was at financial risk for their spending. Beneficiaries in the Level Zero group are excluded from all evaluation analysis, because they were not enrolled or managed in the intervention.

The program ended as scheduled on August 31, 2010. The final cost neutrality reconciliation calculation was completed in September 2011, and was accepted by MHS in October 2011.

These milestones will be discussed in more detail in the following analysis of program operations, including:

- Eligibility Determination;
- Transmission of data to MHS;
- Size and characteristics of the eligible population;
- Risk stratification of the eligible population;
- Program Participation and Beneficiary Opt-out;
- Engagement of high risk enrollees; and,
- Intervention delivery.

Exhibit 3: Timeline of Program Implementation



Eligibility Determination

The process for eligibility determination was implemented successfully. Each month Medi-Cal Management Information Systems and Decision Support Systems (MIS/DSS) created a file, called the "Potential DM Beneficiary File" that identified potentially eligible individuals for DMPP. This file was made available to California Department of Health Services (CDHS), Medicaid Applications Section (MAS) and Information Technology Services (ITSD). Once the file was received by MAS, they identified the beneficiaries that were currently eligible in accordance with program rules, and forwarded the "DMETS CIN File" (a file that contained all Client Identification Numbers (CINs) for beneficiaries eligible for DMPP) and the "MEDS Eligibility File" (a file that contained specific data for all DMPP eligible beneficiaries) to the Office of Medi-Cal Payment Systems (OMPS). In addition, a CIN cross-reference file was included to capture beneficiaries who had more than one CIN number assigned over time.

OMPS used the "DMETS CIN File" and the "MEDS Eligibility File" to create and maintain a system to track and report DMPP beneficiaries, which was called the Disease Management Eligibility Tracking System (DMETS).

Transmission of Data to McKesson Health Solutions

On a monthly basis, following eligibility determination, the "DMETS CIN File," "CIN Cross-Reference File," and the "MEDS Eligibility File" were sent to UCLA. UCLA forwarded all three files to MHS, which they used to enroll/disenroll beneficiaries into DMPP. Following the 30-day opt-out period after initial eligibility determination, MHS created a file describing the enrollment status of each beneficiary received in the "MEDS Eligibility File," which was called the "DM Enrollment Status File." MHS forwarded this "enrollment status" file to MAS, and MAS updated MEDS with the enrollment status of each beneficiary.

MHS also received claims history data for eligible members, for use in risk stratification and condition management. Claims history files were extracted from the Medi-Cal claims data warehouse based on the eligibility data described above. Claims data were transmitted to MHS via UCLA on a monthly basis.

Data delivery was timely, with the exceptions of a six-month period, beginning in January 2008, during which DHCS's Medi-Cal claims data warehouse underwent a conversion to a new vendor and structure (Exhibit 3). While the three eligibility files described above continued to be delivered, the warehouse conversion caused a significant and unavoidable delay in delivery of claims data to UCLA and MHS. MHS reported that the delay limited MHS' ability to: risk stratify the member population; provide outreach to program beneficiaries; and, review claims data to respond to health care events such as hospitalizations or carry out interim assessments of savings in the program.

The warehouse conversion also impacted UCLA's ability to carry out interim cost neutrality calculations, which were delayed until the beginning of Program Year Three.

Size and Characteristics of the Eligible Population

As illustrated in Exhibit 4, there were a total of 54,051 people eligible for DMPP over the three-year program period. This excludes individuals who were eligible but were held on the "Level Zero" waiting list. Of this total, 9,871 people resided in Alameda County, 44,086 resided in Los Angeles County, and 94 did not have county information.

Exhibit 4: Total Unduplicated Number of Eligible Individuals by County of Residence, 36-Month Program Period

Alameda		**Los Angeles**		**Missing County**		**Total**
Number	%	Number	%	Number	%	**Number**
9,871	18%	44,086	82%	94	0.2%	**54,051**

Source: UCLA analysis of Medi-Cal eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list. See Exhibit 8.

Among all eligible individuals, the most prevalent primary condition was diabetes (31%) followed by CAD/ADS, COPD, Asthma, and CHF (Exhibit 5). This prevalence analysis is impacted by the program disease hierarchy. Those beneficiaries with comorbidities are identified by their higher-ranked primary condition.

Exhibit 5: Total Unduplicated Number of Eligible Individuals by Primary Condition, 36-Month Program Period

	Number of Eligible Individuals	**% of Total Eligible Population**
Asthma	7,410	14%
CAD/ADS	13,303	25%
CHF	7,405	14%
COPD	8,980	17%
Diabetes	16,953	31%
All Conditions	**54,051**	**100%**

Source: UCLA Analysis of MHS PCM data and Medi-Cal eligibility data.
Note: Percentages may not add to 100% due to rounding. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Exhibit 6 presents the demographic characteristics of the total eligible population, both overall and by primary condition. Among all eligible beneficiaries, most were over age 55, and fewer than 15% were ages 22 to 44. A slight majority of the population was female. The most prevalent ethnicity was White (36%), with almost half of all Whites identified as

Armenian. The majority of the population (78%) had a disability, and among those with a disability, most were in Aid Code 60: Disabled – SSI/SSP – Cash. Among those who were not disabled, most were in Aid Codes 14: Aid to the Aged – Medically Needy or 10: Aid to the Aged – SSI/SSP. Population characteristics varied across the five disease groups. The Asthma population is different than other disease groups, with younger individuals representing a higher proportion of the eligible beneficiaries. Armenians were a larger proportion of the heart disease related conditions.

More detailed tables containing the number of individuals in each category, as well as percentages calculated across diseases within each demographic characteristic ("row percentages") and within disease groups ("column percentages") are contained in Appendix 2, Table 1 and Appendix 2, Table 2, respectively.

Exhibit 6: Characteristics of the Eligible Population by Primary Condition

	Asthma	CAD/ADS	CHF	COPD	Diabetes	All Conditions
Total Number of Beneficiaries	**7,410**	**13,303**	**7,405**	**8,980**	**16,953**	**54,051**
Age Group						
22-34	14%	1%	2%	4%	4%	**5%**
35-44	14%	3%	5%	8%	7%	**7%**
45-54	26%	16%	22%	28%	20%	**21%**
55-64	33%	47%	47%	43%	41%	**43%**
65+	13%	33%	24%	17%	28%	**25%**
Gender						
Female	68%	58%	56%	45%	60%	**57%**
Ethnicity						
White (Total)	30%	47%	39%	40%	26%	**36%**
White Armenian	*10%*	*29%*	*17%*	*11%*	*11%*	***16%***
White Other	*20%*	*19%*	*21%*	*29%*	*15%*	***20%***
Latino	20%	18%	21%	14%	33%	**23%**
African American	27%	9%	23%	27%	14%	**18%**
Asian/Pacific Islander	14%	18%	11%	12%	19%	**16%**
Other	2%	2%	2%	2%	2%	**2%**
Missing	6%	5%	4%	6%	5%	**5%**
Language						
Armenian	10%	30%	18%	11%	11%	**17%**
East Asian Languages	4%	8%	4%	4%	6%	**6%**
English	47%	25%	42%	47%	32%	**36%**
European Languages	1%	4%	3%	1%	1%	**2%**
Southeast Asian Languages	5%	3%	2%	2%	5%	**4%**
Spanish	11%	14%	15%	7%	24%	**16%**
Other Languages	2%	4%	3%	2%	4%	**3%**
Unknown Language	20%	12%	14%	25%	16%	**17%**
County						
Alameda	24%	11%	20%	19%	21%	**18%**
Los Angeles	76%	89%	80%	81%	79%	**82%**
Aid Code						
Total Disabled	89%	71%	80%	87%	74%	78%
60: Disabled – SSI/SSP – Cash	*82%*	*64%*	*70%*	*81%*	*64%*	*70%*
64: Disabled – Medically Needy	*3%*	*4%*	*5%*	*2%*	*5%*	*4%*
6E: Craig v. Bonta Disabled	*1%*	*1%*	*1%*	*2%*	*1%*	*1%*
6H: Disabled – FPL	*2%*	*2%*	*4%*	*2%*	*3%*	*3%*
6N: Former SSI No Longer Disabled in SSI Appeals Status	*0.3%*	*0.1%*	*0.1%*	*0.1%*	*0.2%*	*0.2%*
Other Aid Codes - Disabled	*0.1%*	*0.0%*	*0.1%*	*0.0%*	*0.1%*	*0.1%*
Total Not Disabled	11%	29%	20%	13%	26%	22%
10: Aid to the Aged – SSI/SSP	*2%*	*7%*	*5%*	*3%*	*3%*	*4%*
14: Aid to the Aged – Medically Needy	*7%*	*19%*	*13%*	*9%*	*19%*	*15%*
1H: Federal Poverty Level – Aged (FPL-Aged)	*0%*	*1%*	*1%*	*1%*	*2%*	*1%*
20: Blind – SSI/SSP – Cash.	*1%*	*1%*	*1%*	*1%*	*2%*	*1%*
Other Aid Codes - Not Disabled	*0.1%*	*0.2%*	*0.2%*	*0.1%*	*0.2%*	*0.2%*
Co-morbidity						
Yes	6%	7%	23%	13%	0%	**8%**

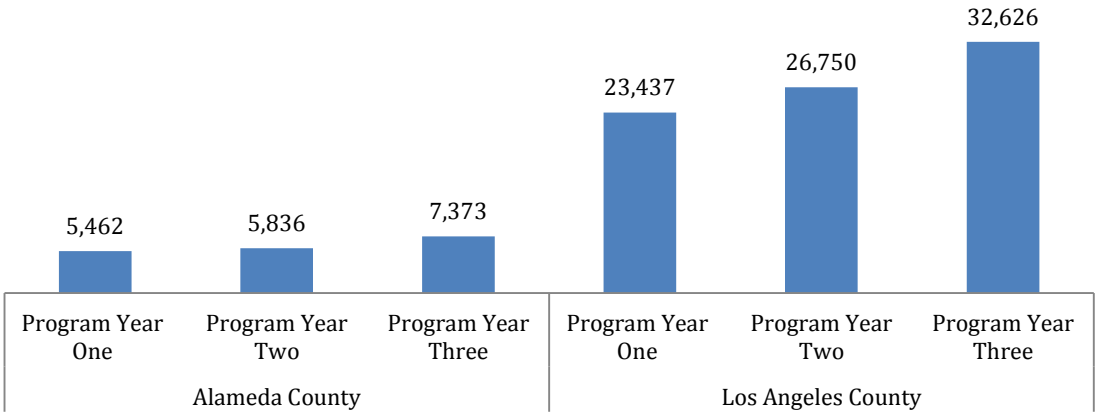
Source: UCLA Analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Columns may not add to 100% due to rounding. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Growth in the Eligible Population

Exhibit 7 displays the total number of unique people eligible for DMPP in each Program Year, by county. In the first year of the program a total of 28,954 individuals were found eligible for DMPP, in Program Year Two 32,656 were eligible, and finally a total of 40,052 were eligible in Program Year Three. In Alameda and Los Angeles, the total eligible population experienced similar proportional growth from the first to the third year (35% change and 39% change from Year One to Year Three, respectively).

Exhibit 7: Eligible Population by Program Year and County of Residence



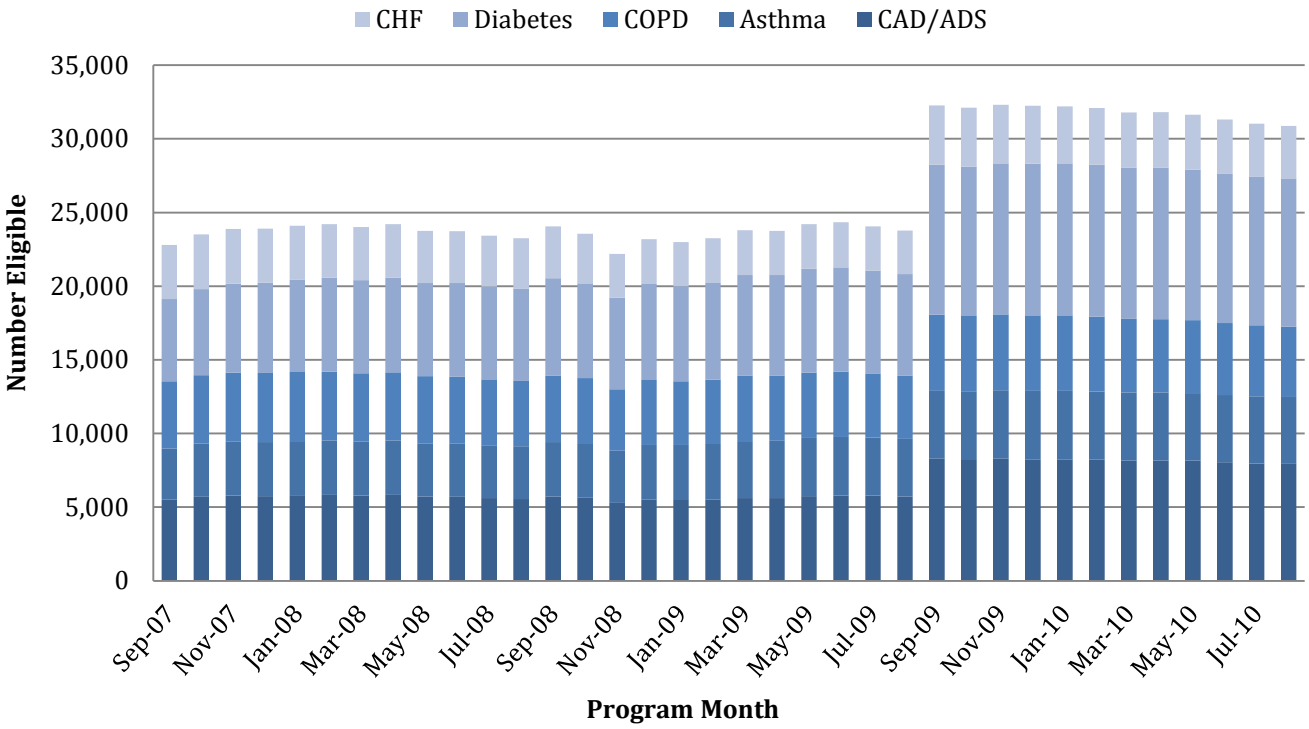
Source: UCLA analysis of Medi-Cal eligibility data.
Note: Beneficiaries with missing county of residence are excluded from this analysis. County of residence information was missing for 55 people in year one, 70 in year two, and 53 in year three. Excludes eligible individuals who were held in the "Level Zero" waiting list.

The monthly eligible population remained fairly constant between 20,000 and 25,000 throughout Program Years One and Two (Exhibit 8). The substantial growth in the size of the eligible population in Program Year Three is attributable to the addition of three new full-scope Aid Codes to the program inclusion criteria in July 2009 (Exhibit 3). In July of 2009, MHS and DHCS agreed to add Medi-Cal Aid Codes 14 (Aid to the Aged – Medically Needy), 24 (Blind – Medically Needy), and 64 (Disabled – Medically Needy) to the program inclusion criteria to increase the size of the enrolled population. The first beneficiaries within the newly added Aid Codes were determined eligible in July, and became enrolled in September 2009. As seen in Exhibit 8, there was minimal variation in the distribution of beneficiaries by disease over the 36-month program period.

Between July 2009 and August 2010, a total of 11,135 individuals became eligible for the intervention group within the new Aid Codes, representing a 25% increase in total eligible population. The slight lag in the increased number of eligibles is due to the waiting period established in program implementation rules, which allowed eligible members an opportunity to opt out within 30 days.

The total number of eligible individuals in each year (Exhibit 7) is higher than the number of eligibles during any month within that year (Exhibit 8) due to churning in eligibility due to disenrollment, recertification, changes in income and residency status, and other reasons.

Exhibit 8: Monthly Number of Eligible Individuals by Primary Condition, September 2007 to August 2010



Source: UCLA Analysis of MHS PCM data and Medi-Cal eligibility data.
Note: This analysis includes the population added to the program eligibility criteria in August 2009, but held in the "Level Zero" waiting list.

Churn in Eligibility

Eligibility for DMPP was re-determined by DHCS each month. Exhibit 9 illustrates the number of people who were eligible for specific lengths of time during each year of the program. For instance, in Program Year One 21,308 (74%) of the total 28,954 were eligible for 9-12 months. In the same year, 13% were eligible for five to eight months of the Program Year and 12% were only eligible for one to four months of the Program Year. Thus, the majority of the eligible population was eligible for nine to 12 months each year.

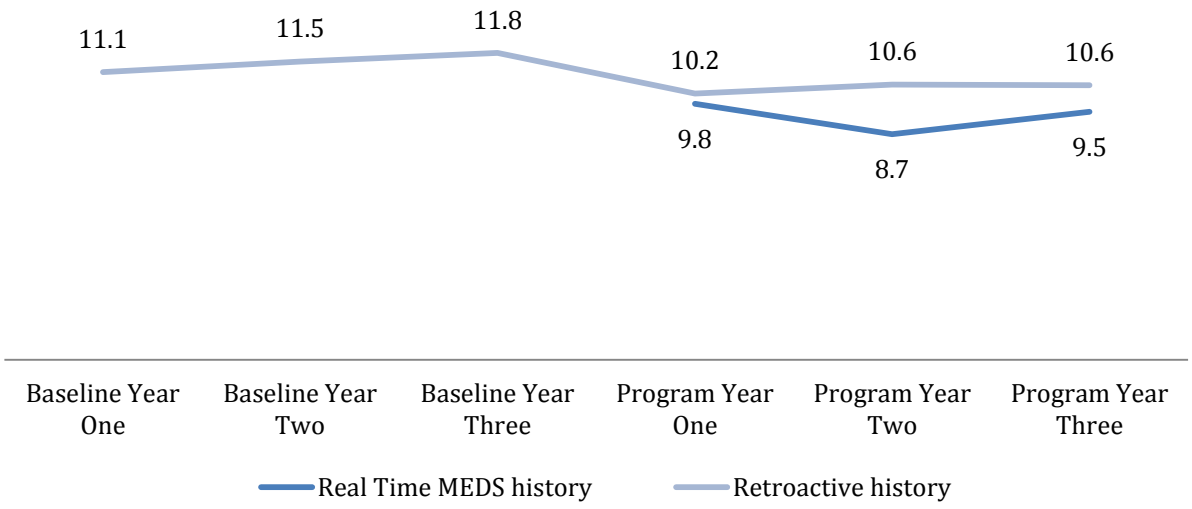
Exhibit 9: Proportion of the Eligible Population with Discontinuous Eligibility, by Program Year

	1-4 months	%	5-8 months	%	9-12 months	%	Total
Program Year One	3,413	12%	4,233	13%	21,308	74%	**28,954**
Program Year Two	7,822	24%	4,627	14%	20,207	62%	**32,656**
Program Year Three	6,234	16%	5,517	14%	28,301	71%	**40,052**

Source: UCLA analysis of Medi-Cal eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

Exhibit 10 illustrates the mean length of eligibility for Baseline Years One to Three as well as Program Years One to Three. Due to retroactive eligibility, where a person may officially qualify for Medi-Cal one to two months after a presumed eligibility determination at the point-of-service, there is an overestimate in the baseline period. This difference cannot be corrected due to the lack of complete monthly real-time MEDS data for the baseline period. To show the impact of this data anomaly, we have applied the same retroactive eligibility criteria to the Program Years in Exhibit 10.

Exhibit 10: Mean Length of Annual Eligibility for Baseline and Program Years



Source: UCLA analysis of Medi-Cal eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

Churn in eligibility is of concern because of the disruptive nature of gaining and losing eligibility in a short period of time, which leads to disruptions in the intervention. Exhibit 11 depicts the proportion of eligible individuals who lost DMPP eligibility at least once in the year. For example, 21.6% of people who were eligible in Program Year One lost this status at least once within that same year. This increased to 28.9% in Program Year Two

and then dropped slightly to 25.3% in Program Year Three. Over the full 36-month period, nearly half of the eligible population lost eligibility at least once.

Exhibit 11: Proportion of Individuals who Lost Eligibility at Least Once, Total 36-Month Period and by Program Year

Program Year	Total eligible population	% of total eligible who never lost eligibility	% of total eligible who lost eligibility at least once
Program Year One	28,954	78.4%	21.6%
Program Year Two	32,656	71.1%	28.9%
Program Year Three	40,052	74.7%	25.3%
Total Program	**54,051**	**52.8%**	**47.2%**

Source: UCLA analysis of PCM and Medi-Cal eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

Risk Stratification of the Eligible Population

MHS Risk Stratification Methodology

MHS assigned each eligible member who did not opt out to an initial risk level, based on claims expenses in the previous 12 months. MHS expected to assign about 50% of participants to Risk Level One (the lowest risk group). Risk Levels Two and Three were expected to comprise approximately 30% and 20% of the population, respectively.

Risk levels for each enrollee were reported each month by MHS. For the purpose of this report, we report on the risk level assigned at the end of the year (month 12 of each Program Year).

MHS planned to conduct re-stratification of the population quarterly based on claims data. Delivery of claims data was delayed due to the DHCS warehouse conversion during the first program year (Exhibit 3), and limited MHS ability to conduct claims-based population re-stratification until the second year. Nevertheless, each member's assigned risk level could also change at any time during the program period based on DM nurse recommendation. This nurse-initiated re-stratification was only to occur among enrollees who were contacted by telephone, so it is not as likely to occur in the lower-risk and non-active population. The risk levels utilized in our analyses are a combination of those that were assigned by MHS nurses and initial MHS claims-based assignments (for those whose risk levels were not overridden by nurses). There were minimal differences between the original and nurse-reviewed risk level assignments for each Program Year:

- In Program Year One, 98% (28,505) had no changes in risk level, 1% (428 people)

had one change in risk level, and less than 1% (21 people) had two changes in risk level.

- In Program Year Two, 99% (32,346 people) had no changes in risk level, and 1% (1,390 people) had one change in risk level.
- In Program Year Three, 97% (38,662 people) had no changes in risk level, 3% (2,083 people) had one change in risk level, less than 1% (46 people) had two or more changes in risk level.

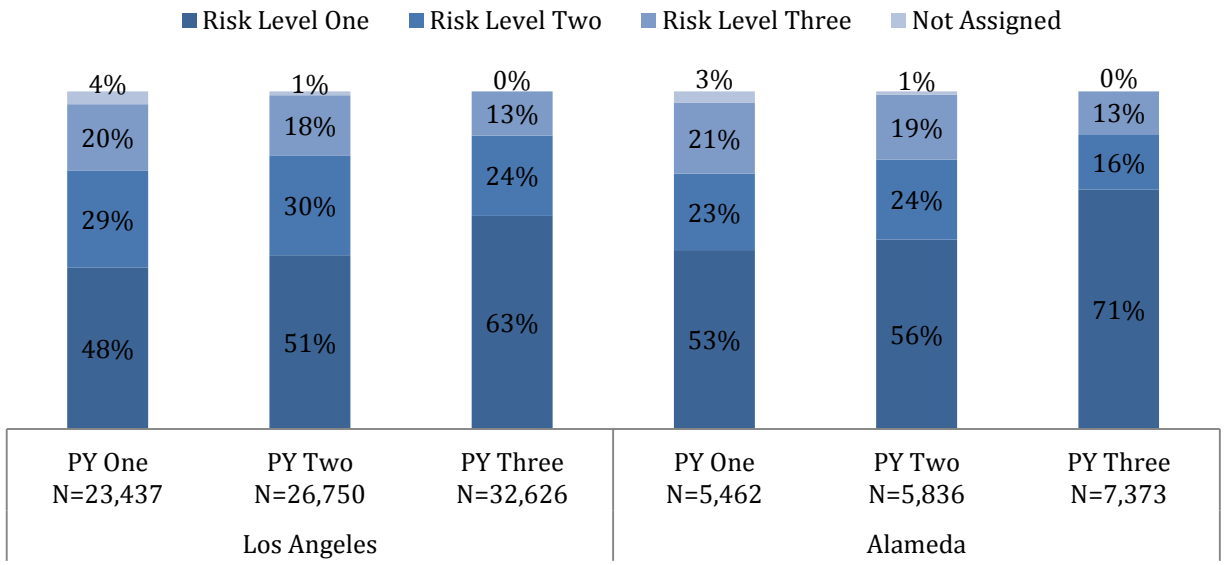
The addition of the new Aid Codes in June of 2009 resulted in significantly larger total volume of new members than anticipated. MHS and DHCS agreed that if the increase in billable members was not reduced, the program's billable amount would exceed the $4,000,000 maximum allowable in billable costs for Program Year Three by June 2010. Therefore, a waiting list (Risk Level Zero) was developed to control the volume of eligible beneficiaries entering DMPP at a rate that aligned with the program budget.

Once the waiting list was put into place, eligible beneficiaries were stratified into Risk Levels Zero, One, Two, and Three, based on expenditure thresholds identified by MHS using historical claims data. Risk Level Zero beneficiaries were those with the lowest amount of total claims expenses ($2,000 or less), and were maintained in a "waiting" status without any intervention. Risk Level Zero enrollees are not included in our analyses, as they received no intervention and did not generate program fees for MHS.

Risk Profile of the Eligible Population

As displayed in Exhibit 12, the risk distribution of the eligible population varied by county and by year. During the three Program Years, an increasing proportion of beneficiaries were classified in the lowest risk level. In general, a larger proportion of beneficiaries in Alameda County were categorized as low-risk than in Los Angeles. However, the proportion of the population in the highest risk group was essentially equivalent in Los Angeles and Alameda counties in each Program Year.

Exhibit 12: Risk Stratification of the Eligible Population, by County and Program Year



Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.
Note: Risk level indicates risk level at end point of the Program Year. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Risk stratification was based on total health care expenditures. As a result, existing underlying patterns of racial/ethnic disparities in expenditures [18] are likely to be reflected in risk stratification. We examined the distribution of enrollees across the three Risk Levels in each racial/ethnic category, and found a statistically significant difference ($p<0.01$) (Exhibit 13). Generally, the majority of non-White beneficiaries were assigned to Risk Level One based on their lower health care spending levels in the previous 12 months. It is apparent that Asian/Pacific Islanders (A/PIs) were least frequently classified as high risk. For example, 23% of Whites were classified as high risk in Program Year One, compared to 15% of Asian/Pacific Islanders. This trend persisted over the three Program Years, despite the concurrent shift toward a lower overall risk profile for the population as a whole.

Lower risk stratification for non-White beneficiaries means they are less likely to be engaged in the active intervention and receive outbound nurse assessment and monitoring calls. The relationship between risk stratification and engagement in the active intervention will be described in the next section of this chapter.

Exhibit 13: Risk Stratification of Racial/Ethnic Groups, by Program Year

	Risk Level One		Risk Level Two		Risk Level Three		All Risk Levels
	N	%	N	%	N	%	N
Program Year One							
White (Total)	5,023	44%	3,873	34%	2,632	23%	**11,528**
White Armenian	*2,135*	*41%*	*2,032*	*39%*	*992*	*19%*	***5,159***
White Other	*2,888*	*45%*	*1,841*	*29%*	*1,640*	*26%*	***6,369***
Latino	2,879	55%	1,314	25%	1,007	19%	**5,200**
African American	3,203	55%	1,366	23%	1,272	22%	**5,841**
Asian/Pacific Islander	1,733	57%	847	28%	458	15%	**3,038**
Other	305	54%	146	26%	112	20%	**563**
Missing	993	57%	435	25%	300	17%	**1,728**
Total	**14,136**	**51%**	**7,981**	**29%**	**5,781**	**21%**	**27,898**
Program Year Two							
White (Total)	6,130	47%	4,373	33%	2,677	20%	**13,180**
White Armenian	*2,630*	*45%*	*2,273*	*39%*	*939*	*16%*	***5,842***
White Other	*3,500*	*48%*	*2,100*	*29%*	*1,738*	*24%*	***7,338***
Latino	3,390	56%	1,631	27%	1,063	17%	**6,084**
African American	4,066	58%	1,656	24%	1,288	18%	**7,010**
Asian/Pacific Islander	1,990	58%	973	28%	480	14%	**3,443**
Other	319	56%	167	29%	88	15%	**574**
Missing	1,176	58%	517	26%	320	16%	**2,013**
Total	**17,071**	**53%**	**9,317**	**29%**	**5,916**	**18%**	**32,304**
Program Year Three							
White (Total)	7,858	55%	4,004	28%	2,463	17%	**14,325**
White Armenian	*3,624*	*53%*	*2,224*	*32%*	*1,036*	*15%*	***6,884***
White Other	*4,234*	*57%*	*1,780*	*24%*	*1,427*	*19%*	***7,441***
Latino	6,681	72%	1,714	18%	939	10%	**9,334**
African American	4,219	66%	1,296	20%	900	14%	**6,415**
Asian/Pacific Islander	5,290	73%	1,360	19%	597	8%	**7,247**
Other	530	70%	145	19%	77	10%	**752**
Missing	1,303	66%	426	22%	250	13%	**1,979**
Total	**25,881**	**65%**	**8,945**	**22%**	**5,226**	**13%**	**40,052**
Program Total							
White (Total)	9,936	51%	5,529	28%	3,950	20%	19,415
White Armenian	*4,322*	*50%*	*2,866*	*33%*	*1,487*	*17%*	8,675
White Other	*5,614*	*52%*	*2,663*	*25%*	*2,463*	*23%*	*10,740*
Latino	8,253	67%	2,447	20%	1633	13%	*12,333*
African American	5,904	60%	2,114	22%	1777	18%	9,795
Asian/Pacific Islander	6,061	70%	1,722	20%	845	10%	8,628
Other	652	65%	210	21%	141	14%	1,003
Missing	1,765	61%	641	22%	471	16%	2877
Total	**32,571**	**60%**	**12,663**	**23%**	**8,817**	**16%**	**54,051**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.

Notes:

(1) Risk level indicates risk level at end of the Program Year.

(2) Rows may not add up to 100% due to rounding.

(3) Risk Level Zero enrollees and those with missing risk level information are excluded from this analysis.

Program Participation and Beneficiary Opt-Out

Opt-Out Process

Eligible individuals were notified of their program eligibility through non-condition specific, general introductory letters from DHCS. The letter initiated a 30-day waiting period prior to the beginning of the intervention in which MHS began sending program materials through mail. The 30-day waiting period was put in place to facilitate the opt-out process, which is discussed below. Individuals who did not opt out of the program during this initial waiting period were enrolled in DMPP. MHS corresponded with enrollees thereafter through mailings that were condition specific and printed in appropriate threshold languages.[i] Individuals could also opt-out at any time after the initial 30-day waiting period.

During the first Program Year, MHS initially provided all eligible beneficiaries with a self-addressed post card for opting out. However, several months after program launch, MHS reported that some beneficiaries thought they were required to respond via post card to be *enrolled* in the program. Therefore, MHS stopped providing the opt-out post card with eligibility notification materials, to decrease the incidence of accidental opt-out. Instead, MHS and DHCS agreed on clear instructions related to beneficiary options, including a toll-free number, so that eligibles could easily opt out of the program.

A recurring issue that impacted program implementation was missing or incorrect contact information for eligible beneficiaries. Missing or incorrect mailing addresses were a barrier to eligibility notification and opt out processes. Further, missing or incorrect addresses or phone numbers hindered MHS' ability to deliver the intervention, which was delivered almost exclusively through mailings and phone calls.

Exhibit 14 shows the number of eligible individuals with missing or incorrect contact information and the duration for which the contact information was missing or incorrect. This analysis is based on MHS PCM data, which contained an indicator for missing or incorrect contact information. It is possible that additional instances of missing or incorrect information existed but were not detected by MHS, and therefore that an unknown proportion of beneficiaries were never actually contacted by mail.

[i] Threshold languages are defined as languages spoken by 5% or more of the eligible population, based on the Medi-Cal managed care definitions for interpreter/translator need in health plans.

Exhibit 14: Eligible Individuals with Missing or Incorrect Contact Information

Percentage of Eligible Months Contact Information was Missing (# of Months Contact Information was missing/ # of Eligible Months)	Number of Beneficiaries	Percent of Beneficiaries
No Missing Information	40,600	75%
0-20% of eligible months	3,298	6%
21-40% of eligible months	2,947	5%
41-60% of eligible months	2,557	5%
61-80% of eligible months	2,002	4%
81 -100% of eligible months	2,647	5%
Total	**54,051**	**100%**

Source: UCLA analysis of MHS PCM data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

Of the 54,051 individuals that were ever eligible for DMPP over the three-year program period, MHS reported that 40,600 (75%) had correct contact information for the full duration of their eligibility. Conversely, the other 25% had incorrect or missing contact information for some period of their eligibility. For many of these individuals, correct contact information was eventually found.

Given the opt-out program design, this issue did not impact the ability of the program to reach optimal enrollment levels. Although MHS attempted to use Telematch and other methods to obtain updated contact information for the eligibles, the lack of Social Security Numbers in the DMETS file made it difficult to identify individuals. Using name, previous address, previous phone number, and date of birth proved marginally effective in obtaining corrected contact information. MHS was at risk for the entire population, including those who were unreachable, and therefore received PMPM management fees regardless of contact. MHS reported several initiatives to attempt to reach beneficiaries with poor contact information, some of which are discussed in more detail below.

Eligible Beneficiaries who Opted Out

Of the 54,051 unique individuals who were ever eligible for the program (Exhibit 4), a total of 3,156 individuals opted out of the program at some point in time (Exhibit 15). The overall program opt-out rate was thus nearly 6%. When opt-out data are reviewed by year, we find a decline in the opt-out rate throughout the program period (not shown).

The opt-out rate varied by demographic subgroup. Notably, beneficiaries of Armenian race/ethnicity opted out at a significantly higher rate, as did beneficiaries who spoke European languages (Exhibit 15). This may be partially related to the languages spoken by DM nurses, the extent of availability of program mailings in beneficiary's primary languages, and provider and community responses to the program. Although telephonic translation was available between English-speaking nurses and limited English proficient (LEP) beneficiaries, this option may not have fully resolved language barriers to

participation. MHS hired a DM nurse who spoke Armenian near the end of Program Year One to address this issue. MHS also reported that medical providers in the Armenian community discouraged their patients from program participation. MHS reported undertaking a high-intensity outreach campaign to both patients and providers in the Armenian community to address this issue, but the overall opt-out rate in this group was nevertheless high relative to other ethnicities.

Also more likely to opt out were individuals with the following characteristics: residence in Los Angeles; disabled (identified by Aid Code); speakers of European languages; pre-Medicare age (55-64); members with CAD/ADS and CHF; and, members in Risk Levels Two and Three.

Exhibit 15: Opt-Out Rate by Demographic Group, 36-Month Program Period

	Total Eligible Population	Number Opted Out	Opt Out Rate (# Opted Out/Total Eligible)
Total	**54,051**	**3,156**	**5.8%**
Age Group			
22-34	2,469	51	2.1%
35-44	3,665	126	3.4%
45-54	11,533	587	5.1%
55-64	23,074	1,859	8.1%
65+	13,310	533	4.0%
Gender			
Female	31,064	2,009	6.5%
Male	22,987	1,147	5.0%
Ethnicity			
White (Total)	19,415	1,976	10.2%
White Armenian	*8,675*	*1,258*	*14.5%*
White Other	*10,740*	*718*	*6.7%*
Latino	12,333	333	2.7%
African American	9,795	271	2.8%
Asian/Pacific Islander	8,628	361	4.2%
Other	1,003	45	4.5%
Missing	2,877	130	4.5%
Language			
Armenian	8,968	1,314	14.7%
East Asian Languages	3,179	144	4.5%
English	19,572	664	3.4%
European Languages	1,101	213	19.3%
Southeast Asian Languages	1,959	92	4.7%
Spanish	8,551	200	2.3%
Other Languages	1,681	66	3.9%
Unknown Language	9,040	463	5.1%
County			
Alameda	9,871	241	2.4%
Los Angeles	44,086	2,913	6.6%
Disability Indicator			
Yes	42,292	2,753	6.5%
No	11,759	403	3.4%
Primary Condition			
Asthma	7,410	404	5.5%
CAD/ADS	13,303	961	7.2%
CHF	7,405	499	6.7%
COPD	8,980	454	5.1%
Diabetes	16,953	838	4.9%
Risk Level			
Risk Level One	32,571	960	2.9%
Risk Level Two	12,663	1,293	10.2%
Risk Level Three	8,817	903	10.2%

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.
Note: Individuals in Risk Level Zero and those with missing county of residence are excluded from this table.

Our analysis indicates that the majority (95%) of those who opted out of the program did so within the first 30 days of their program eligibility, i.e., during the initial opt-out period prior to enrollment. The remaining 5% of those who opted out of the program did so after being enrolled in the program for at least one month. The reasons for these later opt outs are generally unknown.

The demographic characteristics of the population that opted out by primary disease condition are displayed in Exhibit 16. Overall, those who opted out were predominantly older, female, white, and disabled. For nearly every demographic factor, there was a significant difference between those that opted out and those that did not within each disease group. The only exceptions were gender among members with COPD, and disability among those with CHF. Detailed tables showing the number of individuals in each category and group are contained in Appendix 2, Table 3 and Appendix 2, Table 4.

Exhibit 16: Characteristics of the Population that Opted Out Compared to those that Did Not Opt Out, by Primary Condition

	Asthma		CAD/ADS		CHF		COPD		Diabetes		All Conditions	
	Opt Out	Not Opt Out	Opt Out	Not Opt Out	Opt Out	Not Opt Out	Opt Out	Not Opt Out	Opt Out	Not Opt Out	**Opt Out**	**Not Opt Out**
Total	**404**	**7,006**	**499**	**6,906**	**961**	**12,342**	**454**	**8,526**	**838**	**16,115**	**3,156**	**50,895**
Age Group												
22-34	4%	15%	0%	2%	1%	1%	1%	4%	3%	5%	**2%**	**5%**
35-44	9%	14%	2%	5%	1%	3%	5%	8%	5%	7%	**4%**	**7%**
45-54	24%	27%	15%	23%	15%	16%	23%	28%	20%	20%	**19%**	**22%**
55-64	53%	32%	59%	47%	63%	46%	59%	42%	57%	40%	**59%**	**42%**
65+	9%	13%	23%	24%	20%	34%	12%	17%	16%	28%	**17%**	**25%**
Gender												
Female	75%	67%	62%	56%	65%	57%	45%	45%	68%	60%	**64%**	**57%**
Male	25%	33%	38%	44%	35%	43%	55%	55%	32%	40%	**36%**	**43%**
Ethnicity												
White (Total)	49%	29%	71%	36%	75%	45%	60%	39%	56%	25%	**64%**	**34%**
White Armenian	*23%*	*9%*	*48%*	*15%*	*55%*	*27%*	*31%*	*10%*	*36%*	*10%*	***41%***	***14%***
White Other	*26%*	*20%*	*23%*	*21%*	*20%*	*18%*	*30%*	*29%*	*20%*	*15%*	***23%***	***20%***
Latino	10%	21%	10%	22%	8%	19%	10%	15%	14%	34%	**11%**	**24%**
African American	15%	28%	8%	24%	4%	10%	14%	28%	8%	15%	**9%**	**19%**
Asian/Pacific Islander	18%	14%	7%	12%	9%	19%	9%	12%	15%	19%	**11%**	**16%**
Other	2%	2%	0%	2%	1%	2%	2%	2%	2%	2%	**1%**	**2%**
Missing	5%	6%	2%	5%	4%	5%	5%	6%	4%	5%	**4%**	**5%**
Language												
Armenian	23%	9%	48%	16%	55%	28%	31%	10%	37%	10%	**42%**	**15%**
East Asian Languages	8%	4%	3%	4%	4%	9%	4%	4%	5%	7%	**5%**	**6%**
English	30%	48%	20%	43%	12%	26%	31%	48%	21%	33%	**21%**	**37%**
European Languages	5%	1%	8%	2%	9%	3%	4%	1%	5%	1%	**7%**	**2%**
Southeast Asian Languages	5%	5%	1%	3%	2%	3%	2%	2%	5%	5%	**3%**	**4%**
Spanish	5%	11%	6%	15%	6%	15%	4%	8%	9%	25%	**6%**	**16%**
Other Languages	2%	2%	2%	3%	2%	4%	2%	2%	2%	4%	**2%**	**3%**
Unknown Language	22%	20%	11%	14%	9%	12%	22%	25%	16%	16%	**15%**	**17%**
County												
Alameda	12%	25%	8%	21%	3%	12%	9%	19%	10%	21%	**8%**	**19%**
Los Angeles	88%	75%	92%	79%	97%	88%	91%	80%	90%	79%	**92%**	**81%**
Aid Code												
Total Disabled	6%	11%	19%	20%	15%	30%	10%	14%	11%	27%	**13%**	**22%**
Total Not Disabled	94%	89%	81%	80%	85%	70%	90%	86%	89%	73%	**87%**	**78%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Columns may not add to 100% due to rounding. Excludes eligible individuals who were held in the "Level Zero" waiting list.

We also analyzed the total medical expenditures of those who opted out and those who did not. On average, the population that opted out of the program had significantly higher medical expenditures in the year prior to the program than those who did not opt out, which is concordant with the finding that higher risk beneficiaries were more likely to opt out (Exhibit 17). The reason for this finding is unknown; it raises a concern about possible self-selection bias within the eligible population. It is also potentially due to increased contact with the program for higher risk members, and therefore more opportunities to opt out. Although only 6% opted out overall, because they were a higher cost population before and during the program's operations, the expected effect of the DM intervention could be diminished.

Exhibit 17: Comparison of Average Spending of Populations Who Opted Out vs. Those Who Did Not Opt Out, Baseline Year Three

	Minimum	25% Percentile	Mean	75% percentile	Maximum
Opt Outs	$ 0	$ 6,739	$ 13,342	$ 15,748	$ 242,491
Did Not Opt Out	$ 0	$ 3,282	$ 11,173	$ 12,213	$ 249,834

Source: UCLA analysis of Medi-Cal claims and eligibility data.
Note: The mean total expenditures are significantly different between the two groups, at the $p<0.05$ level. Excludes eligible individuals who were held in the "Level Zero" waiting list.

All members who did not opt out were considered enrolled, and entered the intervention population. MHS then initiated their risk stratification process, and provided intervention in varying levels of intensity according to the program design.

Assignment to Intervention Status Levels

MHS Status Assignment

After eligible beneficiaries were assigned a primary disease and a risk level, MHS transmitted their data to the program operations team. MHS utilized a platform called the Population Care Management (PCM) system, within which information on each member's risk level, status, and intervention was stored. MHS assigned each beneficiary to one of seven possible enrollment statuses (some of which contained subcategories) each month they were enrolled in DMPP. The definitions of each of MHS's member status categories are contained in Appendix 1: Methodology.

Those who opted out were categorized as such at this time, and did not receive any intervention. MHS assigned all other members in Risk Level One to the status of *On Demand/Member Risk Level Not Managed*. These enrollees had access to the 24/7 nurse advice line (NAL) and received educational mailings, but were otherwise not contacted by

MHS. In contrast, members in Risk Levels Two and Three were initially given the status of *Referred*, and were eligible for outbound nurse calls. Thereafter, *Referred* members were contacted, and were either "engaged" into an active intervention with regular DM nurse contact, or were changed to a non-active status at member request. We evaluated the percentage of Risk Level Two and Three beneficiaries that were contacted for this determination of active engagement versus non-active status assignment. In total, MHS placed 146,426 of these "enrollment" calls. The majority (107,082) were placed to individuals in Risk Levels Two and Three. More than 90% of Risk Level Two and Three beneficiaries received at least one "enrollment" call. The majority of those who were ever called received only one call, with a median of three calls per person over their full duration of eligibility.

Each member's initial engagement status was altered as needed, depending on the beneficiary's circumstances and risk level.

UCLA Engagement Hierarchy

For the purposes of evaluating the DM program, we developed a five-level hierarchical categorization of member status, based on MHS' status classifications (Appendix 1: Methodology). Our member status categories are as follows and are listed in order of hierarchy ranking:

1. **Active/Engaged –** Beneficiaries MHS intended to treat with proactive outbound calls from DM nurses on a regular schedule after risk stratification was completed.
2. **On Demand –** Beneficiaries who did not receive proactive outbound calls from DM nurses. These members could call into the 24/7 NAL.
3. **Opt Out –** Beneficiaries who requested not to participate in the program.
4. **Inactive –** Beneficiaries who did not participate in the program for reasons other than opting out.[ii]
5. **Pending –** Beneficiaries who were never successfully contacted.

Based on our engagement hierarchy, beneficiaries who had at least one month in the first status in the hierarchy (Active) were assigned to this group. Beneficiaries that did not meet this criterion were then evaluated to determine whether they fell into the second category (On Demand). This process continued until each beneficiary was assigned to one of UCLA's five hierarchical and mutually exclusive engagement categories. A decision tree illustrating this process can be found in Appendix 1: Methodology.

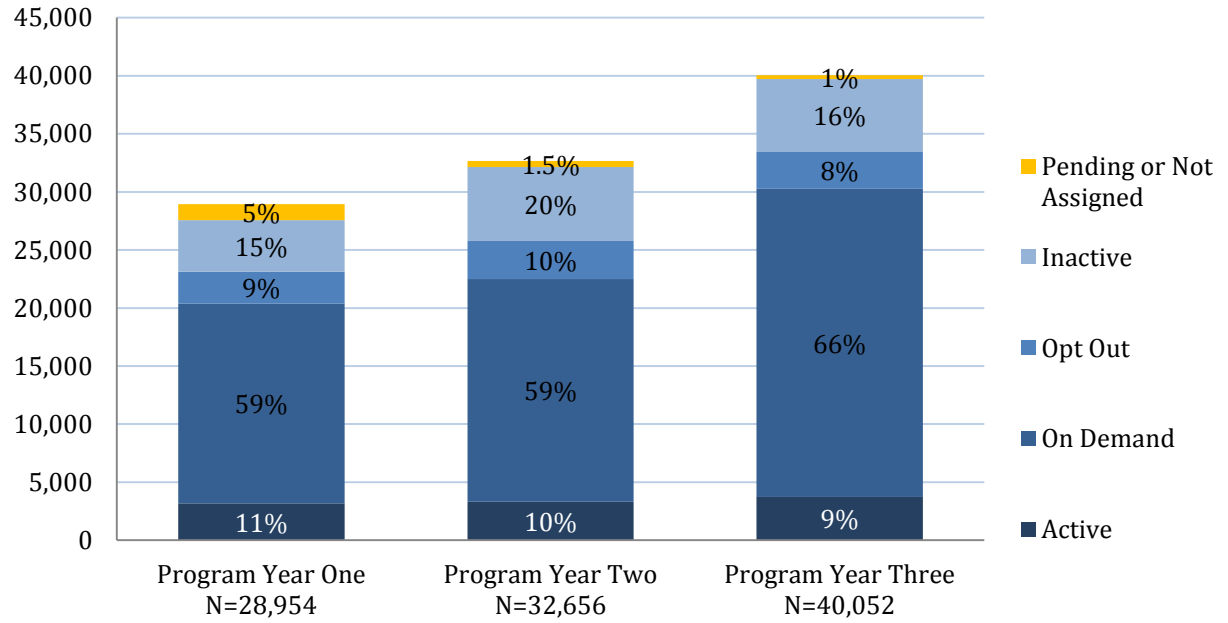
[ii] Other reasons include inactive status triggered by lack of accurate contact information after attempting initial contact, or meeting exclusion criteria such as more than 30 day stay in a long term care facility (refer to Appendix 1, Table 2 for a complete list of medical exclusion criteria).

The outcome of this methodology is that members are captured in the Active category if they were ever Active during the Program Year. For example, a member who was active for one month before opting out would still be classified as "Active."

Intervention Status of the Eligible Population

Exhibit 18displays the proportion of members assigned to each status category in each year, using UCLA's hierarchy of member engagement. Over the three years, the proportion assigned to an Active status was relatively constant (10%). Between 59% and 66% of eligible beneficiaries in each year were classified as "On Demand." An additional 8% to 10% opted out, and 15% to 20% were inactive (due to temporary ineligibility, lack of contact information, or other reasons). The remainder was pending contact or had not been assigned a status by MHS. There was significant growth in the proportion of members who were On Demand in the third Program Year, when the new Aid Codes were added to the intervention population, while the distribution of eligible beneficiaries across the other categories remained essentially unchanged.

Exhibit 18: Hierarchical Intervention Status Classification of the Eligible Population, by Program Year



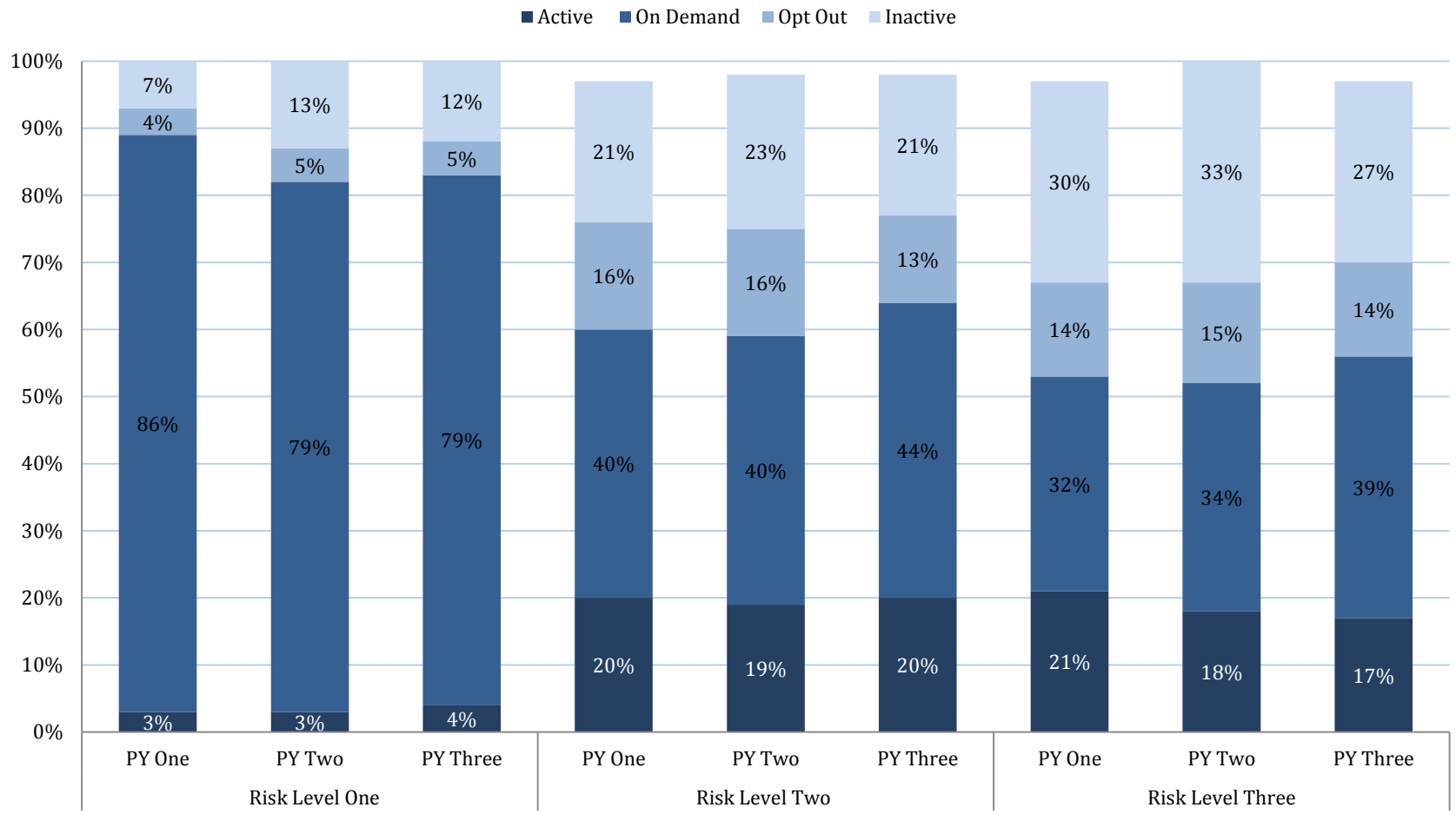
Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
**Note: Excludes individuals who were held in the "Level Zero" waiting list, as well as those not assigned risk levels or statuses by MHS.

Member status was assigned by MHS partially based on Risk Level. We reviewed the status classification of the eligible population by Risk Level, and found that engagement proceeded essentially as planned by MHS (Exhibit 19). Risk Level One enrollees were almost entirely in the On Demand and Inactive groups, with a small proportion engaged in Active intervention. These members are presumed to have requested engagement in the Active intervention group. It is also possible that some individuals who were in the lowest risk group at the end of the year were previously classified in a higher Risk Level. Due to UCLA's methodology, which uses hierarchical status classification and Risk Level as of the end of the year, these cases could appear as low-risk Active beneficiaries.

As the Risk Level increased, the proportion in an On Demand status decreased. The proportion of members that were actively engaged was relatively similar between Risk Levels Two and Three, and across the three Program Years. A much larger proportion of Risk Level Two and Three members Opted Out of the program compared to Risk Level One, potentially due to increased contact with the program and therefore more opportunities to request disenrollment.

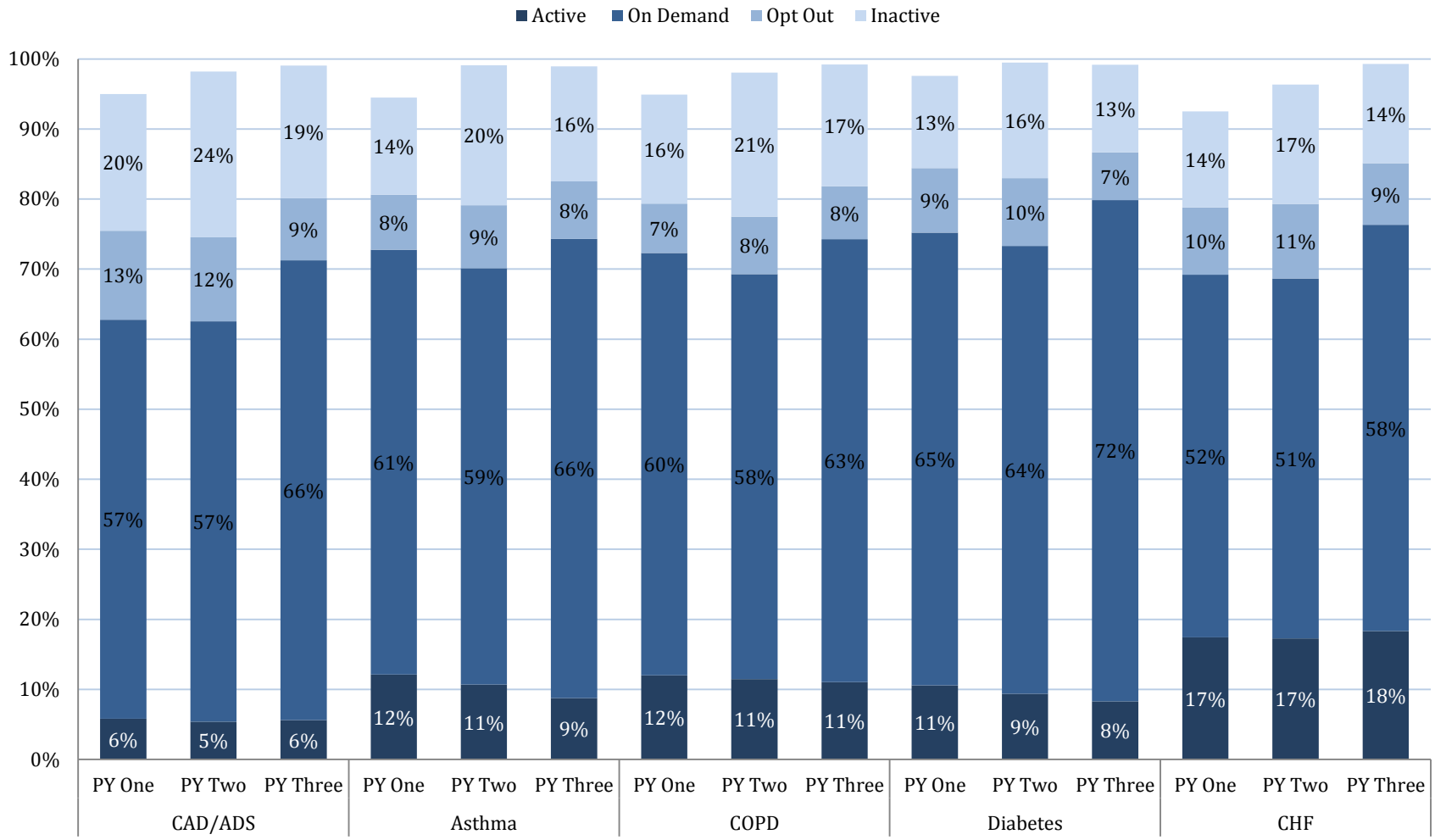
Exhibit 20 displays the status classification of the eligible population, by condition. Within each disease group, there was little variation in the proportion of enrollees that were Active, but across diseases, engagement levels varied. Members with CHF were most likely to be Active, and those with CAD/ADS were least likely to be Active. The proportion of members who were On Demand was highest in Diabetes and COPD. In each disease group, the proportion On Demand increased in the third Program Year. A more detailed table showing the number and percent of individuals in each category and group is contained in Appendix 2, Table 7.

Exhibit 19: Hierarchical Intervention Status Classification of the Eligible Population, Stratified by Risk Level and Program Year



Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Excludes individuals who were held in the "Level Zero" waiting list, as well as those not assigned a risk level, and those with "Pending" or "Not Assigned" status.

Exhibit 20: Hierarchical Intervention Status Classification of the Eligible Population, Stratified by Primary Condition and Program Year



Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Excludes individuals who were held in the "Level Zero" waiting list, as well as those not assigned a risk level, and those with "Pending" or "Not Assigned" status.

The Actively Engaged Population

Although UCLA's hierarchy required only a single month of Active status to classify a member as "Active," we assessed changes in Active status within each year to measure stability of the UCLA methodology and to determine the level of churn in MHS's active intervention (Exhibit 21). In each year, less than 10% of once Active members lost their Active status more than once.

Exhibit 21: Number of Times Active Status was Lost, by Program Year

Number of Times Active Status was Lost	Program Year One		Program Year Two		Program Year Three		Overall Program	
	Number	%	Number	%	Number	%	Number	%
Never	1,092	34%	1,381	42%	1,502	40%	**1,336**	**19%**
One time	2,005	63%	1,740	53%	2,014	54%	**4,794**	**67%**
Two times	89	3%	171	5%	208	6%	**855**	**12%**
Three or more times	2	0%	19	1%	12	0.32%	**204**	**3%**
Total Active Enrollees	**3,188**	**100%**	**3,311**	**100%**	**3,736**	**100%**	**7,189**	**100%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.

The demographic profile of the Active population is displayed in Exhibit 22. In general, the Active population demographics reflected the underlying population characteristics of the total eligible group, which was predominantly older, female, White, and Disabled. Nevertheless, the characteristics of the Active population compared to the population that was not active (the On Demand group) within each disease category were significantly different for every demographic factor. This may indicate a higher propensity to become actively engaged in some populations. However, Active engagement is predicated partly on Risk Level, which is assigned based on claims cost in the past year. Therefore, apparent differences in the demographics of the Active and On Demand groups may simply be reflective of underlying differences in medical expenditures. These differences may also be due to participant preferences and propensity to engage, and other possible factors.

Detailed tables showing the number of individuals in each category and group are contained in Appendix 2, Table 5 and Appendix 2, Table 6.

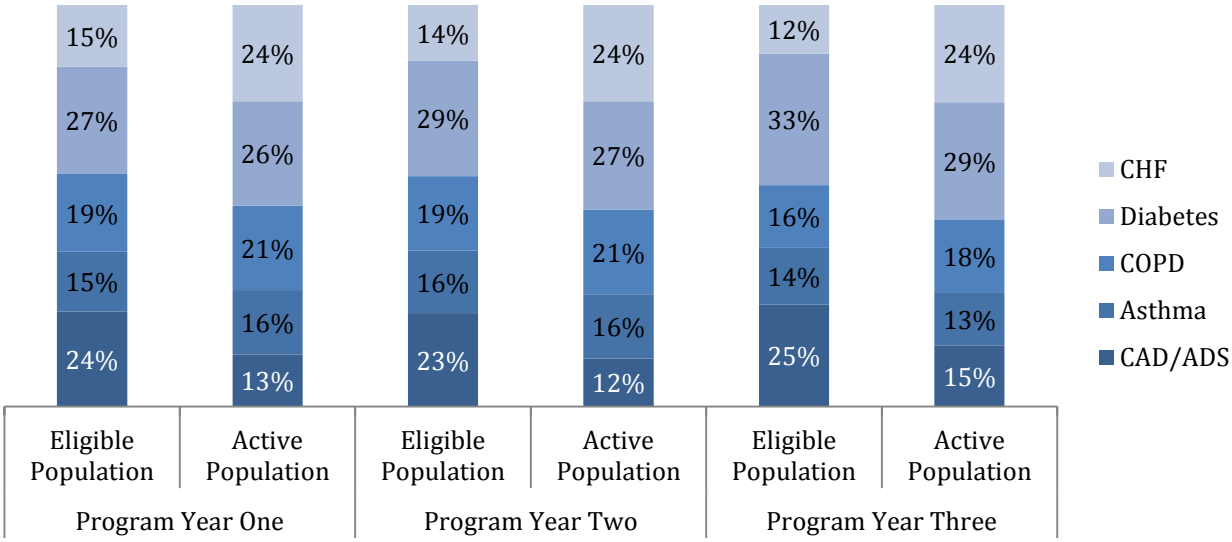
Exhibit 22: Demographic Characteristics of Population that was Ever Active, Compared to those who were On Demand, by Primary Condition

	Asthma		CAD/ADS		CHF		COPD		Diabetes		All Conditions	
	Active	On Demand	Active	On Demand	Active	On Demand	Active	On Demand	Active	On Demand	**Active**	**On Demand**
Total	**1,041**	**4,984**	**1,054**	**8,934**	**1,784**	**4,125**	**1,417**	**5,886**	**1,893**	**12,284**	**7,189**	**36,213**
Age Group												
22-34	14%	16%	0%	1%	1%	2%	2%	4%	4%	4%	**4%**	**5%**
35-44	14%	14%	2%	4%	3%	4%	9%	8%	7%	7%	**7%**	**7%**
45-54	30%	27%	18%	15%	24%	22%	31%	28%	24%	19%	**25%**	**21%**
55-64	35%	30%	55%	45%	54%	45%	48%	42%	48%	40%	**49%**	**41%**
65+	7%	13%	25%	35%	17%	26%	9%	19%	17%	31%	**15%**	**27%**
Gender												
Female	75%	66%	59%	55%	61%	53%	56%	42%	63%	59%	**62%**	**56%**
Male	25%	34%	41%	45%	39%	47%	44%	58%	37%	41%	**38%**	**44%**
Ethnicity												
White (Total)	31%	27%	51%	44%	37%	35%	43%	37%	27%	23%	**37%**	**32%**
White Armenian	*10%*	*7%*	*32%*	*26%*	*17%*	*14%*	*9%*	*10%*	*11%*	*9%*	***15%***	***14%***
White Other	*21%*	*19%*	*19%*	*17%*	*20%*	*21%*	*34%*	*27%*	*16%*	*14%*	***22%***	***18%***
Latino	24%	20%	21%	19%	23%	22%	14%	14%	35%	34%	**24%**	**24%**
African American	26%	30%	8%	10%	24%	25%	32%	28%	15%	15%	**21%**	**19%**
Asian/Pacific Islander	12%	15%	13%	20%	12%	12%	6%	13%	15%	20%	**12%**	**17%**
Other	2%	2%	1%	2%	1%	2%	1%	2%	2%	2%	**1%**	**2%**
Missing	5%	7%	5%	5%	3%	5%	5%	6%	6%	5%	**5%**	**6%**
Language												
Armenian	10%	8%	33%	27%	17%	15%	9%	10%	11%	9%	**15%**	**14%**
East Asian Languages	2%	4%	6%	9%	5%	4%	1%	5%	5%	7%	**4%**	**6%**
English	48%	50%	24%	26%	44%	43%	58%	47%	34%	33%	**42%**	**37%**
European Languages	1%	1%	4%	3%	3%	2%	1%	1%	1%	1%	**2%**	**1%**
Southeast Asian Languages	5%	4%	3%	3%	3%	2%	2%	3%	4%	5%	**3%**	**4%**
Spanish	14%	11%	15%	15%	16%	15%	7%	8%	26%	26%	**16%**	**17%**
Other Languages	2%	2%	5%	4%	2%	4%	1%	2%	3%	4%	**3%**	**3%**
Unknown Language	18%	20%	10%	12%	10%	15%	20%	25%	15%	16%	**14%**	**17%**
County												
Alameda	28%	26%	12%	12%	20%	21%	26%	19%	24%	21%	**22%**	**19%**
Los Angeles	72%	74%	87%	88%	80%	79%	74%	81%	76%	79%	**78%**	**81%**
Aid Code												
Total Disabled	6%	12%	22%	32%	16%	22%	7%	15%	17%	29%	**14%**	**24%**
Total Not Disabled	94%	88%	78%	68%	84%	78%	93%	85%	83%	71%	**86%**	**76%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Columns may not add to 100% due to rounding. Excludes eligible individuals who were held in the "Level Zero" waiting list.

We compared the proportion of members in each disease group who were eligible versus Active by year. Members with CHF were consistently overrepresented in the Active group, compared to their prevalence in the eligible population (Exhibit 23). This is concordant with the DMPP disease hierarchy, which placed CHF as the highest ranked condition (Exhibit 1). The population with CAD/ADS is conversely underrepresented. Smaller differences are found in proportion of members with diabetes, asthma, and COPD who were eligible versus actively engaged.

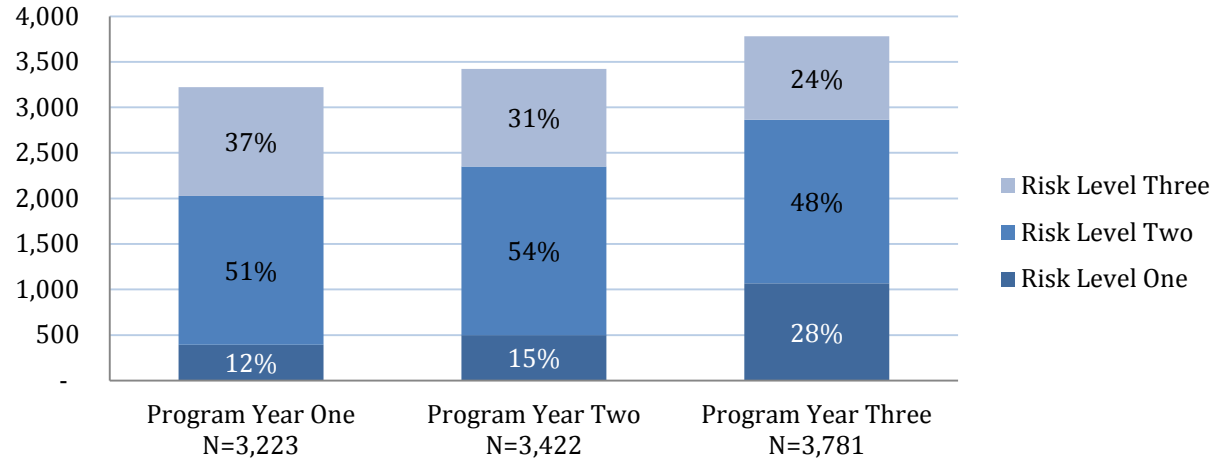
Exhibit 23: Primary Conditions of Eligible and Ever Active Populations, by Program Year



Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

The total number of individuals who were Active at any time within each Program Year increased from 3,223 in Program Year One to 3,781 in Program Year Three, using UCLA's hierarchy of engagement based on MHS status assignment (Exhibit 24). Across the three Program Years, an increasing proportion of Risk Level One enrollees were engaged, while the proportion of Active enrollees who were in Risk Level Three (the highest expenditure group) decreased. This may reflect improving accuracy of engagement based on clinical factors not associated with medical expenditures.

Exhibit 24: Risk Level Composition of the Ever Active Population, by Program Year



Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

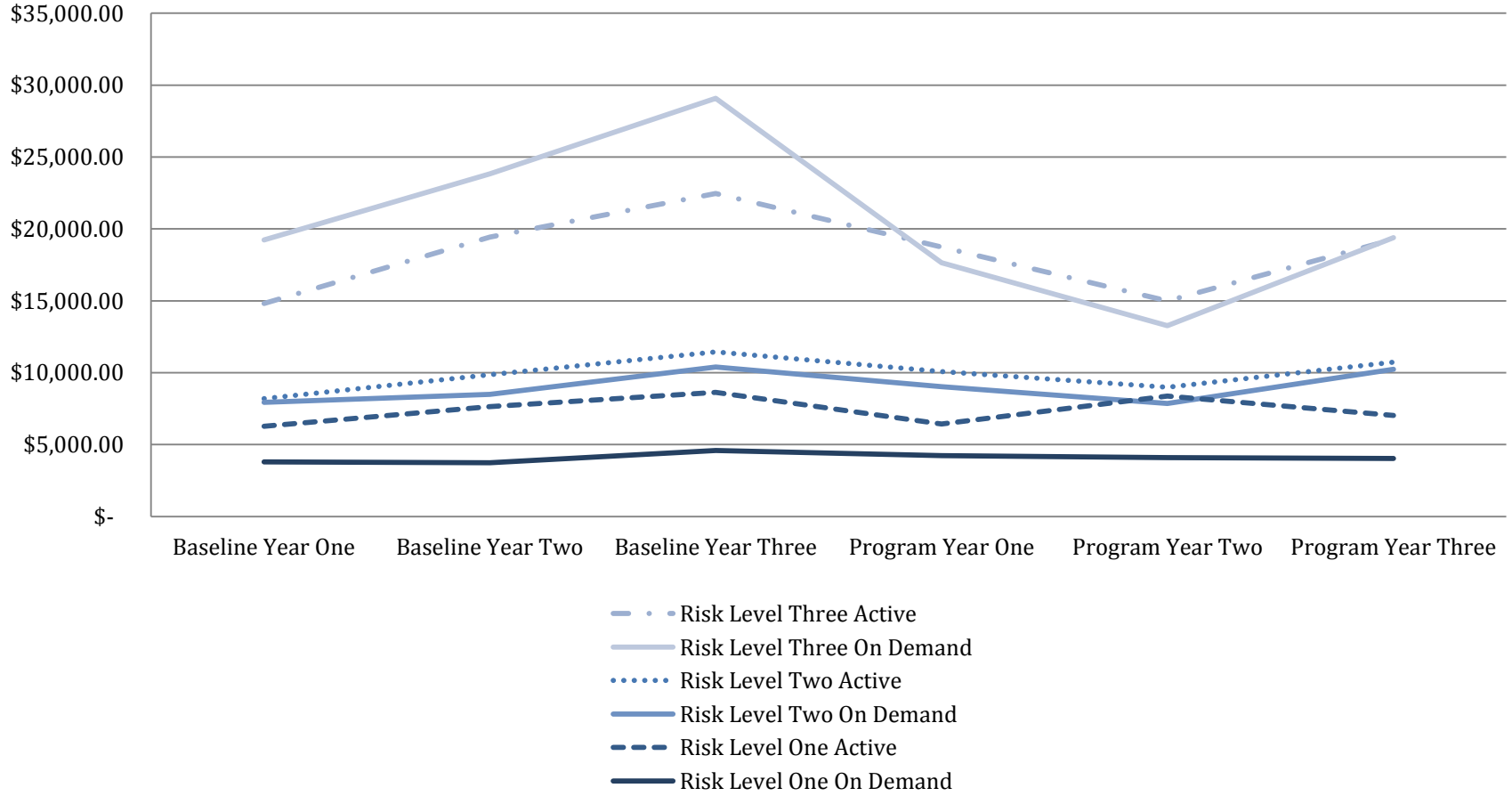
Mean Total Medical Expenditures in the Actively Engaged Population

Exhibit 25 displays the mean annual total medical expenditures of the Active population compared to the On Demand population, for each year in the entire six-year study period. This analysis illuminates trends in expenditures over time and differences in expenditures across the risk levels for each intervention status group. The apparent change in expenditures between Baseline Year Three and Program Year One is in part explained by differential detail in eligibility data provided to UCLA for the baseline period. This data anomaly creates a calculation artifact that results from higher average annual duration of eligibility in the baseline, and therefore, higher program costs. This is related to the data presented in Exhibit 10, and is further discussed in Chapter 2B. Health Services Expenditures and Utilization Outcomes.

The risk-based groups display expected variation in total expenditures within each year, with Risk Level Three enrollees having expenditures two to three times as much as the lower risk groups. Risk Level Two enrollees are higher cost than Risk Level One enrollees, but these groups are more similar to each other in total costs.

MHS engaged the higher-cost individuals within each of the lower risk groups (Levels One and Two), as shown by the consistently higher average cost in each year between the Active and On Demand populations within Risk Levels One and Two. In the Risk Level Three group, there is less clear pattern in engagement according to expenditures, indicating that MHS may determine engagement within the Risk Level Three population on more clinically based factors. Within each Risk Level and Year, the Active and On Demand groups are significantly different from each other, with the exception of the Risk Level Two group in Baseline Year One and Program Year Three, and the Risk Level Three group in Program Years One and Three.

Exhibit 25: Mean Annual Medical Expenditures, Stratified by Risk Level and Hierarchical Intervention Status Classification, Baseline Year One to Program Year Three



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data, and MHS PCM data using UCLA engagement hierarchy.
Notes: (1) individuals who were held in the "Level Zero" waiting list or without an assigned Risk Level are excluded from this analysis.
(2) mean total expenditures are significantly different between the Active and On Demand groups in every Risk Level-Year pair, with the exception of the Risk Level Two group in Baseline Year One and in Program Year Three, and the Risk Level Three group in Program Years One and Three ($p<0.05$).

Components of the Intervention

The Planned Intervention

The proactive telephonic intervention designed for actively engaged members was expected to target Risk Level Two and Three beneficiaries. However Risk Level One members could opt into the higher intensity intervention if they wished.

Educational mailings and 24/7 Nurse Advice Line (NAL) services were available to all members including those who were On Demand. The telephonic intervention for actively engaged members involved multiple types of contact in addition to these services, including outreach to providers, and calls placed by DM nurses directly to program beneficiaries. Calls made by DM nurses included (1) outbound monitoring calls to members, which included educational modules and self-care support, (2) outbound calls in response to specific events such as a member-initiated call to the 24/7 NAL, (3) outbound assessment calls to members, which were scheduled semi-annually and included a survey of self-reported health status, disease specific health outcomes, and other care coordination information, and (4) provider calls, which were placed by DM nurses to coordinate with the enrollee's medical provider.

In addition to telephonic intervention by DM nurses and mail-based patient education, MHS used a range of supplemental personnel and strategies. Each is summarized below. However, limited data were made available to independently evaluate the frequency with which these services were provided or their impact on members. Therefore, the following summaries are based on MHS's self-reported activities.[17]

1. **Medical Resource Coordinators**
   MHS used medical resource coordinators primarily to expedite treatment authorization requests (TARs) with DHCS. In Medi-Cal, certain covered benefits must be authorized prior to delivery. The timing of TAR processing can be a factor in delaying access to needed services. The resource coordinators participated in biweekly calls with DHCS staff to collaborate in expediting TARs increasing access to clinical and social services for members.
2. **Community Health Workers**
   In Program Year Two, MHS placed full time community health workers in each county. Their roles were enhanced in Program Year Three to include outreach and engagement efforts within provider offices.
3. **Behavioral Health Specialist**
   A part time behavioral health specialist was employed by MHS to provider support and resource referrals for the DM care team. Primarily, the behavioral health specialist focused on making referrals and coordinating with medical providers with

respect to behavioral health needs.

4. **Pharmacy Consultant**
   A part time pharmacist was employed by MHS to assist in coordinating and streamlining prescription medications for members. If DM nurses became aware of medication duplications, possible interactions, need for education, or other pharmaceutical concerns, they were able to refer the member to the pharmacist for consulting. The referrals were processed through the PCM platform.
5. **Medical Consultants**
   MHS employs a medical director and two medical advisors, to provide outreach to physicians in the community. The medical advisors (one located in each intervention county) were affiliated with local health plans (L.A. Care Health Plan in Los Angeles and Lumetra in Alameda). This included targeted provider outreach to the physicians in the Armenian community, particularly in Program Year One. The medical consultants conducted several other outreach and endorsement activities with the local provider communities, which are detailed in MHS's final program report to DHCS.
6. **Provider Portal**
   The provider portal was launched in August 2009, and contained care guidelines, copies of mailings, links to local, state, and national resources. Materials were available in English and translated versions, to allow providers to print the materials for patients if needed. No evidence on the use of the provider portal was made available to UCLA.

Non-Telephonic Aspects of the Intervention

Mailing of routine disease management and self-care materials, as well as targeted educational mailings (i.e. seasonal flu shot campaign) were reported by MHS for all DMPP members. According to MHS's final annual program report, more than 400,000 pieces of mail were distributed to DMPP eligible beneficiaries and their providers during the 36 month program. No member-level data on the frequency of mailings were made available, and receipt and use of the mailings by members cannot be measured. Given problems with contact information noted above, it is likely that a portion of the mailings sent by MHS were never received by DMPP members.

Condition-Driven Management

MHS's disease management program was condition-driven, meaning members were assessed and coached for their primary condition. The condition hierarchy was established such that eligible individuals could be moved to a higher priority condition in the hierarchy, if he or she was newly diagnosed or experienced claims related to that condition that had not been in the past 12 months of claims history.

Participants could be simultaneously managed in multiple conditions if they were identified with more than one diagnosis. However, the condition hierarchy was separated into two categories: respiratory and vascular conditions. A single member would never be managed for two respiratory or two vascular conditions at the same time. If a person's comorbidity was in the same condition family as the original condition, the person was managed for only the most severe condition. If the member had respiratory and vascular comorbidities, they were managed in two separate programs simultaneously.

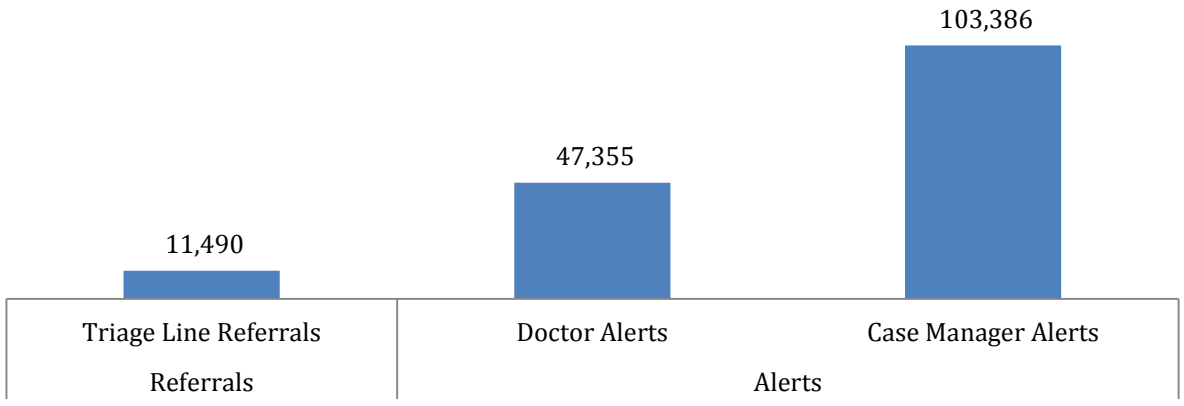
Intensity of Telephonic Intervention

We evaluated the delivery of telephonic intervention to the enrolled population, including inbound calls to the NAL, outbound calls from DM nurses to members, and internal coordination ("alerts" and "referrals") on behalf of members.

Care Coordination Alerts and Referrals

During the program, members were referred to the 24/7 NAL nearly 11,500 times (Exhibit 26). In addition, a very large number of "alerts" occurred, which were instances where a DM nurse flagged an aspect of the member record to generate an automatic follow up, either by the medical resource coordinator, or with the primary care provider through email or fax.

Exhibit 26: Total Number of Referrals and Alerts, 36-Month Program Period



Source: UCLA analysis of MHS PCM data and call log data.
Note: This analysis includes all alerts and referrals made for each member's primary and comorbid conditions. Excludes eligible individuals who were held in the "Level Zero" waiting list.

PCM system alerts are expected to have resulted in action from the appropriate MHS care team members, including potential telephonic interaction with the member, with DHCS, or with the member's provider. However, no data were available linking the alert to the follow-up activity that may have resulted from it.

Inbound Calls Placed by Members

All members were given access to a toll free telephone number, which had an automated script in English and Spanish allowing members to access the 24/7 NAL or their DM nurse (during business hours). It also had options allowing beneficiaries to enroll or opt out.

Nurse Advice Line (NAL) Calls

The 24/7 NAL was open to all eligible DMPP beneficiaries, regardless of risk level, condition, or engagement status. Eligible beneficiaries were notified of the NAL at their initial contact with MHS, and may have continued using it during periods of ineligibility or after having opted out.

MHS reported a total of 15,404 calls to the NAL during the 36-month program.[17] Each month, between 0.14 and 0.28 calls per eligible beneficiary were received, with a consistent decreasing trend over time. However, the decreasing trend is largely explained by the growth in the eligible population. The majority of calls to the NAL were related to a specific symptom or emergency (32%). However, a significant proportion of calls to the NAL were transferred to the inbound phone number to reach a DM nurse (28%).[iii]

Inbound Calls to DM Nurses

A total of 22,907 inbound calls to speak with a DM nurse were placed by members during the three-year program (not shown). When members called after business hours, they could leave a message. Incomplete calls, including calls that ended in a message, are included in this analysis. A total of 11,372 individuals (21% of all eligible beneficiaries) made at least one inbound call to speak to a DM nurse (Exhibit 27). Among those members who placed at least one call to a DM nurse, each member made 1.8 calls on average over the 36-month program (not shown).

A large proportion of those who placed a call to a DM nurse (4,860 out of the 11, 372 who ever called) were actively engaged. This represents 68% of the 7,189 actively engaged beneficiaries. A similar total number of On Demand beneficiaries (4,278 individuals) ever made an inbound DM nurse call, but this represents only 12% of On Demand members due to the large size of this population. Interestingly, the data indicate that 39% of members who ever Opted Out made at least one inbound call, as did a small proportion of members who were Inactive or Pending. It is unknown whether these calls were placed before or after the individuals left the program. One possible explanation is that members selected this option in the automated telephone script (option two in the script process) when their intention was to opt-out (option three in the script process).

[iii] UCLA did not complete independent analysis of NAL call log data. These data are based on information reported by MHS in progress reports to DHCS.

Exhibit 27: Number and Percent of Eligible Beneficiaries who Ever Placed an Inbound Call to the DM Nurse, by Hierarchical Intervention Status Classification, 36-Month Program

	Actively Engaged	On Demand	Opt Out	Inactive	Pending	Total
Made One or More Calls to a DM Nurse	4,860 68%	4,278 12%	1,238 39%	986 14%	10 3%	11,372 21%
Did Not Place Any Inbound Calls to a DM Nurse	2,329 32%	31,935 88%	1,918 61%	6,166 86%	331 97%	42,679 79%
Total Eligible Beneficiaries	**7,189**	**36,213**	**3,156**	**7,152**	**341**	**54,051**

Source: UCLA analysis of MHS PCM data and call log data.
Note: This analysis includes all calls attributed to each member's primary and comorbid conditions. Excludes eligible individuals who were held in the "Level Zero" waiting list.

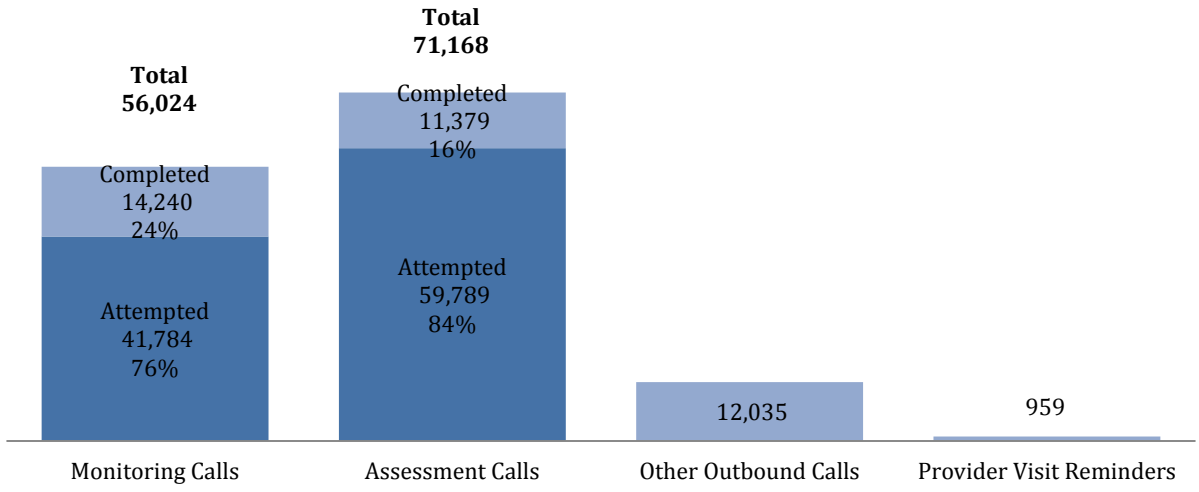
Outbound Calls

The volume of outbound assessment, monitoring, and other outbound calls placed by nurses is displayed in Exhibit 28. Other outbound calls include calls to medical providers, medical resource coordination calls, follow-up calls after NAL contact, and other care coordination calls placed by DM nurses or other MHS care team members. Both "attempted" (but unsuccessful) and "completed" calls are included. Attempted calls include calls that were dialed but not answered, as well as those where the enrollee may have answered the phone but elected not to complete the call plan. Calls were classified as completed if the member and DM nurse completed a threshold amount of the planned call content. This analysis includes calls placed for the primary condition as well as comorbid conditions.

The most frequent type of outbound call placed by MHS nurses was assessment calls, with a total of 71,168 calls placed. Risk Level Two and Three members were to receive an initial assessment call upon enrollment, followed by semi-annual assessments for those who were actively engaged.

A large number of monitoring calls were also placed by DM nurses, with a total of 56,024 attempted and completed calls during the three-year program. Nearly 1,000 calls to remind members of an upcoming provider visit were made in total. Finally, there were more than 12,000 other outbound calls (made by either the DM nurse or the medical resource coordinator). UCLA did not analyze post hospitalization calls because fewer than 30 were ever completed. This may be due in part to the delay in receipt of complete claims data for Medi-Cal, limiting MHS's ability to place timely calls following health care events.

Exhibit 28: Total Number of Outbound Calls, 36-Month Program Period



Source: UCLA analysis of MHS PCM data and call log data.
Note: This analysis includes all calls attributed to each member's primary and comorbid conditions. Post hospitalization calls were not analyzed by UCLA because fewer than 30 were ever completed. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Looking at assessment, monitoring, and other outbound calls together, we assessed the proportion of the total eligible population that was ever called within each disease group and risk level (Exhibit 29). There was a statistically significant difference ($p<0.01$) between disease groups in the proportion of members that received any complete outbound call, within each risk level and Program Year. This confirms that members in select conditions were more likely to be actively engaged and receive outbound telephonic intervention.

Exhibit 29: Proportion of Eligible Beneficiaries that Completed an Outbound Nurse Call, by Risk Level and Primary Condition, by Program Year

	Risk Level One			Risk Level Two			Risk Level Three			Total, All Risk Levels			
	Called	Not Called	Total	Called	Not Called	Total	Called	Not Called	Total	Called	Not Called	Total	
Program Year One													
Asthma	6%	94%	2,178	26%	74%	1,156	27%	73%	788	16%	84%	4,122	100%
CAD/ADS	1%	99%	3,418	11%	89%	1,876	14%	86%	1,299	7%	93%	6,593	100%
CHF	4%	96%	1,789	26%	74%	1,287	31%	69%	1,091	18%	82%	4,167	100%
COPD	7%	93%	2,566	21%	79%	1,585	27%	73%	1,238	16%	84%	5,389	100%
Diabetes	5%	95%	4,185	19%	81%	2,077	19%	81%	1,365	11%	89%	7,627	100%
Total	**5%**	**95%**	**14,136**	**20%**	**80%**	**7,981**	**23%**	**77%**	**5,781**	**13%**	**87%**	**27,898**	**100%**
Program Year Two													
Asthma	4%	96%	2,847	26%	74%	1,385	25%	75%	807	13%	87%	5,039	100%
CAD/ADS	2%	98%	4,062	16%	84%	2,135	15%	85%	1,331	8%	92%	7,528	100%
CHF	8%	92%	1,944	30%	70%	1,408	30%	70%	1,023	20%	80%	4,375	100%
COPD	5%	95%	2,987	28%	72%	1,757	27%	73%	1,239	16%	84%	5,983	100%
Diabetes	3%	97%	5,231	25%	75%	2,632	21%	79%	1,516	12%	88%	9,379	100%
Total	**4%**	**96%**	**17,071**	**24%**	**76%**	**9,317**	**23%**	**77%**	**5,916**	**13%**	**87%**	**32,304**	**100%**
Program Year Three													
Asthma	4%	96%	3,793	19%	81%	1,246	17%	83%	613	9%	91%	5,652	100%
CAD/ADS	2%	98%	6,585	13%	87%	2,307	13%	87%	1,290	6%	94%	10,182	100%
CHF	8%	92%	2,652	29%	71%	1,279	28%	72%	926	18%	82%	4,857	100%
COPD	6%	94%	3,687	22%	78%	1,558	19%	81%	1,012	12%	88%	6,257	100%
Diabetes	4%	96%	9,164	20%	80%	2,555	16%	84%	1,385	8%	92%	13,104	100%
Total	**4%**	**96%**	**25,881**	**20%**	**80%**	**8,945**	**18%**	**82%**	**5,226**	**10%**	**90%**	**40,052**	**100%**

Source: UCLA analysis of MHS PCM data and call log data.

Note: This analysis includes only completed Assessment, Monitoring, and Other Outbound calls for each member's primary condition. Excludes eligible individuals who were held in the "Level Zero" waiting list.

The intervention for actively engaged members was delivered primarily through monitoring and assessment calls. Therefore, the remainder of this analysis will concentrate on these call types. According to MHS's risk stratification and engagement methodology, members in Risk Levels Two and Three were considered for active engagement, and members in Risk Level One could opt into this telephonic intervention. Those who were actively engaged were then expected to receive regular monitoring and assessment calls. The number and frequency of these calls was determined by: (1) risk level and engagement status, (2) primary condition, (3) duration of enrollment in the program, (4) ability to contact the member, and (5) member interest/agreement to participate.

For the purposes of this analysis, we examined those calls related to each individual's primary condition only. A small proportion of the total population of eligible beneficiaries ever received an assessment or monitoring call during the total program period; 14.8% of all eligible individuals received any assessment call (including incomplete attempted calls), and 10.7% completed an assessment (Exhibit 30). However, among those who were ever actively engaged, more than 99% received any assessment call, and almost 73% completed at least one assessment. A similar pattern is found with monitoring calls, although in general the rates of monitoring call attempts and completions are lower than assessment calls. The disparity between total placed calls and completed calls is likely reflective at least in part of the quality of telephone contact information in MEDS data.

Exhibit 30: Number and Percent of Eligible Beneficiaries that Ever Received an Assessment or Monitoring Call, by Hierarchical Intervention Status Classification, 36-Month Program Period

UCLA Engagement Status Hierarchy	Total N	Assessment Calls				Monitoring Calls			
		Any Assessment Call		Completed Assessment Call		Any Monitoring Call		Completed Monitoring Call	
		N	%	N	%	N	%	N	%
Actively Engaged	7,189	7,169	99.7%	5,225	72.7%	4,919	68.4%	4,054	56.4%
On Demand	36,213	448	1.2%	244	0.7%	177	0.5%	122	0.3%
Opt Out	3,156	185	5.9%	22	0.7%	13	0.4%	9	0.3%
Inactive	7,152	179	2.5%	316	4.4%	242	3.4%	198	2.8%
Pending	341	0	0.0%	1	0.3%	1	0.3%	0	0.0%
Total	**54,051**	**7,981**	**14.8%**	**5,808**	**10.7%**	**5,352**	**9.9%**	**4,383**	**8.1%**

Source: UCLA analysis of MHS PCM data and call log data.

Note: This analysis includes only Assessment and Monitoring calls made for each member's primary condition. "Any Call" includes both attempted and completed calls. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Exhibit 31 displays the mean and maximum number of calls per person, stratified by Risk Level. On average, DM nurses placed 7.8 assessment calls and 9.5 monitoring calls to each actively engaged member (not shown). When the number of assessment and monitoring calls per Active member is assessed by risk level, we find no clear patterns in the mean number of calls placed or the number completed between the risk levels (Exhibit 31). This indicates that engagement status drove call delivery, regardless of the risk level of the actively engaged member.

It appears from this analysis that between three and four call attempts are required to achieve a single completed call. This may be related to the quality of contact information in Medi-Cal eligibility data, and is also partially explained by member availability and interest in participating in a DM call. MHS made call attempts at various times of day and on various days of the week, to attempt to mitigate inability to contact related to work or school schedules. However, the assessment calls were approximately an hour long, and as a result, members frequently answered their telephone but refused to complete the assessment at that time.

Individuals that had at least one call attempt were on average actively engaged for six months or longer (Exhibit 32). In general, members who completed a call had longer average eligibility and engagement than those for whom call attempts were not successful.

Exhibit 31: Mean and Maximum Number of Calls per Ever Active Member, Among Those with at Least One Call, by Call Type and Risk Level, 36-Month Program Period

	Mean Number of Calls Per Person			Maximum Number of Calls Per Person		
	Risk Level One	Risk Level Two	Risk Level Three	Risk Level One	Risk Level Two	Risk Level Three
Any Assessment Call	8.62	7.25	8.03	51	51	52
Completed Assessment Call	1.96	1.70	1.76	6	7	6
Any Monitoring Call	8.96	8.87	10.86	44	44	54
Completed Monitoring Call	2.70	2.83	3.40	15	17	18

Source: UCLA analysis of MHS PCM and call log data.

Note: This analysis includes Assessment and Monitoring calls made for each member's primary condition. Mean is calculated only among those with at least one call; individuals with no calls are excluded. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Exhibit 32: Mean Duration of Eligibility and Active Engagement, Among those with at Least One Call, by Call Type and Risk Level, 36-Month Program Period

	Risk Level One		Risk Level Two		Risk Level Three	
	Mean Months Eligible	Mean Months Engaged	Mean Months Eligible	Mean Months Engaged	Mean Months Eligible	Mean Months Engaged
Any Assessment Call	24.4	7.9	20.1	6.6	20.3	6.7
Completed Assessment Call	24.6	10.4	20.4	8.3	20.3	8.5
Any Monitoring Call	25.8	11.2	20.7	8.8	20.8	9.0
Completed Monitoring Call	25.5	12.6	20.6	10.0	21.1	10.

Source: UCLA analysis of MHS PCM and call log data, and Medi-Cal eligibility data.

Note: This analysis includes Assessment and Monitoring calls made for each member's primary condition. Mean is calculated only among those with at least one call; individuals with no calls are excluded. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Population Receiving Any Intervention

Based on the analysis provided above, some members who were assigned to the "Actively Engaged" status by MHS for at least one month did not receive any monitoring or assessment calls, and conversely, some members in non-Active statuse appear to have received assessments. To further explore these cases, we compared each member's assigned status to the actual receipt of telephonic intervention to determine the number of individuals who received complete assessment and monitoring contact from DM nurses (Exhibit 33). Only "completed" calls are included in this analysis.

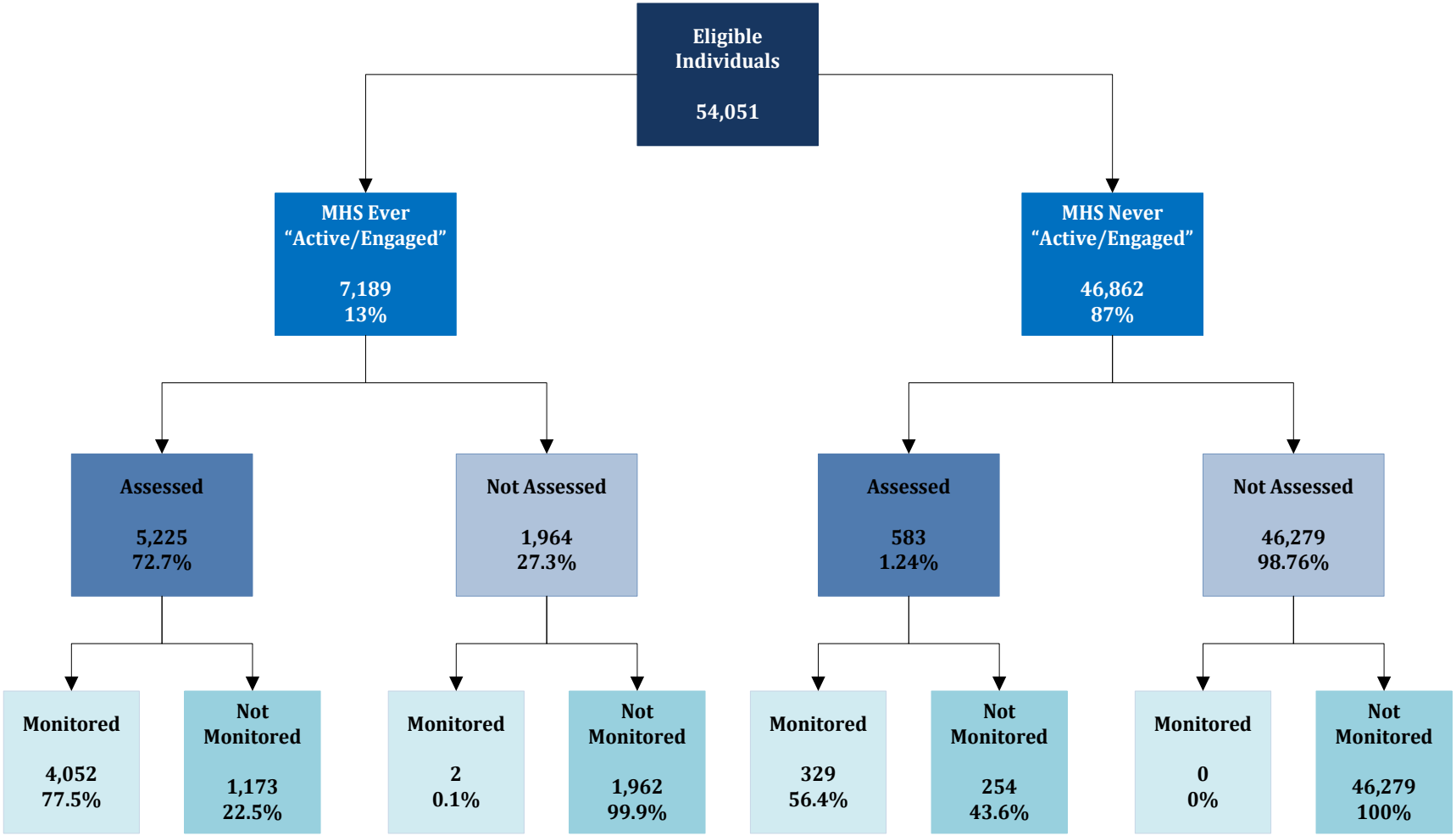
Of the 7,189 individuals who were ever in the actively engaged population, 5,225 (73%) individuals completed an assessment. Among those assessed, 4,052 (76%) also received monitoring calls, while for 1,173 there was no record of a monitoring call. Conversely, 1,964 (27%) of the actively engaged members never completed an assessment. Of these, all but two enrollees also never received a monitoring call, indicating that they received no outbound telephonic intervention. MHS attempted to contact more than 99% of members who were ever actively engaged at least once. Those who were actively engaged but not assessed did receive failed attempts to complete an assessment.

Several explanations of the incongruity between MHS status assignment and actual intervention delivery exist. Of those who were categorized as "Active/Engaged" and were assessed but never monitored, 438 (37% of the 1,173 total) had only one to two months of engagement. For these individuals, there was not sufficient time in Active status to achieve a monitoring call. Similarly, for those who were Active but were neither assessed nor monitored (1,962 total), 1,486 (76%) had one or two months of Active status. Furthermore, Active members may not have completed assessments due to missing contact information, or they may have refused assessment if they were successfully contacted. MHS attempted to assess 99% of the engaged members who were never successfully contacted for assessment (1,945 out of 1,964 individuals). Among those who were engaged and assessed, but never received a monitoring call (1,173), MHS made at least one attempted monitoring call to 863 of them (74%), but did not successfully make contact.

Individuals who were not actively engaged by MHS overwhelmingly did not receive assessments or monitoring calls. In total, 46,279 (99% of the not Active) were never assessed or monitored. However, 583 individuals who were never categorized as Active enrollees appear to have in fact completed an assessment. More than half of these individuals also received at least one monitoring call. Among the 583 individuals who received assessments despite never being categorized as actively engaged, 244 were On Demand, with 14% of these On Demand members having two or less months On Demand. An additional 316 individuals were Inactive, and 22 had Opted Out.

The reasons that telephonic intervention did not appear to match engagement status as expected in some cases are unknown, and it is possible that these cases are evidence of errors in the data. UCLA received monthly extractions of data from a continually updated member management data system maintained by MHS. It is possible that point-in-time data provided to UCLA do not represent all member status changes. For example, if a member's status was "Referred" in one monthly data file provided to UCLA, and in the following month was recorded as "Opt-out," UCLA would be unable to access any intermediate changes to member status made by the nurse. If the member was classified as "Active" for a short time between the two data extractions, this classification would not be reflected in data provided to UCLA. Moreover, the hierarchical intervention status classification used by UCLA for the evaluation resulted in cases where an individual classified as "Active" in only one month is ranked as "ever active" by UCLA.

Exhibit 33: Number and Percent of Beneficiaries who Completed Assessment and Monitoring Calls, by Hierarchical Intervention Status Classification



Source: UCLA analysis of MHS PCM data and call log data.
Note: This analysis includes only *completed* Assessment and Monitoring calls for each member's primary condition. Those who appear to have received assessments or monitoring calls despite never being actively engaged may be an artifact of data structure; the reason for these cases is unknown.

Systematic Differences in Characteristics of the Original and New Aid Code Populations

Individuals in the new Aid Code categories (14, 24, and 64) added to the population at the start of the final Program Year were systematically different from the population in the original program Aid Codes. Differences were found in the primary conditions, demographics, expenditures, and cost savings.

Of the 40,052 individuals who were eligible during Program Year Three (when the new Aid Codes were present in the intervention group), 10,428 (26%) were in one of the three new Aid Code categories (Exhibit 34). This does not account for beneficiaries in "Level Zero," the waiting list established to control program enrollment. The new Aid Code population was predominantly made up of beneficiaries with CAD/ADS and diabetes, and had a lower proportion of asthma and COPD members than the population in the original program Aid Codes.

Exhibit 34: Primary Condition Distribution, Original versus New Aid Code Populations, Program Year Three

	Original Aid Codes		New Aid Codes	
	Number	**%**	**Number**	**%**
Asthma	4,863	16%	789	8%
CAD/ADS	7,063	24%	3,119	30%
CHF	3,527	12%	1,330	13%
COPD	5,200	18%	1,057	10%
Diabetes	8,971	30%	4,133	40%
All Conditions	**29,624**	**100%**	**10,428**	**100%**

Source: UCLA analysis of MHS PCM and Medi-Cal eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list.

The demographic profiles of the populations within the new and original Aid Codes are displayed in Exhibit 35. For every demographic factor, the population distribution is significantly different between the original and new Aid Code groups within each primary condition. Notably, a much larger proportion of the original program Aid Code population was over age 65, female, non-White, non-English speaking, and disabled, when compared to those in the new Aid Codes. The only exceptions are gender among those with COPD and County in COPD and CHF populations. For these factors there is no significant difference in the characteristics of the two Aid Code groups.

Detailed tables displaying the demographic characteristics of the new Aid Code population with numbers and percentages in each subgroup can be found in Appendix 2, Table 12. Characteristics of the original Aid Code population alone are provided for comparison in Appendix 2, Table 11.

Exhibit 35: Demographic Characteristics of the Populations in the Original DMPP Aid Codes Compared to the New Aid Codes, by Primary Condition, Program Year Three

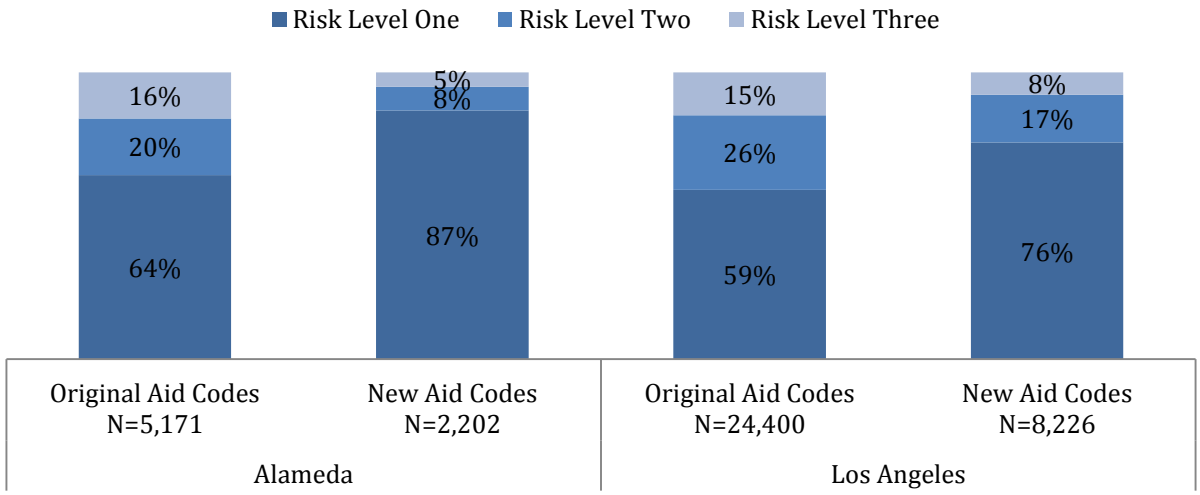
	Asthma		CAD/ADS		CHF		COPD		Diabetes		All Conditions	
	Original Aid Codes	New Aid Codes	Original Aid Codes	New Aid Codes	Original Aid Codes	New Aid Codes	Original Aid Codes	New Aid Codes	Original Aid Codes	New Aid Codes	**Original Aid Codes**	**New Aid Codes**
Total (N)	**789**	**4,863**	**3,119**	**7,063**	**1,330**	**3,527**	**1,057**	**5,200**	**4,133**	**8,971**	**10,428**	**29,624**
Age Group												
21-34	4%	16%	0%	2%	1%	2%	1%	4%	1%	6%	**1%**	**6%**
35-44	4%	14%	0%	4%	2%	5%	1%	9%	1%	9%	**1%**	**8%**
45-54	8%	30%	3%	21%	7%	27%	5%	33%	4%	26%	**4%**	**27%**
55-64	14%	36%	13%	60%	16%	56%	14%	48%	13%	50%	**14%**	**50%**
65+	70%	4%	84%	13%	74%	10%	79%	6%	80%	8%	**80%**	**9%**
Gender												
Female	72%	67%	61%	58%	63%	57%	47%	45%	68%	58%	**63%**	**57%**
Male	28%	33%	39%	42%	37%	43%	53%	55%	32%	42%	**37%**	**43%**
Ethnicity												
White (Total)	19%	32%	24%	58%	23%	45%	19%	43%	11%	33%	**18%**	**42%**
White Armenian	*9%*	*11%*	*14%*	*37%*	*11%*	*23%*	*8%*	*13%*	*5%*	*15%*	**9%**	**20%**
White Other	*10%*	*21%*	*10%*	*21%*	*13%*	*22%*	*11%*	*31%*	*6%*	*18%*	**9%**	**22%**
Latino	38%	18%	26%	14%	40%	16%	32%	12%	46%	27%	**37%**	**18%**
African American	3%	28%	1%	10%	5%	25%	3%	30%	2%	18%	**3%**	**21%**
Asian/Pacific Islander	37%	13%	45%	10%	28%	8%	43%	8%	38%	13%	**39%**	**11%**
Other	2%	2%	2%	1%	2%	2%	2%	2%	2%	2%	**2%**	**2%**
Missing	1%	7%	1%	6%	1%	5%	1%	6%	1%	7%	**1%**	**6%**
Language												
Armenian	9%	12%	14%	39%	11%	23%	8%	13%	5%	15%	**9%**	**21%**
East Asian Languages	16%	2%	25%	3%	13%	2%	24%	2%	16%	3%	**19%**	**3%**
English	25%	48%	19%	25%	25%	42%	24%	49%	20%	35%	**21%**	**38%**
European Languages	1%	1%	3%	4%	3%	2%	1%	1%	1%	1%	**2%**	**2%**
Southeast Asian Languages	8%	5%	6%	3%	5%	2%	9%	2%	7%	4%	**7%**	**3%**
Spanish	33%	8%	25%	9%	37%	9%	29%	5%	43%	17%	**35%**	**11%**
Other Languages	7%	2%	8%	3%	7%	2%	5%	1%	7%	2%	**7%**	**2%**
Unknown Language	0%	23%	0%	14%	0%	16%	0%	28%	0%	22%	**0%**	**21%**
County												
Alameda	21%	24%	18%	8%	20%	19%	20%	19%	24%	20%	**21%**	**17%**
Los Angeles	79%	76%	82%	92%	80%	81%	80%	80%	76%	80%	**79%**	**82%**
Aid Code												
Total Disabled	70%	4%	83%	12%	73%	8%	79%	4%	80%	8%	**79%**	**8%**
Total Not Disabled	30%	96%	17%	88%	27%	92%	21%	96%	20%	92%	**21%**	**92%**

Source: UCLA analysis of MHS PCM and Medi-Cal Eligibility data.

Note: Columns may not add to 100% due to rounding. Excludes eligible individuals who were held in the "Level Zero" waiting list.

Individuals in the new Aid Codes only received a maximum of 12 months of intervention, because they were added to the DMPP population at the start of Program Year Three. Furthermore, a large proportion of this group was stratified into Risk Level One, which generally received less active intervention than the higher risk groups (Exhibit 36).

Exhibit 36: Comparison of Risk Level Distribution by County, Original versus New Aid Code Populations, Program Year Three



Source: UCLA analysis of MHS PCM and Medi-Cal Eligibility data.
Note: Excludes eligible individuals who were held in the "Level Zero" waiting list, as well as 53 Individuals with no county of residence information.

In addition to the differences found in disease prevalence, risk level, and demographic characteristics, we identified systematic differences in health care expenditures between the two groups. The new Aid Code population had significantly lower average health care costs than those eligible for the program within the original Aid Codes (approximately $200 less per member per month on average, although differences varied by disease group). Average PMPM expenditures for the new Aid Code group can be found in Appendix 2, Table 16 and Appendix 2, Table 17. These can be compared to Exhibit 38and Exhibit 39, displaying the same analysis for the original Aid Code population only.

Given the systematic differences between the original and new Aid Code populations, both in characteristics and in the level and duration of intervention received, we excluded those beneficiaries within the new Aid Codes from all analysis in subsequent analyses. However, we completed several separate analyses of this group, including an independent cost savings analysis, which is contained in the section of this report focusing on cost neutrality of the program (Chapter 2E). The remainder of this report focuses on the population in the 15 original DMPP Aid Codes only.

Implementation Processes and Outcomes Summary

- **The program was implemented as planned, and in a timely manner.**

  Overall, there were minimal delays in program implementation, from the release of the RFP until the program was completed. DHCS and MHS collaborated throughout the program period to resolve challenges, related to the size of the eligible population, the rate of program opt-out, and other implementation barriers that arose. MHS delivered the aspects of the program planned in the RFP response and application, although some aspects were launched later than planned, such as the Provider Portal.

  The only major delays or barriers in program implementation were related to Medi-Cal data. The quality of contact information in MEDS was a challenge in this telephonic intervention. The conversion of the claims warehouse in 2008 also impacted implementation of the program. MHS was unable to conduct claims-based re-stratification of member risk during the first Program Year, and lacked data on medical service utilization. However, the inherent delay in claims data completeness related to claims run-out and claims lag routinely results in a ten-month delay in completeness of claims data, which would have impacted MHS ability to use claims in program operations to some extent, regardless of the warehouse conversion.

- **Most beneficiaries in the eligible population did not opt-out of the program.**

  In total, DHCS identified 54,051 individuals who were eligible for the program (excluding those who were eligible but stratified into Risk Level Zero – the program waiting list). Within this total population, 3,156 individuals (6%) opted out. Opt-out rates were higher in some racial/ethnic subgroups and other demographic groups, potentially reflecting differential willingness to participate, availability of bilingual nurses and DMPP materials, and other issues. Opt-out rates decreased in each program year, potentially due to modifications to program operations by MHS to maintain higher rates of enrollment.

- **Within the population that did not opt out, risk stratification and engagement status assignment were implemented successfully.**

  Despite delays and barriers related to the Medi-Cal data warehouse conversion and the quality of contact information in MEDS, MHS completed risk stratification and engagement status assignment. Approximately 50% to 60% of the population was stratified as Risk Level One, 22% to 30% were in Risk Level Two, and the remaining

15% to 21% were in Risk Level Three. These ratios are aligned with MHS's planned program design.

Roughly 10% of the total eligible population was actively engaged in the telephonic intervention at any given time in the program period, with a much higher proportion of CHF, COPD, and Asthma members in the Active status (24%, 16%, and 14%, respectively). Between 17% and 20% of Risk Level Two or Three members were Active in each Program Year, while 3% to 4% of Risk Level One members were Active.

In Program Years One and Two, 85% to 87% of the Active population was in Risk Level Two or Three. In contrast, in Program Year Three only 72% of the Active population was made up of these higher risk members, while 28% were in Risk Level One. The reason for this shift in the composition of the Active group is unknown.

- **There were significant differences in the characteristics of the populations that Opted Out, and those that were Active.**

  There were statistically significant differences in the characteristics of key subgroups of the total eligible population. Differences were found in the population that opted out (compared to those who did not opt out), those stratified as high versus low risk, and in the population that was actively engaged (compared to those who were On Demand).

  These differences have several possible implications for program implementation, and could inform future program planning. For example, the lower level of spending among minority groups lead to lower average risk level assignment by MHS in these populations, and therefore, lower likelihood of receiving active intervention. Racial/ethnic disparities in expenditures are a well documented characteristic of the U.S. health care system, and risk stratification based primarily on medical expenditures is susceptible to underlying patterns in expenditures.[18] It may be beneficial to conduct risk stratification in further divided subgroups of the population to address apparent disparities in certain demographic groups, or to employ a risk stratification method that is less dependent on expenditures and more reliant on clinical measures of risk.

- **MHS data indicate a large volume of attempted and completed contacts with enrolled members. Although MHS attempted to deliver proactive telephonic**

intervention to all of the actively engaged members, little or no intervention was received by a significant proportion of Active members.

A large volume of outbound calls were placed by DM nurses employed by MHS. More than 139,000 assessment, monitoring, and other outbound calls were placed. MHS attempted to contact more than 99% of Active members for a telephonic Assessment. However, only 72% of Active members successfully completed an assessment, and those who were not assessed generally did not receive monitoring calls. A significant proportion of those who were never contacted with proactive intervention-focused calls had a short duration of enrollment, which partially explains MHS's inability to contact them. Poor quality contact information is also a likely contributing factor to the experience of this group.

Although the majority of individuals who were assessed and/or monitored were in the Active group, a small number of people in non-Active statuses appear to have been assessed and monitored. Among these individuals, the majority were classified as Inactive or On Demand. The reasons for intervention delivery to individuals who are not expected to have been participating in the program are unknown, and raise the question of possible data errors. Data related to call delivery and member status were extracted from the program operations system used by MHS to track call delivery by DM nurses. Systems designed for operational applications may not be ideal for capturing accurate and comprehensive evaluation data. Future programs should devote time for planning and analysis of data sources and data requirements prior to the start of implementation, to ensure accurate and comprehensive data.

- **The population in the 15 original DMPP Aid Codes was significantly different from those in the three new Aid Codes added to the program in the final year. Therefore, it is not appropriate to analyze the original and new Aid Code groups together. Unless otherwise noted, the new Aid Code population is excluded from analyses in this report. Specific analyses on this population are presented separately.**

B. Health Services Expenditures and Utilization Outcomes

A key goal of disease management is to decrease overall health care costs by reducing unnecessary use of services, particularly emergency room and inpatient care.

We conducted both descriptive and multivariate analyses of expenditures and utilization of health services among the intervention and control populations. Descriptive analyses presented in the first part of this section provide information describing the population. It is not appropriate to make statistical comparisons between these two groups based on descriptive analyses because of many underlying differences between populations in the intervention and control counties; the multivariate models presented in the second part of this section control for many of the variables that impact expenditures and utilization and provide information on statistically significant differences between the control and intervention groups.

The multivariate analysis of expenditures and utilization of major services presented in this chapter is a required component of the evaluation, and is distinct from the return on investment (ROI) analysis included in Chapter 2E. Financial Outcomes, and is stipulated in the original evaluation plan. The purpose of these multivariate analyses was to evaluate the impact of DMPP on Medi-Cal expenditures and utilization by disease condition, adjusting for covariates that effect expenditures such as demographic and health status characteristics of the DMPP and control group populations. We also conducted these analyses to determine what underlying changes in utilization, if any, were responsible for possible changes in expenditures.

Data Sources and Methods

Descriptive analyses are presented using an average per member per month (average PMPM) format to account for variations in length of enrollment. We utilized a total of 36 months of baseline data (Baseline Years One through Three) and 36 months of program data (Program Years One through Three) for both the intervention and control populations. Only the original DMPP Aid Code population was included in these analyses.

Expenditures and utilization are presented by risk stratification level. UCLA used a calculated risk stratification method based on the CDPS algorithm. [19] Our calculation for risk level is used because the MHS risk level is only assigned to individuals who are enrolled in the program period, and for these analyses, it was necessary to assign risk level for the control group and during the baseline period. Calculating risk level allows stratification by risk level between the baseline and program periods, as well as for the

control and intervention groups. The risk score was log transformed for utility in analysis.

The duration of enrollment (number of member months) in the baseline period is an estimate based on Medi-Cal enrollment in the baseline period. In the intervention period, the duration of enrollment is based on actual DMPP eligibility and enrollment. Because the duration of actual DMPP eligibility and enrollment is slightly lower than Medi-Cal enrollment due to retroactive eligibility and additional DMPP exclusion criteria (some of which are applied by DHCS and which UCLA could not apply due to inadequate claims information), the baseline and intervention groups are slightly different, as shown in Exhibit 10 (Chapter 2A). Additional exclusion criteria in the intervention period leads to fewer eligible member months and fewer eligible expenses because paid claims are selected only for months where an individual is DMPP eligible or enrolled in Medi-Cal. The methodology change in determining the eligibility and enrollment months causes an apparent drop in average PMPM between Baseline Year Three and Program Year One. This shift is thus an artifact of the different calculation of average enrollment during the baseline period compared to the intervention period.

Data sources for expenditure and utilization analyses included paid claims data for inpatient visits, emergency room visits, outpatient evaluation and management (E & M) services, prescriptions (filled), laboratory and radiology diagnostic services, and surgical and anesthesia services. The outcome measures include average PMPM expenditures and utilization measures, both overall and by disease category and year. More detailed tables displaying additional economic and utilization outcomes are contained in Appendix 2, Table 13 through Appendix 2, Table 17.

Total Medical Expenditures per Member per Month (PMPM)

Throughout the baseline and intervention periods, beneficiaries who were ever enrolled in DMPP had similar or higher average total monthly medical expenditures than those in the control population, except for individuals with CHF, where the intervention group had consistently lower costs than the control group.

The average PMPM had a slight upward trend for all diseases except CHF (Exhibit 37). The interpretation of trends across the Baseline and Program periods is complicated somewhat by the difference in average duration of eligibility in each time period, which is an artifact of the differential methods of calculating enrollment months.

Exhibit 37: Average Annual PMPM Expenditures by Year and Primary Condition

Year	Asthma		CAD/ADS		CHF		COPD		Diabetes	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Baseline Year One	$536	$580	$759	$735	$1,258	$1,123	$962	$933	$592	$611
Baseline Year Two	$573	$629	$845	$825	$1,524	$1,300	$1,064	$1,087	$639	$678
Baseline Year Three	$640	$705	$945	$918	$1,712	$1,612	$1,183	$1,247	$702	$747
Program Year One	$621	$665	$759	$821	$1,483	$1,454	$1,046	$1,110	$632	$704
Program Year Two	$622	$674	$759	$800	$1,370	$1,277	$1,040	$1,026	$618	$669
Program Year Three	$605	$671	$755	$809	$1,477	$1,313	$1,024	$1,040	$590	$655

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

The average PMPM by risk level shows a very steep gradient in expenditures with increasing risk level, with Risk Level One (RL One) having about half the average PMPM expenditures as Risk Level Two (RL Two), and RL Two having about a third of the average PMPM expenditures as Risk Level Three (RL Three) (Exhibit 38).

Exhibit 39 displays the differences in average PMPM by patient characteristics, including age, gender, ethnicity, language, county of responsibility, primary disease, presence of one or more comorbid conditions, and disability status. Among age groups, there is not a clear trend among high and low cost groups, but the youngest and oldest groups had the most change between the baseline and intervention periods. White individuals had the highest average PMPM, while Asian/Pacific Islanders have the lowest average PMPM. The greatest change in cost was among individuals with an "Other" or "Unknown" ethnicity, particularly in the intervention group. Individuals with comorbid conditions and disabilities had higher expenses than their counterparts who did not have these characteristics.

Exhibit 38: Average Annual PMPM Expenditures by Primary Condition and Risk Level

Year	Risk Level	Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Baseline Year One	RL One	$218	$227	$231	$313	$282	$301	$243	$262	$153	$165
	RL Two	$426	$496	$554	$614	$835	$866	$745	$789	$422	$457
	RL Three	$1421	$1480	$2100	$1767	$3665	$3095	$2753	$2543	$1635	$1544
	Overall	$536	$580	$759	$735	$1,258	$1,123	$962	$933	$592	$611
Baseline Year Two	RL One	$225	$264	$275	$355	$359	$394	$291	$324	$182	$201
	RL Two	$492	$600	$672	$749	$1100	$1088	$889	$960	$514	$575
	RL Three	$1613	$1644	$2511	$2123	$4852	$3742	$3152	$3130	$1866	$1876
	Overall	$573	$629	$845	$825	$1,524	$1,300	$1,064	$1,087	$639	$678
Baseline Year Three	RL One	$258	$293	$319	$403	$440	$496	$341	$382	$225	$243
	RL Two	$572	$671	$770	$858	$1415	$1339	$1030	$1111	$602	$670
	RL Three	$1841	$1955	$2942	$2431	$5553	$4942	$3569	$3702	$2081	$2162
	Overall	$640	$705	$945	$918	$1,712	$1,612	$1,183	$1,247	$632	$747
Program Year One	RL One	$371	$433	$449	$529	$487	$548	$498	$551	$327	$362
	RL Two	$645	$704	$807	$904	$1400	$1336	$1065	$1128	$622	$714
	RL Three	$1991	$1919	$2543	$2225	$4859	$4443	$3215	$3288	$1792	$1892
	Overall	$621	$665	$759	$821	$1,483	$1,454	$1,046	$1,110	$632	$704
Program Year Two	RL One	$315	$352	$374	$421	$323	$326	$357	$366	$262	$283
	RL Two	$515	$568	$557	$701	$847	$839	$838	$822	$460	$501
	RL Three	$1703	$1744	$2079	$1851	$3694	$3142	$2747	$2609	$1529	$1560
	Overall	$622	$674	$759	$800	$1,370	$1,277	$1,040	$1,026	$618	$669
Program Year Three	RL One	$260	$284	$319	$362	$275	$294	$264	$293	$216	$244
	RL Two	$400	$481	$416	$592	$613	$665	$653	$693	$334	$372
	RL Three	$1587	$1679	$1906	$1770	$3672	$2883	$2589	$2423	$1376	$1420
	Overall	$605	$671	$755	$809	$1,477	$1,313	$1,024	$1,040	$590	$655

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 39: Average PMPM Expenditures, by Patient Characteristics, Aggregated Over Baseline and Program Periods

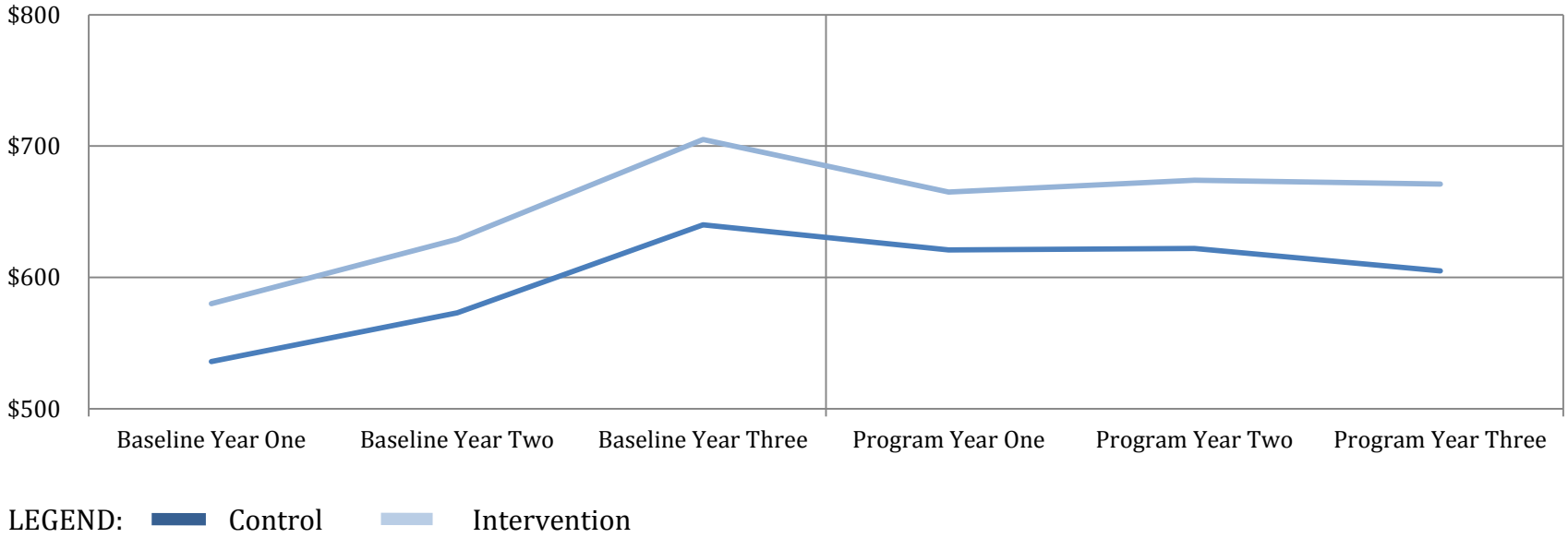
	PMPM					
	Control			Intervention		
	Baseline	Program	% change	Baseline	Program	% change
Overall Average PMPM	$878	$805	-8%	$890	$841	-6%
Age Group						
22-34	$802	$707	-12%	$829	$647	-22%
35-44	$869	$826	-5%	$905	$811	-10%
45-54	$912	$881	-3%	$919	$910	-1%
55-64	$881	$834	-5%	$867	$874	1%
65+	$817	$594	-27%	$947	$696	-27%
Gender						
Female	$866	$815	-6%	$880	$857	-3%
Male	$898	$791	-12%	$905	$818	-10%
Ethnicity						
White	$1,048	$956	-9%	$1,089	$979	-10%
Latino	$882	$808	-8%	$813	$733	-10%
African American	$906	$806	-11%	$940	$848	-10%
Asian/Pacific Islander	$561	$575	2%	$683	$668	-2%
Other	$614	$578	-6%	$856	$636	-26%
Unknown	$863	$740	-14%	$863	$687	-20%
Language						
English	$1,030	$925	-10%	$979	$865	-12%
Spanish	$743	$712	-4%	$713	$681	-4%
European Languages	$665	$703	6%	$1,161	$1,278	10%
East Asian Languages	$597	$540	-10%	$704	$713	1%
Southeast Asian Languages	$532	$555	4%	$593	$608	3%
Other Languages	$642	$698	9%	$789	$911	15%
Unknown Language	$832	$728	-13%	$959	$802	-16%
County of Residence						
Alameda/Control Counties	$893	$797	-11%	$955	$910	-5%
Los Angeles/Control Counties	$875	$807	-8%	$876	$826	-6%
Comorbid Conditions						
No	$641	$547	-15%	$663	$609	-8%
Yes	$1,111	$1,024	-8%	$1,052	$1,018	-3%
Disabled						
No	$672	$593	-12%	$847	$791	-7%
Yes	$889	$816	-8%	$894	$844	-6%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Total Medical Expenditures by Condition and Risk Level

The following graphs (Exhibit 40 through Exhibit 44) present the average PMPM for each Program Year by condition, and graphs displayed in Exhibit 45 through Exhibit 49 show average PMPM by condition and risk level. The trend that individuals in the intervention have a higher average PMPM throughout all six years of data is seen for all conditions except CAD/ADS.

Exhibit 40: Average Annual PMPM Expenditures for Enrollees with Asthma



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 41: Average Annual PMPM Expenditures for Enrollees with CAD/ADS

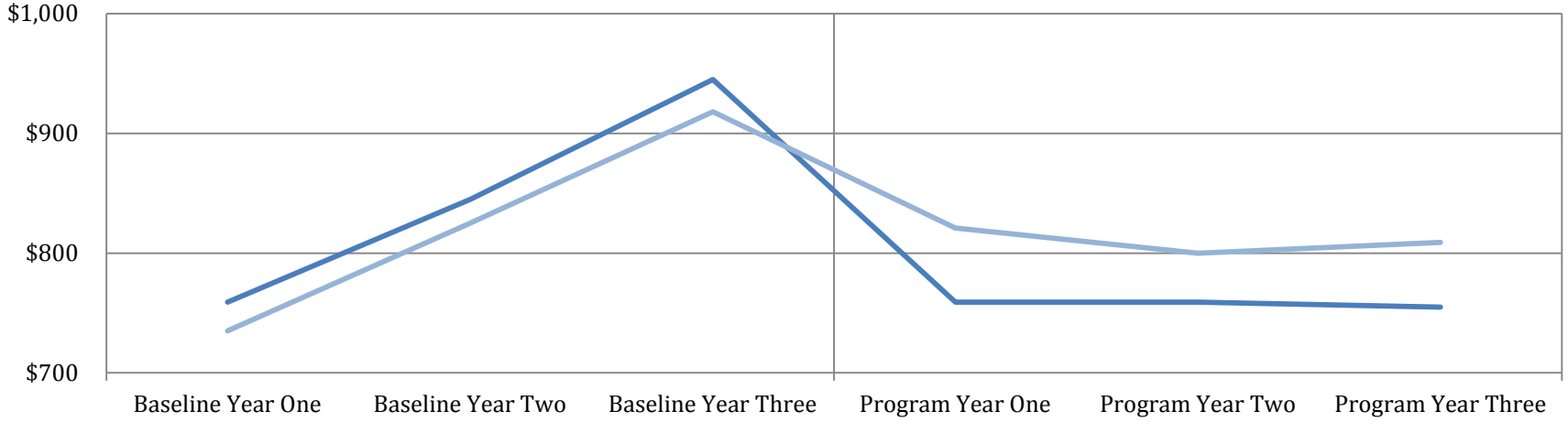
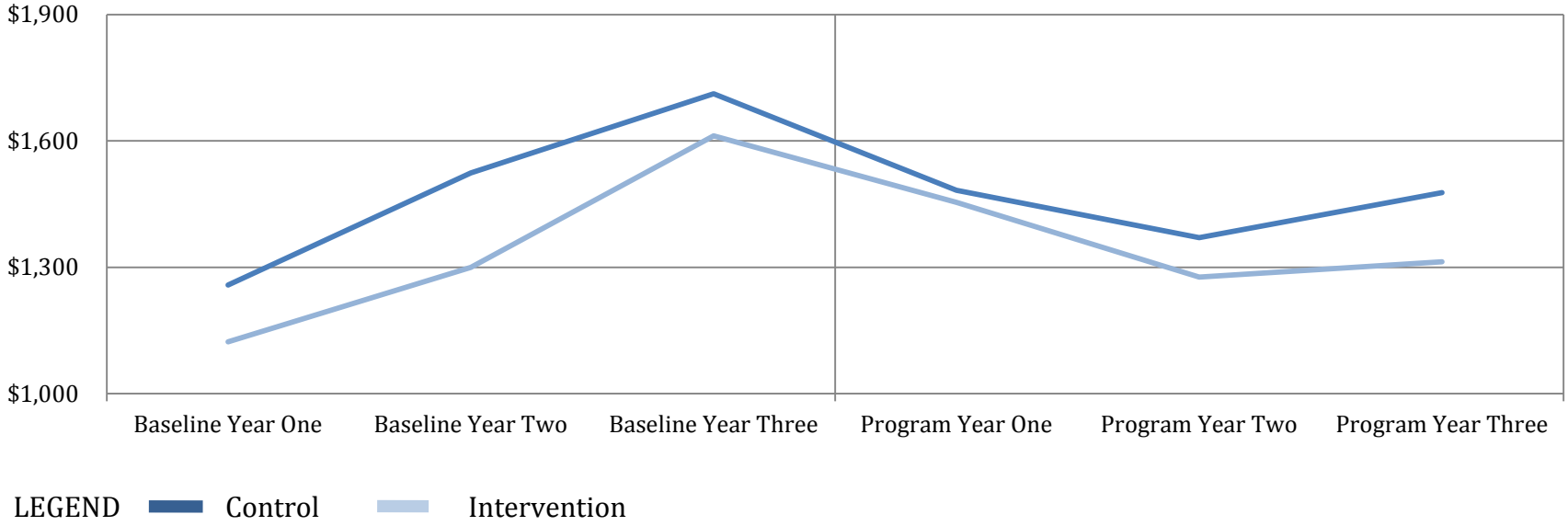


Exhibit 42: Average Annual PMPM Expenditures for Enrollees with CHF



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 43: Average Annual PMPM Expenditures for Enrollees with COPD

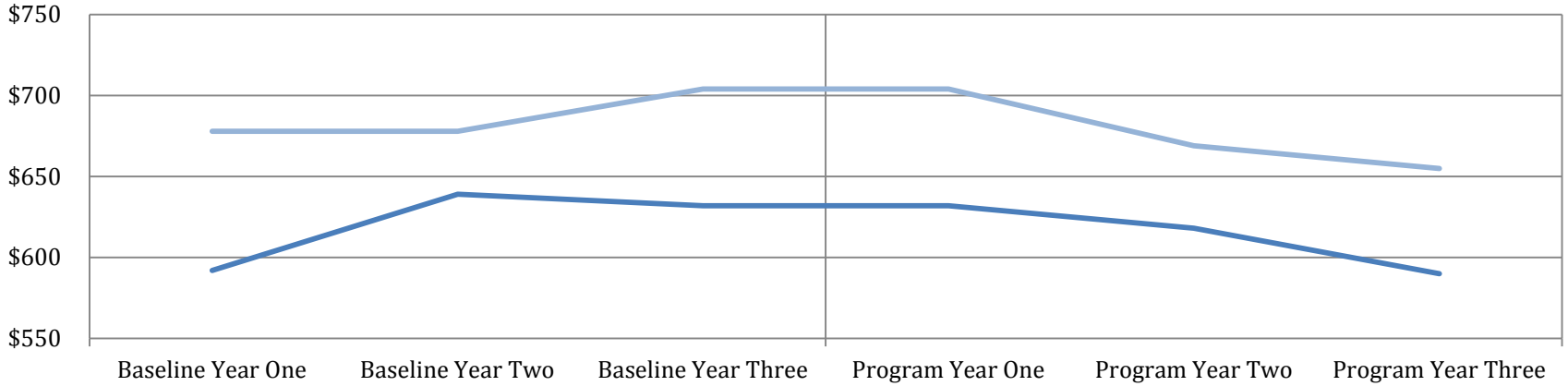
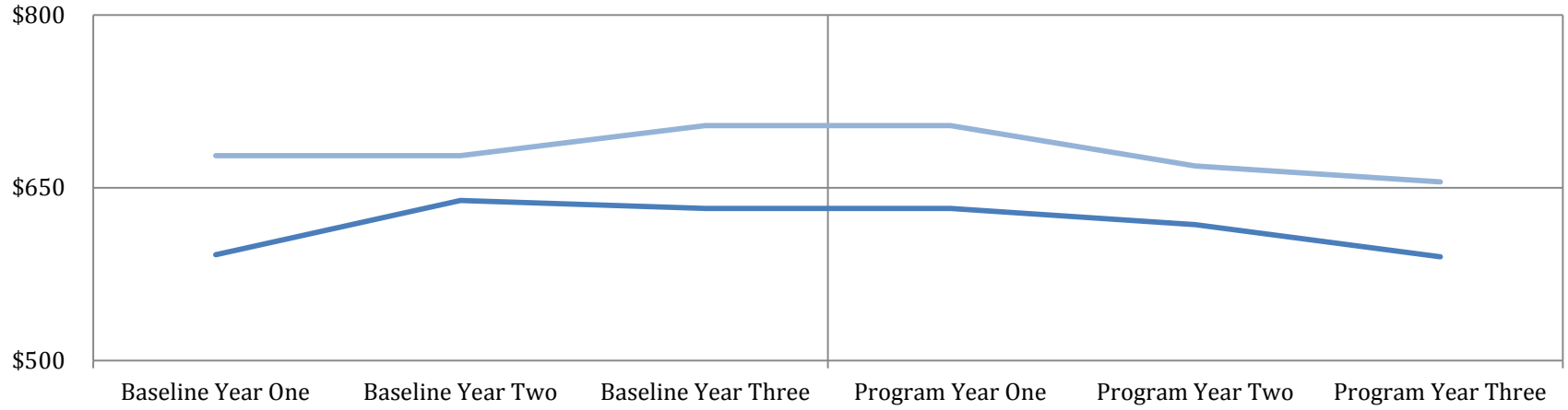


Exhibit 44: Average Annual PMPM Expenditures for Enrollees with Diabetes



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 45: Average Annual PMPM Expenditures for Enrollees with Asthma by Risk Level

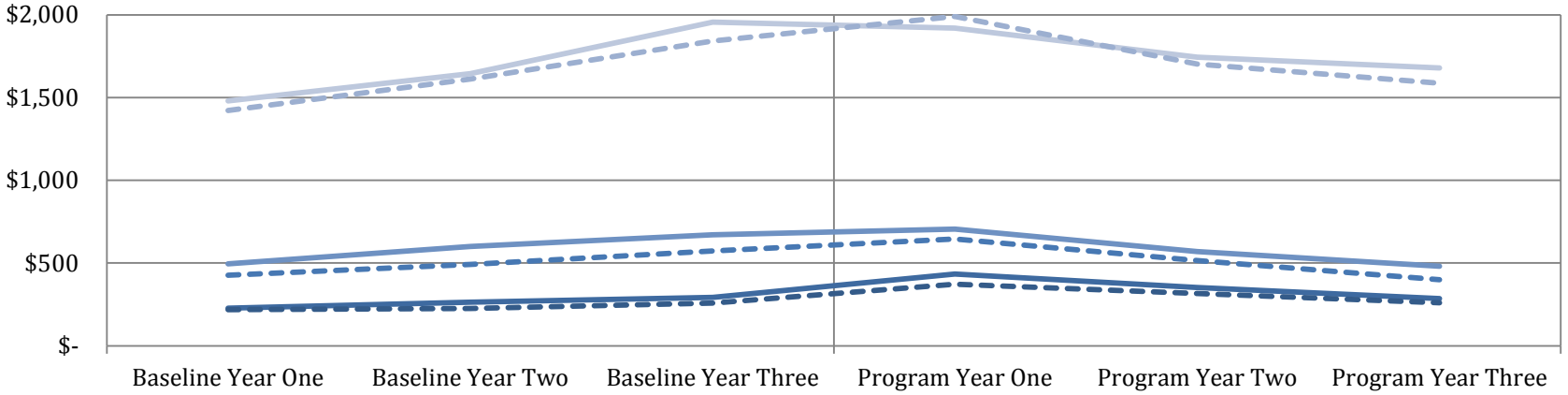
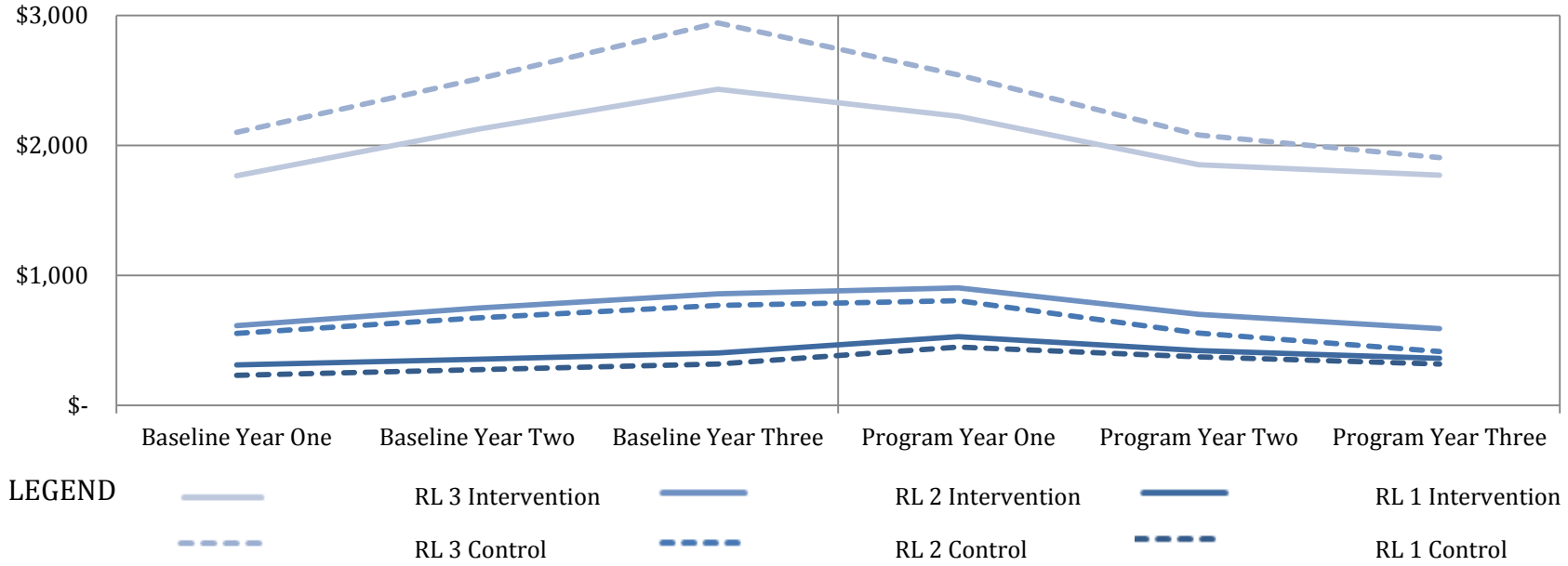


Exhibit 46: Average Annual PMPM Expenditures for Enrollees with CAD/ADS by Risk Level



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 47: Average Annual PMPM Expenditures for Enrollees with CHF by Risk Level

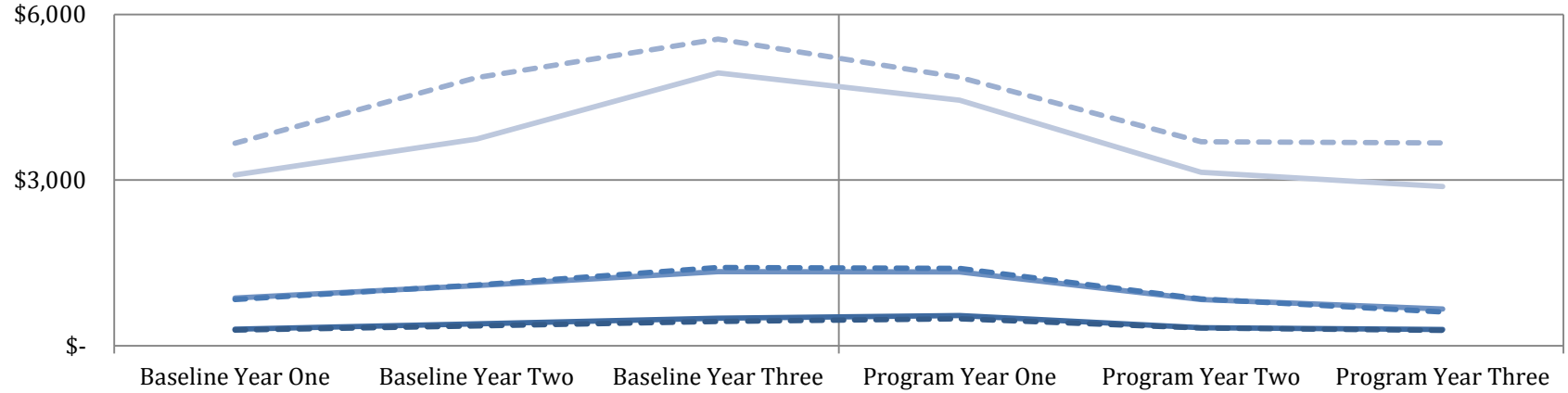
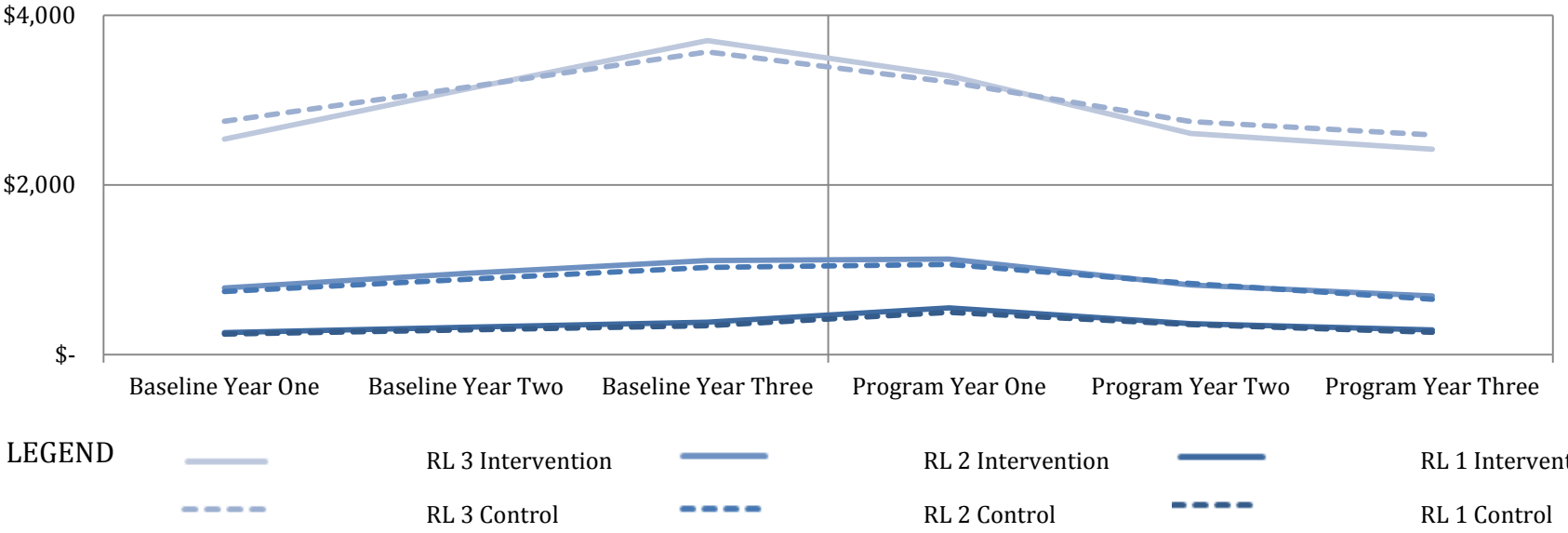
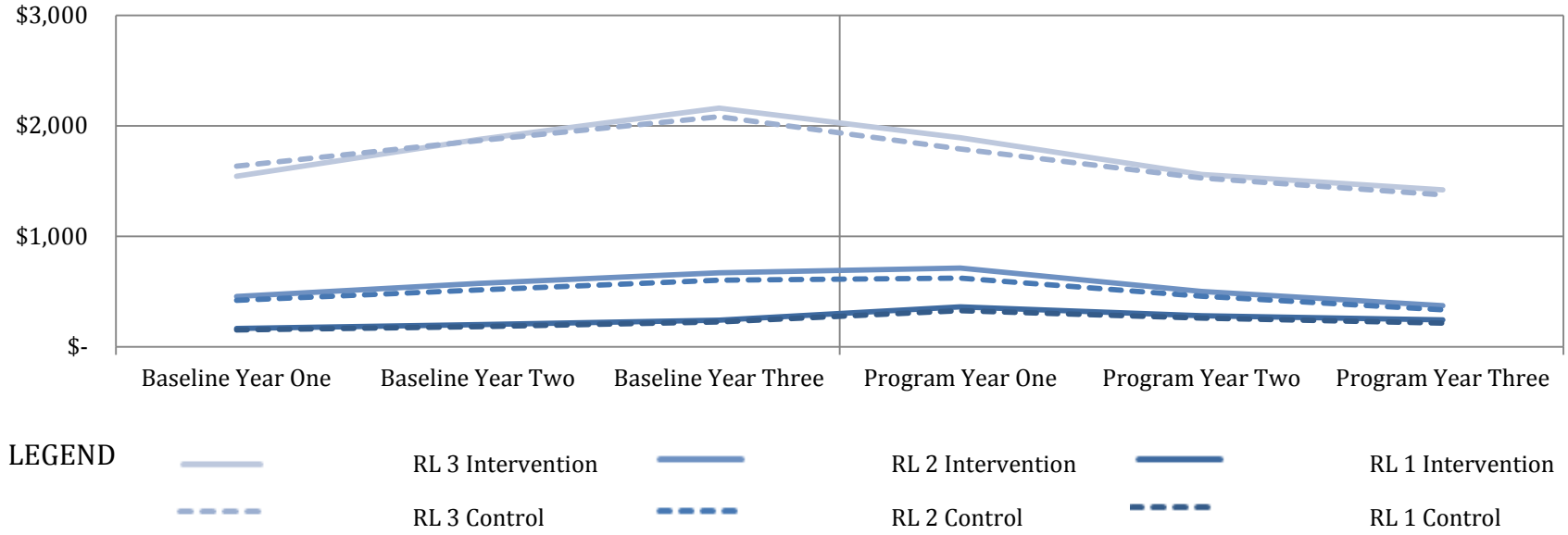


Exhibit 48: Average Annual PMPM Expenditures for Enrollees with COPD by Risk Level



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Exhibit 49: Average Annual PMPM Expenditures for Enrollees with Diabetes by Risk Level



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Impact of Phone Calls on Expenditures

We investigated the impact of phone calls on average annual PMPMs using both a continuous variable to determine if there was a possible "dose response" of the intervention, as well as using a categorical method to determine the impact of receiving any call versus no calls. However, the sample size for those who received multiple calls in a year and had data in the PCM member list and claims file was too small to conduct a rigorous dose response analysis. Therefore, we undertook basic descriptive analysis of the average expenditures of those with any call in each year compared to those who were never called. The results of this analysis indicate that there is no consistent trend in the impact of calls on PMPM expenditures.

- No trend was found in average PMPM in Program Year Two for those with calls in Program Year One.
- Among those who received a call in Program Year Two, the average PMPM for those in RL Three in Program Year Three is slightly lower for all diseases except diabetes and only marginally better for CHF; RL Two is very similar for the two groups, and RL One is generally slightly higher for those who received a call, except for Diabetes and CHF.
- Finally, an assessment of the cumulative effect of repeated phone calls was conducted for a subset of those who had calls in Program Years One and Two on average PMPM in Program Year Three. There is no consistent trend in Program Year Three expenses among those who had a call in both Program Years: for ADS and Asthma, those who received calls had lower expenditures among all risk levels; for COPD, those who received calls had lower expenditures for RL Two and RL Three but not RL One; for Diabetes, those who received calls had lower expenditures for RL Two; for CHF, none of the risk levels had lower expenses for those who received calls.

PMPM Health Care Services Utilization

Descriptive analyses of PMPM utilization of health care services are presented in Appendix 2, Table 15.

Multivariate Expenditure and Utilization Analyses

Expenditure Models

We conducted multivariate analyses of expenditures and utilization to determine if there were statistically significant differences between the intervention and control populations, controlling for differences in the demographic and clinical characteristics of the

populations, as well as for level of expenditures and utilization in the baseline period, which can affect outcomes in during the program period.

Four-part Expenditure Model

We developed a four-part model to assess costs and utilization in the intervention and control groups. The first two parts examine differences in the population comparing first users vs. nonusers, then, among users, comparing users of inpatient care vs. users without any inpatient care. The next two parts model the expenses within each of the two groups of users, respectively.

Utilization/Count Models

For the analyses of utilization measures, most of which were counts of units of service, we applied two-part hurdle models with random parameters. We also considered heterogeneity in the count model and endogenous hurdle effects.

Difference-in-Difference Estimators and Bootstrapping

To determine whether DM had a statistically significant impact on expenditures and utilization, we estimated the conditional mean of outcome variables (expenditure/utilization) for both the intervention and control groups during the baseline period and for the intervention and controls groups during the program period. We then estimated the effect of DM by using a Difference-in-Difference (D-in-D) method. This is a standard technique for assessing program impacts over time, and permits us to control for differences in the baseline period when assessing differences in the program period. We applied bootstrapping and a Delta method to estimate standard errors of the D-in-D estimators to determine the statistical significance of the treatment effect for each outcome.

Budget Neutrality Results versus Multivariate Difference-in-Difference Results

One of the conditions MHS was subject to in operating DMPP was that the program be budget neutral; namely, that it save at least as much as it cost in monthly fees during the entire program period. The results of our budget neutrality calculation are presented later in Chapter 2E: Financial Outcomes. The results from our multivariate difference-in-difference models differ from the budget neutrality calculation presented in Chapter 2E for the following reasons:

- Budget neutrality calculation was based on monthly average PMPM expenditures in disease-and-county groups, rather than individual level data.
- Budget neutrality calculation methodology was developed prior to the

availability of program data and was intended to provide expenditure targets for MHS ***prospectively*** for interim adjustments to the program, rather than to measure and explain actual cost differences ***retrospectively***.

- Budget neutrality calculation method used trends in the baseline period to adjust observed expenditures in the program period, and is thus subject to forecast error over extended intervention periods.

Because it was not possible to develop models using individual-level data prior to program implementation in September 2007, the budget neutrality calculation presented in Chapter 2E represents the methodology that was contractually agreed upon to determine if DMPP met the budget neutrality requirement. As a result, there are differences in the findings of the multivariate D-in-D model presented immediately below compared to the budget neutrality calculation presented later. The multivariate results presented here represent the best scientific evidence regarding the impact of DMPP on expenditures and utilization after all the data were available, and alternative models could be tested to develop the best method for assessing difference *retrospectively.* The budget neutrality calculation represents the best effort to explain expenditure differences using a model developed *prospectively.* It is therefore not surprising that these different approaches led to different conclusions about the impact of DMPP on expenditures and utilization.

Analysis and Results

Of the outcome categories, most had a significant change for only one disease type (Exhibit 50). For example, expenditures significantly changed only for CAD/ADS ($p \leq 0.05$, expenses increased), average number of IP stays changed only for CHF ($p \leq 0.01$, number decreased), for ER use only CAD/ADS changed ($p \leq 0.01$, number increased), for OP count COPD changed ($p \leq 0.01$, number decreased). The exception is the number of IP days, which had significant changes in most disease categories. Decreased total number of IP days was seen for CAD/ADS ($p \leq 0.05$) and CHF ($p \leq 0.01$); while an increase was seen for COPD ($p \leq 0.01$). No significant changes were identified for members with asthma or diabetes.

Therefore, based on our multivariate D-in-D models, DMPP did not save money in any of the five disease categories. In addition, there is no evidence of a statistically significant increase in costs, except in the CAD/ADS category. There is limited evidence of statistically significant decreases in IP admissions (for CHF) and IP days per year (CHF and CAD/ADS), but no evidence of reductions in ER use.

Exhibit 50: Multivariate Analyses of Total Annual Expenditures and Utilization

		Baseline			Program				Difference-in-Difference			
Outcome	Conditions	Intervention	Control	Difference (Intervention-Control)	Intervention	Control	Difference (Intervention-Control)	Adjusted Control	D-in-D estimate	t statistics	95% CI	% change
Expenditures	Asthma	6,273	5,967	306	6,759	6,639	120	6945	-186	-1.61	[-411, 41]	-2.68
	CAD/ADS***	7,992	8,395	-403	8,435	8,395	40	7992	443	2.9	[144, 743]	5.54
	CHF	13,529	14,699	-1170	13,688	14,899	-1211	13729	-41	-0.11	[-754, 672]	-0.30
	COPD	10,552	10,777	-225	11,102	11,300	-198	11075	27	0.14	[-348, 401]	0.24
	Diabetes	6,640	6,238	402	6,893	6,411	482	6813	80	0.396	[-105, 266]	1.17
IP Stays	Asthma	0.1448	0.1443	0.0005	0.1433	0.1465	-0.0032	0.1470	-0.0037	0.87	[-0.0036, 0.0046]	-2.52
	CAD/ADS	0.3197	0.3217	-0.0020	0.3158	0.3241	-0.0083	0.3221	-0.0063	0.84	[-0.0211, 0.0084]	-1.96
	CHF***	0.7335	0.7159	0.0176	0.7094	0.7225	-0.0131	0.7401	-0.0307	2.47	[-0.0548, -0.0064]	-4.15
	COPD	0.5053	0.5066	-0.0013	0.5111	0.5075	0.0036	0.5062	0.0049	0.56	[-0.0121, 0.0218]	0.97
	Diabetes	0.1526	0.1514	0.0012	0.1579	0.1546	0.0033	0.1558	0.0021	0.52	[-0.0059, 0.0101]	1.35
IP Days	Asthma	0.9828	0.9661	0.0167	0.9574	0.9891	-0.0317	1.0058	-0.0484	1.78	[-0.1017, 0.005]	-4.81
	CAD/ADS***	1.1068	0.8516	0.2552	1.0610	1.1340	-0.0730	1.3892	-0.3282	15	[-0.3711, -0.2853]	-23.63
	CHF***	2.8276	2.3827	0.4449	2.7074	2.6326	0.0748	3.0775	-0.3701	10.38	[-0.4400, -0.3002]	-12.03
	COPD***	2.3537	2.4051	-0.0514	2.5156	2.3695	0.1461	2.3181	0.1975	4.37	[0.1089, 0.2861]	8.52
	Diabetes	0.6545	0.6375	0.0170	0.6520	0.6500	0.0020	0.6669	-0.0150	1.08	[-0.0421, 0.1213]	-2.25
ER Visits	Asthma	0.5387	0.5346	0.0041	0.5335	0.5351	-0.0016	0.5392	-0.0057	0.71	[-0.0214, 0.01004]	-1.06
	CAD/ADS***	0.7409	0.7551	-0.0142	0.7753	0.7553	0.0200	0.7411	0.0342	2.88	[0.011, 0.0576]	4.61
	CHF	0.5126	0.5129	-0.0003	0.5052	0.5038	0.0014	0.5035	0.0017	0.17	[-0.0175, 0.0209]	0.34
	COPD	0.4772	0.4812	-0.0040	0.4818	0.4807	0.0011	0.4767	0.0051	0.82	[-0.0085, 0.0208]	1.07
	Diabetes	0.2530	0.2474	0.0056	0.2500	0.2471	0.0029	0.2527	-0.0027	0.69	[-0.0102, 0.00489]	-1.07
OP Visits	Asthma	5.7348	5.7514	-0.0166	5.7661	5.7482	0.0179	5.7316	0.0345	1.25	[-0.0195, 0.0885]	0.60
	CAD/ADS	4.7410	4.7585	-0.0175	4.7816	4.7678	0.0138	4.7503	0.0313	0.96	[-0.0323, 0.0948]	0.66
	CHF	4.8812	4.8892	-0.0080	4.8944	4.8265	0.0679	4.8185	0.0759	1.78	[-0.0077, 1.6127]	1.58
	COPD***	4.8368	4.7056	0.1312	4.8103	4.8100	0.0003	4.9412	-0.1309	4.92	[-0.8298, -0.0784]	-2.65
	Diabetes	2.1634	2.1756	-0.0122	2.1767	2.1653	0.0114	2.1531	0.0236	1.58	[-0.0057, 0.0528]	1.10

Significance level note: **5% ***1%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Economic and Utilization Outcomes Summary

- **The differing method of constructing member months in the different periods resulted in an artifact where the average PMPM appears to peak, then drop between the Baseline Year Three and Program Year One.**

  The trends seen in rates of medical expenditures and utilization are at least partially explained by the nature of eligibility data in the baseline and program periods. In future analyses, comparable data for the baseline period are essential to fully analyze trends in expenditures

- **Members with CHF consistently had the highest expenditures and utilization. Those with asthma and diabetes were consistently on the low end of expenditures and utilization.**

  Differences in utilization in each of the five DMPP conditions confirm the importance of sub-group analysis in descriptive and multivariate analyses, including the cost neutrality analysis.

- **There are large differences in average PMPM between different demographic groups, particularly when stratified by race/ethnicity, language, and the presence of comorbid conditions.**

  These differences may reflect a range of underlying characteristics, including health status, propensity to use care, access to care, and other potential inequalities. It may be necessary to conduct targeted, strategic risk stratification and program engagement in order to address apparent disparities in utilization in the Medi-Cal population through a DM intervention.

- **The small number of members who received multiple calls during the intervention limited UCLA's ability to assess the impact of the telephonic contact on utilization of health services.**

  Overall pre-post and control-intervention comparisons of utilization of health services are not sufficient to attribute changes found in behavior of the eligible population to the success of disease management. To understand the impact of the intervention on member utilization of health services, ideally trends in use would be measured according to intensity of intervention, as well as before and after intervention delivery. Therefore, this evaluation is unable to draw clear conclusions

regarding the impact and effectiveness of telephonic disease management on utilization of health services.

- **The multivariate model adjusted for factors that impact cost and utilization. No consistent patterns in changes in utilization or expenditures were found.**

  UCLA's multivariate analysis of utilization and expenditures is rigorous in that it controls for characteristics of the population that are potential confounders of health care utilization.

  Significant changes in emergency room utilization, outpatient utilization, number of inpatient admissions, and total health care expenditures were seen for one disease group per measure. Inpatient days decreased for two diseases and increased for one disease. The lack of consistency in outcomes implies that effects of the intervention, if present, were localized in particular subgroups, although the reasons for these changes cannot be directly attributed to the intervention.

  Based on these findings, we conclude that after controlling for confounding factors such as demographics and intercorrelation, the intervention and control groups had relatively similar service use and expenditures across the baseline and program periods. Thus, the program did not produce significant changes in health care expenditures among enrollees, despite the savings reported in the budget neutrality calculation presented in Chapter 2, Section E. The apparent discrepancy between these findings reflects differences in the methodology. Budget neutrality calculations (presented later in Chapter 2E. Financial Outcomes) were intended to assess interim program performance and savings for program adjustments in the absence of full claims data and did not account for many potential confounders and other threats to validity. We believe that the results of our multivariate analyses of program expenditures and utilization in this section are scientifically sound and rigorous and accurately reflect the financial impact of the program.

C. Clinical Outcomes

Quality of care was assessed using process and outcome of care measures. The *process* measures included: (1) receipt of appropriate clinical services in accordance with clinical care guidelines (e.g., blood tests, annual flu shot, foot exam); and (2) receipt of appropriate pharmacologic treatment (e.g., beta-agonists for patients with asthma or COPD, beta-blockers for patients with CHF or post myocardial infarction (MI), ACE inhibitors for people with microalbuminuria), including refills. The *outcome* measures included: (1) adequate control of disease, including clinical responses to care (short-term, e.g. change in hemoglobin A1c control, change in low density lipoprotein (LDL) cholesterol control), (2) reductions in avoidable ER visits and hospitalizations (intermediate-term); and (3) improvements in self-reported health status (long-term).

For each of the DMPP conditions, MHS, DHCS, and UCLA defined a list of agreed-upon metrics that would be used to measure clinical processes and outcomes. These measures have clinical significance and represent process and outcomes for each condition. In addition, we used HEDIS-based measures of quality of care for selected outcomes where the available data were sufficient to implement the HEDIS guideline. HEDIS is a nationally recognized and standardized set of performance measures used by consumers, employers, government agencies, legislators, advocates, and potential purchasers to assess the quality of care by health plans and their providers.

Clinical process and outcome measures are presented for each of the DMPP eligible diseases, including: asthma, COPD, diabetes, CHF, and CAD/ADS. Measures that are common to all conditions, such as use of ER services, are presented under each disease category. Due to differences in methodology and sample, HEDIS measures, non-HEIDS claims-based measures, and assessment-based measures are reported separately.

Detailed tables displaying the demographic characteristics of the population included in each measure, and the result statistics for every measure across all diseases and time periods are contained in Appendix 2, Table 18 through Appendix 2, Table 40.

Data Sources and Methods

Analyses of quality of care were based on Medi-Cal claims data and Clinical Assessment Data collected by MHS. In addition, we used Medi-Cal eligibility data to limit all analyses to populations that were continuously enrolled during each measurement period.

Claims data were used preferentially when both claims and clinical assessment data contained information about a specific clinical measure, because assessment data are only available for a subset of the intervention group during the program period, and are

possibly subject to recall bias and other self-reporting error. All quality analyses based on claims data provide information on the provision of guideline-concordant services to both intervention and control groups throughout the six-year baseline and project period. In claims-based analysis, the population in each study year differs, and does not represent a cohort with increasing duration of enrollment. For this reason, it is not appropriate to draw statistical conclusions about the significance of trends in clinical outcomes over time. Instead, UCLA tested the significance of the difference between the intervention and control groups within each study year.

The Clinical Assessment Data include self-reported clinical and behavioral factors measured by MHS via telephone at six-month intervals. Assessment data were used for measures of quality for which they are the only source of information on beneficiaries, such as outcomes of care (e.g., LDL cholesterol level), health behaviors, or self-reported health status. Only a subset of intervention group members received clinical assessments. Therefore, the population included in measures based on assessment data predominantly includes members in the Risk Level Two and Three groups, who received active monitoring and intervention from MHS. Among the subset of beneficiaries who were assessed at least once, the number of assessments varies, and in many cases they answered only selected questions in the assessment, leading to variation in the number of beneficiaries responding to each survey item. Therefore, UCLA constructed multiple cohorts of beneficiaries within each condition based on the number of assessments received, and tested the significance of the difference in mean outcomes from first assessment to last assessment for each cohort. We only computed assessment-based indexes for measures with at least ten respondents.

For both claims and assessment data, only individuals with continuous enrollment are included, with a maximum of one 30-day gap in enrollment per year allowed. Among the continuously enrolled, every clinical process and outcome measure is restricted to the population for whom care is recommended, which may vary based on age or gender. However, data on many factors that affect appropriate provision of care, such as risk, clinical indication, contra-indication, or patient preference, were not available to UCLA. For claims-based analyses, new individuals join and leave the cohort each year, which may dilute the effect of the program, especially for people who have received the intervention for only one or two years. For analyses of prescription use, an enrollee is considered to have received continuous therapy for a medication within a given year if their Medi-Cal claims for that year indicate a supply of that medication that is sufficient to cover at least 80% of that year (292 days).

In this section, the five disease groups are ordered based on clinical similarity. More detailed technical information regarding the methods for calculating each measure is contained in Appendix 1: Methodology.

Clinical Outcomes for Beneficiaries with Asthma

Clinical Background

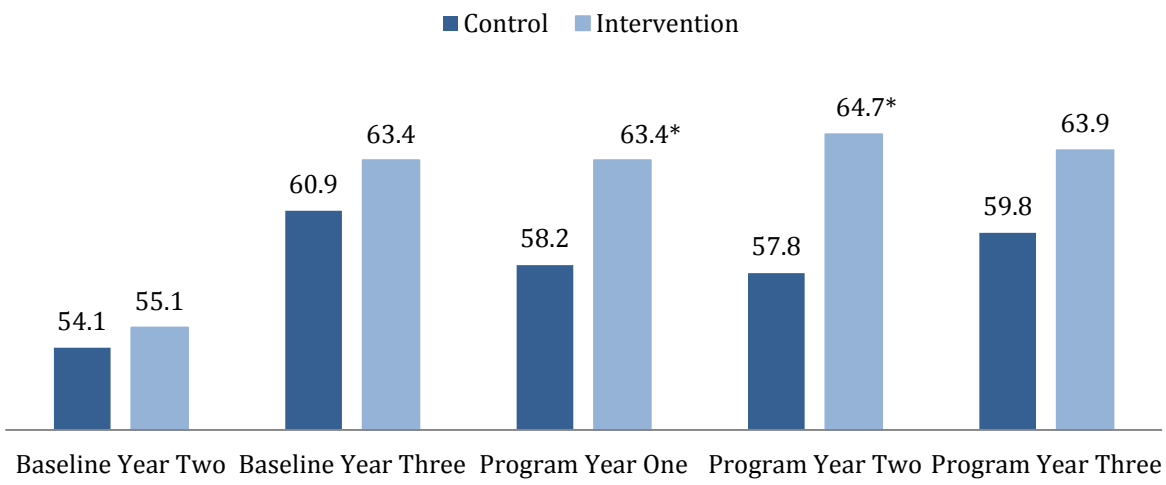
Asthma is a chronic condition that causes the airways of the lungs to become inflamed and more sensitive to constriction, causing difficulties in breathing. Asthma is one of the most common reasons for hospital admission and emergency room care. However, asthma can be well controlled with appropriate management. Based on the national guidelines sponsored by the National Heart, Lung and Blood Institute, management of asthma requires a comprehensive approach, including ongoing assessment and monitoring such as regular doctor visits and use of a peak flow meter, annual flu vaccine, receipt of a pneumonia vaccine, having an asthma action plan, use of appropriate medications, and control of exposures to environmental triggers such as tobacco smoking.[20] People with intermittent asthma need short-acting beta-agonists for quick relief as needed. People with persistent asthma need daily controller therapy, such as long-acting beta-agonists and daily inhaled corticosteroids as opposed to simply a rescue inhaler.[21] Appropriate use of medication for people with persistent asthma can help relieve airway inflammation and prevent airway narrowing and further lung damage. Appropriate medication use can also reduce the number of avoidable hospitalizations, ER visits, missed work and school days, and preventable deaths. [22]

HEDIS Measure of Appropriate Medication Use for People with Asthma

This HEDIS measure assesses whether individuals ages 21 and older who have been identified with persistent asthma have been *appropriately prescribed medication* during the measurement year (Exhibit 51). Appropriate medications include an inhaled corticosteroid alone, an inhaled steroid in combination with a long-acting beta agonist, leukotriene modifiers, mast cell stabilizers, and/or methylxanthines.[23] The specific definition of the HEDIS measure is detailed in Appendix 1: Methodology.

The national Medicaid rate of appropriate use of medication for HMO enrollees with asthma (ages five to 50 years old) was 87.1% in 2006, 86.9% in 2007, 88.7% in 2008, 88.6% in 2009, and 88.4% in 2010. The average Medi-Cal Managed Care rates of appropriate use of medication for individuals with asthma (ages five to 56 years old) were 84.5% in 2006, 86.8% in 2007, 88.8% in 2008 and 88.6% in 2009.[24]

Exhibit 51: HEDIS - Appropriate Use of Medication for Persons with Persistent Asthma; Intervention vs. Control by Year



Source: UCLA Analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

Based on the claims data, asthma medication use was comparable between control and intervention groups with no significant difference between the groups ($p>0.05$) during the Baseline Years. However, during Program Years One and Two, the intervention group had significantly higher rates of appropriate medication use compared to the control group (63.4% vs. 58.2% in Year One; $p<0.05$). During the final Program Year the significant difference between the intervention and control groups appeared to converge though the differences between the two groups are marginally significant ($p<0.1$).

Claims-Based Clinical Indices for Beneficiaries with Asthma by Year, Intervention versus Control Group

The full results of claims based analysis for members with asthma are contained in Appendix 2, Table 18. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 19.

Provision of Clinical Services/Preventive Care

Receipt of the *flu vaccine* was lower in the intervention group than in the control group in Baseline Year Three and Program Years One and Two. However, the rates of receiving an annual flu shot in the two groups (13.4% for the control group vs. 12.0% for the intervention group) became comparable by the end of Program Year Three since the rates in the control group decreased.

Medication Use

The beneficiaries in both the intervention and control groups had similar rates of receiving

inhaled corticosteroid prescriptions across the Program Years though downward trends of receiving at least one corticosteroid prescription per year were observed in both the groups.

The proportions of beneficiaries receiving prescriptions of *short-acting or long-acting beta agonists* were higher in the control group than the intervention group in the Baseline Years and in Program Year One. Downward trends in receiving prescriptions for short-acting or long-acting beta agonists were observed for both groups by the end of Program Year Three. However, the control group continued to have a higher rate of receipt than the intervention group by the end of Program Year Three.

Utilization of Health Care Services

The average numbers of *emergency department visits, hospitalizations*, and *outpatient doctor visits* were assessed using descriptive and multivariate methods in Chapter 2B. Health Services Expenditures and Utilization Outcomes (Exhibit 37, Exhibit 50, and Appendix 2, Table 15). Enrollees with Asthma had a decline in inpatient days, but this change had borderline significance at the 10% level.

Assessment-Based Clinical Indices for Intervention Group Beneficiaries with Asthma by Number of Assessments

The full results of assessment based analysis for members with asthma are contained in Appendix 2, Table 20. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 21.

Asthma Action Plan

A steadily increasing trend was observed between the number of assessments and the proportion of enrollees who reported having an asthma management plan (Exhibit 52). Among those individuals with asthma who were assessed only once (n=545), 6% reported having an asthma management plan. Among beneficiaries who were assessed twice (n=232), the rate of having an asthma management plan increased by 6.4% between their first and last assessment, while the prevalence of having an asthma management plan increased by 8.8% among those with three assessments (n=113) and 26.7% among those with our or more assessments (n=86).

Medication Use

Between 40% and 50% of beneficiaries reported using a *rescue inhaler* daily at the time of their first assessment (Exhibit 53). The rates of daily rescue inhaler use decreased by 13.5% among those were assessed twice (n=184), possibly due to improvement in asthma control. However, no significant changes were observed for beneficiaries with three or more assessments.

Provision of Clinical Services/Preventive Care

The use of *a peak flow meter* increased between the first and last assessment among people who were assessed twice (8.5% vs. 14.0%, n=232) (Exhibit 54). An even greater increase among those with four or more assessments (14.2% vs. 42.8%) though the number of participants was reduced to 14 only.

No changes in prevalence were observed for the following clinical measures: self-reported health status, functional limitations, treated for depression, use of rescue inhaler seasonally, knowledge of asthma triggers, and days of work or school missed due to asthma.

Summary of Clinical Outcomes for Beneficiaries with Asthma

During the Program Years, we observed changes in several clinical indices among beneficiaries with asthma. However, the majority of indicators displayed comparable change in both the intervention and control groups.

Nevertheless, there were favorable trends observed in the intervention group during the Program Years that may be attributable to the program. For instance, according to HEDIS measures, the rate of appropriate asthma medication use was higher among the intervention group across all three Program Years. Assessment data indicated that the proportion of people with an asthma management plan increased with each additional assessment. Beneficiaries with two assessments demonstrated a decrease in daily rescue inhaler use between first and last assessment, while in general, peak flow meter use increased as the number of assessments increased.

Exhibit 52: Proportion of Asthma Beneficiaries with an Asthma Action Plan; Change from First to Last Assessment, by Number of Assessments

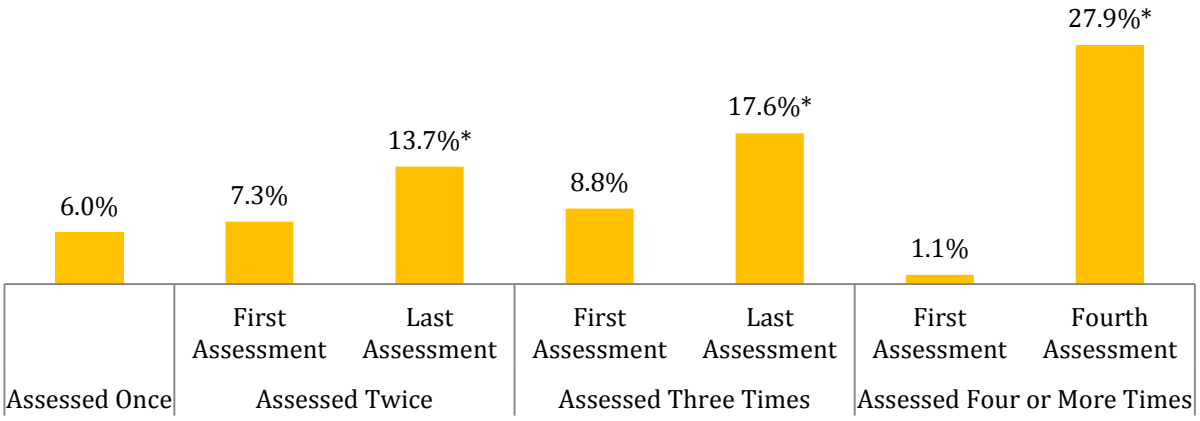


Exhibit 53: Proportion of Asthma Beneficiaries who Use a Rescue Inhaler Daily; Change from First to Last Assessment, by Number of Assessments

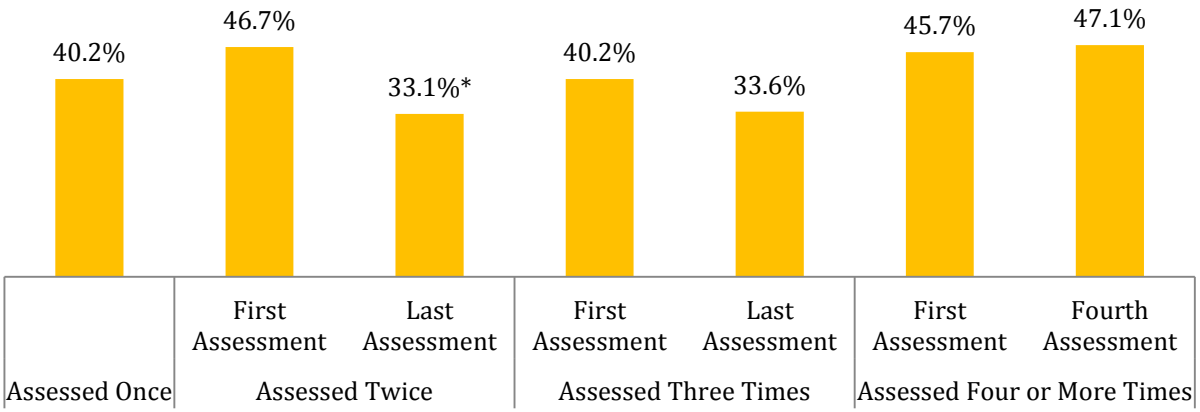
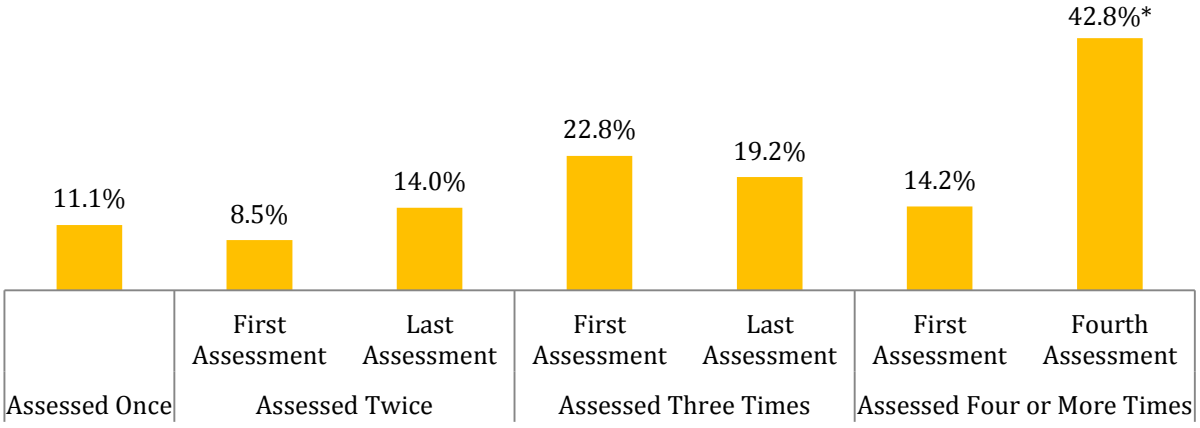


Exhibit 54: Proportion of Asthma Beneficiaries who Use a Peak Flow Meter; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Clinical Outcomes for Beneficiaries with COPD

Clinical Background

COPD is a major cause of mortality and morbidity throughout the U.S., though it is a preventable and treatable disease. COPD is characterized by persistent air flow limitations due to chronic lung damage. The most important aspects of treatment are avoidance of contributory factors, such as tobacco smoking and other air pollutants from the patient's home or workplace. Management of COPD requires ongoing assessment and monitoring through regular doctor visits and use of oximetry, receipt of annual flu and pneumonia vaccines, and having a COPD action plan. Symptoms such as coughing or wheezing can be treated with medication. Medications used to treat COPD include bronchodilators to open the airways, inhaled steroids and other anti-inflammatory medications to reduce lung inflammation, as well as antibiotics. Patients with COPD also need to have their blood oxygen levels measured regularly since they may need to be treated with supplemental oxygen therapy.

Claims-Based Clinical Indices for Beneficiaries with COPD by Year, Intervention versus Control Group

The full results of claims based analysis for members with COPD are contained in Appendix 2, Table 22. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 23.

Provision of Clinical Services/Preventive Care

In general, the beneficiaries in the intervention group had lower rates of receiving an *annual flu vaccine* than the beneficiaries in the control group during the Baseline Years and Program Years One and Two. However, the differences in the rates of receiving an annual flu vaccination between the control and intervention groups disappeared by the end of Program Year Three (20.2% vs. 17.8%) when the rates in both groups decreased.

The proportion of beneficiaries with COPD who had *blood gas or pulse oximetry* was lower among the intervention group than the control group across all the Baseline Years and Program Years. Overall, there was a decline in testing rates for both groups throughout the three Program Years, specifically from 11.3% to 3.1% for the intervention group and from 13.0% to 3.1% for the control group.

Medication Use

The proportions of beneficiaries receiving *antibiotic prescriptions* were identical in both the control and intervention groups in Program Year One (Exhibit 55). However, the beneficiaries in the intervention group had higher rates of receiving antibiotic prescriptions than those in the control group in Program Years Two and Three.

The proportion of beneficiaries receiving *long-acting beta agonist* prescriptions was higher in the control group than in the intervention group during the Baseline Years (Exhibit 56). However, there was an increase in the receipt of long-acting beta agonist prescriptions in the intervention group during Program Years. As a result, the rates of receipt of the two groups became comparable by the end of Program Year Three. The proportion of beneficiaries receiving *short-acting beta agonist* and *corticosteroid prescriptions* was higher in the control group than in the intervention group throughout the Baseline Years and Program Years.

Exhibit 55: Proportion of COPD Beneficiaries with any Antibiotic Prescription; Intervention vs. Control by Year

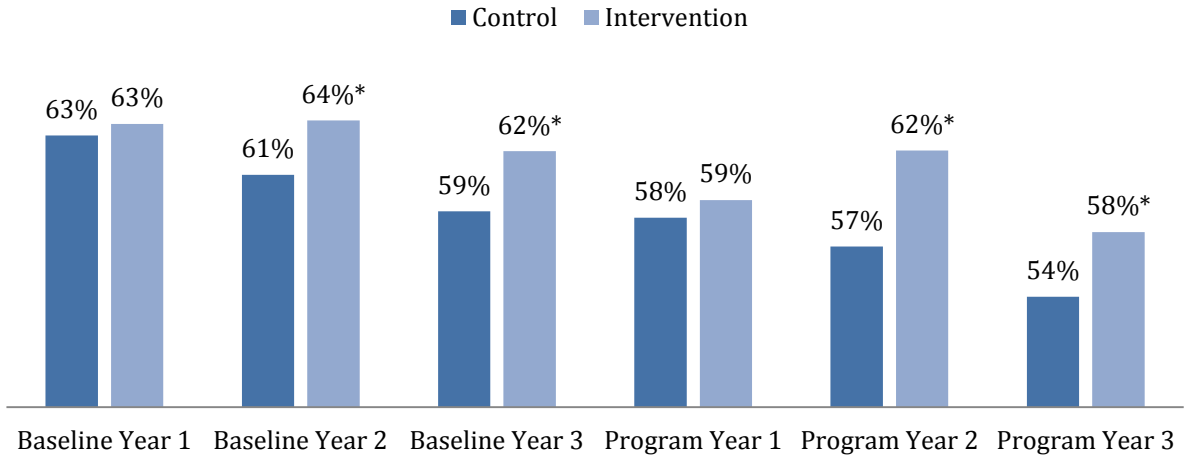
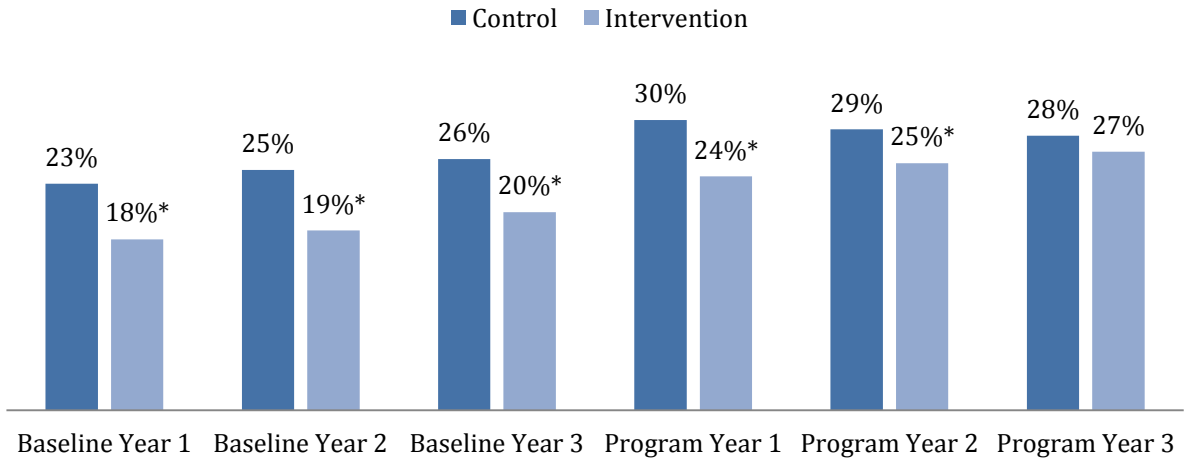


Exhibit 56: Proportion of COPD Beneficiaries who Ever Received Long Acting Beta Agonist Medication; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.
Note: (*) Differences between groups within a year are statistically significant at the 5% level

Utilization of Health Care Services

The average numbers of *emergency department visits, hospitalizations*, and *outpatient doctor visits* were assessed using descriptive and multivariate methods in Chapter 2B. Health Services Expenditures and Utilization Outcomes (Exhibit 37, Exhibit 50, and Appendix 2, Table 15). Beneficiaries with COPD had an increase in inpatient days that was significant at the 1% level, and also experienced a significant decline in outpatient visits. The reasons for these changes are unknown; while they are contrary to the expected trend of increased outpatient management and decreased hospitalization, it is possible that changes were clinically appropriate. No other statistically significant changes in utilization relative to the baseline period and control group were found for enrollees with COPD.

Assessment-Based Clinical Indices for Intervention Group Beneficiaries with COPD by Number of Assessments

The full results of assessment based analysis for members with COPD are contained in Appendix 2, Table 24 and Appendix 2, Table 25. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 26.

COPD Action Plan

The proportion of beneficiaries with a *COPD action plan* increased between the first and the last assessment for all beneficiaries with more than one assessment (Exhibit 57). The proportion of individuals with a COPD action plan increased by 6.2% among those with two assessments (n=289), 14.3% among those with three assessments (n=133), and 12.4% among those with four or more assessments (n=113).

Provision of Clinical Services/Preventive Care

The proportion of beneficiaries who had ever received a *pneumonia shot* increased between the first and last assessment among all groups with more than one assessment, with the greatest absolute percent increase among those with four or more assessments (Exhibit 58). The rates of receiving pneumonia shots increased by 12.8% among those with two assessments (n=289), 11.3% among those with three assessments (n=133), and 16.0% among those with four or more assessments (n=113).

No changes were observed in the rates of treatment for depression or use of oxygen.

Health Outcomes

No changes were observed in the rates for the following clinical measures: overweight/obesity, functional limitations, increased symptoms, and limitations in activity due to COPD.

Summary of Clinical Outcomes for Beneficiaries with COPD

During the Program Years, we observed changes in several clinical indices among beneficiaries with COPD in both the intervention and control groups. While, in general, the magnitude of the changes was similar for most of the indices in both the control and intervention groups, we did observe several favorable trends in the intervention group alone. For instance, the proportions of beneficiaries receiving antibiotic prescriptions were higher in the intervention group than in the control group in Program Years Two and Three. There was an increase in the receipt of long-acting beta agonist prescriptions in the intervention group during the Program Years, which led to a comparable rate between the two groups by the end of Program Year Three. Based on assessment data, the proportion of people with a COPD action plan and the proportion of those who had received a pneumonia shot increased as the number of assessments increased.

Exhibit 57: Proportion of COPD Beneficiaries with a COPD Action Plan; Change from First to Last Assessment, by Number of Assessments

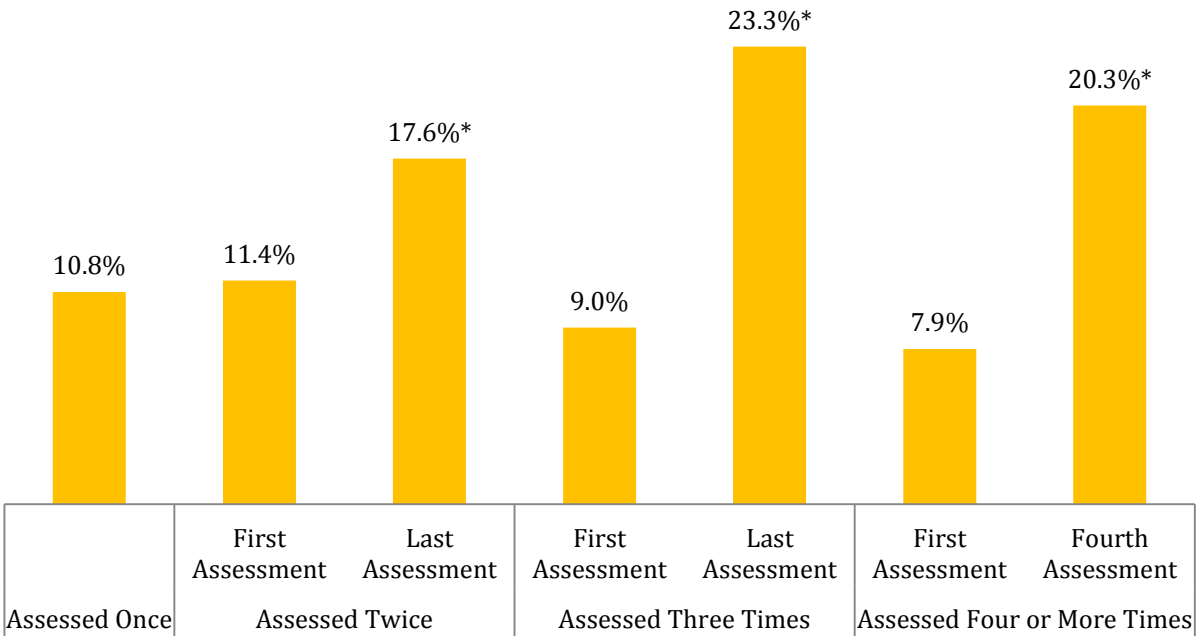
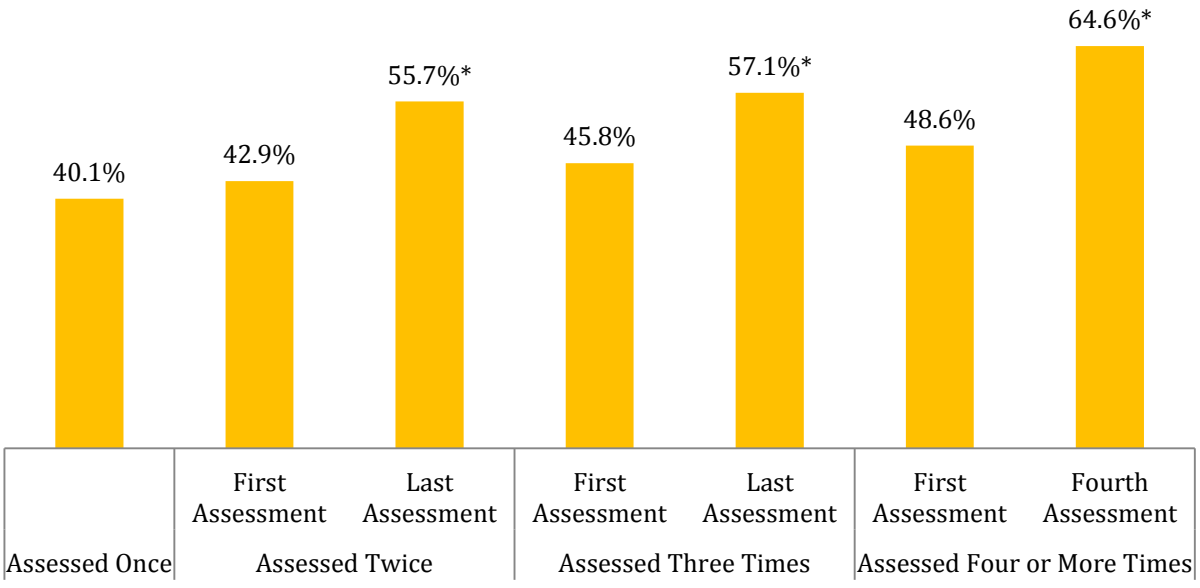


Exhibit 58: Proportion of COPD Beneficiaries who Received a Pneumonia Shot; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Clinical Outcomes for Beneficiaries with Diabetes

Clinical Background

Diabetes is a chronic condition of impaired glucose metabolism, with the potential to cause significant complications leading to disability and death. The early diagnosis and treatment of diabetes with medications, monitoring, behavioral interventions and counseling can improve glycemic control.[25] Enhanced glycemic control results in a decreased risk of diabetes-related complications including cardiovascular disease, kidney failure, blindness, peripheral neuropathy and non-traumatic amputation. Diabetes-specific monitoring with hemoglobin A1C is an important measure of glycemic control as it correlates with an individuals' risk of developing diabetes related complications, health care utilization, diabetes related health care costs, and health status. The HbA1c testing allows health care providers to monitor and assess the effectiveness of a treatment plan.[26]

Among people with diabetes, retinal damage can occur without signs or symptoms. This long-term consequence of diabetes can be diagnosed early and even prevented through regular dilated retinal eye exams. At the time of this program, the American Diabetes Association recommended that persons with diabetes receive a dilated eye exam at least once a year.[27]

Additional testing among people with diabetes includes LDL cholesterol testing – to reduce the risk for coronary artery disease[28, 29], and foot exams to assess the presence of diabetic ulcers and peripheral neuropathy. Diabetes treatment includes medications for blood pressure control and kidney protection (ACE-I/ARB), and statins for cholesterol control. Additionally, because diabetes is a chronic condition that can affect the immune system, receipt of influenza and pneumonia immunizations helps reduce the risk for respiratory infections. Furthermore, having an action plan to address acute and chronic diabetes related issues can improve overall diabetes care. Medicaid care management programs target diabetes frequently because of its high prevalence and cost, with a specific goal of reducing ER visits and preventable hospitalizations.[30, 31]

HEDIS Measure of Hemoglobin A1C (HbA1c) Testing for People with Diabetes

This quality of care measure estimated the proportion of individuals ages 22 and older with diabetes (Type 1 and Type 2) who had at least one HbA1c test within the past year (Exhibit 59). National and State Medicaid measure the percentage of 18-75 year olds with diabetes who had at least one HbA1c test(s) during the preceding year.[22] The average California Medi-Cal Managed Care HbA1c testing rates were 74.3% in 2006, and had increased to 82.0% in 2010.[24] The specific definition of the HEDIS measure is detailed in Appendix 1: Methodology.

The intervention group maintained HbA1c testing rates above 70% from Baseline Year

Two through Program Year Three. The intervention group also maintained significantly higher rates than the control group ($p<0.05$) for each Program Year. As seen in Exhibit 59, the intervention group had higher rates of HbA1c testing in the final year of the intervention (75.5%) compared to the two prior Program Years. The control group rates appeared to remain consistent throughout with a slight increase in rates between Program Years 1 and 2.

HEDIS Measure of Low Density Lipoprotein Cholesterol (LDL-C) Screening for People with Diabetes

For this measure, we estimated the percent of individuals ages 21 and up with diabetes (Type 1 and Type 2) who had at least one LDL-C test during the past year (Exhibit 60). In 2006, 84.4% of beneficiaries enrolled in the California Medi-Cal Managed Care Program received the recommended LDL-C testing, and this increased to 79.3% in 2010. Rates of LDL-C testing for national Medicaid beneficiaries enrolled in an HMO plan were similar—71.1% in 2006, and 74.7% in 2010.[32, 33] State and national rates include 18-75 year olds in the measurement population. The specific definition of the HEDIS measure is detailed in Appendix 1: Methodology.

Rates of LDL-C testing were significantly higher in the intervention group compared to the control group during all of the Baseline and Program Years ($p<0.01$). As depicted in Exhibit 60, beginning at Baseline Year Three and continuing through Program Year Two, LDL-C testing rates appear to be increasing for both the intervention and control groups.

HEDIS Measure of Eye Exams (Retinal) for People with Diabetes

This quality of care measure estimated the percent of individuals ages 22 or older with diabetes (Type 1 and Type 2) who had at least one retinal eye exam performed by a professional (optometrist or ophthalmologist) within the last measurement year (Exhibit 61). National and State Medicaid measure the proportion of members 18-75 years of age who received this exam. In California's Medicaid HMO population, rates of eye exam receipt were 51.1% in 2006, and increased to 54.4% in 2010. National Medicaid rates among HMO enrollees were 51.4% in 2006, and increased to 53.1% in 2010.[32, 33] The specific definition of the HEDIS measure is detailed in Appendix 1: Methodology.

Retinal exam rates remained above 87% for the intervention group throughout the program. The control group experienced significantly lower exam rates ($p<0.05$) compared to the intervention group during each Baseline and Program Year. Notably, the control group's rates dropped between the two final years of the program while the intervention group sustained higher rates, 88% in Year Two and 87% in Year Three.

Exhibit 59: HEDIS - Hemoglobin A1c Testing for People with Diabetes; Intervention vs. Control by Year

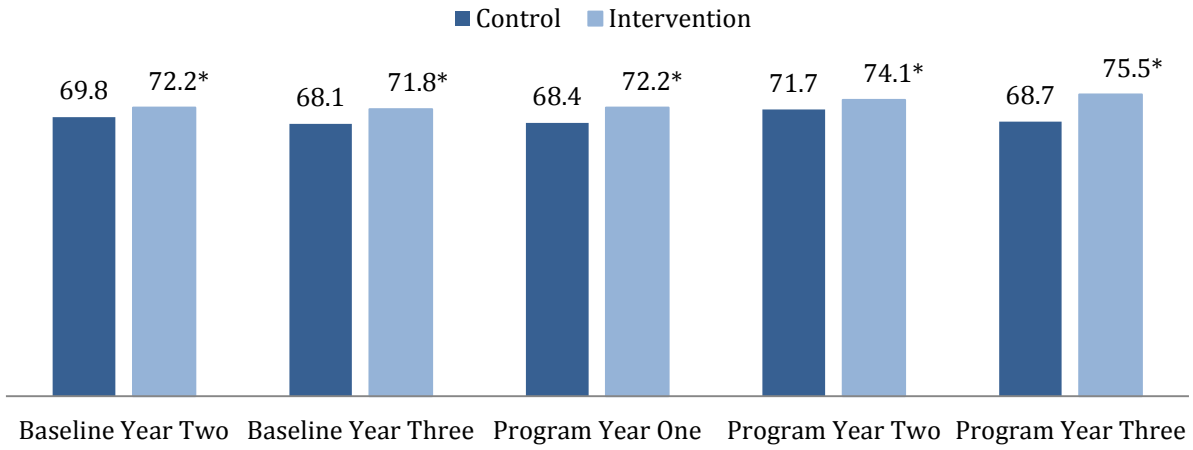


Exhibit 60: HEDIS - LDL-C Screening Rates for People with Diabetes; Intervention vs. Control by Year

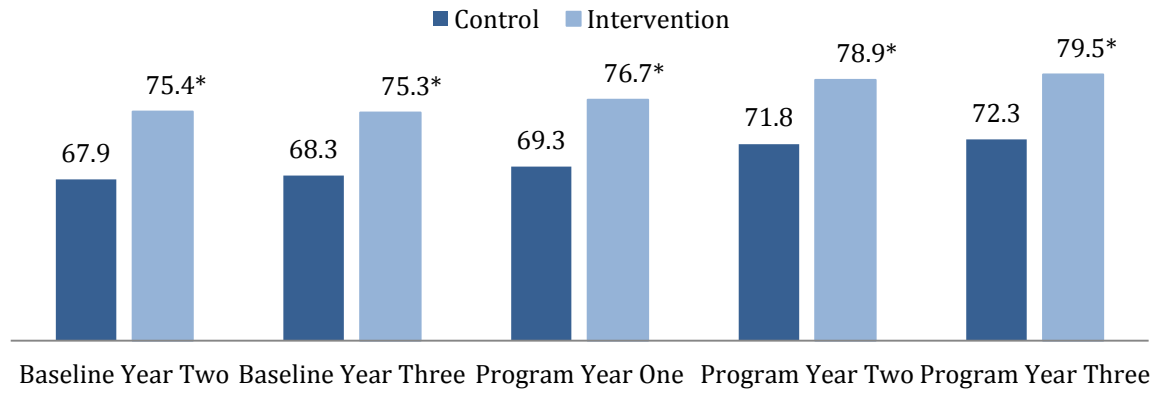
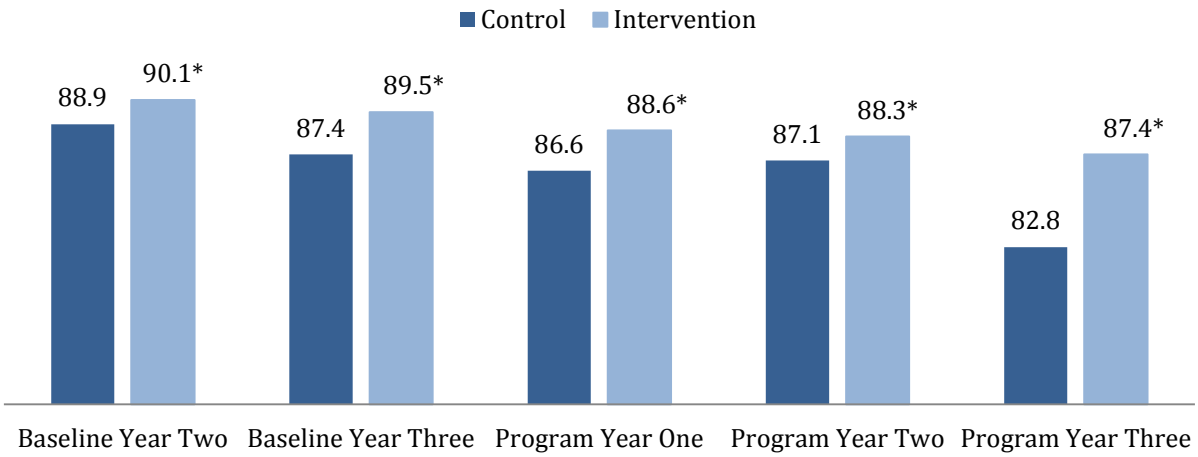


Exhibit 61 : HEDIS - Retinal Eye Exams for People with Diabetes; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

Claims-Based Clinical Indices for Beneficiaries with Diabetes by Year, Intervention versus Control Group

The full results of claims based analysis for members with Diabetes are contained in Appendix 2, Table 27. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 28.

Provision of Clinical Services/Preventive Care

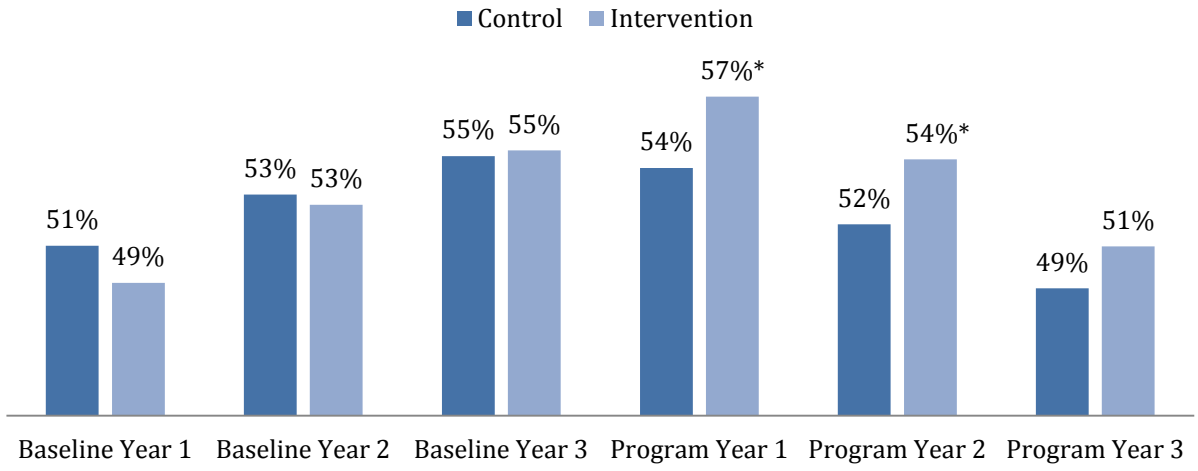
Less than one in ten enrollees had received the *flu vaccine* during the first two Baseline Years. Beginning in Baseline Year Three and continuing through the end of the program adults in the control group had higher rates of receiving an annual flu shot than those in the intervention group. This difference increased significantly during the Program Years, with the highest rates for both groups in Program Year Two (17.7% control vs. 14.1% intervention). Vaccination rates decreased by the end of the program (13.8% control vs. 11.7% intervention).

Annual rates of *hemoglobin A1c* (HbA1c) and *LDL-C testing*, and *annual dilated retinal exams* were low in both the intervention and control groups compared to the HEDIS analyses. The variation in findings is due to the differences in the specifications for the samples, with HEDIS inclusive of health care utilization measures and medication use which narrow the individuals eligible to be included in the analyses. In the claims only data, there is no adjustment for other services.

For *HgA1c testing* there were no significant differences during the Baseline Years between the intervention and control groups (Exhibit 62). After Program Years One and Two, a significantly larger proportion of participants in the intervention compared to the control had received annual HbA1c testing (Program Year One: 57.0% vs. 54.1% Program Year Two: 54.4% vs. 51.8%), although the rates remained low. By the end of Program Year Three the rates in both groups continued to decline and were not significantly different.

During the Baseline Years rates of *LDL-C testing* rates were significantly higher in the intervention than the control group (Baseline Year Three: 68.3% vs. 64.1%). These differences continued throughout the Program Years. By the end of Program Year One, 69.4% of beneficiaries in the intervention group compared to 62.2% of people in the control group had undergone annual cholesterol testing. The intervention group continued to have significantly higher rates of LDL-C testing through Program Years Two and Three (66.7% vs. 60.0%).

Exhibit 62: Proportion of Diabetes Beneficiaries with Annual Hemoglobin A1c Performed; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

Less than one third of individuals in either the intervention or control group received an *annual retinal exam*. During Baseline Year Three individuals in the intervention group started to have a higher rate than people in the control group of an annual retinal exam (30.9% vs. 28.6%). This difference between the intervention and control groups remained significant and increased during Program Year One (30.3% vs. 26.9%), and by the end of Program Year Two both groups had reached their peak rates (31.0% vs. 27.2%) with a decline by the end of Program Year Three.

Medication Use

In Baseline Year One, beneficiaries in the intervention group had a higher rate of *statin medication* use than the control group. This difference was not significant through the remainder of the Baseline Years and the start of the program. In Program Year Two, the intervention group had achieved a significantly higher rate of statin medication use (54.2% vs. 51.8%), but this difference did not persist in the final year of the program.

At baseline, less than one in ten people in either group were using *aspirin or another anti-platelet agent*. Throughout the Baseline and Program Years the intervention group had significantly higher rates of aspirin/anti-platelet medication use. By the end of Program Year One, rates in both groups had peaked, and remained significantly higher in the intervention compared to the control group (19.7% vs. 14.3%) By the end of Program Year Three the rates for both groups had decreased, but the intervention group continued to have a higher rate than the control group (17.5% vs. 13.3%).

Utilization of Health Care Services

The average numbers of *emergency department visits, hospitalizations*, and *outpatient doctor visits* were assessed using descriptive and multivariate methods in Chapter 2B. Health Services Expenditures and Utilization Outcomes (Exhibit 37, Exhibit 50 and Appendix 2, Table 15). No statistically significant changes in utilization relative to the baseline period and control group were found for beneficiaries with diabetes.

Assessment-Based Clinical Indices for Intervention Group Beneficiaries with Diabetes by Number of Assessments

The full results of assessment based analysis for members with diabetes are contained in Appendix 2, Table 29. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 30.

Diabetes Action Plan

Overall rates of having an *action plan for diabetes* were low, with some improvement among individuals with multiple assessments. Less than one in six participants had a diabetes action plan at the time of their first assessment (Exhibit 63). There were increases in the rates of having an action plan for people with two or more assessments; 8.2% for people with two assessments; 3.9% among people with three assessments, and 8.3% among people with four or more assessments.

Provision of Clinical Services/Preventive Care

Rates of ever receiving a *pneumonia vaccine* varied considerably between the groups. Among individuals with only one assessment 27% reported receipt of a pneumonia shot (Exhibit 64). However, baseline rates of ever receiving a pneumonia shot among participants with multiple assessments demonstrated large variations due to the small sample sizes, with increased reported rates of vaccination among people with two or three assessments.

Receipt of an *annual foot exam* was reported by 62.6% to 72.5% of participants. The only change that occurred over the course of the program was a decline in the proportion of individuals with four or more assessments who reported a foot exam between the first and last assessment.

Slightly more than one third of people (35.8%) with one assessment had ever been *treated for depression*. The rate of treatment for depression increased from the first to last assessment among people with two (4.1%) or three assessments (4.5%).

Health Outcomes

Rates of good *glycemic control* were high (i.e., hemoglobin A1c less than seven). At their

first assessment over 95% of individuals reported an HbA1c value of less than seven at the time of their most recent test. The only significant changes for glycemic control appear to have occurred among individuals with three assessments where the proportion with an HgA1C less than seven decreased from 95.2% at their first assessment to 85.1% at their second assessment (Exhibit 65). Concomitantly the proportion of participants with an HgA1c between seven and eight increased by 6.9%, as well as an increase of 3.1% for people with an HbA1c greater than eight.

Rates of *blood pressure control* differed between people with varying numbers of assessments. Among people with multiple assessments there was improvement in blood pressure control. Less than one-quarter of people with a single assessment reported a blood pressure within acceptable limits. Among people with three assessments there was a significant improvement of 4.4% in the rate of acceptable blood pressure control (36.2% up to 40.6%).

The prevalence of *obesity* was high among all groups. At their first assessment, just under half (47.6%) of individuals with only one assessment were obese. There were no declines in the prevalence of obesity in any of the groups. Only individuals with four or more assessments had a significant change in the rates of obesity, and that was an increase of 7.6% (55.8% to 63.2%).

At their first assessment over one in nine participants reported some *functional limitation*. The only change from first to last assessment was among individuals with three assessments, where the rate of functional limitation increased by 2.1% (96.5% to 98.6%).

No changes were observed for the following outcome measures: LDL-C or days of work/school missed due to diabetes.

Summary of Clinical Outcomes for Beneficiaries with Diabetes

Participants in the intervention group demonstrated higher rates than the control group for several measures including annual retinal exams, annual HbA1c testing, LDL-C testing, statin use, and ASA/anti-platelet medication during some years of the program. However, patterns between the two groups were relatively static, indicating concurrent change in the control group for many indicators.

Interpretation of the assessment data was limited. Among people with multiple assessments there was no improvement in glycemic control, LDL-C levels below 100mg/dL, blood pressure control or days of work or school missed.

Exhibit 63: Proportion of Diabetes Beneficiaries with a Diabetes Action Plan; Change from First to Last Assessment, by Number of Assessments

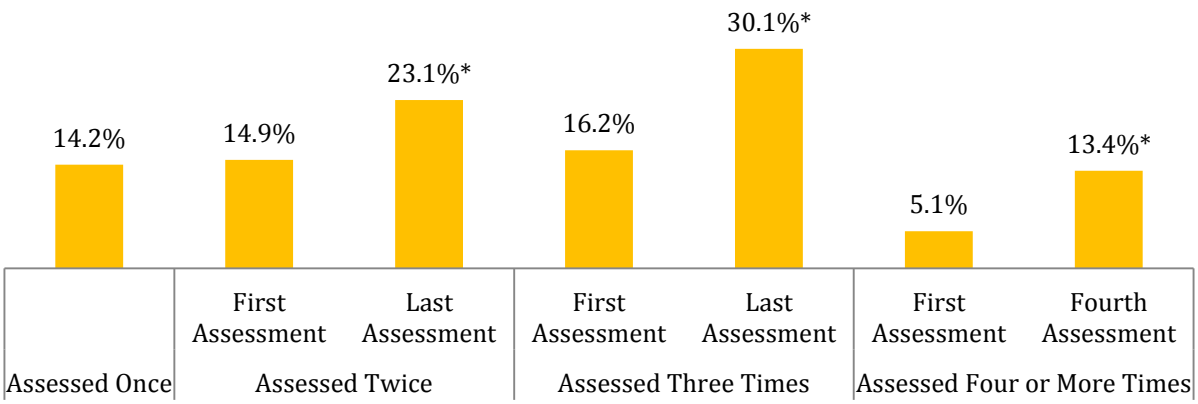


Exhibit 64: Proportion of Diabetes Beneficiaries who Received a Pneumonia Shot; Change from First to Last Assessment, by Number of Assessments

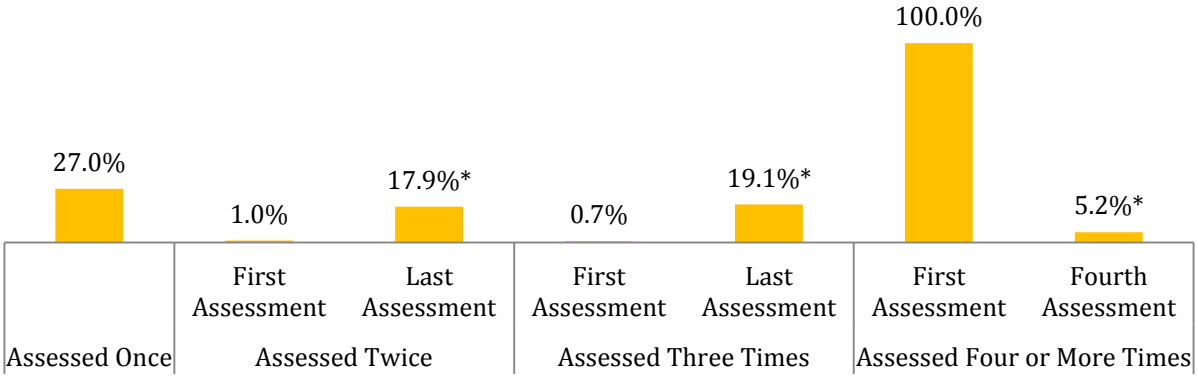
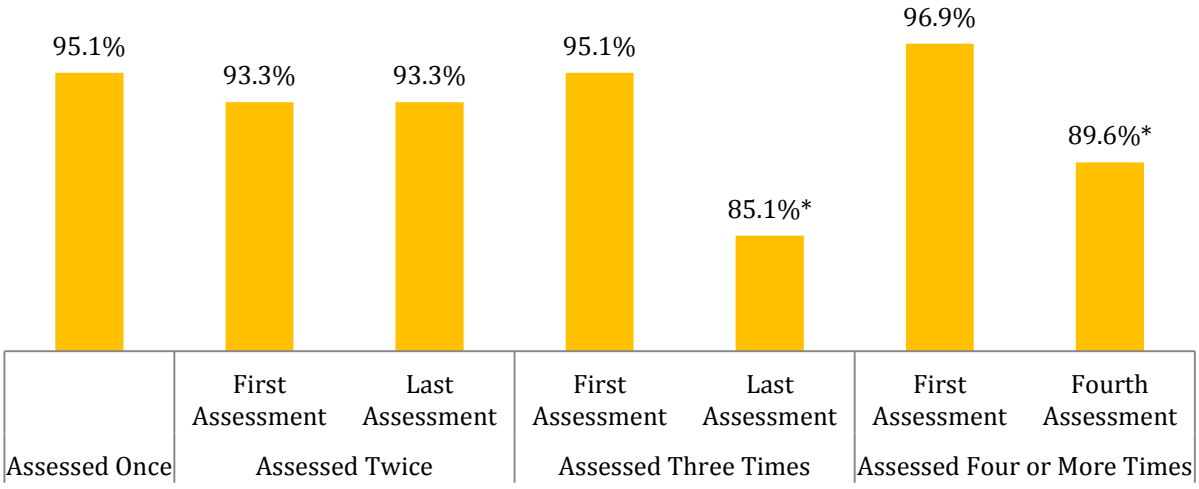


Exhibit 65: Proportion of Diabetes Beneficiaries with Hemoglobin A1C below 7; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Clinical Outcomes for Beneficiaries with CHF

Clinical Background

The early diagnosis and treatment of the underlying causes and contributing factors for CHF can reduce the risk for recurrent and symptomatic episodes. Among individuals with known CHF pharmacologic intervention and blood tests, as well as behavioral interventions are key. Beneficial and recommended pharmacologic interventions include the use of agents to control fluid status, blood pressure, and to optimize cardiac function. These agents include loop diuretics, beta-blockers, and ACE-Inhibitors where they are not contraindicated. At least annual testing of renal function and potassium levels is important for individuals with CHF due to the potential for impaired kidney function and elevated potassium levels due to CHF and/or medications. Additionally, to reduce cardiovascular complications blood pressure and cholesterol should be carefully monitored and treated. Cholesterol control is assessed by annual testing of a fasting lipid panel with a goal LDL cholesterol of <100mg/dL. The use of statins or other cholesterol lowering medications should be used to achieve this goal for further cardiac risk reduction. Satisfactory blood pressure control is 140/90 or lower for people with CHF. Furthermore, because of the risk for further fluid retention and stress on the heart individuals with CHF are commonly advised to pursue a low sodium diet and to monitor their daily weight.[34] A highly prevalent disease among the Medicaid population, CHF is targeted consistently in care management programs.

Claims-Based Clinical Indices for Beneficiaries with CHF by Year, Intervention versus Control Group

The full results of claims based analysis for members with CHF are contained in Appendix 2, Table 31. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 32.

Provision of Clinical Services/Preventive Care

Rates of *flu vaccination* were low at baseline but did not differ significantly between the intervention and control groups (5.0% vs. 5.9%). Both groups demonstrated an increase in rates of flu shots with a significantly higher rate in the control versus the intervention group in Program Year Two (18.8% vs. 14.5%).

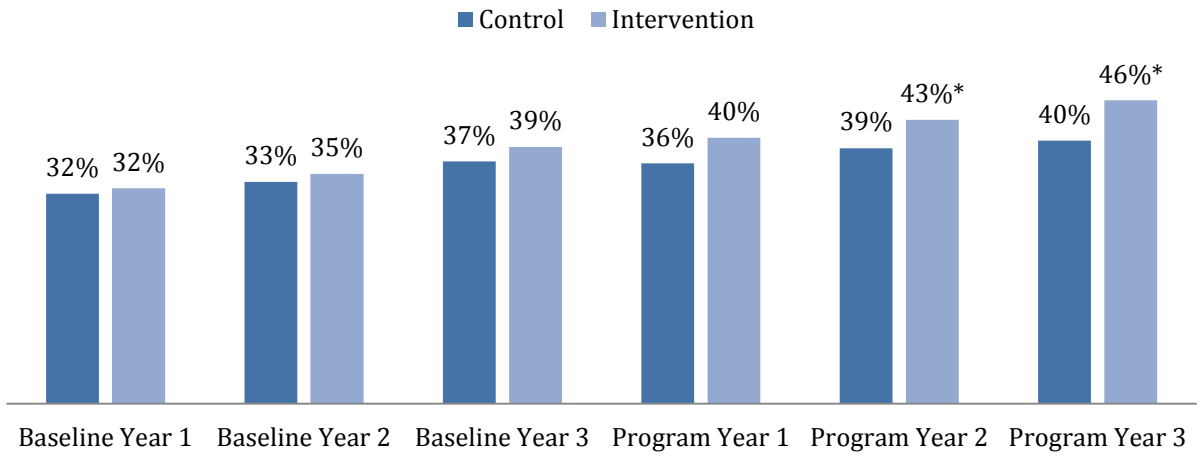
Blood *testing for kidney function and potassium levels* were higher in the intervention than control group beginning during the Baseline Years (83.2% vs. 73.8%) and throughout the Program Years (84.2% vs. 77.6%). The largest difference in testing rates was at the end of Program Year Two (86.6% vs. 78.5%).

Annual *cholesterol testing* rates in the intervention group exceeded those in the control group beginning at baseline (68.9% vs. 58.6%) and continuing through the end of Program Year Three. The highest rates of testing for both groups were during Program Year Two (74.3% intervention vs. 61.7% control) with a small decrease by the end of Program Year Three (71.7% vs. 60.8%).

Medication Use

Treatment with a *continuous supply of an ACE-I/ARB medication* demonstrated improvement over the course of the program. There were no significant differences in medication use during the baseline period (Exhibit 66). People in the intervention compared to the control group had significantly higher rates ACE-I/ARB use by the end of both Program Year Two (42.8% vs. 38.6%), and Program Year Three (45.8% vs. 39.7%.

Exhibit 66: Proportion of CHF Beneficiaries with a Continuous Supply of ACE-Inhibitor/ARB Medications; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

At baseline and throughout the Program Years, individuals in the intervention compared to the control group had significantly higher rates of using *ASA/anti-platelet agents*. Rates of medication use increased for both groups (Baseline Year One: 21.5% vs. 15.7%), but people in the intervention had significantly higher rates of medication use during all three Program Years (Program Year One - 28.2% vs. 20.9%; Program Year Two - 31.0% vs. 22.0%; Program Year Three - 32.9% vs. 21.3%).

There was no significant difference in *beta blocker* or *diuretic use* between the intervention and control groups throughout the baseline or program period, but both groups demonstrated an increasing trend in utilization from Baseline through the end of Program

Year Three.

Utilization of Health Care Services

The average numbers of *emergency department visits, hospitalizations*, and *outpatient doctor visits* were assessed using descriptive and multivariate methods in Chapter 2B. Health Services Expenditures and Utilization Outcomes (Exhibit 37, Exhibit 50 and Appendix 2, Table 15). For beneficiaries with CHF, we found a significant decline in both the number of inpatient admissions and the number of inpatient days. We also identified a significant increase in outpatient visits that was significant at the 10% level. There was no significant change in emergency department utilization.

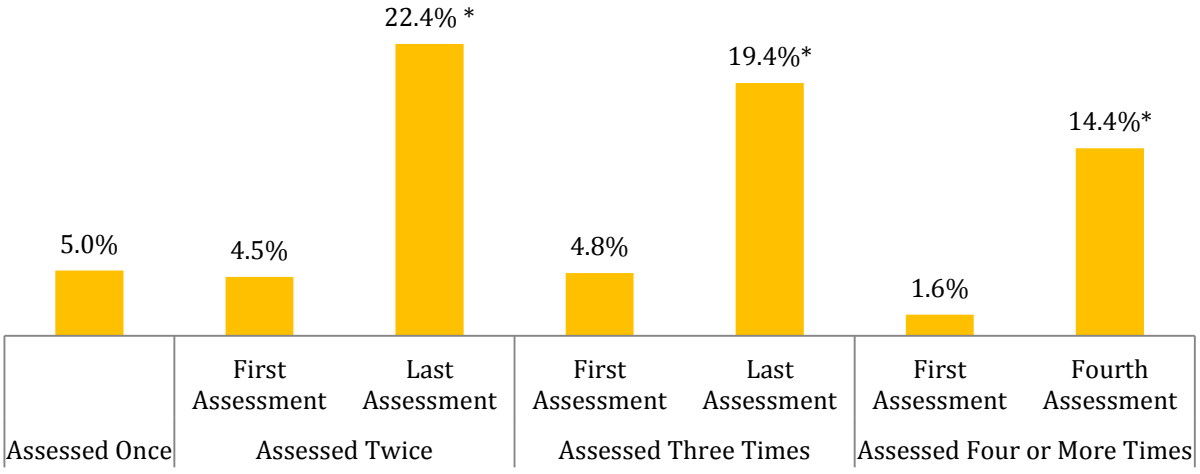
Assessment-Based Clinical Indices for Intervention Group Beneficiaries with CHF by Number of Assessments

The full results of assessment based analysis for members with CHF are contained in Appendix 2, Table 33 and Appendix 2, Table 34. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 35.

CHF Action Plan

Levels of reporting a *CHF action plan* were low, but people with two or more assessments demonstrated an increase in the proportion who reported having an action plan. At the time of their first assessment, 5% or less of individuals had an action plan (Exhibit 67). Among people with two assessments there was an increase of 17.9%, 14.6% among people with three assessments and 12.7% among people with four or more assessments.

Exhibit 67: Proportion of CHF Beneficiaries with a CHF Action Plan; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Provision of Clinical Services/Preventive Care

Rates of ever receiving a *pneumonia vaccine* varied considerably between the groups. Among individuals with only one assessment 37% reported receipt of a pneumonia shot. However, baseline rates of ever receiving a pneumonia shot among participants with multiple assessments demonstrated large variations, with increased rates of vaccination among people with two assessments (19.6%) or three assessments (15.9%) but a decline among people with four or more assessments (78.7%) (Exhibit 68).

The proportion of people who reported *avoiding salt in their diet* was high and the rates improved over time among people with multiple assessments. Among individuals with one assessment, 91.9% reported avoiding salt, and the rate increased among people with two (3.7%) or three (9.0%) assessments (Exhibit 69).

At their first assessment almost two-fifths of people reported being *treated for depression*. Among people with two or four or more assessments the rate of people reporting treatment increased (3.7% and 9.3% respectively).

Health Outcomes

At the time of their first assessment less than half of participants *knew their blood pressure*. Among people with two assessments the proportion of people who knew their blood pressure increased by 5.7%, and among those with four or more assessments the increase was 15.3%. Among people who knew their blood pressure at the time of their first assessment, 47.0% to 54.6% reported a *blood pressure within an acceptable range*. For individuals with multiple assessments, the rate of blood pressure control increased by 13.8% for people with two assessments, and by 18.2% among people with four or more assessments (Exhibit 70).

No changes in prevalence were observed for the following outcome measures: obesity, functionally limited, LDL-c less than 100mg/dL, days of work/school missed due to CHF or smoking cessation.

Exhibit 68: Proportion of CHF Beneficiaries who Received a Pneumonia Shot; Change from First to Last Assessment, by Number of Assessments

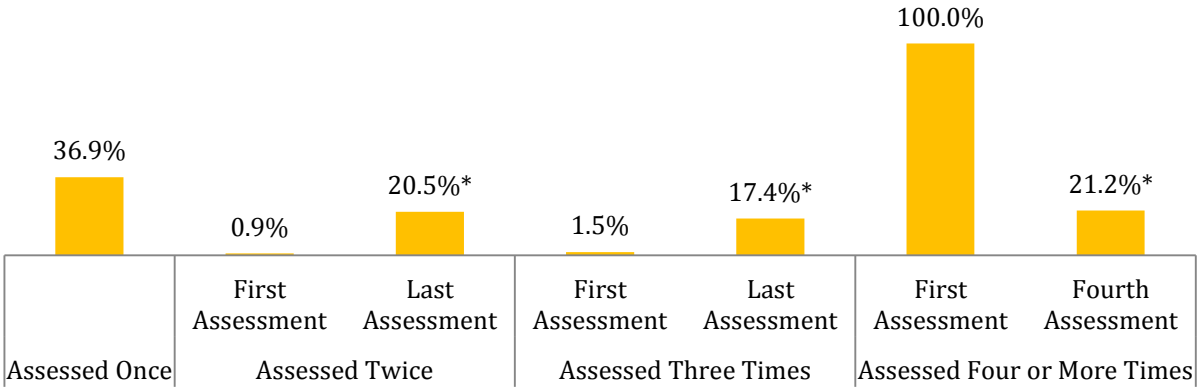


Exhibit 69: Proportion of CHF Beneficiaries who Avoid Salt; Change from First to Last Assessment, by Number of Assessments

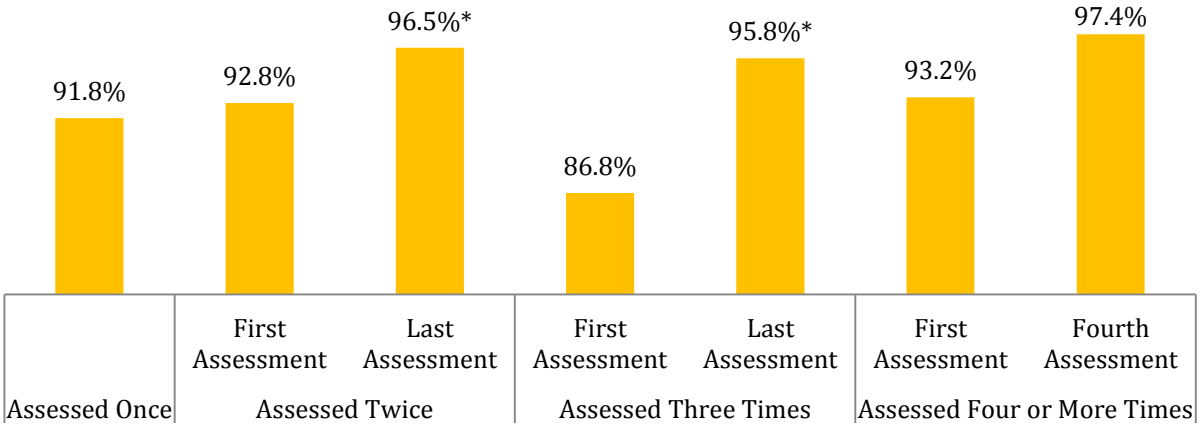
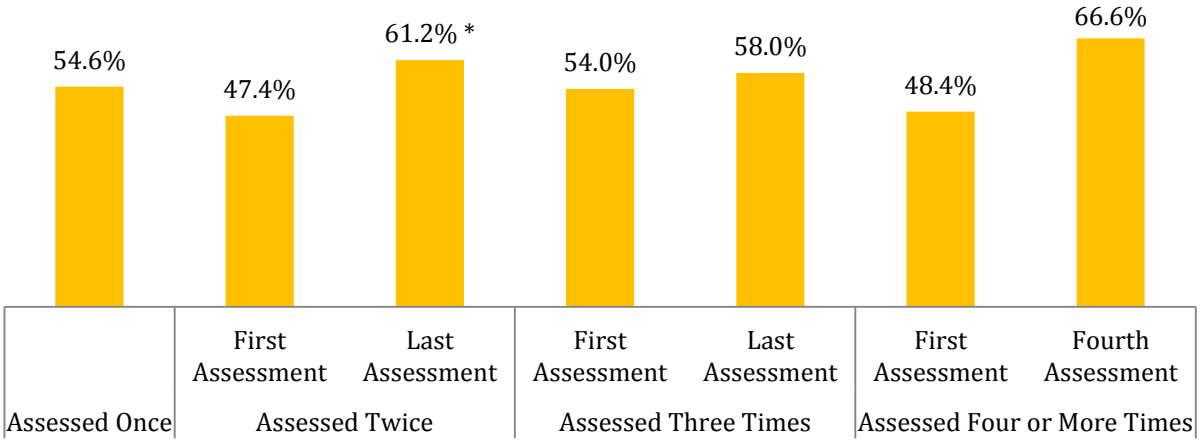


Exhibit 70: Proportion of CHF Beneficiaries Whose Blood Pressure was Within Acceptable Limits; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Summary of Clinical Outcomes for Beneficiaries with CHF

Participants with CHF in the intervention group demonstrated higher rates than the control group for annual LDL-C testing during all years of the program. The use of ACE-I/ARB and ASA/other platelet agents demonstrated a significant improvement in the intervention group, although some trends were not isolated in the intervention group and program period.

Self-reported assessment data indicated that among people with multiple assessments, there were increases in several indicators over time, including having a CHF action plan, being treated for depression, receiving a pneumonia vaccine, avoiding salt in their diet, knowing their blood pressure, and having their blood pressure within an acceptable range.

Clinical Outcomes for Beneficiaries with CAD/ADS

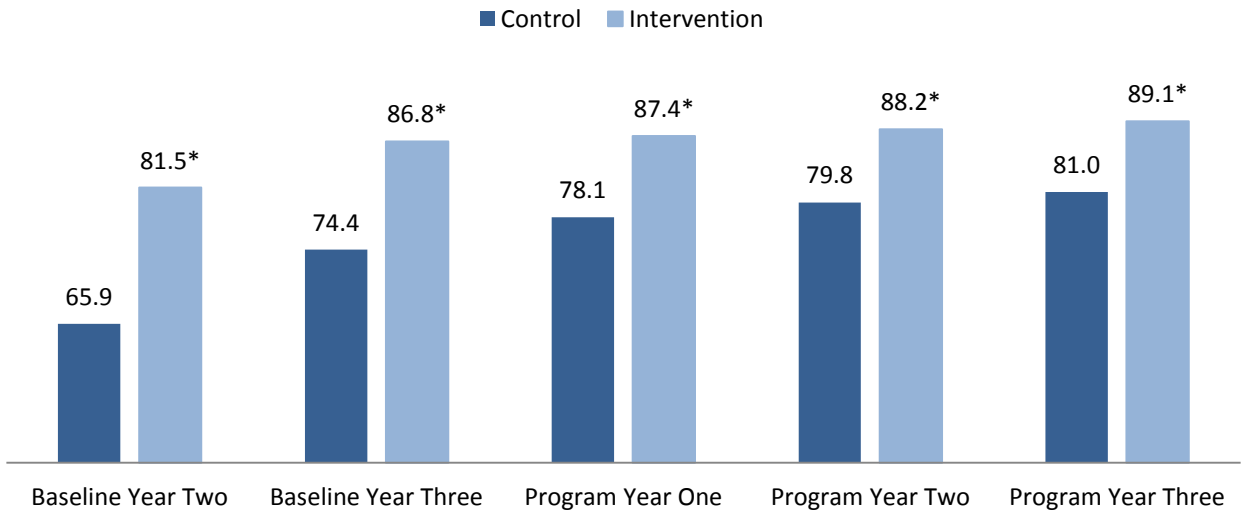
Clinical Background

Cardiovascular disease is the leading cause of death among adults in the U.S. Each year, approximately 920,000 people suffer from a myocardial infarction or other types of cardiac events resulting in 450,000 deaths.[22] These cardiac events heart episodes may cause functional disabilities and about half of all heart attack survivors experience a recurrent attack within the following 12 months.[35] The early diagnosis and treatment of these conditions and associated risk factors (e.g., diabetes) can reduce the risk for incident or recurrences of myocardial infarction and stroke. Among individuals with known CAD/ADS annual testing for lipids and tight control of LDL cholesterol (<70mg/dL) using cholesterol lowering medications (i.e., statins) have documented benefit on risk reduction for recurrence. Additionally, the use of pharmacologic agents to optimize cardiac function including beta-blockers and ACE-I (where not contraindicated) have demonstrated significant improvements in outcomes and risk reduction. Of all the diseases, the least amount of evidence exists for the effect of care management on CAD.

HEDIS Measure of Low Density Lipoprotein Cholesterol (LDL-C) Screening for People with Cardiovascular Conditions

This measure estimated the percent of individuals ages 22 and up with at least one cardiovascular condition (acute myocardial infarction, coronary bypass graft or percutaneous transluminal coronary angioplasty) that had an LDL-C blood test in the past year (Exhibit 71). Among the national Medicaid HMO population with at least one cardiovascular condition75.5% had an LDL-C blood test in 2006, 76.3% in 2007, 79.6% in 2008, 80.7% in 2009 and 82% in 2010.[22, 32, 33] National and the Medi-Cal programs include people age 18-75 years old in the measurement definition. The specific definition of the HEDIS measure is detailed in Appendix 1: Methodology.

Exhibit 71: HEDIS – LDL-C Screening Rates for Beneficiaries with Cardiovascular Conditions; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

LDL-C testing rates were significantly higher for the intervention group compared to the control group for each Baseline and Program Year (Exhibit 71). Moreover, rates appeared to increase in both groups between Baseline Year Two and the final Program Year (89.1% and 81.1% for intervention vs. control respectively).

Claims-Based Clinical Indices for Beneficiaries with CAD/ADS by Year, Intervention versus Control Group

The full results of claims based analysis for members with CAD/ADS are contained in Appendix 2, Table 36. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 37.

Provision of Clinical Services/Preventive Care

Rates of *flu vaccination* were low at baseline but did not differ significantly between the intervention and control groups (4.7% vs. 5.9%). Both groups demonstrated an increase in rates of flu shots with a significantly higher rate in the control versus the intervention group in Program Year Two (17.3% vs. 15.0%) and a downward trend in Program Year Three.

Annual rates of *LDL-C testing* were low in both the intervention and control groups compared to the HEDIS analyses. The variation in findings is due to the differences in the specifications for the samples, with HEDIS inclusive of health care utilization measures and medication use which narrow the individuals eligible to be included in the analyses. In the

claims only data, there is no adjustment for other services. Annual cholesterol testing rates in the intervention group exceeded those in the control group beginning at baseline (77.4% vs. 64.3%) and continuing through the end of Program Year Three (78.3% vs. 61.8%).

Medication Use

At baseline and throughout the Program Years the rate of *statin medication* use was significantly higher in the intervention than the control group (Exhibit 72). Both groups demonstrated an increase in medication use rates over the Baseline (47.3% vs. 37.5%) and Program Years. The highest rate of statin use among adults in the intervention group was achieved in Program Year Three (58.9% vs. 42.6%).

Use of an *ACE-Inhibitor or ARBs* was low at baseline, but increased over the course of the program for all adults. Individuals in the intervention group had persistently higher rates of treatment with an ACE-I or ARB compared to the control group throughout the Baseline (29.8% vs. 26.4%) and Program Years (Exhibit 73). Continuous use of these medications demonstrated a sustained increase through all Program Years, significantly higher for the intervention compared to the control group, peaking in Program Year Three (41.7% vs. 30.2%).

The use of *beta blockers* increased for both the intervention and control groups over the course of the program beginning at baseline (21.2% vs. 18.8%), with significantly higher levels of utilization in the intervention group (Exhibit 74). The highest levels of continuous beta blocker treatment were attained during Program Year Two and were higher for the intervention than the control group (31.7% vs. 24.5%).

Exhibit 72: Proportion of CAD/ADS Beneficiaries with Continuous Supply of Statin Medications; Intervention vs. Control by Year

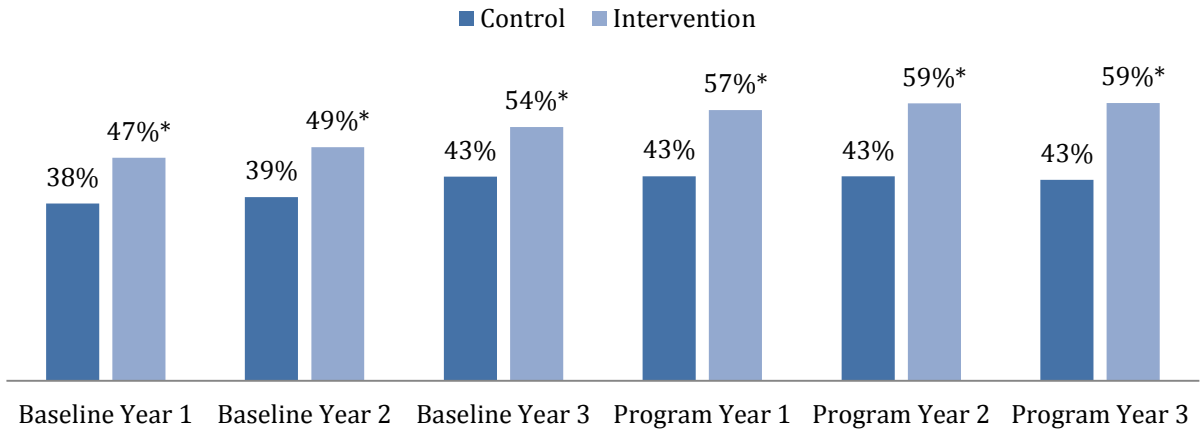


Exhibit 73: Proportion of CAD/ADS Beneficiaries with Continuous Supply of ACE-Inhibitor/ARB Medications; Intervention vs. Control by Year

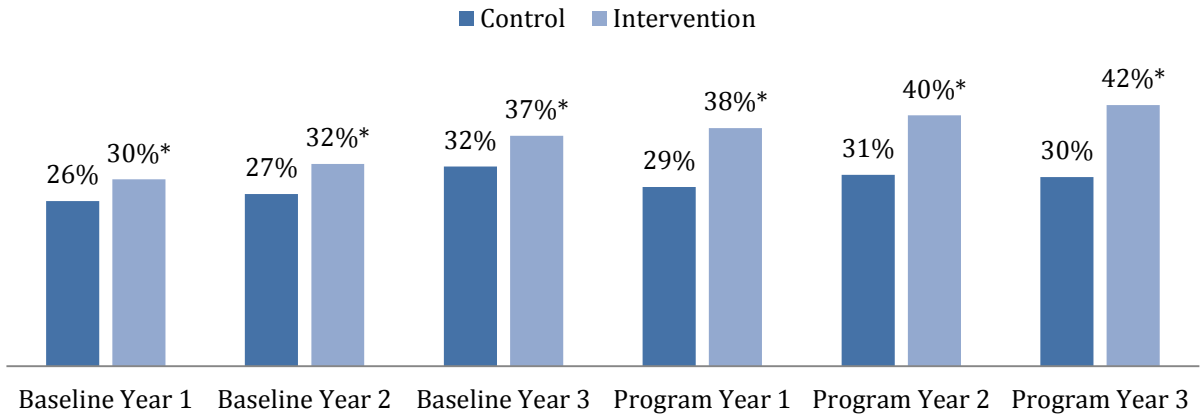
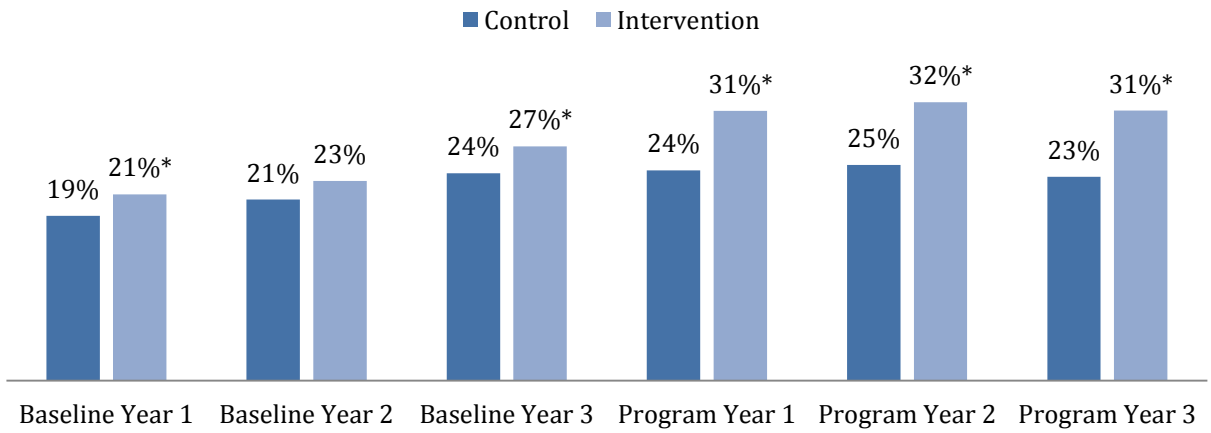


Exhibit 74: Proportion of CAD/ADS Beneficiaries with Continuous Supply of Beta Blocker Medications; Intervention vs. Control by Year



Source: UCLA analysis of 6 years Medi-Cal Claims and Eligibility data
Note: (*) Differences between groups within a year are statistically significant at the 5% level

Utilization of Health Care Services

The average numbers of *emergency department visits, hospitalizations*, and *outpatient doctor visits* were assessed using descriptive and multivariate methods in Chapter 2B. Health Services Expenditures and Utilization Outcomes (Exhibit 37, Exhibit 50 and Appendix 2, Table 15). Beneficiaries with CAD/ADS had a significant decline in inpatient days, and an increase in emergency department visits. No statistically significant changes in outpatient use were found relative to the baseline period and control group.

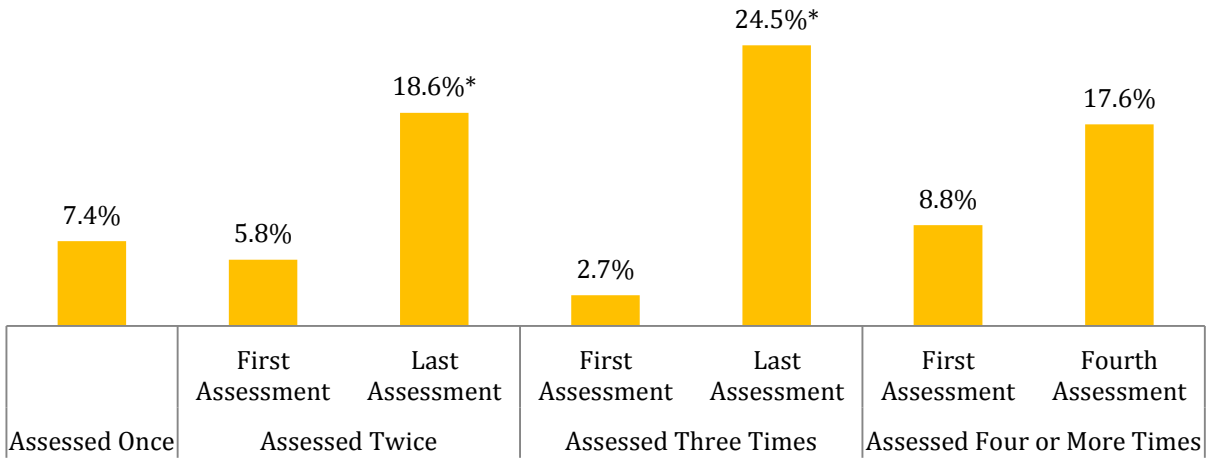
Assessment-Based Clinical Indices for Intervention Group Beneficiaries with CAD/ADS by Number of Assessments

The full results of assessment based analysis for members with CAD/ADS are contained in Appendix 2, Table 38 and Appendix 2, Table 39. Demographics of the individuals in each analytic subgroup can be found in Appendix 2, Table 40.

CAD/ADS Action Plan

Levels of reporting an *action plan for CAD/ADS* were low, but people with multiple assessments had an increase in the proportion reporting an action plan (Exhibit 75). At the time of their first assessment, between 2.7% and 8.8% of participants with CAD/ADS had an action plan. The prevalence of having an action plan increased by 12.8% for participants with two assessments, and by 21.8% for those with three assessments. There was no significant change for participants with four or more assessments.

Exhibit 75: Proportion of CAD/ADS Beneficiaries with a CAD/ADS Action Plan; Change from First to Last Assessment, by Number of Assessments



Source: UCLA analysis of MHS Assessment Data
Note: (*) Differences from first to last assessment within a cohort are statistically significant at the 5% level

Provision of Clinical Services/Preventive Care

At their first assessment from 42.6 to 63.2% of people reported ever being *treated for depression*. By the time of their last assessment people with three assessment s had a 10.9% absolute increase in the rate of treatment.

No changes in prevalence were observed for ever having a pneumonia shot.

Health Outcomes

No changes in prevalence were observed for the following measures: self-reported health status, obesity, functionally limited, days of work/school missed due to CAD/ADS and smoking cessation.

Summary of Clinical Outcomes for Beneficiaries with CAD/ADS

Participants in the intervention group demonstrated higher rates than the control group for annual LDL-C testing and statin use during all years of the program. The use of ACE-I/ARB and ASA or other platelet agents were significantly higher in the intervention group.

Interpretation of the assessment data was limited. Among people with multiple assessments there was a higher prevalence of having a CAD/ADS action plan, and some increase in depression treatment

Clinical Outcomes Summary

During the Program Years, we observed several favorable trends in the intervention group during the program period, which may be attributable to DMPP intervention. More detailed analysis using multivariate methods is needed to determine whether intervention exposure is directly related to improved clinical quality.

For many clinical services reviewed, concurrent and comparable changes were found among enrollees in both the intervention and control groups. While in some cases the intervention group was different than the control group, when these differences already existed at baseline they cannot be attributed to the program. Similarly, parallel and concurrent changes in the intervention and control groups is not evidence of intervention impact. The highlights of clinical outcomes findings are detailed as follows:

Provision of Clinical Services/Preventive care

- Assessment data indicated that the proportion of people with an action plan increased with each additional assessment, for beneficiaries in every condition group.
- Claims data did not indicate isolated improvement in flu vaccination rates in the intervention group for any condition. While claims data may not capture all flu vaccinations, which are likely to occur at public health clinics or other venues that do not generate claims data, this factor is expected to impact control and intervention groups equally and therefore does not account for the absence of improvement.
- The proportion of people with COPD who received a pneumonia shot based on self-reported data increased as the number of assessments increased. There was mixed evidence of improvement in pneumonia vaccination after multiple assessments for beneficiaries with CHF and diabetes, highlighting the limited reliability of self-reported data for vaccination receipt, particularly as the pneumonia vaccine is only recommended every five years and therefore prone to recall bias.
- Improvements in other clinical preventive services in the intervention group alone were found in specific instances, including increased use of peak flow meter and decreased use of daily rescue inhalers for beneficiaries with asthma, and avoidance of salt among those with CHF.

Medication Use

- Several measures of access to or use of condition-specific medications were found to show improvements in the intervention group during the program period. Specific examples include use of long acting beta-agonists and antibiotics for beneficiaries with COPD, continuous supply of ACE/ARB medications for those with CHF and

CAD/ADS, and improved access to continuous medication supply of beta blockers and statins for those with CAD/ADS.

- While some medications are recommended for individuals with specific conditions regardless of health status/disease progression, it is not necessarily possible to affirm appropriate medication use patterns in the absence of clinical or medical record data. Moreover, claims-based medication analysis is based on prescription filling records alone, and therefore is only a proxy for actual medication compliance.

Health Service Utilization

- Multivariate analysis of utilization was presented in Chapter 2B. Health Services Expenditures and Utilization Outcomes. After controlling for potential confounding factors, we identified sporadic changes in utilization of health services, with no clear pattern of change between or within diseases.
- Enrollees with CHF experienced significant decreases in utilization for more measures than individuals with other conditions, but the largest magnitude of change was the decrease in number of impatient days found among beneficiaries with CAD/ADS.

Health Outcomes

- People with multiple assessments appeared to obtain benefits from the program in some ways but not in others, or inconsistently based on the number of assessments.
- In general, enrollment in depression treatment increased over time for those with diabetes, CHF and CAD/ADS. Beneficiaries also more frequently knew their blood pressure (CHF) and reported improved blood pressure control (diabetes and CHF).
- No consistent patterns of improvement were seen over time in functional limitations, missing work/school, self-reported health status, overweigh/obesity, or several other measures.

Over the course of this program there appear to have been some secular changes that may have impacted the receipt of services, both positively as well as negatively. In some cases, we found improvements in both the intervention and control groups that persisted throughout the program, which may indicate ongoing patterns of general improvement in Medi-Cal external to DMPP.

The impact of recall bias and reliance on self-reported data is apparent. For example, large variation in member reported receipt of pneumonia vaccination raises concerns about the reliability of quality-related information provided by beneficiaries. The outcomes of the intervention are challenging to evaluate due to these data-reliability issues, as well as the small sample size for many of the measures due in part to incomplete data when the same items were not asked of individuals at subsequent assessments.

D. Satisfaction Outcomes

Data Sources

The patient and provider outcomes reported in this section are based on survey data collected by UCLA and MHS. MHS used a third party service to conduct a survey of a sample of engaged patients receiving DM intervention from nurses on their satisfaction with DM services. Individuals who were continuously engaged were surveyed more than once depending on the length of their enrollment.

UCLA conducted a follow-up survey of these patients surveyed by MHS, to gather further information on their overall quality of life as well as their satisfaction levels with their health care and health care providers in general. Individuals surveyed more than once by MHS were also surveyed more than once by UCLA.

MHS also conducted a survey of callers to the Nurse Advice Line, regardless of engagement in the program to gather information on satisfaction with the Nurse Advice Line services as well as the outcomes of the call.

MHS also conducted a survey of a number of physicians who provided care to the patients engaged in the DM program for two consecutive years. For each of the four survey types completed during DMPP, only a subset of those contacted for each survey chose to participate and are analyzed as respondents. The methodologies for each survey are described in more detail in Appendix 1: Methodology.

Characteristics of Survey Population

The demographic characteristics of the sample and the surveyed populations are depicted in Exhibit 76. The "sample frame" column illustrates the characteristics of the population selected for the survey and the "respondents" column illustrates the characteristics of the population that responded. Approximately 32% of the population ever engaged by MHS was targeted to be surveyed on their satisfaction with DM services received. Of those targeted for survey (2,269), 758 or 28.5% responded to the survey. The respondents are also differentiated by whether they were surveyed only once (85.46% or 647 out of 758) or multiple times (14.6% or 111 out of 758). Despite apparent differences in characteristics of single and multiple respondents to the MHS DM survey these differences were not statistically significant due to the small number of respondents in several groups.

About 10% of the population ever engaged by MHS was also surveyed by UCLA for a follow up survey to assess their satisfaction with care in general and their quality of life. Of these 751 individuals who were contacted by UCLA, 337 or 44.9% participated in the survey. The

great majority (95.5% or 322 out of 337) participated in the survey only once. As indicated above, apparent differences in characteristics of single and multiple respondents to the UCLA survey were not statistically significant due to the small number of respondents.

An estimated 19% of the population ever engaged by MHS made at least one call to the Nurse Advice Line. Of the 1,339 individuals who used the NAL and were eligible to be surveyed, 499 individuals responded to the survey: 379 were surveyed once, and 120 were surveyed more than once (73 surveyed twice and 47 surveyed three or more times).

Exhibit 76: Characteristics of the Surveyed Populations by Type of Survey

	McKesson Disease Management Survey			UCLA Quality of Life and Satisfaction with Health Care Survey			McKesson Nurse Advice Line Survey		
	Sample Frame	Respondents		Sample Frame	Respondents		Sample Frame	Respondents	
		Surveyed Once	Surveyed More than Once		Surveyed Once	Surveyed More than Once		Surveyed Once	Surveyed More than Once
Number of Respondents	2,269	647	111	751	322	15	1339	379	120
Percent of population ever engaged (N=7,189)	32%	9%	2%	10%	4%	0.2%	19%	5%	2%
Percent of population ever eligible who did not opt out (N=50,895)	4%	1%	0.22%	1%	1%	0.03%	3%	1%	0.24%
Demographics									
Female	64%	62%	68%	63%	61%	73%	65%	66%	69%
Age									
30 and under	1%	2%	*	2%	*	*	2%	1%	4%
31-45	8%	11%	*	11%	10%	*	11%	10%	12%
46-64	76%	79%	88%	80%	84%	67%	78%	82%	82%
65+	15%	8%	*	7%	4%	*	9%	7%	30%
Race/Ethnicity									
White Armenian	14%	1%	*	1%	*	-	6%	1%	-
White Other	23%	30%	33%	31%	35%	*	28%	29%	36%
Latino	28%	35%	20%	33%	26%	*	26%	31%	32%
African American	22%	27%	39%	28%	31%	*	30%	35%	28%
Asian/Pacific Islander	12%	6%	*	6%	5%	-	8%	4%	3%
Unknown	2%	1%	*	1%	*	-	1%	-	2%
Disabled eligibility status	86%	93%	96%	93%	98%	93%	91%	94%	96%
Health Status									
Chronic condition									
ADS/CAD	15%	10%	*	9%	8%	*	14%	14%	10%
Asthma	13%	15%	14%	15%	13%	*	14%	14%	23%
COPD	21%	24%	38%	26%	29%	*	23%	22%	21%

	McKesson Disease Management Survey			UCLA Quality of Life and Satisfaction with Health Care Survey			McKesson Nurse Advice Line Survey		
	Sample Frame	Respondents		Sample Frame	Respondents		Sample Frame	Respondents	
		Surveyed Once	Surveyed More than Once		Surveyed Once	Surveyed More than Once		Surveyed Once	Surveyed More than Once
Diabetes	22%	23%	*	19%	15%	*	22%	21%	23%
CHF	28%	28%	34%	30%	35%	*	27%	29%	23%
Has more than one of the above chronic conditions	39%	38%	56%	41%	43%	80%	36%	37%	41%
Risk level									
Level One	32%	32%	37%	33%	30%	*	34%	29%	35%
Level Two	42%	40%	36%	39%	38%	67%	38%	41%	32%
Level Three	26%	28%	27%	28%	32%	*	29%	29%	33%
Program Participation									
Avg. Number of months of engagement	12.3	12.9	20.5	14.0	15.2	17.9	8.8	10.3	11.8
Avg. Number of breaks in engagement	0.7	0.8	0.6	0.8	0.8	0.6	0.7	0.7	0.8
Number of nurse assessment calls to member	3.1	3.2	6.1	3.6	4.0	8.2	2.2	2.5	4.0
Number of nurse monitoring calls to member	4.0	4.3	8.6	5.0	5.5	13.8	3.2	3.5	6.3
Number of calls initiated by member	3.2	3.3	5.6	3.6	4.0	8.5	4.2	3.9	15.4

Source: UCLA analysis of Medi-Cal eligibility data and MHS and UCLA survey data.

Note: UCLA survey includes population surveyed by MHS in the first two years of program and up to July 2009.

* Denotes small sample size with less than 10 individuals.

McKesson Disease Management Survey Results

The findings from the MHS survey of satisfaction with the DM program are presented in Exhibit 77. The results in the column titled "total (duplicated, as reported by McKesson)" are those previously reported by MHS in various reports and include multiple responses per surveyed individual. The additional columns differentiate between the responses of participants who were surveyed once; the first and second responses of those who were surveyed twice; and the first, second, and third responses of those who were surveyed three or more times. The results include mean scores for each survey question. In addition, we grouped question on similar topics into overall ratings for specific content areas. Average scores for these combined categories of questions are also presented, and are indicated by bold type in Exhibit 77.

Among those surveyed once, the mean scores for all survey questions were at the upper range as is common in satisfaction surveys.[36] These satisfaction rates are based on members who, on average, were engaged for 12.9 months, received 3.2 nurse assessment calls, 4.3 nurse monitoring calls, and called in 3.3 times. The results are examined by topic and by specific questions. Examining the population who were surveyed twice revealed a statistically significant increase in the average score between the first and second survey in usefulness of the DM intervention (8.74 to 9.10) and receipt of information on self-care (96% to 98%). Examining specific questions revealed a statistically significant change in the average scores between the first and the second responses for the following questions: an increase in the proportion who reported receipt of information about nutrition and food (Q16: 54% to 69%), receipt of information about physical activity (Q18: 73% to 85%), overall rating of DM program on care coordination (8.65 to 9.36) and the positive impact of the DM program on helping patients to maintain regular testing and monitoring (Q43: 79% to 92%). Examining the population surveyed three or more times did not reveal a statistically significant change between the first and final survey in the average scores for any category of questions grouped by UCLA. However, a statistically significant increase in the mean score of individual questions on usefulness of the printed educational materials (Q3: 7.76 to 9.20) and rating of the improved control of medical conditions and symptoms due to DM services received (Q39: 8.57 to 9.36) was found. The limited number of outcomes for which there was significant change among those surveyed three or more times may be partially explained by the small number of individuals in this sample.

Overall, only six out of 49 unique measures of satisfaction were significantly improved among those surveyed twice or more often.

Exhibit 77: McKesson DMPP Survey Results

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Maximum number of respondents[2]	**896**	**646**	**88**				**23**		
Usefulness of DM intervention Response range 1: not useful to 10: very useful	-	**8.88**	**8.74**	**9.10**	✓	**8.38**	**8.87**	**9.00**	
Q3: How useful were the printed educational materials to help you deal with your condition?	8.59	8.60	8.00	8.95		7.76	8.90	9.20	✓
Q4: How useful was the information to help you talk to your doctor about your health issues?	8.82	8.80	8.71	9.10		8.57	8.57	8.77	
Q6: How useful were the telephone calls from the program's medical staff?	9.32	9.30	9.50	9.35		8.96	9.43	9.09	
Frequency of Patient-Centered DM Intervention Response range:1= Never; 2= Sometimes, 3= Usually, 4= Always	-	**3.74**	**3.75**	**3.77**		**3.71**	**3.75**	**3.68**	
Q7: During the past 6 months, how often did the program staff explain things in a way that you could understand?	3.73	3.72	3.74	3.83		3.57	3.78	3.78	
Q8: During the past 6 months, how often did the program staff listen carefully to you?	3.82	3.82	3.82	3.83		3.87	3.74	3.87	
Q9: During the past 6 months, how often did the program staff show that they were knowledgeable about your specific needs?	3.77	3.75	3.85	3.82		3.78	3.91	3.70	
Q10: During the past 6 months, how often did the program staff show concern for your comfort?	3.82	3.83	3.78	3.84		3.87	3.91	3.61	
Q11: During the past 6 months, how often did the program staff spend enough time with you?	3.82	3.81	3.84	3.84		3.77	3.91	3.78	

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Q12: During the past 6 months, how often was the program staff helpful as you thought they should be?	3.79	3.79	3.78	3.82		3.78	3.78	3.65	
Q13: During the past 6 months, how often did the DM program teach you something new that helped you better manage your health?	3.48	3.50	3.48	3.47		3.35	3.18	3.39	
Receipt of Information on Self-Care Q14, 16, 18, 20; Response: proportion responding yes	-	**77%**	**72%**	**81%**	✓	**74%**	**84%**	**83%**	
Usefulness of Information on Self-Care Q15, 17, 19, 21; Response: proportion responding yes	-	**98%**	**98%**	**98%**		**94%**	**96%**	**99%**	
Q14: During the past 6 months, did you receive information about understanding your condition better?	88%	88%	83%	90%		87%	87%	91%	
Q15: Was the information (refer to Q14) useful?	99%	99%	99%	100%		100%	100%	100%	
Q16: During the past 6 months, did you receive information about nutrition and the foods you eat?	67%	68%	54%	69%	✓	68%	83%	75%	
Q17: Was the information (refer to Q16) useful?	99%	99%	100%	100%		93%	95%	100%	
Q18: During the past 6 months, did you receive information about physical activities such as exercise and walking?	78%	77%	73%	85%	✓	65%	82%	81%	
Q19: Was the information (refer to Q18) useful?	96%	97%	97%	95%		87%	89%	94%	
Q20: During the past 6 months, did you receive information about how to live a healthier life?	80%	80%	79%	80%		74%	83%	82%	

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Q21: Was the information (refer to Q20) useful?	98%	98%	100%	99%		88%	100%	100%	
Rating specific aspects of the DM program Response range 1=Low to 10=High	-	**9.17**	**9.09**	**9.27**		**9.02**	**9.18**	**9.17**	
Q22: Rate the experiences you had with how easy it is to understand the information that is given to you	8.87	8.86	8.61	8.95		9.17	9.18	8.91	
Q23: Rate the experiences you had with how often information is given to you	8.78	8.78	8.51	8.96		8.78	8.78	8.96	
Q24: Rate the experiences you had with the information you receive about nutrition, physical activity (exercise) and how to live a healthier life	8.63	8.63	8.41	8.70		8.35	8.90	8.68	
Q25: Rate the experiences you had with the information to help you talk to your doctor about your health issues	9.02	9.03	8.86	9.07		9.04	9.32	8.61	
Q26: Rate your overall experience with the information and communication from your DM program	9.16	9.17	9.05	9.26		8.96	9.00	9.35	
Q27: Rate the experiences you had with the responsiveness, courtesy, and friendliness of the DM program staff	9.51	9.47	9.70	9.68		9.04	9.70	9.35	
Q28: Rate the experiences you had with the experience and knowledge of the medical staff at the DM program	9.38	9.40	9.28	9.38		9.00	9.26	9.39	
Q29: Rate the experiences you had with the program staff's concern for your comfort	9.46	9.46	9.31	9.55		9.26	9.30	9.61	
Q30: Rate the experiences you had with the amount of time the program staff spends with you	9.46	9.44	9.45	9.56		9.17	9.82	9.39	

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Q31: Rate the experiences you had with the program staff being sensitive to your specific needs	9.50	9.49	9.55	9.53		9.22	9.82	9.43	
Q32: Rate the experiences you had with the program staff's ability to get feedback from you about your condition	9.40	9.41	9.33	9.40		9.22	9.41	9.26	
Rating the Overall DM experience Response range 1=Low to 10=High	-	**8.91**	**8.70**	**8.95**		**8.94**	**8.96**	**9.42**	
Q33: Rate your overall experience with the DM program staff	9.42	9.43	9.41	9.34		9.27	9.09	9.83	
Q34: Rate your overall experience with how much the DM program keeps you involved in your health care management	9.24	9.25	8.94	9.27		9.22	9.52	9.78	
Q35: Thinking about all aspects of your DM program, how would you rate your experience overall	9.24	9.21	9.24	9.25		9.17	9.22	9.70	
Q36: How would you rate the DM program overall on coordination of your care	9.10	9.09	8.65	9.36	✓	9.24	9.48	9.14	
Q37: How would you rate the overall improvement in your health and your ability to take part in your daily activities, as a result of the services from the DM program	8.57	8.61	8.22	8.40		8.59	8.65	8.73	
Q38: How would you rate your ability to manage your condition by yourself, as a result of the services and education from the DM program	8.40	8.42	7.97	8.43		8.55	8.27	9.27	
Q39: How would you rate the improved control of your medical condition and symptoms, as a result of the services from the DM program	8.68	8.73	8.12	8.63		8.57	8.55	9.36	✓

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Q40: Based on your experiences, would you recommend the DM program to a friend or a family member with the same medical condition? Response range: 4= Definitely Would, 3= Probably Would, 2= Probably Would Not, 1= Definitely Would Not	**3.79**	**3.78**	**3.79**	**3.81**		**3.87**	**3.83**	**3.91**	
Impact of DM on individual's self care activities Response: proportion responding yes	**-**	**81%**	**77%**	**80%**		**78%**	**80%**	**84%**	
Q41: Does having the DM program available make you think more positively about your health coverage with Medi-Cal?	96%	95%	100%	99%		91%	100%	100%	
Q42: Has your DM program encouraged or helped you to maintain improving your diet?	85%	86%	78%	82%		91%	87%	87%	
Q43: Has your DM program encouraged or helped you to maintain regularly testing and monitoring?	89%	90%	79%	92%	✓	78%	87%	91%	
Q44: Has your DM program encouraged or helped you to maintain taking your medications as prescribed?	96%	97%	92%	95%		87%	91%	96%	
Q45: Has your DM program encouraged or helped you to maintain better stress management?	85%	86%	82%	84%		87%	83%	87%	
Q46: Has your DM program encouraged or helped you to maintain exercising regularly or increasing your physical activity?	86%	87%	80%	82%		83%	83%	91%	
Q47: Has your DM program encouraged or helped you to maintain quitting tobacco products?	55%	54%	54%	57%		57%	48%	65%	

	Total (duplicated, as reported by MHS)	Surveyed Once	Surveyed Twice		Statistically significant change in mean score[1]	Surveyed Three or More Times			Statistically significant change in mean score[1]
			1st Survey	2nd Survey		1st Survey	2nd Survey	3rd Survey	
Q48: Has your DM program encouraged or helped you to maintain annual check-ups with your doctor?	95%	95%	93%	97%		87%	87%	96%	
Q49: Has your DM program encouraged or helped you to maintain annual follow-ups, such as flu shots, pneumonia vaccinations, eye exams, etc.?	89%	89%	84%	88%		91%	96%	96%	
Q50: Has your DM program encouraged or helped you to maintain losing weight or improving your weight management?	80%	79%	79%	82%		87%	91%	83%	
Q51: Has your DM program encouraged or helped you to maintain increasing your interest in improving your lifestyle?	90%	90%	85%	90%		87%	96%	91%	
Q52: Has your DM program encouraged or helped you to maintain any other lifestyle changes?	20%	20%	17%	17%		13%	13%	22%	
Demographics									
Q55: Education (1= Did not finish HS, 2= HS grad or GED, 3= Some college/2-year degree, 4= 4-year college degree, 5= More than college degree)	2.00	2.04	2.00	2.02		1.65	1.74	1.65	
Q56: Hispanic/Latino (1=Yes, 0=No)	34%	36%	28%	33%		30%	39%	22%	

Source: UCLA analysis of MHS survey data.

[1] Change in mean score from first survey to last survey is statistically significant ($p<.05$).

[2] The number of respondents per question varies.

UCLA Quality of Life and Satisfaction with Health Care Survey Results

The UCLA survey assessed overall quality of life, as well as member's satisfaction with health care and providers. The UCLA survey includes responses for individuals who had been first surveyed by MHS on their satisfaction with care up to July 2009 (see Appendix 1: Methodology for more information on UCLA's sample). The results of our survey are presented in Exhibit 78. Among those who were surveyed just once, 26% reported being in good to excellent health, had an average of 16 unhealthy days per month, and 16.6 activity limitations days. On average, those surveyed once also reported fair health status, 16.8 days per month when physical health was not good, and 15.2 days when mental health was not good. Satisfaction with personal doctor (8.2), specialist (8.5), Medi-Cal (7.9) and overall health care in the past six months (8.1) was relatively high (on a one to ten scale).

Among those who were surveyed more than once, the average days of activity limitation declined significantly from 21 to 9.1 from the first to the second survey. Looking at individual indicators of quality of life, a significant decline in average number of days when mental health was not good (20.3 to 10.1) was also observed from the first to the second survey. Satisfaction with health care and providers did not differ statistically for those surveyed more than once.

Overall, two out of four measures of quality of life and zero out of four measures of satisfaction with health care and providers were significantly improved among those surveyed twice.

Exhibit 78: UCLA Quality of Life and Satisfaction with Health Care Survey Results

	Surveyed Once	Surveyed More than Once		
		1st Survey	2nd Survey	Statistically significant change in mean score[1]
Maximum number of respondents[2]	321	15		
Health Related Quality of Life- Healthy Days Index				
% Good-to-Excellent Health	26%	20%	20%	
Mean Unhealthy Days (Physical or Mental Health)	16.0	18.1	11.4	
Mean Activity Limitation Days (Physical or Mental Health)[3]	16.6	21.0	9.1	✓
Quality of Life				
Q1. General Health Status Response range: 1=poor, 2=fair, 3=good, 4=very good, 5=excellent	2.0	1.8	2.0	
Q2. Days in past 30 when physical health was not good	16.8	16.5	15.7	
Q3. Days in past 30 when mental health was not good	15.2	20.3	10.1	✓
Q4. Days in past 30 when physical or mental health restricted activities	16.6	21.0	9.1	✓
Satisfaction with Health Care and Providers Response range 1=Low to 10=High				
Q5. Personal doctor rating	8.2	8.2	9.2	
Q6. Specialist rating	8.5	8.5	8.8	
Q7. Health Plan (Medi-Cal) rating	7.9	7.9	8.2	
Q8. Overall health care rating for previous 6 months	8.1	8.9	8.8	

Source: UCLA analysis UCLA survey data.
[1] Change in mean score from first survey to last survey is statistically significant ($p<.05$).
[2] The number of respondents per question varies.
[3] Same as Q4.

McKesson Nurse Advice Line Satisfaction Survey Results

UCLA's analysis of the responses to the MHS's survey of Nurse Advice Line callers is displayed in Exhibit 79. These results are not distinguished by the number of times individuals are surveyed because the goal of this analysis is not to assess changes in individuals' responses due to a specific intervention or over time. In addition, the reason for each call, even by the same person, is likely to be different.

Overall satisfaction with the Nurse Advice Line callers was 4.7 (with five being highly satisfied), with the scores to individual questions ranging from 4.65 to 4.83. Of the 772 callers, most (79%) followed the nurse's recommendation, but 21% responded that they did not. The reasons for not following the recommendations were diverse, with 14% citing that they felt they were not as sick as the nurse believed and 8% reporting not being able to contact their physician. Among the 46% of all respondents with a nurse's recommendation to call a provider, 10% did not speak with the provider, but most had some direct communication with a provider. Among those who did not follow the nurse's recommendation, 49% engaged in self-care and another 18% engaged in self-care and sought further care from their provider.

Overall, 26% reported not having resolved their condition after calling the Nurse Advice Line, with 52% still trying to resolve their condition. Still, 98% of the respondents felt that the nurse's recommendation was appropriate, with 28% reporting easy access to the nurses 24 hours a day as the most liked feature of this service. Of the small proportion of respondents (89 out of 772) who work for pay or go to school, 42% reported that the Nurse Advice Line helped them avoid missing work or school and 52% of those reported having avoided a loss of a full day or fewer hours of work.

In general, the nurse advice line achieved a number of desired outcomes for those who used it by diverting patients to their primary care providers and encouraging self-care.

Exhibit 79: McKesson Nurse Advice Line Satisfaction Survey Results

	Number of Respondents	Mean Score/Proportion
Maximum number of respondents [1]	**772**	
Satisfaction with the Nurse Advise Line Response range: 1=Very Dissatisfied to 5=Very Satisfied (Aggregate analysis of Q2 through Q5)	772	**4.70**
Q2: How would you rate your overall satisfaction with the Nurse Advise Line?		4.65
Q3: How would you rate your satisfaction with the nurse's medical knowledge?		4.66
Q4: How would you rate your satisfaction with how well the nurse understood your medical condition?		4.67
Q5: How would you rate your comfort level in speaking with the nurse?		4.69
Q6: How likely are you to use the service again? Response range: 1= Definitely Would Not to 5= Definitely Would	772	**4.83**
Q7: Does having a nurse advice service available through your health insurance plan make you think more positively about Medi-Cal? Response: proportion responding yes		
Q8: Did you decide to follow nurse recommendation?	772	
Yes, nurse recommended calling provider		46%
Yes, nurse recommended other		54%
No		21%
Reason for not following recommendation	163	
Didn't want to call provider		7%
No, Wanted second opinion		8%
No, Didn't have time to follow recommendation		7%
No, Couldn't contact physician		8%
No, Felt patient wasn't as sick as nurse believed		14%
No, other reason		57%
Q9: If nurse recommended calling provider, what happened when you called the doctor's office?	280	
Saw medical provider		38%
Spoke with a medical provider		27%
Called but did not speak with a medical provider		10%
Medical provider recommended go to emergency room or ER		8%
Spoke with a medical provider and doctor called in prescription		7%
Other		9%

	Number of Respondents	Mean Score/Proportion
Q10: if you did not follow nurse recommendation, what did you do to obtain care after speaking with the nurse?	**149**	
Saw medical provider or spoke with one		25%
Went to emergency room or hospital or urgent care center		10%
Took care of condition at home/used self-care		49%
Took care of condition at home and sought further care with doctor		18%
Other		16%
Q11: Did your actions (following or not following nurse recommendation) resolve your medical condition?	761	
Yes		67%
No		26%
Unsure		7%
Q12: If your actions did not resolve your condition, what did you do to resolve your condition?	197	
Saw a medical provider or spoke with one		11%
Went to emergency room or hospital		9%
Self-care/home care		10%
Still resolving medical condition (drugs, tests, seeing another provider)		52%
Other		13%
Q13: Do you feel the nurse's recommendation was appropriate?	759	
Yes		98%
No		2%
Q14: Why did you feel the nurse's recommendation was not appropriate?	16	Not sufficient data
Q15: What did you like most about this service?	753	
Nurse (demeanor, understanding, ability)		51%
Easy access to the nurses 24 hours a day		28%
Information sent after the call		2%
Nothing was good (dissatisfied with service)		
Nothing in particular (entire service was good)		9%
Other		9%

	Number of Respondents	Mean Score/Proportion
Q16: Do you have any suggestions for improving our service?	742	
Nurses should be more knowledgeable/clear		2%
No suggestions (service is good)		83%
Other		14%
Q17: From what source did you obtain our telephone number?	770	
Brochure on nurse advice service		20%
Health Plan Customer Service/on hold messaging		6%
Health Plan Communication		14%
Magnet		9%
Postcard		2%
Wallet card for nurse advice service/Sticker		2%
Member ID card		9%
Other		23%
Unsure		16%
Q19: If you work for pay or go to school, did calling the nurse advice line help you avoid missing work/school while resolving your health problem?	89	
Yes		42%
No		58%
Q20: Approximately how much time from work or school do you think you would have missed trying to resolve your most recent medical problem?	33	
A full day or less		52%
More than one day		48%

Source: UCLA analysis of MHS survey data.
[1] The number of respondents per question varies

McKesson Provider Satisfaction Survey Results

The results of MHS surveys of selected providers are displayed in Exhibit 80. The providers' responses to various questions did not vary statistically between 2009 and 2010. In general, most providers rated the usefulness of the program highly. For example, providers reported that the DM program was useful to their practice (3.74 and 3.64) and to their patients (3.83 and 3.78) in 2009 and 2010 respectively (on a one to five scale).

Exhibit 80: McKesson Provider Satisfaction Survey Results, 2009 and 2010

	2009	2010	Statistically significant change in mean score[2]
Maximum number of respondents[1]	94	87	
I am familiar with the features and goals of the Medi-Cal CareEnhance Disease Management Pilot Program	-	3.28	
Usefulness of DM program Response Range: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree			
I believe the Disease Management Program is useful to me and my practice	3.74	3.64	
I believe the Disease Management Program is useful to my patients	3.83	3.78	
I believe the Disease Management Program materials that included clinical alerts, national guidelines, patient rosters and assessment reports are useful to me and my practice	3.91	3.94	
I believe the McKesson staff that provides the Disease Management Program is helpful and knowledgeable about the conditions	3.82	3.70	
I believe that the Disease Management Program participation improves patient compliance with my recommendations	3.78	3.79	
I would recommend that eligible patients with Asthma, Diabetes, COPD, Coronary Artery Disease and/or Congestive Heart Failure participate in the Disease Management program	3.89	3.85	
I believe that patient participation in the Medi-Cal CareEnhance Disease Management Pilot Program encourages more appropriate use of services.	-	3.78	
I believe that patient participation in the Medi-Cal CareEnhance Disease Management Pilot Program improves patient health status relative to their chronic condition(s).	-	3.80	

	2009	2010	Statistically significant change in mean score[2]
Has suggestions for improvement of DM program			
Response Range: 1=Yes, 0=No			
I have suggestions for how to improve the Disease Management Program and/or program materials.	15%	13%	
A McKesson and/or Medi-Cal representative may contact me to discuss my suggestions and comments entered above.	11%	9%	
Satisfaction with DM program administration			
Response Range: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree			
I am satisfied overall with the Medi-Cal CareEnhance Disease Management Pilot Program administered by McKesson	-	3.66	

Source: UCLA analysis of MHS survey data.

[1] The number of respondents per question varies.

[2] Change in mean score from first survey to last survey is statistically significant ($p<.05$). Individual identifiers were not available to identify how many providers were surveyed in both years. Test of differences assumes overlap.

Satisfaction Outcomes Summary

Member quality of life, and satisfaction with the DM program, health care in general, and the nurse advice line were generally high, as is consistent with results of satisfaction surveys in various settings in the literature.

The data on satisfaction with DM services, health care in general, and quality of life are subject to several limitations, including self-selection of program participants into the DM program, willingness to participate in MHS and UCLA surveys, and loss of MHS survey respondents to follow up by UCLA, among others. In addition, small sample sizes may have reduced the ability to detect significant differences between groups.

Highlights of the significant findings in the multiple satisfactions surveys are detailed as follows:

Satisfaction with DM program

- DM program participants surveyed twice reported an increase in their satisfaction score of the usefulness of the DM intervention and receipt of information self-care in general. Among those satisfied with the receipt of information on self-care, satisfaction was higher after one year with information on nutrition and food and physical activity.
- DM program participants surveyed twice also reported an increased rating of the DM program on care coordination and positive impact on helping patients maintain regular testing and monitoring.
- DM program participants surveyed three times or more also reported an increase in usefulness of the printed educational materials and rating of the improved control of medical conditions and symptoms due to DM services received.
- Overall, only six out of 49 unique measures of satisfaction were significantly improved among those surveyed twice or more often.

Quality of Life and Satisfaction with General Health Care

- Among those surveyed more than once, respondents reported a decline in the number of days when mental health was not good as well as a decline in average number of days when physical or mental health restricted activities.
- Overall, two out of four measures of quality of life and zero out of four measures of satisfaction with health care and providers were significantly improved among those surveyed twice.

Nurse Advice Line Satisfaction

- Overall satisfaction with the Nurse Advice Line was high and the 79% followed

nurse's recommendation.

- Of the 21% who did not follow the nurse's recommendation, 49% engaged in self-care.
- Of the 46% with a nurse's recommendation to call a provider, the majority succeeded in doing so.
- The majority of respondents reported having resolved their condition after calling the Nurse Advice Line, but 26% did not resolve it.
- Easy access to nurses 24 hours a day was the most like feature of this service for 28% of respondents.

Provider Satisfaction

- Among the providers surveyed, the usefulness of the program was rated highly but no differences in ratings between 2009 and 2010 were observed.

E. Financial Outcomes

Methodology

The methodology for calculating cost savings was negotiated by MHS, DHCS, and UCLA, and is described in detail below. Details regarding the process of methodology development can be found in Appendix 1: Methodology.

Reconciliation Periods

Cost savings calculations for the Disease Management Pilot Program were carried out on an interim basis throughout the program period. This report presents the findings of the final reconciliation period, which includes all 36 months of program operations.

Data Source and Preparation

Each reconciliation period used claims and eligibility data from both the baseline and program periods and the intervention and control groups. Paid claims data for each reconciliation period are limited by dates of service. In order to account for delayed submission and processing of claims, a claims run-out period was allowed. Claims run-out is the difference between the date of service and the date of claim payment for each individual claim. A maximum of seven months of run-out was allowed for the reconciliation calculation, where claims paid more than seven months after the date of service are excluded from the analysis (as displayed in Figure 1). In addition, a three-month claims lag period is inherent in all Medi-Cal claims data, such that data become available approximately three months after the claim is paid. Equal duration of claims run-out and claims lag is used in all reconciliation periods to support comparable data completeness between baseline and program periods.

Sub-Group Analysis

The cost savings calculation is generated in stratified groupings by disease condition and county. Due to sample size concerns, enrollee samples for Atherosclerotic Disease Syndrome (ADS) and Coronary Artery Disease (CAD) are combined, resulting in stratification by five disease groups and two counties, for a total of ten analytic subgroups.[iv]

[iv] The sample size in Alameda County's ADS group is 82 in the baseline period. This is below the sample size requirement for the analysis, and is associated with a statistically insignificant regression line slope. Los Angeles County's ADS group is also associated with a statistically insignificant regression line slope, although the sample size in this county is acceptable according to evaluation clarification documentation. Due to highly

Mathematical Methodology

The mathematical methodology for cost savings calculation is presented in Equations 1 through 5. The methodology corrects both the intercept and slope of the regression line of expenditures in the control group to be the same as those in the intervention group over the 30-month baseline period (March 2005 to August 2007), and extends these regression lines into the program period. To calculate cost savings, a *ratio* or *proportional adjustment* factor is used. This method takes the ratio of the baseline PMPM estimate from the intervention group to that of the control group as the adjustment index:

$$\hat{y}_{adj} = \frac{\hat{y}_I}{\hat{y}_C} = \frac{\beta_{I_0} + \beta_{I_1} t}{\beta_{C_0} + \beta_{C_1} t} \quad (1)$$

Where:
$\hat{y}$ = PMPM cost estimate;
I = intervention group;
C = control group;
β = regression coefficient of PMPM cost estimate on time, in the baseline period; and,
t = time by month.

In the baseline period, the adjusted control group PMPM cost is calculated as follows:

$$y_{C_{adj}} = y_{C_{obs}} * \hat{y}_{adj} = y_{C_{obs}} * \frac{\hat{y}_I}{\hat{y}_C} = (\hat{y}_C + \gamma) * \frac{\hat{y}_I}{\hat{y}_C} = \hat{y}_I + \frac{\hat{y}_I}{\hat{y}_C}\gamma$$

$$= \hat{y}_I + \gamma' = \beta_{I_0} + \beta_{I_1} t + \gamma'$$

$$\Rightarrow \hat{y}_{C_{adj}} = \beta_{I_0} + \beta_{I_1} t = \hat{y}_I \quad (2)$$

Where:

γ = the residual that is normally distributed with mean 0 and variance σ^2.

To extend the ratio adjustment to the program period, the ratio of the projected estimate between intervention and control regression lines is used. The adjusted post period control PMPM is:

$$y_{C_{adj_{post}}} = y_{C_{obs_{post}}} * \frac{\hat{y}_{\mathrm{I}_{\mathrm{projected}}}}{\hat{y}_{\mathrm{C}_{\mathrm{projected}}}} \quad (3)$$

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related disease management strategy employed by MHS for the ADS and CAD disease groups, these groups are logically suitable to combine.

And the PMPM savings in each month are:

$$\Delta PMPM = y_{C_{adj_{post}}} - y_{I_{obs_{post}}} = y_{C_{obs_{post}}} * \frac{\hat{y}_{\mathrm{I}_{\mathrm{projected}}}}{\hat{y}_{\mathrm{C}_{\mathrm{projected}}}} - y_{I_{obs_{post}}} \quad (4)$$

Finally, to calculate final overall program savings, monthly savings are added over each intervention area (county) and disease group for the full 36-month study period, and DM fees are subtracted:

$$Total\ Savings = \sum_{\mathrm{i}=1}^{2} \sum_{\mathrm{j}=1}^{5} \sum_{\mathrm{k}=1}^{36} \Delta PMPM_{\mathrm{ijk}} * MM_{\mathrm{ijk}} - total\ DM\ fees \quad (5)$$

Where:
i = intervention area (county);
j = disease group;
k = program months; and,
MM = number of member months.

This method produces a total dollar estimate of the savings of the program, which represents the difference between actual costs incurred by Medi-Cal for program beneficiaries and the projected costs that would have been incurred had the program not been implemented.

Exclusion of Population in Aid Codes 14, 24, and 64

During final cost savings analysis, we identified a data anomaly that originated with the construction of claims and eligibility data for the control group. The three additional Medi-Cal Aid Codes which were added to the DMPP beneficiary population in June of 2009 (14, 24 and 64) were first included in DMPP data in July 2009. However, while these new Aid Code categories were added to the intervention population, the corresponding Aid Codes was not included in the control group. This anomaly created systematic differences in the characteristics of the control and intervention populations. Individuals in the new Aid Code categories had significantly lower average health care costs (approximately $300 less per member per month) than those eligible for the program within the original Aid Codes. Therefore, the addition of these members to the intervention group without a corresponding addition to the control group resulted in a false inflation of program savings, by reducing the average per member per month expenditures in the intervention group alone.

In response to this data anomaly, the cost savings calculation presented in this memo excludes individuals in the new Aid Code categories (14, 24 and 64), and focuses only on the population within the original program eligibility Aid Codes for which a comparable control group is available. Member months and claims contributed by individuals within the new Aid Code categories are excluded from the analysis. In addition, total vendor fees are proportionally adjusted for the original Aid Code population, based on the proportion of total program member months that were accrued by individuals in the original Aid Codes.

We conducted an independent cost savings analysis for the segment of the DMPP population in the new Aid Codes, which were added to the program in the final Program Year. This analysis, following the same methodology as the overall program savings analysis, indicated that MHS did not achieve savings for this subgroup. During the 12 months of intervention for this subgroup, DMPP resulted in a loss of $991,674 ($9.53 per member per month) after accounting for fees paid to the vendor. A detailed table displaying the cost savings finding for the population in the new Aid Codes can be found in Appendix 2, Table 41.

Total Projected Expenditures and Total Gross Savings

Total projected expenditures are calculated based on the regression methodology discussed above. The majority of projected expenditures were in the LA region, and COPD was projected to be the highest-cost condition (Exhibit 81).

Exhibit 81: Total Projected Medi-Cal Expenditures by Intervention Area and Condition, 36-Month Pilot Program

Disease	Total Projected Expenditures: 36 Months		
	Los Angeles	Alameda	All
Asthma	$74,461,044	$26,644,380	$101,105,424
CAD & ADS	$160,249,937	$11,291,763	$171,541,699
CHF	$115,488,820	$36,690,355	$152,179,175
COPD	$139,439,915	$38,390,663	$177,830,578
Diabetes	$127,850,467	$38,118,808	$165,969,275
Total	**$617,490,183**	**$151,135,968**	**$768,626,151**

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.
Notes:
(1) "Projected Expenditures" are adjusted control group expenditures in the post period. This represents the projection of expenditures that would have occurred within the intervention population in the absence of the pilot program.
(2) This finding is for the fifteen original Aid Codes only due to a data error identified for Aid Codes 14, 24 and 64 in the control group.

Exhibit 82: Total Gross Savings by Intervention Area and Condition, 36-Month Pilot Program

Disease	Total Savings: 36 Months		
	Los Angeles	Alameda	All
Asthma	$2,635,607	$2,481,140	$5,116,747
CAD & ADS	$5,389,279	-$3,722,173	$1,667,105
CHF	$12,380,083	$4,794,806	$17,174,889
COPD	$8,935,054	$5,220,299	$14,155,354
Diabetes	$2,166,020	$1,294,589	$3,460,609
Total	$31,506,043	$10,068,661	**$41,574,704**

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.
Notes:
(1) Savings estimate is calculated using agreed-upon methodology, and represents "projected expenditures" less actual intervention group expenditures. Estimate is cumulative over 36 months.
(2) This finding is for the fifteen original Aid Codes only due to a data error identified for Aid Codes 14, 24 and 64 in the control group.
(3) Fees paid to the vendor are not deducted from this estimate of "total savings".
(4) Calculation uses 7-month claims run out and 3-month claims lag period in both baseline and project periods.

Total and Adjusted Vendor Fees

Based on MHS' and DHCS records, a total of $10,958,751 program fees were paid to MHS during the course of program operations (Exhibit 83). These total vendor fees were adjusted for the purpose of the cost neutrality calculation, to account for fees related to the original Aid Codes only. The results of our proportional adjustment are displayed in Exhibit 84.

Exhibit 83: Total Vendor Fees by Year, 36-Month Pilot Program

					UCLA Analysis of Total Disease-Specific Fees			
Total Invoiced Fees	**PY1 Subtotal**	**PY2 Subtotal**	**PY3 Subtotal**	**PY1 - PY3 Total**	**% of billings per disease**	**Proportional distribution of non-disease specific billings/credits**	**Adjusted PY1-PY3 disease-specific fees with credits proportionally distributed across disease groups**	
Asthma	$ 528,483	$ 545,559	$ 565,566	$ 1,639,609	15%	$ (14,103)	$ 1,625,505	
CAD	$ 755,352	$ 674,762	$ 938,609	$ 2,368,724	21%	$ (20,375)	$ 2,348,348	$ 2,597,590
ADS	$ 82,064	$ 66,515	$ 102,825	$ 251,404	2%	$ (2,163)	$ 249,241	
CHF	$ 448,613	$ 365,145	$ 431,519	$ 1,245,278	11%	$ (10,712)	$ 1,234,566	
COPD	$ 664,794	$ 588,732	$ 610,529	$ 1,864,056	17%	$ (16,034)	$ 1,848,022	
Diabetes	$ 1,094,120	$ 1,133,133	$ 1,457,510	$ 3,684,763	33%	$ (31,695)	$ 3,653,068	
Subsequent Billings/Credits (invoices not condition-specific)	$ 30,888	$ -	$ (125,970)	$ (95,082)				
Total	**$ 3,604,314**	**$ 3,373,847**	**$ 3,980,590**	**$ 10,958,751**			**$ 10,958,751**	
Remaining Balance	**$ 8,395,686**	**$ 5,021,839**	**$ 1,041,250**				**$ 1,041,250**	

Source: UCLA analysis of 3 years Medi-Cal eligibility data and MHS fees invoices.

Notes:

(1) Fees as reported by MHS on July 19, 2011.

(2) UCLA analysis proportionally distributes billings/credits that are not disease-specific between diseases, based on proportion of total billings per disease.

(3) Fees for ADS & CAD are summed for the purposes of the cost neutrality calculation

Exhibit 84: Vendor Fees Proportionally Adjusted for Original Program Aid Codes Only

Disease	36-Month Vendor Fees Total	Member Months, Original Aid Codes Only	Member Months, All Aid Codes	Proportional Adjustment for Original Aid Codes Only	Adjusted Vendor Fees for Original Aid Codes Only
Asthma	$1,625,505	143,169	151,102	94.75%	$1,540,165
CAD & ADS	$2,597,590	209,589	241,219	86.89%	$2,256,979
CHF	$1,234,566	101,958	111,330	91.58%	$1,130,638
COPD	$1,848,022	154,884	163,840	94.53%	$1,747,003
Diabetes	$3,653,068	246,384	292,591	84.21%	$3,076,162
Program Total	**$10,958,751**	**855,984**	**960,082**	**89.16%**	**$9,770,535**

Source: UCLA analysis of 3 years Medi-Cal eligibility data and MHS fees invoices.
Notes:
(1) Vendor fees are proportionally adjusted according to the decrease in member months associated with exclusion of individuals with Aid Codes 14, 24, and 64 from the analysis.
(2) This adjustment is necessary due to a data error identified for individuals within Aid Codes 14, 24, and 64 in the control group.

Final Net Savings and Return on Investment

Given the methodology described above, our calculations indicate a net savings of **$31,804,168** over the total 36-month study period for the population eligible for the program within the original Aid Codes designated by Medi-Cal, after accounting for fees paid to the vendor (Exhibit 85). This constitutes a net return on investment (ROI) of approximately 3.26, with an average savings of $37.16 per member per month. Savings are found in all conditions with the exception of CAD/ADS. The largest savings are among beneficiaries with CHF.

Exhibit 85: Summary of Final 36-Month Program Savings, Financial Reconciliation Methodology

	Total Savings	**Vendor Fees & Net Savings**		**Per Member Savings**				**Return on Investment**	
	Total 36-Month Savings	36-Month Vendor Fees Adjusted for Original Aid Codes	**Net 36-Month Savings**	Members	Member Months	Average Net Savings per Member, 36 months	Average Net Savings per Member per Month (PMPM)	36-Month Gross Return on Investment (Gross ROI)	36-Month Net Return on Investment (Net ROI)
Program Total (36 Months)	**$41,574,704**	**$9,770,535**	**$31,804,168**	**45,016**	**855,984**	**$706.51**	**$37.16**	**4.26**	**3.26**
Asthma (36 Months)	$5,116,747	$1,540,165	**$3,576,582**	7,256	143,169	$492.91	$24.98	3.32	2.32
CAD & ADS (36 Months)	$1,667,105	$2,256,979	**-$589,874**	10,767	209,589	-$54.79	-$2.81	0.74	(0.26)
CHF (36 Months)	$17,174,889	$1,130,638	**$16,044,251**	5,394	101,958	$2,974.46	$157.36	15.19	14.19
COPD (36 Months)	$14,155,354	$1,747,003	**$12,408,351**	7,801	154,884	$1,590.61	$80.11	8.10	7.10
Diabetes (36 Months)	$3,460,609	$3,076,162	**$384,447**	13,798	246,384	$27.86	$1.56	1.12	0.12

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data and MHS fees invoices.

Notes:

(1) Estimates are presented for the program as a whole, as well as each disease group individually.

(2) This finding is for the fifteen original Aid Codes only due to a data error identified for Aid Codes 14, 24 and 64 in the control group.

(3) "Projected Expenditures" are adjusted control group expenditures in the post period. This represents the estimate of expenditures that are project to have occurred within the intervention population in the absence of the pilot program.

(4) Savings estimate is cumulative over the 36-month pilot program. "Total" savings are savings before accounting for vendor fees; "Net" savings account for vendor fees.

(5) Calculation uses 7-month claims run-out and 3-month claims lag in both baseline and project periods. Run-out is the difference between the date of service and the date of claim payment.

(6) For Disease-specific calculations, credits in vendor fee amount that are not disease specific are proportionally distributed across disease groups.

The majority of the savings are achieved in Los Angeles County, primarily due to the much larger population within this region (Exhibit 86).

Exhibit 86: Total and Net Savings by Region, 36-Month Reconciliation Period

County	Savings Calculation	Return on Investment
Total Savings, Alameda	$10,068,661	
Total Savings, Los Angeles	$31,506,043	
Total Savings, All Regions, 36-Months	**$41,574,704**	**Gross: 4.26**
Total Vendor Fees, Adjusted for Aid Code Exclusion[v]	$9,770,535	
Net Savings, All Regions, 36-Months	**$31,804,168**	**Net: 3.26**

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data and MHS fees invoices.
Note: (1) This finding is for the fifteen original Aid Codes only due to a data error identified for Aid Codes 14, 24 and 64 in the control group.

[v] Based on paid fees as reported by MHS on July 19, 2011. Fee amounts are proportionally adjusted by UCLA to account for the decrease in member months resulting from exclusion of the population in Aid Codes 14, 24 and 64 from this analysis. Total fees paid to MHS in the amount of $10,958,751 are deflated by 10.84%, the proportion of member months that were contributed by the population in the new Aid Code categories.

Financial Outcomes Summary

MHS, DHCS, and UCLA agreed on a savings methodology that was implemented by UCLA. The results were duplicated and validated by MHS. Completion of interim financial reconciliations was delayed due to the Medi-Cal data warehouse conversion in 2008. Nevertheless, the final financial reconciliation was completed on time, in September of 2011, after allowing for a sufficient data completion period of seven months claims run-out and three months claims delay.

- **The population in Aid Codes 14, 24 and 64 were excluded from the overall savings analysis, as agreed by MHS, DHCS and UCLA.**

  The new Aid Code population was initially excluded from the control group data, which led to a lack of comparability between the control and intervention groups. This data anomaly led UCLA to propose exclusion of the population in these Aid Codes from the savings calculation. Although control group data for this group was ultimately provided, UCLA documented significant and systematic differences in the characteristics of the two populations. Moreover, this group received a maximum of only 12 months of intervention. Therefore, it was determined that a combined analysis was not appropriate, and the final savings analysis for DMPP focused only on the population in the original 15 DMPP Aid Codes.

  In a separate analysis of savings for the new program Aid Codes only, we found a loss of slightly less than $1 Million. A detailed table displaying the cost savings finding for the population in the new Aid Codes can be found in Appendix 2, Table 41.

- **DMPP resulted in savings of more than $31.8 Million during the three-year intervention.**

  Based on the agreed methodology, a total of $31,804,168 in net program savings was identified for the original 15 DMPP Aid Codes. This accounts for the cost to the State of running the program, which totaled to an estimated $9,770,535 for the selected Aid Codes (MHS was paid a total of $10,985,751 in program fees, which was deflated by 10.84% to account for exclusion of the new Aid Code population).

- **The return on investment varied substantially by disease group.**

  The ROI analysis found the largest savings among beneficiaries with CHF, where a net savings of almost $160 per member per month (PMPM) was identified. Large

savings were also found among those with COPD ($80.11 PMPM) and Asthma ($24.98 PMPM). Minimal savings of $1.56 PMPM were identified in the diabetes population, and a loss of $2.81 PMPM was found among those with CAD/ADS.

- **The methodology used for the budget neutrality calculation does not account for the characteristics of the intervention and control groups, and uses a methodology that is subject to bias over extended intervention periods.**

  The limitations of the methodology for cost neutrality/ROI analysis agreed to by DHCS, UCLA, and MHS should be considered when interpreting the savings finding or planning future DM programs.

  A significant limitation of this analysis is that the methodology does not adjust for the characteristics of the population, which could confound the analysis. Associations found in descriptive analyses such as this one do not account for potentially confounding factors such as age or race, which were controlled for in the multivariate analysis presented above in Chapter 2 Section B. That analysis found that expenditures did not significantly change during the program for any group except those with CAD/ADS, where expenditures increased (Exhibit 50).

  Another limitation of the savings calculation is the methodology used to estimate projected expenditures. The projection was based on a linear regression, which used monthly expenditures in the baseline period to predict expenditures over the 36-month program period for each subgroup. Projected expenditures were used to proportionally adjust the control group costs. This adjustment factor is highly sensitive to the slopes of the regression lines for the intervention and control groups. Typically, projections of this type are used for time periods that are immediately adjacent to each other. The prediction of expenditures, and therefore the adjustment factor, becomes increasingly less accurate as it extends further over time from the baseline period. In subsequent analyses not shown in this report, we determined that the *actual* PMPM expenditures in the intervention years did not follow the linear trend *predicted* by the regression line fit to the Baseline Years.

  There is a substantial need to establish a standard methodology for estimating savings from interventions such as DMPP. Absence of a uniform method limits the ability of evaluation efforts to demonstrate financial outcomes of programs, and prohibits comparison of outcomes between programs.

Chapter 3: Conclusions and Recommendations

Given all aspects of the DMPP evaluation, we draw the following conclusions and recommendations related to the program goals.

Program Implementation:

The opt-out program design led to successful enrollment of the eligible population with an overall 6% opt-out rate. Among enrollees, the overall rate of active engagement was about 10% per program year. Inaccuracies in enrollee contact information and delays in availability of utilization data may have contributed to the rate of engagement, and were a barrier to intervention delivery. Furthermore, the intensity of the intervention among the actively enrolled population was low, with approximately 2.7 to 3.4 monitoring calls per person during the full duration of their eligibility. These findings highlight the importance of complete data on the delivery of services in DM interventions.

- In total, more than 54,000 beneficiaries were eligible for DMPP in the original fifteen beneficiary aid codes. Of those, approximately 6% opted out of the program. About 50% of the enrolled group was categorized as low-risk, and primarily received mailed information unless they requested telephonic intervention. Within the remaining 50% of the population in medium and high risk groups, roughly 20% were ever actively engaged, with approximately 10% of the total eligible population engaged during each of the three Program Years. Members with CHF as their primary condition were more likely to be engaged than the other disease groups. No data were available to evaluate the criteria that determined MHS's engagement strategy within the higher risk groups.

- Inaccuracies in enrollee contact information were a barrier to delivery of DM

services. Evidence suggests that Medi-Cal FFS data contained inaccurate contact information for as much as 25% of the eligible population. These inaccuracies may have limited receipt of intervention particularly because the program was designed to use mail and telephone based services. UCLA did not receive any data on mailing of DM materials to enrollees and whether the enrollees understood or acted upon the information in those mailings.

- Inherent delays in availability of claims data were also a barrier to timely delivery of DM services after major events such as hospitalizations and emergency room visits, and restricted the planned use of claims data to re-stratify the population according to risk. In programs that rely on claims data, the inherent delay in claims submission and processing should inform program design, and may necessitate program activities with a high level of provider-vendor communication. UCLA did not receive any data from MHS on the level of effort spent by MHS in establishing communication with patients' providers to address the shortcomings of the data.

- The intensity of telephonic intervention was generally low, even in the group engaged in telephonic intervention. About 23% of the 7,189 individuals who were ever actively engaged by MHS were never successfully reached by phone for the telephonic intervention delivered through assessment and monitoring calls. Among those who were reached, the mean number of complete calls was between 1.7 to 1.98 calls per person for assessments (planned to be completed biannually), and from 2.7 to 3.4 calls per person for monitoring calls (planned to be delivered more frequent) during the entire length of their eligibility. This low intensity of intervention is partly explained by poor contact information and short duration of eligibility and enrollment for many members. However, it limited UCLA's ability to conduct a dose-response analysis of telephonic DM. Nevertheless, the intensity of the intervention may have been too low to achieve meaningful and sustained changes in clinical or health care utilization behavior of actively engaged enrollees.

- Our findings confirm that an opt-out enrollment design will lead to high enrollment rates. They also illustrate the importance of accurate patient contact information and utilization data for successful delivery of DM interventions. In addition, complete information on all aspects of the intervention is essential to evaluate the level and intensity of services delivered by DM programs.

Utilization of Health Services:

There is no consistent evidence of systematic change in health care utilization among

enrollees due to the intervention. Both descriptive and multivariate analysis of utilization failed to identify significantly favorable patterns of change in utilization attributable to the intervention. We observed varied experiences between the disease groups, highlighting the importance of conducting disease-stratified analysis in any DM evaluation.

- We used comprehensive multivariate methods to measure utilization while controlling for potential confounding factors including patient demographics, risk level, chronic conditions, and county of residence. There was no consistent evidence of systematic change in health care utilization among enrollees due to the intervention. Multivariate analysis of utilization identified disease-specific changes in select measures, including decreases in the duration of IP stays for individuals with CHF, COPD, and CAD/ADS. Other measures of use (i.e., ER visits, OP visits, and IP stays) showed inconsistent changes in the same three disease groups; no significant change was found for members with asthma or diabetes, for any measure of utilization.

- The lack of consistency in outcomes implies that effects of the intervention, if present, were specific to particular subgroups. Our findings also highlight the importance of conducting the evaluation of DM program utilization and expenditures separately for each disease condition, rather than pooling the findings across all conditions.

Quality of Care:

No consistent patterns of change in process and outcome quality of care indicators were identified in the DM program. There were improvements in several specific quality measures within the intervention group. However, for most measures of quality of care, observed improvements were comparable in both the intervention and control groups implying underlying contextual change in Medi-Cal that cannot be attributed to the intervention. Small sample sizes and reliance on self-reported clinical outcomes further limited the reliability of these findings. The findings highlight the importance of complete and reliable outcome data for assessment of quality of care in DM programs.

- During the Program Years, we observed several favorable trends in quality of care within the intervention group. However, improvements in the intervention group are not indicative of program impact if comparable changes occurred in the

control group during the same time period. For many clinical services reviewed, concurrent or comparable changes were found among beneficiaries in both the intervention and control groups. In other cases where the intervention group was different than the control group, these differences already existed at baseline and therefore cannot be attributed to the program.

- The paucity of findings related to clinical improvements is partially due to limited availability of data documenting health outcomes among active enrollees. The evaluation of quality of care was particularly challenging because all outcome measures were obtained from the self-reported information gathered during nurse assessments, that had small sample sizes for many of the measures, offered limited repeated measurements because the same items were not consistently asked of individuals at subsequent assessments, and were prone to inaccuracy due to recall bias by enrollees.

- Our findings highlight the importance of complete and reliable outcome data for assessment of quality of care in DM programs. More detailed analysis using multivariate methods is needed to determine whether intervention exposure is directly related to improved clinical quality.

Member Satisfaction:

Member quality of life, satisfaction with the DM program, general health care, and the nurse advice line were generally high, as is consistent with results of satisfaction surveys in various settings in the literature. In addition, there was some evidence of improvement in member satisfaction with the program(6 out of 49 unique measures) and quality of life indicators (2 out of 4). There was no evidence of improvement in satisfaction in general health care or provider satisfaction with the program over time.

- The nurse advice line achieved a number of desired outcomes for those who used it by diverting patients to their primary care providers and encouraging self-care. Limitations to survey data included: self-selection bias, loss to follow-up, and small sample sizes. The results indicate the need for assessing patient's experiences and outcomes in DM programs and can identify areas in need of further improvement.

Health Services Expenditures and Cost Neutrality

The evaluation included two types of expenditure analysis with different methods and goals. The return on investment (ROI) methodology for determining cost-neutrality of the intervention was agreed to by DHCS, MHS, and UCLA, and was designed to provide prospective analysis of program expenditures. Our ROI analysis indicates that the program saved an average of $37.16 PMPM, with large variation in savings between the disease groups. This ROI method does not fully account for concurrent trends and potential confounders. Therefore, in accordance with the evaluation design, we also completed a comprehensive multivariate analysis of expenditures that adjusts for all possible covariates. Our multivariate analysis of expenditures found no significant reduction in expenditures in any disease group. These findings highlight the importance of identifying an appropriate and standardized methodology for measuring the return on investment of DM programs.

- According to the specific methodology for estimating cost neutrality agreed to by DHCS, MHS, and UCLA, the program resulted in net savings of more than $31 million, which constitutes approximately 4.4% of total Medi-Cal expenditures for the intervention group during the three-year program period. The majority of the savings were realized in the population with CHF, which was the highest-cost condition, and the most likely to be actively engaged by MHS. However, savings ranged from $157.36 PMPM in the CHF group to $1.56 PMPM in the diabetes group, and there was a net loss among those with CAD/ADS.

- In accordance with the evaluation design, UCLA also employed descriptive and comprehensive multivariate approaches to analyze the impact of DMPP on program expenditures. The descriptive analysis found parallel trends in health care expenditures for the intervention and control groups during the intervention and baseline periods, across disease groups and risk levels. These results imply that patterns in expenditures over time may be attributable to ongoing contextual change in Medi-Cal rather than to the DMPP intervention. When the populations were risk-stratified, most variation between intervention and control groups was eliminated with a few exceptions in the highest risk group.

- The more comprehensive multivariate methods we used were based on a difference-in-difference approach, and accounted for potential covariates, including enrollee characteristics (e.g., age, gender, chronic conditions, comorbidities), eligibility (e.g., aid code, coverage duration), variations in county systems of care, and intercorrelation between multiple observations from the same enrollee in

claims data. After controlling for a wide range of potential confounding factors, the only significant change in expenditures was found among members with CAD/ADS, but this group had a significant *increase* of 5.5% in annual total medical expenditures. Therefore, the multivariate models found no evidence of savings, despite the ROI findings.

- These analyses highlight the importance of identifying an appropriate and standardized methodology for measuring the return on investment of DM programs. Different methods employed to measure savings can lead to divergent findings. There is a notable pattern of differential methods for estimating financial outcomes in the literature related to the effectiveness of DM.

In general, success of such DM programs depends on availability and quality of data for program implementation, as well as the size of the population targeted for intervention and the intensity of the intervention delivered.

The overall findings of our evaluation indicate that delivery of DM benefit to fee-for-service Medicaid beneficiaries may produce some desired reductions in expenditures, improved quality, and higher levels of satisfaction with care. However, DM programs implemented by third-party vendors face substantial challenges in light of delays in claims data processing and inaccuracies in Medicaid beneficiary contact information, which are not unique to this program.

The barriers posed by data accuracy and timeliness can be addressed in part through sustained and high-intensity effort by the DM vendors to reach the eligible population and their medical providers to coordinate care delivery and obtain timely information on enrollees' health status and utilization profile. Furthermore, targeting of high-risk enrollees can be improved and the intensity of the intervention can be increased to improve the effectiveness of DM services.

Finally, concerns related to quality, timeliness, and completeness of data from both DHCS and MHS limited the ability of the evaluation to demonstrate beneficial outcomes resulting from the program. Future programs should allocate time before program implementation to map data systems, determine what data the vendor will need and what the vendor will do with that data, and what data the vendor will supply to document program operations and outcomes. In the absence of these efforts, conclusive evidence of DM effectiveness will continue to be elusive.

Appendix 1: Methodology

This appendix contains detailed information about the methodology used in evaluation of DMPP. In cases where methodology was sufficiently explained within the report document, this appendix does not re-state methods. Methodological information is contained here to supplement the information provided within the report.

The following methodological information is contained in this appendix:

1. Program Inclusion and Exclusion Criteria
2. Control Group Selection
3. Member Intervention Status Assignment and UCLA's Engagement Hierarchy
4. Multivariate Analysis of Expenditures and Utilization
5. Analysis of Clinical Measures of Quality of Care
6. Analysis of Satisfaction Outcomes

Program Inclusion and Exclusion Criteria

Appendix 1, Table 1: Inclusion criteria

1 Adult 22 years of age or older

2 Medi-Cal Recipients who are Aged, Blind or Disabled beneficiaries (ABD), with current eligibility under one of the following Aid Codes:
10- Aged-SSI/SSP-Cash
16 -Aged-Pickle Eligibility
1E -Craig v. Bonta Aged Pending SB 87 Redetermination
1H -Federal Poverty Level - Aged
20 -Blind-SSI/SSP-Cash
26- Blind-Pickle Eligibility
2E- Craig v Bonta, Cont. Elig. for the Blind
36 -Disabled-COBRA-Widow/ers
60 -Disabled-SSI/SSP-Cash
66 -Disabled-Pickle Eligibility
6E -Craig v Bonta- Cont. Elig. For the Disabled
6G -250% Working Disabled
6H -250% Working Disabled-Undocs
6N -No Longer Disabled Bene in Appeal (not 6R)
8G -Severely Impaired Working

3 Beneficiaries residence of record must be in Alameda County or in one of the following 122 zip codes of Los Angeles County:

90001	90012	90026	90034	90057	90230	91001	91104	91204	91311	91335	91401	91502	91604	91722	91770	93535
90002	90015	90027	90038	90058	90232	91030	91107	91205	91321	91340	91402	91504	91605	91724	91775	93536
90003	90017	90028	90041	90063	90255	91040	91125	91206	91324	91351	91405	91505	91606	91744	91776	93550
90005	90019	90029	90045	90064	90270	91042	91126	91207	91325	91352	91406	91506	91607	91745	91780	93551
90006	90020	90031	90042	90065	90280	91046	91201	91208	91326	91354	91410	91523	91608	91746	91790	93552
90010	90021	90032	90046	90066	90291	91101	91202	91303	91330	91355	91411	91601	91702	91748	91801	93553
90011	90023	90033	90056	90201	90302	91103	91203	91304	91331	91356	91501	91602	91706	91754	91803	93563
														91756	93534	93591

4 Inpatient or outpatient diagnosis for the specified chronic disease was defined using the ICD-9 diagnosis codes as follows:

1) Diabetes : primary or secondary diagnosis codes of 250:250.99
2) Asthma: primary or secondary diagnosis codes of 493:493.99
3) COPD: primary diagnosis or secondary codes of 492:492.89, 496
4) Coronary Artery Disease: primary diagnosis or secondary codes of 410:410.00 (Acute Myocardial Infarction) and 413:413.99 (Angina Pectoris)
5) Congestive CHF: primary diagnosis codes of 428:428.9.
6) Atherosclerosis: primary or secondary diagnosis codes of 440.0:440.9, 441.0:441.9, 411.0:412, 414:414.9.

Source: DHCS Disease Management Pilot Program Data Management Manual

Appendix 1, Table 2: Exclusion Criteria

1 DHCS will exclude those who:

- Have restricted/emergency only Medi-Cal by Aid code
- Are Medicare eligible (i.e. dual eligible for both Medi-Cal and Medicare)
- Have other insurance that provides comparable DM services (e.g., Medi-Cal Managed Care)
- Receive comparable case management services from another program, such as Medical Case Management
- Are Developmentally Disabled, by Aid code: 6V and 6W
- Reside in LTC, by Aid codes: 0U, 0V, 13, 23, 53, 55 and 63
- Reside in nursing facilities
    - Participants who enter a nursing facility enters a nursing facility for a stay of longer than 30 days
- Reside in all levels of Intermediate Care Facilities for the Developmentally Disabled (ICF/DD);
- Have Medi-Cal period that is only retroactive
- Are less than 22 years of age
- Are eligible as medically needy and clients with share of cost (SOC), by Aid codes: 14,* 17, 24,* 27, 64,* and 67
- Are Native American
- Participate in Medicaid waiver programs, including Home and Community Based, Freedom of Choice and Research an Demonstration waivers, but not including the Hospital Financing/Mental Health waiver.
- Have a primary or secondary diagnosis of Human Immunodeficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS)
- Reside in hospice: MEDS hospice restriction codes are 900, 901, 910, 911, 920, 921, 930, or 931
- Receive services related to transplants, severe trauma, and/or end stage renal disease,
    - A member who after enrolling in DMPP begins to receive treatment for transplants, end stage renal disease will only be disenrolled from DMPP at the Participant's request or in cases where services are duplicated.
- All expenses associated with individuals whose total claims are above a yearly "stop-loss" amount of $250,000 will not be included in the financial reconciliation study – these people and all of their claims will be removed from the study for the year in question.
- Severe Trauma is not to be treated as a program eligibility exclusion based on specific diagnosis (ICD-9) or procedure (CPT) codes. Instead, patients who experience severe trauma whose total claims in a 12 month period exceed the 'stop-loss" amount of $250,000 will have their claims costs removed from the financial reconciliation study for the year in question.

2 Cancer Management

CDHS will exclude all eligibles who have active (malignant) cancers. Active cancer has been defined by CDHS to include any cancer-related ICD-9 codes AND CPT codes within the last six months of claims history. If MHS has a concern with member management, it can identify the member and provide a justification for CDHS to review for exclusion. Once CDHS approves, the member then can be removed from the population. The member will also be removed from the reconciliation retroactive to the date of active and malignant condition.

Source: DHCS Disease Management Pilot Program Data Management Manual

*These Aid Codes were removed from exclusion criteria in October 2009 and were therefore added to the inclusion criteria

Control Group Selection

Eight control group areas were selected to correspond to characteristics and utilization patterns in the pilot areas – San Joaquin, San Diego, Fresno, San Francisco, Riverside, San Bernardino, Sacramento and Santa Clara. These control counties provide comparable population for comparison to the intervention counties, and individuals included in the control group would have been eligible based on criteria if program was implemented in those areas.

In identifying the final control group areas the goal was to reasonably match intervention counties in terms of paid claims (costs), disease rates, demographic characteristics (age, gender, ethnicity, language), and service use (number of hospitalizations, ER visits, and doctor visits). In addition, at least a 1:1 control to intervention ratio is required; although a value closer to 2:1 is preferred to maintain stability in the control group.

A set of control counties with a total eligible population ranging between 4,051 and 8,102 was selected for Alameda and a set of control counties with a total eligible population ranging between 18,484 and 36,968 was selected for Los Angeles, which was done in order to meet all matching requirements. Because the ratio of eligible individuals in Los Angeles county to eligible individuals in Alameda county is about 4.56:1, the goal was to maintain a similar ratio when selecting control counties; specifically, the number of eligible individuals in the control counties matched to Los Angeles county should be about 4.56 times the number of eligible individuals in the control counties matched to Alameda county.

The final control counties were selected using two approaches of cluster analysis. In the first approach, each intervention county was separately compared to all potential control counties. In the second approach, the combined intervention counties were compared to all potential control counties. To achieve a 2:1 ratio, 14 potential control group counties would have had to be used rather than selecting the best matches for the intervention population. A set of control group counties that were similar to the intervention group was generated, which maintained a better than 1:1 ratio of eligible individuals in the control and intervention group.

Hierarchical Member Status Classification

The seven status categories of member status established and defined by MHS are as follows:

Active – Beneficiaries who have been contacted and agreed to participate. The frequency of proactive outbound calls varies depending on risk level. Typically, the Risk Level One (lowest risk) group is not targeted for outbound calls unless by request. The higher risk groups (Risk Levels Two and Three) receive more frequent outbound calls.

On Demand – Beneficiaries who have no proactive outbound calls scheduled, but have the option to use the 24/7 nurse call line. These beneficiaries could be in Risk Level One, Two, or Three. Beneficiaries may be placed in this category by request or by default if the person cannot be reached after repeated attempts.

Referred – Beneficiary record contains all required fields. Proactive calls scheduled to determine if member will participate.

Eligible – Beneficiary record is missing key required field(s) but still loaded into the PCM application. If data is updated, status may change. No proactive calls possible under this status.

On Hold – Beneficiary is placed on hold by a nurse pending verification of eligibility, or if they are never contacted.

Forwarded– Beneficiary has been transferred back to the state for management.

Inactive-Beneficiary not (or no longer) participating in program. Will have one of the following "current reasons" indicating why:

- **Comorbid** – Beneficiary has an additional condition beyond the six DMPP eligible conditions, that requires them to be managed in another program.
- **Deceased**
- **Does not have condition** - Beneficiary reports not having an eligible chronic condition.
- **Health plan request-** DHCS requests member to be inactivated.
- **Member request** – Beneficiary requests to not participate in program (post enrollment).
- **Not member of plan-** Beneficiary is not eligible for the program according to the data received from DHCS.
- **Option Out-** Beneficiary does not want to participate in the program.
- **Other-** Member is inactive for another reason not listed. .

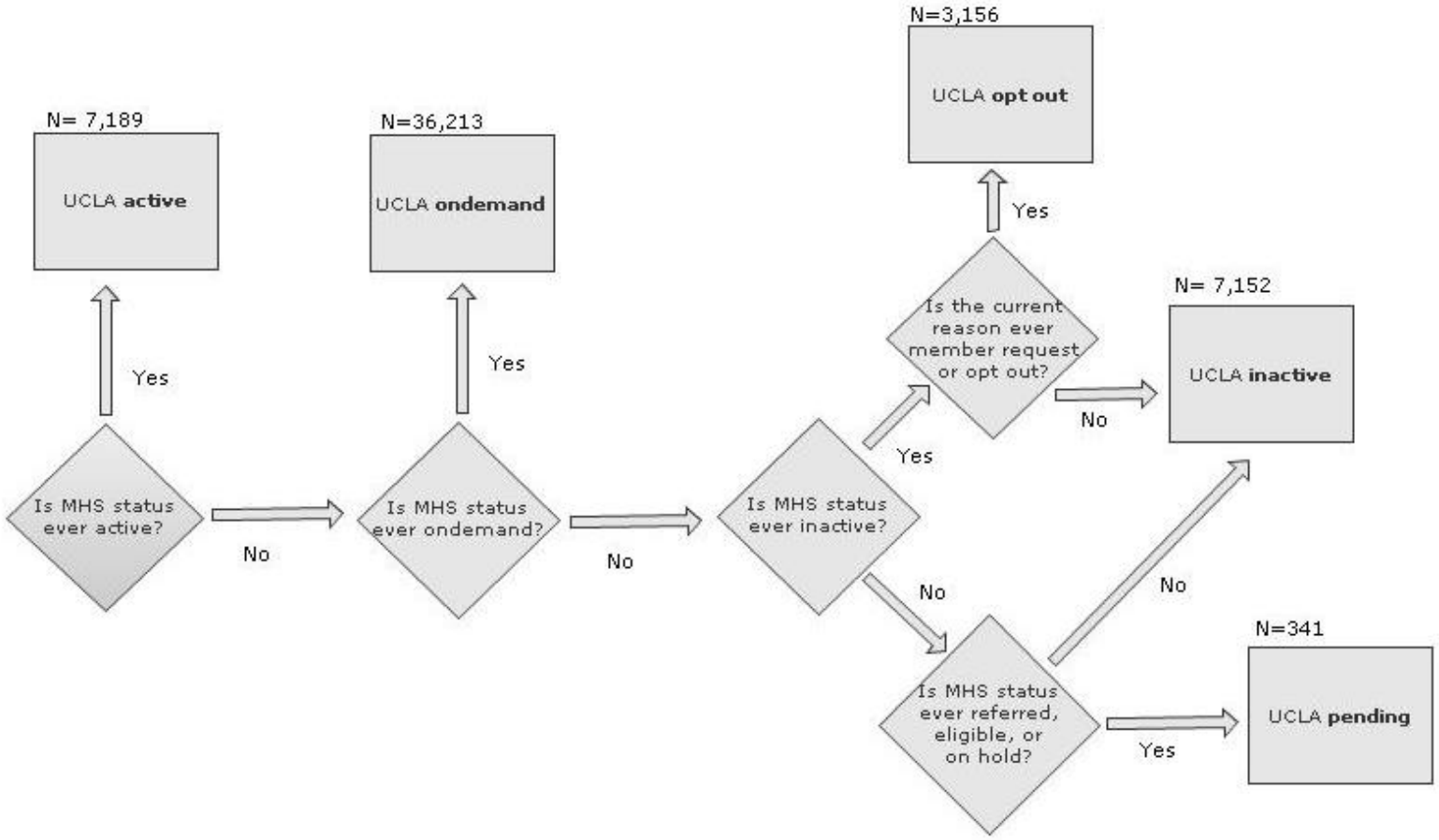
- **Physician request -** The Beneficiary's physician requested they not participate in the program at this time.
- **Skilled nursing facility -** Beneficiary is a resident of a Skilled Nursing Facility for longer than 30 days.
- **Under case management** Beneficiary is under the management of a case manager and not participating in DMPP.
- **Wrong Address -** Beneficiary is no longer at the address listed. This is used for clients utilizing community based outreach. Further attempts may be made to locate the member.

We classified members into five categories based on their MHS-assigned status. To identify the most appropriate category for each beneficiary, we utilized the monthly enrollment status data produced by MHS. Once enrolled into DMPP, MHS assigned each beneficiary an enrollment status. This status may have changed depending on the beneficiary's circumstances. The beneficiaries were assigned one of seven possible statuses (some of which contained subcategories) each month they were enrolled in DMPP.

The engagement categories developed by UCLA are hierarchical. As such, beneficiaries who had at least one month in which MHS assigned them to the Active status wherein MHS intended to treat them with proactive outbound calls were assigned to UCLA's Active category. Of those who did not fall into UCLA's Active category, beneficiaries were then evaluated to determine whether they fell into UCLA's On Demand category.

This process continued until each beneficiary was assigned to one of UCLA's five engagement categories. The decision tree below illustrates the process by which beneficiaries were assigned to UCLA's categories utilizing MHS's enrollment status data.

Appendix 1, Table 3: UCLA's Engagement Hierarchy Decision Tree



Multivariate Analysis of Expenditures and Utilization

The methodologies used in UCLA's four-part model of expenditures and hurdle models for utilization are described in more detailed in the following literature.

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2. Zeger, S. L., Liang, K. Y. and Albert, P. S. (1988). Models for Longitudinal Data: A Generalized Estimating Equation Approach. *Biometrics* **44**, 1049-1060.
3. Robinson, J. W., Zeger, S. L. and Forrest, C. B. (2004). A Hierarchical Multivariate Two-Part Model for profiling Providers' Effects on Healthcare Charges. *Johns Hopkins University, Dept. of Biostatistics Working Papers*, Paper **52**.
4. Neuhaus, J. M., Kalbfleisch, J. D., Hauck, W. W. (1991). A Comparison of Cluster-Specific and Population-Averaged Approaches for Analyzing Correlated Binary Data. *International Statistical Review* **59**, 25-35.
5. Mullahy, J. (1998). Much ado about two: Reconsidering Retransformation and the Two-Part Model in Health *Economics* **17**, 247-281.
6. Gurmu, S. (1998). Generalized Hurdle Count Data Regression Models. *Economics Letters* **58**, 263-268.
7. Abadie, A. (2005). Semiparametric Difference-in-Differences Estimators. *Review of Economic Studies* **72**, 1-19.
8. William Greene. NLOGIT 4.0 Manual.
9. Jean-Philippe Boucher, Michel Denuit and Montserrat Guillen. Modelisation of Claim Count with Hurdle Distribution for Panel Data International Conference on Mathematical and Statistical Modeling in Honor of Enrique Castillo. June 28-30, 2006
10. Jean-Philippe Boucher, Michel Denuit and Montserrat Guillen. Correlated Random Effects for Hurdle Models applied to Claim Counts. (check the final publication)

Clinical Outcomes Analysis

Data Preparation

Medi-Cal Claims Data

- Claims-based analyses are presented for the baseline and program periods, and for the intervention and control groups.
- Analyses based on claims data utilize ICD-9 diagnosis codes, CPT procedure codes, and National Drug Classification (NDC) codes that correspond to the relevant procedure(s), service(s) or medication(s) recommended by clinical guidelines.
- Only individuals with continuous enrollment during each measurement period were included. Continuous enrollment is defined in accordance with HEDIS guidelines, which allow a maximum of a one 45-day break in enrollment during each 12-month period. Given monthly eligibility in Medi-Cal, continuous enrollment is defined as 11 out of 12 months enrolled within each year.
- For prescription data, a beneficiary is considered to have received continuous therapy for a medication within a given year if their Medi-Cal claims for that year indicate a supply of that medication that is sufficient to cover at least 80% of that year (292 days).

MHS's Assessment Data

- Measures based on assessment data are presented for the program period and intervention group only.
- Data include self-reported clinical and behavioral factors measured via telephone at six month intervals.
- Program enrollees may have received up to seven calls during the program duration, depending on the length of their enrollment.
- During assessment calls, the DM nurses did not assess every interview item. Therefore, each clinical measure is computed for the subset of beneficiaries who answered the relevant question, and therefore the denominator may vary for each item within the analysis.
- The methodology for conducting clinical assessments results in exclusion of individuals with a gap in enrollment of greater than 30 days.
- Findings are displayed for each clinical measure in a series of cohorts. The baseline measurement prior to any intervention is displayed for all beneficiaries together. Thereafter, for each measure, beneficiaries are grouped according to the number of repeated measurements available for each individual. Those with two total measurements are analyzed together, and their baseline and endpoint

measurements are compared. A similar approach is taken for those with three measurements, and those with four or more measurements, to the extent possible given limited numbers of beneficiaries with a sufficient period of continuous enrollment.

HEDIS Measures

- HEDIS specifications require two calendar years of data to generate each yearly HEDIS finding. Therefore, HEDIS findings were only possible for five years of the DMPP study period – Baseline Year Two through Program Year Three.
- All HEDIS measures presented by UCLA follow the guidelines set forth by the NCQA.

The tables below include specific parameters used to define the numerator and denominator in each clinical outcome measure. Tables are provided for HEDIS measures, measures common to all conditions, and measures that are specific to each DMPP condition, respectively.

Measure Definitions

Appendix 1, Table 4: Definitions of HEDIS Measures

Measure – HEDIS	Data Source	Statistic	
Appropriate Medication Use for People with Asthma	Claims	Numerator	Individuals in the denominator who received appropriate medications, including antiasthmatic combinations, inhaled steroid combinations, inhaled corticosteroids, leukotriene modifiers, mast cell stabilizers, and/or methylxanthines during the measurement year.
		Denominator	Members with persistent asthma 21 years and older who met at least one of the following criteria during both the measurement year and the year prior to the measurement year. Criteria need not be the same across both years. • At least one ED visit with asthma as the principal diagnosis • At least one acute inpatient claim/encounter with asthma as the principal diagnosis • At least four outpatient asthma visits with asthma as one of the listed diagnoses and at least two asthma medication dispensing events • At least four asthma medication dispensing events
Comprehensive Diabetes Care Measures	Claims	Numerator	Individuals in the denominator who received • semi-annual Hemoglobin A1c (HbA1c), • annual retinal eye exam, or • annual LDL-C screening
		Denominator	Members were identified as having diabetes 21 years and older during the measurement year or the year prior to the measurement year using claims or encounter data or members who were dispensed insulin or oral hypoglycemics/antihyper-glycemics during the measurement year or year prior to the measurement year on an ambulatory basis.
LDL-C Screening Rates for Beneficiaries with Cardiovascular Conditions	Claims	Numerator	Number of individuals in the denominator population who had an LDL-c blood test in the past year.
		Denominator	Individuals ages 21 and up with at least one cardiovascular condition (acute myocardial infarction, coronary bypass graft or percutaneous transluminal coronary angioplasty) were continuously enrolled during the measurement year.

Appendix 1, Table 5: Definitions of Measures Common to all DMPP Conditions

Measure – All Conditions	Data Source	Statistic	
Proportion of continuously enrolled beneficiaries who received a flu shot during each 12 month measurement year	Claims	Numerator	Individual in denominator with who received a flu shot during the measurement year
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.
Proportion received Pneumonia vaccine	Assessment	Result	At each assessment, the proportion of beneficiaries who answered "yes" to the question, "Have you ever had a pneumonia shot?"
Have written action plan	Assessment	Result	[for ADS] At each assessment, the proportion of beneficiaries who answered "Yes" to the questions, "Do you have a written guideline or action plan on what your doctor wants you to do if you have new or bad chest pain or a change in your angina, or quick weight gain, or new swelling or breathing problems?"
Average self-reported health status	Assessment	Result	[ADS] At each assessment the mean response to the question, "In general would you say your health is: Excellent (1), Very good (2), Good (3), Fair (4), Poor (5)."
Mean number of work/school days missed	Assessment	Result	[CHF] At the first assessment, the mean number of days answered to the question, "In the last four weeks, how many days have you missed as a result of your heart problem?" At subsequent assessments, the mean number of days answered to the question, "Since we last talked , how many days have you missed as a result of your heart problems?" [are nonresponses counted as zero?]
Proportion diagnosed/treated with depression	Assessment	Result	At each assessment, the proportion of beneficiaries who answered "Yes, currently" or "Yes, in the past" to the question, "Have you ever been diagnosed with depression, or are you currently being treated for depression?"

Measure – All Conditions	Data Source	Statistic	
BMI	Assessment	Result	At each assessment, the mean BMI value among all beneficiaries who answered the questions, "How tall are you?" and "How much do you currently weight?" BMI auto-calculated by McKesson. Proportion (N) of all beneficiaries in assessment data whose calculated BMI fall in the following ranges: Under weight (BMI <20) Normal weight (20 ≤ BMI < 25) Over weight (25 ≤ BMI < 30) Obese (BMI ≥ 30)
Functional limitations among actively managed beneficiaries	Assessment	Result	Proportion (N) of pts answered YES to at least one of the functional limitation questions. At each assessment, the proportion of beneficiaries who did not answer "Not Limited"
Rate of ER visits with a primary or secondary diagnosis related to Heart Failure or pulmonary edema among continuously enrolled members.	Claims	Numerator	Number of ER visits with a primary or secondary diagnosis related to Heart Failure or pulmonary edema during the measurement year among the denominator population.
		Denominator	All beneficiaries who were continuously enrolled during the measurement year.
Rate of hospital admission with discharge related to asthma	Claims	Numerator	Number of inpatient admissions with a primary or secondary diagnosis related to Heart Failure during the measurement year, among the denominator population.
		Denominator	All beneficiaries who were continuously enrolled during the measurement year.
Number of MD visits/year	Claims	Numerator	All MD visits during the measurement year among the denominator population
		Denominator	All beneficiaries who were continuously enrolled during the measurement year.

Appendix 1, Table 6: Definitions of Measures for Asthma

Measure - Asthma	Data Source	Statistic	
Prescriptions for and refills of an inhaled corticosteroid drug during each 12-month period.	Claims	Numerator	Individuals in denominator with any RX for inhaled corticosteroid drug in the measurement year
		Denominator	All Asthma beneficiaries who were continuously enrolled during the measurement year.
Mean number of RX per person per year for inhaled corticosteroid medication during each 12-month period.	Claims	Result	Mean number of RX per person per year, among beneficiaries with any RX for an inhaled corticosteroid medication during the measurement year.
Proportion of continuously-enrolled asthma beneficiaries who had a "continuous supply" of inhaled corticosteroid following the first time they received any RX for it during each 12-month period.	Claims	Numerator	Individuals in the denominator population with a 'continuous supply' of medication (80% of days within the measurement year).
		Denominator	All Asthma beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled asthma beneficiaries with a prescription and refills of a beta-agonist drug during each 12-month period.	Claims	Numerator	Individuals in the denominator with any RX for an inhaled beta-agonist drug in the measurement year.
		Denominator	All Asthma beneficiaries who were continuously enrolled during the measurement year.
Mean number of beta-agonist prescriptions for continuously-enrolled asthma beneficiaries during each 12-month period	Claims	Result	Mean number of RX per person per year, among beneficiaries with any RX for a beta-agonist medication during the measurement year.
Frequency of inhaled corticosteroid use among those who use at each assessment.	Assessment	Numerator	Beneficiary response (daily, weekly, monthly, etc.)
		Denominator	All Asthma beneficiaries who completed an assessment

Measure - Asthma	Data Source	Statistic	
Proportion of Asthma beneficiaries who do not use an inhaled corticosteroid and who use asthma controller or rescue medicine seasonally.	Assessment	Numerator	Proportion of beneficiaries who reported "Yes" to seasonal use.
		Denominator	All Asthma beneficiaries who completed an assessment and who do not use an inhaled corticosteroid.
Mean number of RX per person per year for inhaled corticosteroid medication during each 12-month period.	Claims	Result	Mean number of Rx among beneficiaries with any Rx for a beta-agonist medication during the measurement year.
Proportion of asthma beneficiaries who used a rescue med (inhaler) daily (as opposed to seasonally).	Assessment	Numerator Denominator	Number with daily use. All beneficiaries who do have a rescue inhaler, and are in assessment data.
Mean frequency of daytime asthma symptoms over the last month at each assessment call.	Assessment	Result	Mean frequency of daytime symptoms.
Mean frequency of nighttime asthma symptoms over the last month at each assessment call.	Assessment	Result	Mean frequency of nighttime symptoms.
Proportion of asthma beneficiaries who reported having knowledge of type of triggers for asthma attack at each assessment call.	Assessment	Numerator Denominator	Individuals who report knowledge of asthma triggers Asthma beneficiaries with any response to this question in the assessment data (if "no"s are populated. If not, must include all members with assessment data.)
Proportion of asthma beneficiaries at each assessment call who reported using a peak flow meter at home.	Assessment	Numerator Denominator	Individuals who report using a peak flow meter at home. Among Asthma beneficiaries with any response to this question in the assessment data (if "no"s are populated. If not, must include all members with assessment data.)
Mean best reported peak flow meter value of asthma beneficiaries at each assessment call.	Assessment	Result	Mean of personal best peak flow results among asthma beneficiaries who reported using a peak flow meter at home.

Measure - Asthma	Data Source	Statistic	
Proportion of asthma beneficiaries at each assessment call who reported ever having had their peak flow measured at their doctor's office.	Assessment	Numerator	Individuals who report having had their peak flow measured at their doctor's office
		Denominator	Among Asthma beneficiaries with any response to this question in the assessment data (if "no"s are populated. If not, must include all members with assessment data.)

Appendix 1, Table 7: Definitions of Measures for COPD

Measure - COPD	Data Source	Statistic	
Proportion of continuously-enrolled COPD beneficiaries who had blood gas or pulse oxymetry performed during each 12-month period.	Claims	Numerator	Individuals in denominator with any blood gas/pulse oxymetry performed during the measurement year.
		Denominator	All COPD beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled COPD beneficiaries with a prescription and refills of a beta-agonist drug during each 12-month period.	Claims	Numerator	Individuals in the denominator with any RX for any beta-agonist in the measurement year
		Denominator	All COPD beneficiaries who were continuously enrolled during the measurement year.
Mean number of beta-agonist prescriptions for continuously-enrolled COPD beneficiaries during each 12-month period.	Claims	Result	Mean number of beta-agonist RX for continuously-enrolled COPD beneficiaries with at least one RX for an beta-agonist medication during the measurement year.
Proportion of COPD beneficiaries who used a rescue med (inhaler) daily (as opposed to seasonally) at each assessment call.	Assessment	Numerator	Number with daily use.
		Denominator	All COPD beneficiaries who do have a rescue inhaler, and who received that assessment call.
Proportion of COPD beneficiaries reporting a course of steroid use at each assessment call.	Assessment	Numerator	COPD beneficiaries who reported use of oral steroid.
		Denominator	All COPD beneficiaries who received that assessment call.
Proportion of COPD beneficiaries reporting a course of antibiotics at each assessment call.	Assessment	Numerator	COPD beneficiaries who reported use of an antibiotic.
		Denominator	All COPD beneficiaries who received that assessment call.
Proportion of COPD beneficiaries who report using	Assessment	Numerator	COPD beneficiaries who report using oxygen.

Measure - COPD	Data Source	Statistic	
oxygen at each assessment call.		Denominator	All COPD beneficiaries who received that assessment call.
Proportion of COPD beneficiaries who report having COPD symptoms in the last week at each assessment call.	Assessment	Numerator	Number of COPD beneficiaries who report at least one COPD symptom (such as feeling short of breath, new wheeze, cough, and sputum production) in the last week.
		Denominator	All COPD beneficiaries who received that assessment call.
Proportion of COPD beneficiaries at each assessment call who reported being limitations in activity in the past week due to their breathing problem.	Assessment	Numerator	Number of COPD beneficiaries who reported limitation in activity due to breathing problem in the last week.
		Denominator	All COPD beneficiaries who received that assessment call.

Appendix 1, Table 8: Definitions of Measures for Diabetes

Measure - Diabetes	Data Source	Statistic	
Proportion of diabetes beneficiaries who reported at each assessment call receiving a professional foot exam in the last 12 months.	Assessment	Numerator	Individuals in the denominator hwo reported having a foot exam by their doctor in the past 12 months.
		Denominator	All diabetes beneficiaries who received that assessment call.
Proportion of diabetes beneficiaries who received a dilated eye exam in each 12-month period.	Claims	Numerator	Individuals in denominator with at least one dilated eye exam in past 12 months
		Denominator	All diabetes beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled diabetes beneficiaries who had a HgbA1C test in each 12-month period.	Claims	Numerator	Individuals in denominator with claims for HgbA1C labs in the measurement year.
		Denominator	All diabetes beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled	Claims	Numerator	Individuals in denominator with a cholesterol test in the measurement year.

Measure - Diabetes	Data Source	Statistic	
diabetes beneficiaries who had a cholesterol test in each 12-month period.		Denominator	All diabetes beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled diabetes beneficiaries with a continuous supply of a lipid-lowering agent medication.	Claims	Numerator	Individuals in denominator with continuous supply of lipid-lowering medication (80% of days within the measurement year).
		Denominator	All diabetes beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled diabetes beneficiaries with a prescription for aspirin or an antiplatelet medication in each 12-month period.	Claims	Numerator	Individuals in denominator with at least one Rx for Aspirin or Antiplatelet past 12 months
		Denominator	All diabetes beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled diabetes beneficiaries with albuminuria or hypertension with an ACE inhibitor prescription during each 12-month period.	Claims	Numerator	Individuals in denominator with at least one Rx for ACE inhibitors past 12 months
		Denominator	All diabetes beneficiaries with a history of albuminuria or hypertension who were continuously enrolled during the measurement year.
Proportion of diabetes beneficiaries at each assessment call who reported an LDL value below 100.	Assessment	Numerator	Individuals in denominator reporting an LDL value under 100.
		Denominator	All diabetes beneficiaries who reported an LDL value at that assessment call.
Mean reported A1C value at each assessment call	Assessment	Result	Mean reported A1C value among diabetes beneficiaries who reported an A1C value in that assessment call.
		Proportion	Proportion of all beneficiaries in assessment data whose calculated BMI fall in the following ranges: A1C <7 A1C 7-8 A1C >8

Appendix 1, Table 9: Definitions of Measures for CHF

Measure - CHF	Data Source	Statistic	
Proportion of continuously-enrolled CHF pts who received lab evaluation of Creatinine and Potassium levels during each 12 month measurement year	Claims	Numerator	Individuals in denominator who received a lab test measuring Creatinine and Potassium levels at least once during measurement year.
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled CHF pts who had an cholesterol levels checked during each 12 month measurement year	Claims	Numerator	Individuals in denominator who had at least one cholesterol test during measurement year.
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously enrolled members who had a return outpatient visit within 90 days after an ER visit or inpatient admission with a primary or secondary diagnosis related to HF or pulmonary edema.	Claims	Numerator	Individuals who had an outpatient visits within the 90 days following the denominator event.
		Denominator	All continuously-enrolled CHF beneficiaries with an ER visit or inpatient admission with a primary or secondary diagnosis related to Heart Failure or pulmonary edema during the measurement year
Proportion of continuously-enrolled CHF pts who were prescribed beta-blocker therapy (exclusion: asthma pts (pdiag_dsc='Asthma' or sdiag_dsc='Asthma' THEN DELETE)	Claims	Numerator	Individuals in denominator with continuous supply of beta blocker medication (80% of days within the measurement year).
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year and were not diagnosed with asthma.
Percentage of continuously enrolled-CHF pts who were prescribed either ACE inhibitor or angiotensin receptor blocker (ARB) therapy during each 12 month measurement year	Claims	Numerator	Individuals in denominator with continuous supply of either ACE inhibitor or angiotensin receptor blocker (ARB) (80% of days within the measurement year).
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.
Percentage of continuously-enrolled CHF pts who had an Rx for a loop diuretic in past two months	Claims	Numerator	Individuals in denominator who had at least one Rx for a loop diuretic in past two months.
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.

Measure - CHF	Data Source	Statistic	
Proportion of continuously-enrolled CHF pts who were prescribed Aspirin/Statins during each 12 month measurement year	Claims	Numerator	Individuals in denominator with continuous supply of either aspirin or statin during the measurement year (80% of days within the measurement year).
		Denominator	All CHF beneficiaries who were continuously enrolled during the measurement year.
Proportion of members who reported knowing their blood pressure value	Assessment	Numerator	At each assessment, the number of CHF beneficiaries who answered "Yes" to the question, "Do you know your last blood pressure reading?"
		Denominator	The number of CHF beneficiaries who completed that assessment.
Proportion with acceptable blood pressure	Assessment	Numerator	At each assessment, the number of CHF beneficiaries who reported having a systolic blood pressure less than 130 and diastolic blood pressure less than 80 at their last blood pressure reading.
		Denominator	The number of CHF beneficiaries at that assessment who reported systolic and diastolic blood pressures for their last blood pressure reading at that assessment.
Proportion of pts who reported avoiding foods which were high in sodium (salt)	Assessment	Numerator	[This needs to be updated] At each assessment, the number of CHF beneficiaries who answered "Never" to the questions "How often do you try to avoid foods which are high in sodium (salt)?" or "How often do you add salt to your food either during cooking or when eating?"
		Denominator	All CHF beneficiaries who completed an assessment
Proportion with LDL under 100	Assessment	Numerator	At each assessment, the number of CHF beneficiaries who reported having an LDL value less than 100 in a cholesterol check conducted within the past twelve months.
		Denominator	The number of CHF beneficiaries at that assessment who reported LDL values.

Appendix 1, Table 10: Definitions of Measures for CAD/ADS

Measure – CAD/ADS	Data Source	Statistic	
Proportion of continuously-enrolled CAD pts who had an cholesterol levels checked during each 12 month measurement year	Claims	Numerator	Individuals in denominator who had at least one cholesterol test during measurement year.
		Denominator	All CAD beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled CAD pts who were prescribed beta-blocker therapy (exclusion: asthma pts (pdiag_dsc='Asthma' or sdiag_dsc='Asthma' THEN DELETE)	Claims	Numerator	Individuals in denominator with continuous supply of beta blocker medication (80% of days within the measurement year).
		Denominator	All CAD beneficiaries who were continuously enrolled during the measurement year and were not diagnosed with asthma.
Percentage of continuously enrolled-CAD pts who were prescribed either an ACE inhibitor or angiotensin receptor blocker (ARB) therapy during each 12 month measurement year	Claims	Numerator	Individuals in denominator with continuous supply of either ACE inhibitor or angiotensin receptor blocker (ARB) (80% of days within the measurement year).
		Denominator	All CAD beneficiaries who were continuously enrolled during the measurement year.
Proportion of continuously-enrolled CAD pts who were prescribed Statins during each 12 month measurement year	Claims	Numerator	Individuals in denominator with continuous supply of statins during the measurement year (80% of days within the measurement year).
		Denominator	All CAD beneficiaries who were continuously enrolled during the measurement year.

Satisfaction Analysis

The data in used to assess satisfaction and quality of life is from four different surveys.

McKesson DM Program Participant Satisfaction Survey

MHS conducted a satisfaction survey of the DM program participants who had completed an assessment after six-months of program participation with follow-up surveys at 12-month intervals. Every two weeks, participants who had completed a semi-annual assessment in the past two weeks were identified and contacted by a market research firm by phone up to six times and at different times. MHS modified and administered the survey developed by the Disease Management Association of America. This survey methodology was reported in the final annual report to DHCS. MHS reported a 32% overall response rate based on 899 completed surveys from 2,843 participants who were considered eligible. This response rate does not account for approximately 101 participants who were surveyed more than once.

UCLA Satisfaction and Quality of Life Survey

UCLA conducted a follow up survey of those who had responded to MHS' satisfaction survey to collect additional information on quality of life and satisfaction with health care in general. Once a month, MHS forwarded a list of individuals who had completed the MHS member satisfaction survey in the past month to UCLA. UCLA then mailed a follow up survey to these members and followed up with phone calls to non-respondents. The quality of life questions were those developed by the Centers for Disease Control and Prevention and included self-assessed health status, number of healthy days, and activity limitations. The satisfaction with general care questions were those developed by the CAHPS® 3.0 Adult Medicaid Fee-for-Service Questionnaire (see Appendix 3: UCLA Quality of Life Survey).

Nurse Advice Line Satisfaction Survey

MHS surveyed (through a market research firm) all participants who called the MHS Nurse Advice Line, every time they called. Further information on number of attempts made and the response rate is not available in MHS annual reports and was not provided to UCLA. The survey included questions on satisfaction with the Nurse Advice Line as well as the outcomes of each call.

Provider Survey

MHS identified primary care providers with at least one DM Program participant and

surveyed these physicians through a market research firm. MHS reported having identified 584providers in 2008, 994 in 2009, and 1,586 in 2010, in their annual reports to DHCS. Surveys were mailed in August and September and were faxed back by providers who received a $75 honorarium after completion of the survey. This survey methodology was reported in the final annual report to DHCS.

MHS reported 76, 138, and 96 respondents and a response rate of 13%, 14%, and 6% respectively for Program Years one to three. However, the data provided to UCLA included only 94 and 87 surveys with at least one complete answer per question for the second and third Program Years. No respondent identifiers were available to UCLA for independent assessment of duplication of responses over the years.

Financial Outcomes Analysis

The methodology for Return on Investment (ROI) analysis was agreed to by DHCS, MHS, and UCLA. During interim ROI analysis, UCLA identified several issues that resulted in modifications of the initial methodology.

- Although initial program evaluation documents stipulated use of six months of claims run-out, a seven month run-out was agreed upon, due to technical considerations related to the DHCS warehouse conversion.

- Combination of CAD and ADS groups into a single analytic cohort was determined to be necessary for sample size reasons. This is supported by the fact that these groups received nearly identical DM services.

- The "New Aid Code" population was analyzed separately from the original fifteen aid codes for the final ROI analysis. This determination was made because they were only eligible during the final program year, were systematically different than the populations in the original aid codes, and their baseline period was different than the baseline for the total group.

- MHS suggested a revision to the original method, with the intention of adjusting both the intercept and slope of the regression line of control group to be the same as those of the intervention group over the 30-month pre-program period (March 2005 to August 2007), and then extending that adjustment to the post program period calculation. Interim analysis of cost data found that there was an underlying trend of diverging costs between the intervention and control groups, with the costs in the intervention group growing more rapidly than the control group, on average, during the baseline period.
    - MHS recommended this methodology to address these concerns. However UCLA identified two concerns related to MHS' method: it combined the pre-program scale and post-program scale, and it used a **set adjustment index** that could theoretically drive PMPM savings.
    - Therefore, UCLA proposed a modified version of MHS' proposed formula, which used the **proportional adjustment method** that takes the ratio of PMPM estimate of the intervention group to that of the control group as the adjustment index.
    - All parties agreed to this method. The method is displayed in the Financial Outcomes chapter of this report.

Appendix 2: Supplemental Findings and Analysis

Implementation

Appendix 2, Table 1: Demographic Characteristics of Eligible Population by Primary Condition, Row Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Total	**13,303**	**25%**	**7,410**	**14%**	**8,980**	**17%**	**16,953**	**31%**	**7,405**	**14%**	**54,051**
Age Group											
22-34	189	8%	1,063	43%	319	13%	762	31%	136	6%	**2,469**
35-44	422	12%	1,001	27%	740	20%	1,167	32%	335	9%	**3,665**
45-54	2,069	18%	1,956	17%	2,508	22%	3,351	29%	1,649	14%	**11,533**
55-64	6,272	27%	2,451	11%	3,877	17%	6,962	30%	3,512	15%	**23,074**
65+	4,351	33%	939	7%	1,536	12%	4,711	35%	1,773	13%	**13,310**
Gender											
Female	7,666	25%	5,012	16%	4,050	13%	10,183	33%	4,153	13%	**31,064**
Male	5,637	25%	2,398	10%	4,930	21%	6,770	29%	3,252	14%	**22,987**
Ethnicity											
White (Total)	6,310	33%	2,215	11%	3,566	18%	4,452	23%	2,872	15%	**19,415**
White Armenian	*3,837*	*44%*	*725*	*8%*	*971*	*11%*	*1,849*	*21%*	*1,293*	*15%*	***8,675***
White Other	*2,473*	*23%*	*1,490*	*14%*	*2,595*	*24%*	*2,603*	*24%*	*1,579*	*15%*	***10,740***
Latino	2,454	20%	1,506	12%	1,282	10%	5,541	45%	1,550	13%	**12,333**
African American	1,209	12%	1,996	20%	2,448	25%	2,439	25%	1,703	17%	**9,795**
Asian/Pacific Islander	2,440	28%	1,073	12%	1,043	12%	3,232	37%	840	10%	**8,628**
Other	222	22%	151	15%	143	14%	372	37%	115	11%	**1,003**
Missing	668	23%	469	16%	498	17%	917	32%	325	11%	**2,877**
Language											
Armenian	3,985	44%	748	8%	997	11%	1,915	21%	1,323	15%	**8,968**
East Asian Languages	1,123	35%	284	9%	395	12%	1,095	34%	282	9%	**3,179**
English	3,328	17%	3466	18%	4,223	22%	5,472	28%	3,083	16%	**19,572**
European Languages	496	45%	79	7%	99	9%	232	21%	195	18%	**1,101**
Southeast Asian Languages	433	22%	343	18%	220	11%	781	40%	182	9%	**1,959**
Spanish	1,851	22%	819	10%	672	8%	4,135	48%	1,074	13%	**8,551**

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Other Languages	526	31%	175	10%	150	9%	599	36%	231	14%	**1,681**
Unknown Language	1,561	17%	1496	17%	2,224	25%	2,724	30%	1,035	11%	**9,040**
County											
Alameda	1,456	15%	1774	18%	1,690	17%	3,492	35%	1,459	15%	**9,871**
Los Angeles	11,833	27%	5619	13%	7,254	16%	13,448	31%	5,932	13%	**44,086**
Aid Code											
Total Disabled	9,441	22%	6,591	16%	7,769	18%	12,575	30%	5,916	14%	**42,292**
60: Disabled – SSI/SSP – Cash	*8,451*	*22%*	*6,090*	*16%*	*7,244*	*19%*	*10,913*	*29%*	*5,177*	*14%*	***37,875***
64: Disabled – Medically Needy	*524*	*24%*	*237*	*11%*	*222*	*10%*	*822*	*38%*	*357*	*17%*	***2,162***
6E: Craig v. Bonta Disabled	*123*	*18%*	*98*	*14%*	*136*	*20%*	*227*	*33%*	*99*	*14%*	***683***
6H: Disabled – FPL	*321*	*22%*	*133*	*9%*	*150*	*10%*	*562*	*39%*	*265*	*19%*	***1,431***
6N: Former SSI No Longer Disabled in SSI Appeals Status	*16*	*15%*	*25*	*24%*	*13*	*12%*	*42*	*40%*	*10*	*9%*	***106***
Other Aid Codes - Disabled	*6*	*17%*	*8*	*23%*	*4*	*11%*	*9*	*26%*	*8*	*23%*	***35***
Total Not Disabled	3,862	33%	819	7%	1,211	10%	4,378	37%	1,489	13%	**11,759**
10: Aid to the Aged – SSI/SSP	*960*	*43%*	*142*	*6%*	*238*	*11%*	*534*	*24%*	*351*	*16%*	***2,225***
14: Aid to the Aged – Medically Needy	*2,590*	*31%*	*548*	*7%*	*834*	*10%*	*3,291*	*40%*	*974*	*12%*	***8,237***
1H: Federal Poverty Level – Aged (FPL-Aged)	*162*	*28%*	*36*	*6%*	*51*	*9%*	*259*	*45%*	*70*	*12%*	***578***
20: Blind – SSI/SSP – Cash.	*129*	*20%*	*87*	*14%*	*81*	*13%*	*259*	*41%*	*81*	*13%*	***637***
Other Aid Codes - Not Disabled	*21*	*26%*	*6*	*7%*	*7*	*9%*	*35*	*43%*	*13*	*16%*	***82***
Comorbidity											
No	12,398	25%	6,936	14%	7,831	16%	16,953	34%	5,694	11%	**49,812**
Yes	905	21%	474	11%	1,149	27%	0	0%	1,711	40%	**4,239**

Source: UCLA Analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Rows may not add to zero due to rounding.

Appendix 2, Table 2: Demographic Characteristics of Eligible Population by Primary Condition, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total
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White Other	*2,473*	*19%*	*1,490*	*20%*	*2,595*	*29%*	*2,603*	*15%*	*1,579*	*21%*	***10,740***
Latino	2,454	18%	1,506	20%	1,282	14%	5,541	33%	1,550	21%	**12,333**
African American	1,209	9%	1,996	27%	2,448	27%	2,439	14%	1,703	23%	**9,795**

Asian/Pacific Islander	2,440	18%	1,073	14%	1,043	12%	3,232	19%	840	11%	**8,628**
Other	222	2%	151	2%	143	2%	372	2%	115	2%	**1,003**
Missing	668	5%	469	6%	498	6%	917	5%	325	4%	**2,877**
Language											
Armenian	3,985	30%	748	10%	997	11%	1,915	11%	1,323	18%	**8,968**
East Asian Languages	1,123	8%	284	4%	395	4%	1,095	6%	282	4%	**3,179**
English	3,328	25%	3466	47%	4,223	47%	5,472	32%	3,083	42%	**19,572**
European Languages	496	4%	79	1%	99	1%	232	1%	195	3%	**1,101**
Southeast Asian Languages	433	3%	343	5%	220	2%	781	5%	182	2%	**1,959**
Spanish	1,851	14%	819	11%	672	7%	4,135	24%	1,074	15%	**8,551**
Other Languages	526	4%	175	2%	150	2%	599	4%	231	3%	**1,681**
Unknown Language	1,561	12%	1496	20%	2,224	25%	2,724	16%	1,035	14%	**9,040**
County											
Alameda	1,456	11%	1774	24%	1,690	19%	3,492	21%	1,459	20%	**9,871**
Los Angeles	11,833	89%	5619	76%	7,254	81%	13,448	79%	5,932	80%	**44,086**
Aid Code											
Total Disabled	9,441	71%	6,591	89%	7,769	87%	12,575	74%	5,916	80%	**42,292**
60: Disabled – SSI/SSP – Cash	*8,451*	*64%*	*6,090*	*82%*	*7,244*	*81%*	*10,913*	*64%*	*5,177*	*70%*	***37,875***
64: Disabled – Medically Needy	*524*	*4%*	*237*	*3%*	*222*	*2%*	*822*	*5%*	*357*	*5%*	***2,162***
6E: Craig v. Bonta Disabled	*123*	*1%*	*98*	*1%*	*136*	*2%*	*227*	*1%*	*99*	*1%*	***683***
6H: Disabled – FPL	*321*	*2%*	*133*	*2%*	*150*	*2%*	*562*	*3%*	*265*	*4%*	***1,431***
6N: Former SSI No Longer Disabled in SSI Appeals Status	*16*	*0%*	*25*	*0%*	*13*	*0%*	*42*	*0%*	*10*	*0%*	***106***
Other Aid Codes - Disabled	*6*	*0%*	*8*	*0%*	*4*	*0%*	*9*	*0%*	*8*	*0%*	***35***
Total Not Disabled	3,862	29%	819	11%	1,211	13%	4,378	26%	1,489	20%	**11,759**
10: Aid to the Aged – SSI/SSP	*960*	*7%*	*142*	*2%*	*238*	*3%*	*534*	*3%*	*351*	*5%*	***2,225***
14: Aid to the Aged – Medically Needy	*2,590*	*19%*	*548*	*7%*	*834*	*9%*	*3,291*	*19%*	*974*	*13%*	***8,237***
1H: Federal Poverty Level – Aged (FPL-Aged)	*162*	*1%*	*36*	*0%*	*51*	*1%*	*259*	*2%*	*70*	*1%*	***578***
20: Blind – SSI/SSP – Cash.	*129*	*1%*	*87*	*1%*	*81*	*1%*	*259*	*2%*	*81*	*1%*	***637***
Other Aid Codes - Not Disabled	*21*	*0%*	*6*	*0%*	*7*	*0%*	*35*	*0%*	*13*	*0%*	***82***
Comorbidity											
No	12,398	93%	6,936	94%	7,831	87%	16,953	100%	5,694	77%	**49,812**
Yes	905	7%	474	6%	1,149	13%	0	0%	1,711	23%	**4,239**

Source: UCLA Analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Rows may not add to zero due to rounding.

Appendix 2, Table 3: Demographic Characteristics of the Population that Opted Out, by Primary Condition, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**961**	**100%**	**404**	**100%**	**454**	**100%**	**838**	**100%**	**499**	**100%**	**3,156**	**100%**
Age Group												
22-34	5	1%	18	4%	4	1%	23	3%	1	0%	**51**	**2%**
35-44	12	1%	37	9%	24	5%	41	5%	12	2%	**126**	**4%**
45-54	146	15%	96	24%	104	23%	166	20%	75	15%	**587**	**19%**
55-64	605	63%	215	53%	267	59%	477	57%	295	59%	**1,859**	**59%**
65+	193	20%	38	9%	55	12%	131	16%	116	23%	**533**	**17%**
Gender												
Female	622	65%	305	75%	203	45%	568	68%	311	62%	**2,009**	**64%**
Male	339	35%	99	25%	251	55%	270	32%	188	38%	**1,147**	**36%**
Ethnicity												
Total White	721	75%	198	49%	273	60%	469	56%	355	71%	**2,016**	**64%**
White Armenian	*524*	*55%*	*92*	*23%*	*139*	*31%*	*304*	*36%*	*239*	*48%*	***1,298***	***41%***
White Other	*197*	*20%*	*106*	*26%*	*134*	*30%*	*165*	*20%*	*116*	*23%*	***718***	***23%***
Latino	77	8%	42	10%	44	10%	119	14%	51	10%	**333**	**11%**
African American	34	4%	61	15%	63	14%	71	8%	42	8%	**271**	**9%**
Asian/Pacific Islander	83	9%	71	18%	43	9%	127	15%	37	7%	**361**	**11%**
Other	8	1%	10	2%	7	2%	18	2%	2	0%	**45**	**1%**
Missing	38	4%	22	5%	24	5%	34	4%	12	2%	**130**	**4%**
Language												
Armenian	531	55%	92	23%	142	31%	309	37%	240	48%	**1,314**	**42%**
East Asian Languages	38	4%	31	8%	16	4%	42	5%	17	3%	**144**	**5%**
English	117	12%	123	30%	143	31%	179	21%	102	20%	**664**	**21%**
European Languages	91	9%	22	5%	18	4%	40	5%	42	8%	**213**	**7%**
Southeast Asian Languages	18	2%	21	5%	7	2%	42	5%	4	1%	**92**	**3%**
Spanish	57	6%	20	5%	19	4%	74	9%	30	6%	**200**	**6%**
Other Languages	20	2%	8	2%	8	2%	19	2%	11	2%	**66**	**2%**
Unknown Language	89	9%	87	22%	101	22%	133	16%	53	11%	**463**	**15%**
County												
Alameda	25	3%	47	12%	40	9%	87	10%	42	8%	**241**	**8%**
Los Angeles	935	97%	357	88%	413	91%	751	90%	457	92%	**2,913**	**92%**
Aid Code												
Total Disabled	816	85%	379	94%	408	90%	745	89%	405	81%	**2,753**	**13%**
Total Not Disabled	145	15%	25	6%	46	10%	93	11%	94	19%	**403**	**87%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.
Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 4: Demographic Characteristics of the Population that Did Not Opt Out, by Primary Condition, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	**Number**	**%**
Total	**12,342**	**100%**	**7,006**	**100%**	**8,526**	**100%**	**16,115**	**100%**	**6,906**	**100%**	**50,895**	**100%**
Age Group												
22-34	184	1%	1,045	15%	315	4%	739	5%	135	2%	**2,418**	**5%**
35-44	410	3%	964	14%	716	8%	1,126	7%	323	5%	**3,539**	**7%**
45-54	1,923	16%	1,860	27%	2,404	28%	3,185	20%	1,574	23%	**10,946**	**22%**
55-64	5,667	46%	2,236	32%	3,610	42%	6,485	40%	3,217	47%	**21,215**	**42%**
65+	4,158	34%	901	13%	1,481	17%	4,580	28%	1,657	24%	**12,777**	**25%**
Gender												
Female	7,044	57%	4,707	67%	3,847	45%	9,615	60%	3,842	56%	**29,055**	**57%**
Male	5,298	43%	2,299	33%	4,679	55%	6,500	40%	3,064	44%	**21,840**	**43%**
Ethnicity												
White (Total)	5,589	45%	2,017	29%	3,293	39%	3,983	25%	2,517	36%	**17,399**	**34%**
White Armenian	*3,313*	*27%*	*633*	*9%*	*832*	*10%*	*1,545*	*10%*	*1,054*	*15%*	***7,377***	***14%***
White Other	*2,276*	*18%*	*1,384*	*20%*	*2,461*	*29%*	*2,438*	*15%*	*1,463*	*21%*	***10,022***	***20%***
Latino	2,377	19%	1,464	21%	1,238	15%	5,422	34%	1,499	22%	**12,000**	**24%**
African American	1,175	10%	1,935	28%	2,385	28%	2,368	15%	1,661	24%	**9,524**	**19%**
Asian/Pacific Islander	2,357	19%	1,002	14%	1,000	12%	3,105	19%	803	12%	**8,267**	**16%**
Other	214	2%	141	2%	136	2%	354	2%	113	2%	**958**	**2%**
Missing	630	5%	447	6%	474	6%	883	5%	313	5%	**2,747**	**5%**
Language												
Armenian	3,454	28%	656	9%	855	10%	1,606	10%	1,083	16%	**7,654**	**15%**
East Asian Languages	1,085	9%	253	4%	379	4%	1,053	7%	265	4%	**3,035**	**6%**
English	3,211	26%	3343	48%	4,080	48%	5,293	33%	2,981	43%	**18,908**	**37%**
European Languages	405	3%	57	1%	81	1%	192	1%	153	2%	**888**	**2%**
Southeast Asian Languages	415	3%	322	5%	213	2%	739	5%	178	3%	**1,867**	**4%**
Spanish	1,794	15%	799	11%	653	8%	4,061	25%	1,044	15%	**8,351**	**16%**
Other Languages	506	4%	167	2%	142	2%	580	4%	220	3%	**1,615**	**3%**
Unknown Language	1,472	12%	1409	20%	2,123	25%	2,591	16%	982	14%	**8,577**	**17%**
County												
Alameda	1,431	12%	1727	25%	1,650	19%	3,405	21%	1,417	21%	**9,630**	**19%**
Los Angeles	10,898	88%	5262	75%	6,841	80%	12,697	79%	5,475	79%	**41,173**	**81%**
Aid Code												
Total Disabled	3,717	30%	794	11%	1,165	14%	4,285	27%	1,395	20%	**11,356**	**22%**
Total Not Disabled	8,625	70%	6,212	89%	7,361	86%	11,830	73%	5,511	80%	**39,539**	**78%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 5: Demographic Characteristics of the Population that was Ever Active, by Primary Condition, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**1,054**	**100%**	**1,041**	**100%**	**1,417**	**100%**	**1,893**	**100%**	**1,784**	**100%**	**7,189**	**100%**
Age Group												
22-34	4	0%	143	14%	26	2%	81	4%	20	1%	**274**	**4%**
35-44	16	2%	148	14%	133	9%	127	7%	60	3%	**484**	**7%**
45-54	187	18%	314	30%	440	31%	450	24%	431	24%	**1,822**	**25%**
55-64	583	55%	363	35%	686	48%	909	48%	962	54%	**3,503**	**49%**
65+	264	25%	73	7%	132	9%	326	17%	311	17%	**1,106**	**15%**
Gender												
Female	627	59%	779	75%	799	56%	1,195	63%	1,084	61%	**4,484**	**62%**
Male	427	41%	262	25%	618	44%	698	37%	700	39%	**2,705**	**38%**
Ethnicity												
White (Total)	539	51%	319	31%	605	43%	515	27%	660	37%	**2,638**	**37%**
White Armenian	*339*	*32%*	*101*	*10%*	*130*	*9%*	*205*	*11%*	*299*	*17%*	***1,074***	***15%***
White Other	*200*	*19%*	*218*	*21%*	*475*	*34%*	*310*	*16%*	*361*	*20%*	***1,564***	***22%***
Latino	224	21%	247	24%	199	14%	658	35%	405	23%	**1,733**	**24%**
African American	88	8%	271	26%	451	32%	289	15%	432	24%	**1,531**	**21%**
Asian/Pacific Islander	140	13%	124	12%	87	6%	285	15%	212	12%	**848**	**12%**
Other	14	1%	23	2%	9	1%	38	2%	15	1%	**99**	**1%**
Missing	49	5%	57	5%	66	5%	108	6%	60	3%	**340**	**5%**
Language												
Armenian	348	33%	101	10%	133	9%	212	11%	305	17%	**1,099**	**15%**
East Asian Languages	64	6%	20	2%	19	1%	88	5%	85	5%	**276**	**4%**
English	252	24%	501	48%	828	58%	650	34%	781	44%	**3,012**	**42%**
European Languages	44	4%	12	1%	13	1%	26	1%	56	3%	**151**	**2%**
Southeast Asian Languages	33	3%	49	5%	23	2%	80	4%	50	3%	**235**	**3%**
Spanish	163	15%	142	14%	97	7%	501	26%	283	16%	**1,186**	**16%**
Other Languages	49	5%	25	2%	21	1%	60	3%	42	2%	**197**	**3%**
Unknown Language	101	10%	191	18%	283	20%	276	15%	182	10%	**1,033**	**14%**
County												
Alameda	128	12%	292	28%	366	26%	447	24%	358	20%	**1,591**	**22%**
Los Angeles	922	87%	746	72%	1,042	74%	1,445	76%	1,423	80%	**5,578**	**78%**
Aid Code												
Total Disabled	236	22%	65	6%	98	7%	327	17%	278	16%	**1,004**	**14%**
Total Not Disabled	818	78%	976	94%	1,319	93%	1,566	83%	1,506	84%	**6,185**	**86%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 6: Demographic Characteristics of the Population that Never Active (On Demand), by Primary Condition, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**8,934**	**100%**	**4,984**	**100%**	**5,886**	**100%**	**12,284**	**100%**	**4,125**	**100%**	**36,213**	**100%**
Age Group												
22-34	123	1%	783	16%	215	4%	525	4%	79	2%	**1,725**	**5%**
35-44	319	4%	704	14%	457	8%	807	7%	184	4%	**2,471**	**7%**
45-54	1,327	15%	1,329	27%	1,639	28%	2,284	19%	913	22%	**7,492**	**21%**
55-64	4,020	45%	1,518	30%	2,448	42%	4,891	40%	1,859	45%	**14,736**	**41%**
65+	3,145	35%	650	13%	1,127	19%	3,777	31%	1,090	26%	**9,789**	**27%**
Gender												
Female	4,942	55%	3,300	66%	2,482	42%	7,262	59%	2,192	53%	**20,178**	**56%**
Male	3,992	45%	1,684	34%	3,404	58%	5,022	41%	1,933	47%	**16,035**	**44%**
Ethnicity												
White (Total)	3,892	44%	1,326	27%	2,177	37%	2,843	23%	1,446	35%	**11,684**	**32%**
White Armenian	*2,337*	*26%*	*358*	*7%*	*584*	*10%*	*1,115*	*9%*	*595*	*14%*	***4,989***	***14%***
White Other	*1,555*	*17%*	*968*	*19%*	*1,593*	*27%*	*1,728*	*14%*	*851*	*21%*	***6,695***	***18%***
Latino	1,731	19%	1,007	20%	837	14%	4,199	34%	898	22%	**8,672**	**24%**
African American	864	10%	1,484	30%	1,671	28%	1,798	15%	1,020	25%	**6,837**	**19%**
Asian/Pacific Islander	1,805	20%	728	15%	770	13%	2,514	20%	481	12%	**6,298**	**17%**
Other	161	2%	103	2%	96	2%	263	2%	76	2%	**699**	**2%**
Missing	481	5%	336	7%	335	6%	667	5%	204	5%	**2,023**	**6%**
Language												
Armenian	2,454	27%	377	8%	602	10%	1,165	9%	616	15%	**5,214**	**14%**
East Asian Languages	817	9%	183	4%	307	5%	848	7%	145	4%	**2,300**	**6%**
English	2,330	26%	2497	50%	2,777	47%	3,998	33%	1,785	43%	**13,387**	**37%**
European Languages	236	3%	31	1%	49	1%	127	1%	72	2%	**515**	**1%**
Southeast Asian Languages	302	3%	220	4%	163	3%	594	5%	93	2%	**1,372**	**4%**
Spanish	1,337	15%	545	11%	448	8%	3,174	26%	633	15%	**6,137**	**17%**
Other Languages	369	4%	116	2%	96	2%	465	4%	153	4%	**1,199**	**3%**
Unknown Language	1,089	12%	1015	20%	1,444	25%	1,913	16%	628	15%	**6,089**	**17%**
County												
Alameda	1,087	12%	1285	26%	1,107	19%	2,625	21%	864	21%	**6,968**	**19%**
Los Angeles	7,839	88%	3690	74%	4,759	81%	9,650	79%	3,256	79%	**29,194**	**81%**
Aid Code												
Total Disabled	2,851	32%	580	12%	906	15%	3,545	29%	911	22%	**8,793**	**24%**
Total Not Disabled	6,083	68%	4,404	88%	4,980	85%	8,739	71%	3,214	78%	**27,420**	**76%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.

Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 7: Member Engagement Status by Primary Condition and by Program Year, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total
	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Program Year One											
Active	399	6%	524	12%	671	12%	817	11%	777	17%	3,188
On Demand	3,906	57%	2,622	61%	3,372	60%	4,989	65%	2,308	52%	17,197
Opt Out	870	13%	340	8%	395	7%	712	9%	429	10%	2,746
Inactive	1,340	20%	600	14%	870	16%	1,018	13%	611	14%	4,439
Pending	78	1%	36	1%	81	1%	91	1%	42	1%	328
Not Assigned	264	4%	202	5%	204	4%	94	1%	292	7%	1,056
Total	**6,857**	100%	**4,324**	100%	**5,593**	100%	**7,721**	100%	**4,459**	100%	**28,954**
Program Year Two											
Active	411	5%	542	11%	695	11%	881	9%	782	17%	3,311
On Demand	4,353	57%	3,012	59%	3,507	58%	5,995	64%	2,325	51%	19,192
Opt Out	915	12%	456	9%	498	8%	910	10%	482	11%	3,261
Inactive	1,800	24%	1,013	20%	1,247	21%	1,547	16%	772	17%	6,379
Pending	49	1%	16	0%	36	1%	46	0%	14	0%	161
Not Assigned	88	1%	29	1%	83	1%	1	0%	151	3%	352
Total	**7,616**	100%	**5,068**	100%	**6,066**	100%	**9,380**	100%	**4,526**	100%	**32,656**
Program Year Three											
Active	572	6%	496	9%	690	11%	1,088	8%	890	18%	3,736
On Demand	6,685	66%	3,704	66%	3,957	63%	9,376	72%	2,817	58%	26,539
Opt Out	902	9%	465	8%	472	8%	891	7%	427	9%	3,157
Inactive	1,926	19%	928	16%	1,090	17%	1,643	13%	689	14%	6,276
Pending	97	1%	59	1%	48	1%	106	1%	34	1%	344
Total	**10,182**	100%	**5,652**	100%	**6,257**	100%	**13,104**	100%	**4,857**	100%	**40,052**
Program Total											
Active	1,054	8%	1,041	14%	1,417	16%	1,893	11%	1,784	24%	7,189
On Demand	8,934	67%	4,984	67%	5,886	66%	12,284	72%	4,125	56%	36,213
Opt Out	961	7%	404	5%	454	5%	838	5%	499	7%	3,156
Inactive	2,257	17%	923	12%	1,177	13%	1,832	11%	963	13%	7,152
Pending	97	1%	58	1%	46	1%	106	1%	34	0%	341
Total	**13,303**	**100%**	**7,410**	**100%**	**8,980**	**100%**	**16,953**	**100%**	**7,405**	**100%**	**54,051**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 8: Member Engagement Status by Risk Level and by Year, Row Percentages

	Risk Level One		Risk Level Two		Risk Level Three		Total
	Number	%	Number	%	Number	%	Number
Program Year One							
Active	386	12%	1,610	51%	1,192	37%	3,188
On Demand	12,140	71%	3,209	19%	1,848	11%	17,197
Opt Out	622	23%	1,289	47%	835	30%	2,746
Inactive	977	22%	1,704	38%	1,758	40%	4,439
Pending	11	3%	169	52%	148	45%	328
Total	**14,136**	51%	**7,981**	29%	**5,781**	21%	**27,898**
Program Year Two							
Active	457	14%	1,807	55%	1,047	32%	3,311
On Demand	13,476	70%	3,704	19%	2,012	10%	19,192
Opt Out	842	26%	1,535	47%	884	27%	3,261
Inactive	2,289	36%	2,158	34%	1,932	30%	6,379
Pending	7	4%	113	70%	41	25%	161
Total	**17,071**	53%	**9,317**	29%	**5,916**	18%	**32,304**
Program Year Three							
Active	1,058	28%	1,772	47%	906	24%	3,736
On Demand	20,540	77%	3,942	15%	2,057	8%	26,539
Opt Out	1,230	39%	1,197	38%	730	23%	3,157
Inactive	3,038	48%	1,839	29%	1,399	22%	6,276
Pending	15	4%	195	57%	134	39%	344
Total	**25,881**	65%	**8,945**	22%	**5,226**	13%	**40,052**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.

**Note: Those not assigned risk levels or statuses by MHS have been excluded from analysis.

Appendix 2, Table 9: Member Engagement Status by Risk Level and by Year, Column Percentages

	Risk Level One		Risk Level Two		Risk Level Three		Total
	Number	%	Number	%	Number	%	Number
Program Year One							
Active	386	3%	1,610	20%	1,192	21%	3,188
On Demand	12,140	86%	3,209	40%	1,848	32%	17,197
Opt Out	622	4%	1,289	16%	835	14%	2,746
Inactive	977	7%	1,704	21%	1,758	30%	4,439
Pending	11	0%	169	2%	148	3%	328
Total	**14,136**	100%	**7,981**	100%	**5,781**	100%	**27,898**
Program Year Two							
Active	457	3%	1,807	19%	1,047	18%	3,311
On Demand	13,476	79%	3,704	40%	2,012	34%	19,192
Opt Out	842	5%	1,535	16%	884	15%	3,261
Inactive	2,289	13%	2,158	23%	1,932	33%	6,379
Pending	7	0%	113	1%	41	1%	161
Total	**17,071**	100%	**9,317**	100%	**5,916**	100%	**32,304**
Program Year Three							
Active	1,058	4%	1,772	20%	906	17%	3,736
On Demand	20,540	79%	3,942	44%	2,057	39%	26,539
Opt Out	1,230	5%	1,197	13%	730	14%	3,157
Inactive	3,038	12%	1,839	21%	1,399	27%	6,276
Pending	15	0%	195	2%	134	3%	344
Total	**25,881**	100%	**8,945**	100%	**5,226**	100%	**40,052**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.

**Note: Those not assigned risk levels or statuses by MHS have been excluded from analysis.

Appendix 2, Table 10: Primary Conditions of the Eligible and Active Populations, by Program Year

		Ever Eligible		Ever Active		
	Primary Condition Group	**Total Number of Eligible Individuals**	**% of Total Eligible Population**	**Total Number of Active Individuals**	**% of Total Active Population**	**Mean Length of eligibility (months)**
Program Year One	CAD/ADS	6,857	24%	399	13%	4.8
	Asthma	4,324	15%	524	16%	5.3
	COPD	5,593	19%	671	21%	5.0
	Diabetes	7,721	27%	817	26%	5.2
	CHF	4,459	15%	777	24%	5.1
	Total	**28,954**	**100%**	**3,188**	**100%**	**5.1**
Program Year Two	CAD/ADS	7,616	23%	411	12%	4.6
	Asthma	5,068	16%	542	16%	5.0
	COPD	6,066	19%	695	21%	5.0
	Diabetes	9,380	29%	881	27%	5.5
	CHF	4,526	14%	782	24%	5.0
	Total	**32,656**	**100%**	**3,311**	**100%**	**5.1**
Program Year Three	CAD/ADS	10,182	25%	572	15%	5.8
	Asthma	5,652	14%	496	13%	6.1
	COPD	6,257	16%	690	18%	5.7
	Diabetes	13,104	33%	1,088	29%	6.2
	CHF	4,857	12%	890	24%	5.9
	Total	**40,052**	**100%**	**3,736**	**100%**	**6.0**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data, using UCLA engagement hierarchy.
Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 11: Demographic Characteristics of the Population in the 15 Original DMPP Aid Codes, Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**3,119**	**100%**	**789**	**100%**	**1,057**	**100%**	**4,133**	**100%**	**1,330**	**100%**	**10,428**	**100%**
Age Group												
21-34	8	0%	31	4%	6	1%	41	1%	11	1%	**97**	**1%**
35-44	9	0%	32	4%	13	1%	42	1%	25	2%	**121**	**1%**
45-54	85	3%	61	8%	56	5%	172	4%	94	7%	**468**	**4%**
55-64	399	13%	113	14%	143	14%	556	13%	219	16%	**1,430**	**14%**
65+	2,618	84%	552	70%	839	79%	3,322	80%	981	74%	**8,312**	**80%**
Gender												
Female	1,893	61%	568	72%	500	47%	2,816	68%	835	63%	**6,612**	**63%**
Male	1,226	39%	221	28%	557	53%	1,317	32%	495	37%	**3,816**	**37%**
Ethnicity												
White (Total)	755	24%	151	19%	198	19%	460	11%	309	23%	**1,873**	**18%**
White Armenian	*432*	*14%*	*72*	*9%*	*82*	*8%*	*198*	*5%*	*141*	*11%*	**925**	***9%***
White Other	*323*	*10%*	*79*	*10%*	*116*	*11%*	*262*	*6%*	*168*	*13%*	**948**	***9%***
Latino	815	26%	296	38%	334	32%	1,890	46%	534	40%	**3,869**	**37%**
African American	45	1%	27	3%	33	3%	90	2%	67	5%	**262**	**3%**
Asian/Pacific Islander	1,400	45%	291	37%	453	43%	1,555	38%	377	28%	**4,076**	**39%**
Other	74	2%	15	2%	24	2%	95	2%	29	2%	**237**	**2%**
Missing	30	1%	9	1%	15	1%	43	1%	14	1%	**111**	**1%**
Language												
Armenian	439	14%	74	9%	83	8%	199	5%	142	11%	**937**	**9%**
East Asian Languages	794	25%	125	16%	252	24%	680	16%	168	13%	**2,019**	**19%**
English	596	19%	199	25%	255	24%	840	20%	332	25%	**2,222**	**21%**
European Languages	105	3%	11	1%	6	1%	44	1%	39	3%	**205**	**2%**
Southeast Asian Languages	173	6%	66	8%	94	9%	298	7%	60	5%	**691**	**7%**
Spanish	766	25%	259	33%	311	29%	1,778	43%	489	37%	**3,603**	**35%**
Other Languages	246	8%	54	7%	56	5%	288	7%	98	7%	**742**	**7%**
Unknown Language	0	0%	1	0%	0	0%	6	0%	2	0%	**9**	**0%**
County												
Alameda	567	18%	164	21%	208	20%	993	24%	270	20%	**2,202**	**21%**
Los Angeles	2,552	82%	625	79%	849	80%	3,140	76%	1,060	80%	**8,226**	**79%**
Aid Code												
Total Disabled	2,597	83%	552	70%	835	79%	3,312	80%	974	73%	**8,270**	**79%**
Total Not Disabled	522	17%	237	30%	222	21%	821	20%	356	27%	**2,158**	**21%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Columns may not add to 100% due to rounding.

Appendix 2, Table 12: Demographic Characteristics of the Population in the 3 New DMPP Aid Codes (14, 24, 64), Column Percentages

	CAD/ADS		Asthma		COPD		Diabetes		CHF		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**7,063**	**100%**	**4,863**	**100%**	**5,200**	**100%**	**8,971**	**100%**	**3,527**	**100%**	**29,624**	**100%**
Age Group												
21-34	125	2%	779	16%	200	4%	536	6%	77	2%	**1,717**	**6%**
35-44	291	4%	697	14%	488	9%	843	9%	178	5%	**2,497**	**8%**
45-54	1,497	21%	1,447	30%	1,698	33%	2,375	26%	967	27%	**7,984**	**27%**
55-64	4,215	60%	1,748	36%	2,495	48%	4,459	50%	1,958	56%	**14,875**	**50%**
65+	935	13%	192	4%	319	6%	758	8%	347	10%	**2,551**	**9%**
Gender												
Female	4,091	58%	3,275	67%	2,350	45%	5,204	58%	2,017	57%	**16,937**	**57%**
Male	2,972	42%	1,588	33%	2,850	55%	3,767	42%	1,510	43%	**12,687**	**43%**
Ethnicity												
White (Total)	4,106	58%	1,560	32%	2,237	43%	2,978	33%	1,571	45%	**12,452**	**42%**
White Armenian	*2,632*	*37%*	*552*	*11%*	*650*	*13%*	*1,327*	*15%*	*798*	*23%*	**5,959**	***20%***
White Other	*1,474*	*21%*	*1,008*	*21%*	*1,587*	*31%*	*1,651*	*18%*	*773*	*22%*	**6,493**	***22%***
Latino	1,002	14%	861	18%	635	12%	2,409	27%	558	16%	**5,465**	**18%**
African American	718	10%	1,371	28%	1,546	30%	1,623	18%	895	25%	**6,153**	**21%**
Asian/Pacific Islander	718	10%	608	13%	396	8%	1,179	13%	270	8%	**3,171**	**11%**
Other	85	1%	107	2%	79	2%	190	2%	54	2%	**515**	**2%**
Missing	434	6%	356	7%	307	6%	592	7%	179	5%	**1,868**	**6%**
Language												
Armenian	2,750	39%	570	12%	673	13%	1,377	15%	822	23%	**6,192**	**21%**
East Asian Languages	211	3%	115	2%	83	2%	276	3%	74	2%	**759**	**3%**
English	1,754	25%	2,311	48%	2,527	49%	3,148	35%	1,493	42%	**11,233**	**38%**
European Languages	271	4%	51	1%	55	1%	134	1%	88	2%	**599**	**2%**
Southeast Asian Languages	191	3%	231	5%	93	2%	348	4%	73	2%	**936**	**3%**
Spanish	666	9%	388	8%	244	5%	1,514	17%	321	9%	**3,133**	**11%**
Other Languages	201	3%	85	2%	70	1%	223	2%	78	2%	**657**	**2%**
Unknown Language	1,019	14%	1,112	23%	1,455	28%	1,951	22%	578	16%	**6,115**	**21%**
County												
Alameda	565	8%	1,163	24%	1,008	19%	1,769	20%	666	19%	**5,171**	**17%**
Los Angeles	6,487	92%	3,693	76%	4,171	80%	7,193	80%	2,856	81%	**24,400**	**82%**
Aid Code												
Total Disabled	842	12%	172	4%	219	4%	708	8%	286	8%	**2,227**	**8%**
Total Not Disabled	6,221	88%	4,691	96%	4,981	96%	8,263	92%	3,241	92%	**27,397**	**92%**

Source: UCLA analysis of MHS PCM data and Medi-Cal eligibility data.

Note: Columns may not add to 100% due to rounding.

Economic and Utilization Outcomes

Appendix 2, Table 13: Total Expenditures by Disease, Year, and Type of Service

		Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
	IP	$ 9,487,172	$3,869,099	$12,707,973	$6,265,209	$ 27,556,024	$11,254,463	$24,763,451	$10,081,922	$ 12,966,628	$ 4,623,439
	ER	$999,376	$355,470	$ 608,756	$343,620	$911,238	$ 371,277	$ 1,294,339	$ 482,074	$738,196	$ 288,100
	OP	$1,472,828	$693,373	$ 1,172,910	$1,450,949	$1,158,885	$ 790,784	$ 1,447,639	$ 893,909	$1,668,094	$ 927,234
Baseline	Rx	$ 26,703,208	$ 13,113,216	$19,981,143	$ 24,602,735	$ 24,028,400	$15,108,131	$39,640,135	$22,434,947	$ 37,625,065	$20,726,275
Year One	Lab/Radio	$1,562,597	$676,461	$ 1,483,056	$1,651,639	$1,412,873	$ 881,066	$ 1,890,259	$ 892,230	$1,974,147	$ 959,108
	Surg/Anesth	$2,341,547	$1,401,927	$ 1,899,546	$1,854,765	$1,867,578	$ 1,516,686	$ 2,656,680	$ 2,080,869	$3,368,985	$ 2,251,569
	Other services	$8,399,205	$3,815,121	$11,789,831	$ 12,195,266	$ 22,140,450	$11,625,695	$22,045,205	$12,429,049	$ 16,969,825	$ 8,333,322
Baseline Year One Total		$ 50,965,634	$ 23,924,667	$49,643,215	$ 48,364,183	$ 79,075,449	$41,548,103	$93,737,708	$49,294,999	$ 75,310,939	$38,109,045
	IP	$ 10,547,241	$3,609,573	$16,418,131	$7,876,077	$ 40,252,864	$14,348,852	$29,507,365	$13,687,206	$ 14,393,391	$ 6,259,054
	ER	$1,166,932	$438,554	$ 705,157	$404,379	$1,205,262	$ 492,702	$ 1,480,504	$ 585,529	$872,753	$ 367,062
	OP	$1,581,939	$768,993	$ 1,302,620	$1,610,281	$1,307,410	$ 877,518	$ 1,594,373	$ 991,368	$1,881,383	$ 1,068,702
Baseline	Rx	$ 30,997,947	$ 15,701,282	$24,340,238	$ 30,090,873	$ 29,786,450	$18,380,968	$46,596,710	$26,702,327	$ 45,982,946	$25,353,361
Year Two	Lab/Radio	$2,077,967	$1,022,426	$ 2,033,903	$2,328,086	$1,958,297	$ 1,312,587	$ 2,531,088	$ 1,317,985	$2,642,707	$ 1,435,047
	Surg/Anesth	$2,793,461	$2,067,655	$ 2,346,422	$2,994,245	$2,334,826	$ 2,262,409	$ 3,296,695	$ 2,931,709	$4,153,339	$ 3,789,038
	Other services	$ 10,023,962	$5,336,228	$14,967,326	$ 15,547,078	$ 30,460,672	$15,635,121	$27,141,007	$15,921,992	$ 21,254,018	$10,964,005
Baseline Year Two Total		$ 59,189,450	$ 28,944,711	$62,113,796	$ 60,851,018	$107,305,781	$53,310,156	$ 112,147,742	$62,138,115	$ 91,180,537	$49,236,269
	IP	$ 12,895,083	$5,424,127	$18,925,285	$9,756,829	$ 47,039,894	$22,459,561	$33,955,301	$17,998,059	$ 15,671,854	$ 8,229,360
	ER	$1,484,070	$584,453	$ 959,619	$551,465	$1,588,420	$ 623,933	$ 1,804,850	$ 823,806	$1,127,898	$ 479,174
	OP	$1,614,843	$799,846	$ 1,367,342	$1,699,229	$1,359,899	$ 929,775	$ 1,654,732	$ 1,037,519	$2,010,513	$ 1,189,558
Baseline	Rx	$ 36,505,290	$ 17,921,428	$28,842,028	$ 35,102,598	$ 35,450,129	$22,064,412	$53,636,111	$30,493,017	$ 55,240,105	$30,392,706
Year Three	Lab/Radio	$2,186,454	$1,098,572	$ 2,203,960	$2,490,932	$2,167,820	$ 1,382,707	$ 2,741,519	$ 1,422,932	$2,951,478	$ 1,640,208
	Surg/Anesth	$3,182,980	$2,150,949	$ 2,851,528	$3,423,647	$2,858,724	$ 2,499,232	$ 3,878,095	$ 2,972,710	$5,202,356	$ 4,557,232
	Other services	$ 11,350,501	$6,092,122	$18,211,334	$ 17,758,158	$ 36,724,430	$19,088,852	$31,227,044	$18,522,434	$ 24,224,738	$12,199,198
Baseline Year Three Total		$ 69,219,221	$ 34,071,497	$73,361,097	$ 70,782,858	$127,189,317	$69,048,473	$ 128,897,653	$73,270,478	$106,428,940	$58,687,436
	IP	$ 12,487,858	$4,688,907	$14,823,541	$8,405,263	$ 33,383,635	$15,500,249	$24,667,806	$12,422,698	$ 18,199,067	$ 8,988,240
	ER	$1,508,086	$597,095	$ 990,652	$542,201	$1,106,033	$ 489,665	$ 1,469,637	$ 627,973	$1,591,936	$ 716,829
	OP	$1,355,626	$631,400	$ 1,122,479	$1,326,214	$738,413	$ 504,803	$ 1,088,493	$ 623,373	$2,144,483	$ 1,367,041
Program	Rx	$ 37,048,134	$ 16,769,467	$27,600,529	$ 31,794,055	$ 21,519,881	$13,040,359	$42,891,516	$21,598,726	$ 71,774,209	$43,012,435
Year One	Lab/Radio	$1,828,122	$898,533	$ 1,899,866	$2,186,938	$1,187,169	$ 768,762	$ 1,869,542	$ 955,241	$3,183,189	$ 2,090,923
	Surg/Anesth	$2,789,965	$1,708,060	$ 2,398,147	$2,340,012	$1,713,096	$ 1,252,502	$ 2,886,914	$ 1,793,508	$5,708,610	$ 4,799,016
	Other services	$8,570,360	$4,422,204	$ 8,875,006	$ 10,690,710	$ 10,422,718	$ 5,924,883	$12,352,668	$ 7,239,404	$ 14,584,313	$ 9,902,512
Program Year One Total		$ 65,588,151	$ 29,715,666	$57,710,220	$ 57,285,394	$ 70,070,945	$37,481,224	$87,226,576	$45,260,923	$117,185,806	$70,876,998

		Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
	IP	$ 11,857,414	$5,324,993	$14,249,068	$7,782,807	$ 32,497,484	$14,429,205	$27,220,254	$11,757,421	$ 15,461,360	$ 7,603,833
	ER	$1,407,444	$574,381	$ 809,562	$455,299	$1,051,737	$ 480,034	$ 1,562,272	$ 600,209	$1,239,380	$ 512,765
	OP	$1,402,626	$693,452	$ 1,094,343	$1,281,698	$861,901	$ 575,732	$ 1,283,423	$ 763,664	$1,844,501	$ 1,149,300
Program	Rx	$ 37,593,135	$ 18,113,663	$26,302,673	$ 32,242,518	$ 25,040,398	$14,525,279	$49,108,223	$24,922,272	$ 61,464,668	$35,745,272
Year Two	Lab/Radio	$2,041,161	$1,050,803	$ 1,875,569	$2,102,162	$1,381,265	$ 956,351	$ 2,258,163	$ 1,194,179	$2,804,229	$ 1,795,798
	Surg/Anesth	$3,226,739	$1,984,718	$ 2,487,719	$2,602,425	$2,148,065	$ 1,698,345	$ 3,670,613	$ 2,379,341	$5,307,166	$ 4,482,311
	Other services	$9,404,040	$4,329,455	$ 8,342,996	$8,792,507	$ 10,736,426	$ 6,310,912	$13,740,150	$ 7,529,829	$ 12,469,013	$ 7,798,403
Program Year Two Total		$ 66,932,558	$ 32,071,466	$55,161,931	$ 55,259,415	$ 73,717,276	$38,975,858	$98,843,098	$49,146,916	$100,590,316	$59,087,682
	IP	$ 13,665,626	$5,417,239	$15,072,931	$7,774,884	$ 42,192,489	$15,844,804	$32,439,245	$13,798,427	$ 16,332,406	$ 7,570,331
	ER	$1,490,098	$568,066	$ 886,799	$490,252	$1,198,302	$ 496,824	$ 1,780,581	$ 683,395	$1,144,158	$ 503,915
	OP	$1,304,447	$726,253	$ 1,008,081	$1,299,539	$906,246	$ 632,190	$ 1,233,875	$ 833,096	$1,600,342	$ 1,002,997
Program	Rx	$ 35,609,369	$ 20,028,995	$24,911,658	$ 35,408,091	$ 28,084,568	$16,816,169	$50,484,932	$28,521,340	$ 54,152,168	$32,884,645
Year Three	Lab/Radio	$2,166,031	$1,239,583	$ 1,874,392	$2,313,781	$1,600,899	$ 1,132,498	$ 2,466,788	$ 1,401,065	$2,749,010	$ 1,709,727
	Surg/Anesth	$3,496,750	$2,376,843	$ 2,501,902	$2,972,908	$2,297,026	$ 2,162,731	$ 4,338,828	$ 2,941,317	$5,206,622	$ 4,300,861
	Other services	$8,430,124	$3,992,024	$ 7,873,376	$7,873,358	$ 12,389,702	$ 6,350,375	$14,282,166	$ 7,441,595	$ 10,632,163	$ 6,151,444
Program Year Three Total		$ 66,162,446	$ 34,349,004	$54,129,139	$ 58,132,814	$ 88,669,230	$43,435,590	$ 107,026,415	$55,620,235	$ 91,816,869	$54,123,921
6-year Total		$378,057,460	$183,077,012	$ 352,119,397	$350,675,681	$546,027,998	$ 283,799,405	$ 627,879,191	$ 334,731,666	$582,513,407	$ 330,121,351

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 14: Percentage of Enrollees Using Service by Disease, Year, and Type of Service

		Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Baseline Year One	IP	12.5%	13.4%	20.2%	15.2%	33.3%	30.5%	24.7%	23.3%	10.1%	9.8%
	ER	34.1%	32.4%	28.1%	21.2%	36.5%	30.8%	37.2%	31.7%	22.7%	20.8%
	OP	78.5%	76.5%	81.0%	86.3%	79.4%	79.1%	74.3%	74.6%	75.3%	73.0%
	Rx	92.9%	93.4%	92.2%	94.1%	92.4%	92.7%	94.0%	94.4%	91.0%	89.6%
	Lab/Radio	72.5%	71.5%	78.6%	84.1%	78.4%	77.2%	75.1%	73.0%	75.5%	73.2%
	Surg/Anesth	36.7%	45.4%	40.6%	50.8%	39.7%	49.7%	39.5%	46.5%	36.6%	44.5%
Baseline Year Two	IP	13.1%	12.7%	20.9%	16.5%	36.4%	34.1%	25.7%	25.8%	10.8%	9.4%
	ER	35.4%	33.5%	28.8%	21.1%	39.4%	32.3%	38.4%	33.1%	23.5%	20.6%
	OP	80.0%	77.7%	82.5%	87.3%	81.7%	82.1%	76.6%	76.4%	77.1%	72.9%
	Rx	94.7%	93.3%	94.2%	94.4%	94.8%	93.7%	94.9%	95.6%	93.1%	89.8%
	Lab/Radio	75.6%	75.6%	82.0%	87.2%	82.5%	83.0%	79.0%	80.3%	79.5%	76.6%
	Surg/Anesth	38.8%	48.1%	43.5%	52.4%	41.5%	52.3%	42.0%	50.4%	38.5%	47.6%
Baseline Year Three	IP	13.3%	13.8%	22.9%	16.8%	40.9%	37.7%	26.5%	28.1%	11.1%	10.9%
	ER	38.0%	35.0%	31.6%	22.2%	42.4%	33.6%	39.9%	33.2%	26.5%	22.3%
	OP	79.4%	78.7%	85.0%	89.8%	83.4%	84.4%	76.9%	79.1%	78.6%	77.9%
	Rx	96.0%	95.9%	97.1%	97.4%	97.5%	97.1%	96.8%	96.8%	96.3%	94.2%
	Lab/Radio	77.0%	78.5%	85.5%	89.5%	84.8%	86.5%	80.0%	81.7%	83.0%	82.1%
	Surg/Anesth	40.3%	49.2%	45.8%	53.9%	44.8%	53.5%	43.5%	52.0%	41.9%	51.2%
Program Year One	IP	11.0%	11.6%	16.4%	13.3%	35.1%	32.9%	21.6%	23.2%	8.4%	8.8%
	ER	34.0%	29.6%	27.1%	18.2%	35.2%	28.4%	34.1%	28.5%	22.5%	18.0%
	OP	69.5%	67.0%	71.2%	79.8%	69.9%	74.6%	66.5%	66.9%	67.6%	67.8%
	Rx	88.9%	88.9%	87.5%	92.4%	88.0%	90.7%	89.5%	90.9%	88.1%	89.1%
	Lab/Radio	64.7%	64.3%	69.7%	75.6%	69.9%	72.0%	68.9%	67.7%	70.2%	69.7%
	Surg/Anesth	35.3%	40.2%	36.8%	44.4%	35.4%	45.0%	38.7%	43.2%	36.0%	43.1%
Program Year Two	IP	10.3%	9.7%	14.2%	11.0%	29.9%	23.5%	20.2%	18.3%	8.1%	7.3%
	ER	33.7%	25.1%	25.8%	15.8%	34.2%	22.8%	33.7%	23.5%	21.5%	15.3%
	OP	67.5%	62.1%	70.0%	71.3%	69.5%	62.5%	64.9%	60.6%	64.8%	59.2%
	Rx	87.9%	82.4%	87.1%	82.5%	88.4%	76.5%	89.5%	82.3%	87.1%	78.0%
	Lab/Radio	64.8%	60.8%	68.9%	68.3%	70.1%	61.8%	68.4%	62.0%	67.9%	61.6%
	Surg/Anesth	36.9%	39.4%	38.6%	40.7%	38.5%	39.5%	39.9%	40.0%	36.9%	39.0%
Program Year Three	IP	9.6%	10.2%	13.3%	11.3%	28.1%	25.5%	19.2%	19.7%	7.5%	7.2%
	ER	32.9%	25.8%	24.6%	18.0%	33.3%	25.9%	34.6%	25.5%	20.9%	17.0%
	OP	64.7%	65.0%	68.0%	77.2%	68.9%	72.2%	62.6%	65.7%	61.8%	62.3%
	Rx	88.0%	86.6%	87.7%	89.2%	89.2%	88.1%	89.8%	88.5%	87.2%	84.8%
	Lab/Radio	64.5%	66.3%	69.1%	75.2%	70.3%	72.3%	68.1%	68.3%	67.0%	66.0%
	Surg/Anesth	38.5%	43.4%	40.2%	43.3%	38.2%	47.0%	41.2%	43.1%	38.1%	41.6%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 15: Utilization Rates per Person-Year (12 member months) by Disease, Year, and Type of Service

		Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Baseline Year One	IP	0.204	0.221	0.338	0.256	0.694	0.642	0.482	0.568	0.161	0.164
	ER	0.966	0.844	0.686	0.428	1.099	0.850	1.102	0.891	0.500	0.461
	OP	6.228	6.608	6.984	8.629	7.195	8.279	5.816	6.650	5.259	5.798
	Rx	51.268	54.432	55.047	65.700	71.043	73.340	63.221	64.667	50.035	55.015
	Lab/Radio	4.478	5.083	5.561	7.143	6.323	6.934	5.170	5.498	4.774	5.379
	Surg/Anesth	1.938	2.515	2.066	2.319	2.184	2.984	2.119	3.121	1.955	2.570
Baseline Year Two	IP	0.201	0.201	0.337	0.260	0.758	0.739	0.508	0.595	0.166	0.152
	ER	1.006	0.895	0.693	0.416	1.198	0.914	1.130	0.909	0.494	0.450
	OP	6.181	6.713	6.926	8.613	7.288	8.358	5.942	6.929	5.275	5.826
	Rx	52.973	56.629	57.817	69.634	76.273	78.698	66.463	68.662	53.087	56.046
	Lab/Radio	4.989	5.903	6.186	7.861	7.224	8.130	5.766	6.435	5.124	5.878
	Surg/Anesth	2.109	2.947	2.279	2.696	2.372	3.456	2.436	3.688	2.110	3.030
Baseline Year Three	IP	0.205	0.227	0.376	0.289	0.875	0.887	0.505	0.628	0.172	0.175
	ER	1.057	0.925	0.791	0.427	1.277	0.918	1.205	1.003	0.541	0.467
	OP	5.941	6.545	6.800	8.632	7.048	8.407	5.853	7.010	5.175	5.904
	Rx	57.134	61.367	64.535	77.890	84.481	88.376	72.378	75.399	59.138	62.844
	Lab/Radio	4.863	5.854	6.298	7.843	7.431	8.399	5.773	6.448	5.199	5.914
	Surg/Anesth	2.211	2.716	2.516	2.735	2.674	3.429	2.669	3.459	2.363	3.183
Program Year One	IP	0.192	0.215	0.308	0.246	0.883	0.866	0.456	0.602	0.146	0.157
	ER	1.044	0.941	0.736	0.403	1.274	1.027	1.121	0.967	0.558	0.445
	OP	5.177	5.729	5.808	7.663	6.156	7.733	5.066	6.197	4.606	5.488
	Rx	57.353	60.886	60.744	78.746	79.245	86.552	71.235	73.309	61.171	69.957
	Lab/Radio	4.243	5.033	5.427	7.352	6.245	7.690	4.987	5.950	4.650	5.870
	Surg/Anesth	2.027	2.326	2.183	2.211	2.446	2.942	2.598	3.032	2.143	2.732
Program Year Two	IP	0.174	0.198	0.277	0.229	0.749	0.721	0.440	0.524	0.143	0.145
	ER	1.032	0.881	0.731	0.391	1.248	0.957	1.156	0.856	0.545	0.415
	OP	5.247	5.893	5.940	7.466	6.265	7.485	5.276	6.474	4.515	5.236
	Rx	57.472	62.009	62.853	80.776	82.073	85.947	72.187	73.369	60.340	66.553
	Lab/Radio	4.502	5.664	5.528	7.288	6.272	7.754	5.265	6.262	4.624	5.711
	Surg/Anesth	2.273	2.457	2.427	2.361	2.754	3.200	2.894	3.190	2.333	2.803
Program Year Three	IP	0.165	0.190	0.263	0.212	0.723	0.681	0.411	0.526	0.126	0.128
	ER	1.021	0.829	0.742	0.412	1.204	0.869	1.202	0.837	0.522	0.430
	OP	4.805	5.760	5.546	7.306	5.938	7.606	4.665	6.316	4.100	4.949
	Rx	56.151	62.596	61.258	82.696	81.450	89.195	71.332	75.853	58.396	65.673
	Lab/Radio	4.561	5.948	5.602	7.659	6.458	8.371	5.218	6.544	4.533	5.650
	Surg/Anesth	2.395	2.632	2.503	2.345	2.737	3.367	3.088	3.313	2.381	2.657

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 16: Average PMPM by Year and Primary Condition for the Population in the 3 New DMPP Aid Codes Only

	Asthma		CAD/ADS		CHF		COPD		Diabetes	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Program Year Two (Baseline)	$551	$572	$592	$633	$1,099	$981	$850	$704	$488	$434
Program Year Three	$489	$512	$543	$576	$1,311	$1,066	$780	$782	$467	$408

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Note: the new Aid Codes were added to the DMPP population at the start of Program Year Three. Therefore, Program Year Two constitutes a pre-period baseline measurement for this group.

Appendix 2, Table 17: Expenditures by Primary Condition and Risk Level (Average PMPM) for the Population in the 3 New DMPP Aid Codes Only

		Asthma		CAD/ADS		CHF		COPD		Diabetes	
		Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Program Year Two (Baseline)	RL One	$266	$257	$226	$242	$286	$268	$273	$225	$150	$146
	RL Two	$476	$551	$526	$646	$838	$922	$635	$742	$401	$415
	RL Three	$1,582	$1,679	$1,962	$1,964	$3,869	$3,333	$2,864	$2,093	$1,519	$1,352
	Overall	$551	$572	$592	$633	$1,099	$981	$850	$704	$488	$434
Program Year Three	RL One	$289	$296	$267	$287	$353	$329	$307	$282	$193	$179
	RL Two	$442	$517	$469	$625	$850	$889	$575	$742	$355	$390
	RL Three	$1,345	$1,434	$1,939	$1,830	$4,539	$3,594	$2,485	$2,560	$1,383	$1,218
	Overall	$489	$512	$543	$576	$1,311	$1,066	$780	$782	$467	$408

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Note: the new Aid Codes were added to the DMPP population at the start of Program Year Three. Therefore, Program Year Two constitutes a pre-period baseline measurement for this group.

Clinical Outcomes Findings

Complete Clinical Findings for Beneficiaries with Asthma

Appendix 2, Table 18: Claims Based Clinical Indices for Beneficiaries with Asthma by Year and Group

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**7,148**	**3,118**	**8,234**	**3,674**	**8,783**	**3,944**	**7,487**	**3,077**	**7,379**	**2,909**	**7,725**	**3,452**
Corticosteroid Rx												
Proportion	40.7%	36.1%	42.3%	37.1%	42.6%	37.6%	46.1%	42.3%	40.0%	39.3%	38.3%	37.6%
95% CI	(39.5%, 41.8%)	(34.4%, 37.8%)	(41.2%, 43.4%)	(35.5%, 38.7%)	(41.5%, 43.6%)	(36.1%, 39.1%)	(44.9%, 47.2%)	(40.5%, 44.0%)	(38.9%, 41.1%)	(37.5%, 41.1%)	(37.2%, 39.4%)	(36.0%, 39.2%)
Corticosteroid Rx (continuous supply)												
Proportion	5.1%	5.3%	5.7%	5.6%	7.1%	6.4%	8.6%	8.6%	7.9%	8.5%	7.8%	8.1%
95% CI	(4.6%, 5.6%)	(4.6%, 6.2%)	(5.2%, 6.2%)	(4.8%, 6.3%)	(6.5%, 7.6%)	(5.7%, 7.3%)	(8.0%, 9.3%)	(7.6%, 9.6%)	(7.3%, 8.6%)	(7.5%, 9.6%)	(7.2%, 8.5%)	(7.2%, 9.1%)
Long Acting Beta Agonist Rx												
Proportion	23.4%	18.0%	24.1%	18.6%	23.7%	19.2%	28.0%	23.9%	23.5%	21.4%	22.0%	20.7%
95% CI	(22.4%, 24.4%)	(16.6%, 19.4%)	(23.2%, 25.0%)	(17.4%, 19.9%)	(22.8%, 24.6%)	(18.0%, 20.5%)	(27.0%, 29.0%)	(22.4%, 25.5%)	(22.5%, 24.4%)	(19.9%, 22.9%)	(21.1%, 22.9%)	(19.3%, 22.1%)
Short Acting Beta Agonist Rx												
Proportion	58.8%	48.1%	60.1%	49.2%	57.1%	48.5%	60.1%	51.4%	55.0%	47.7%	52.8%	45.1%
95% CI	(57.6%, 59.9%)	(46.3%, 49.8%)	(59.0%, 61.1%)	(47.5%, 50.8%)	(56.1%, 58.1%)	(47.0%, 50.1%)	(59.0%, 61.2%)	(49.6%, 53.2%)	(53.9%, 56.1%)	(45.8%, 49.5%)	(51.6%, 53.9%)	(43.5%, 46.8%)
Flu Vaccination												
Proportion	6.6%	5.4%	7.8%	8.9%	12.3%	10.0%	15.0%	12.3%	17.5%	13.2%	13.4%	12.0%
95% CI	(6.0%, 7.2%)	(4.6%, 6.2%)	(7.2%, 8.4%)	(7.9%, 9.8%)	(11.6%, 13.0%)	(9.1%, 11.0%)	(14.2%, 15.8%)	(11.1%, 13.5%)	(16.6%, 18.3%)	(12.0%, 14.5%)	(12.6%, 14.1%)	(10.9%, 13.1%)

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 19: Demographic Characteristics of Beneficiaries with Asthma in Claims Based Clinical Analysis

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**7,148**	**3,118**	**8,234**	**3,674**	**8,783**	**3,944**	**7,487**	**3,077**	**7,379**	**2,909**	**7,725**	**3,452**
Age Group (%)												
22-34	13.9%	11.4%	13.9%	11.0%	13.7%	11.5%	12.4%	11.0%	13.7%	10.6%	14.1%	11.8%
35-44	20.1%	15.4%	18.8%	14.8%	17.1%	13.1%	15.5%	12.3%	14.5%	12.4%	15.0%	11.9%
45-54	32.6%	31.9%	31.8%	30.5%	31.0%	28.7%	30.8%	29.5%	29.9%	27.5%	28.7%	25.1%
55-64	30.5%	37.6%	31.3%	39.6%	31.8%	39.3%	34.2%	40.8%	34.5%	42.3%	34.9%	43.2%
65+	3.0%	3.7%	4.3%	4.2%	6.4%	7.3%	7.1%	6.4%	7.4%	7.2%	7.3%	8.1%
Gender (%)												
Female	72.1%	69.4%	71.3%	69.2%	71.1%	68.5%	71.1%	68.1%	70.0%	70.0%	69.0%	68.9%
Male	27.9%	30.6%	28.7%	30.8%	28.9%	31.5%	28.9%	31.9%	30.0%	30.0%	31.0%	31.1%
Ethnicity (%)												
White	34.7%	33.3%	34.7%	32.6%	34.9%	32.3%	35.5%	32.1%	34.0%	34.6%	32.9%	35.7%
Latino	12.3%	16.6%	12.5%	17.0%	13.2%	17.4%	12.1%	16.1%	13.5%	17.1%	14.1%	17.7%
African American	18.4%	25.8%	19.1%	26.5%	18.9%	27.0%	19.9%	28.5%	19.1%	25.7%	19.9%	25.0%
Asian/Pacific Islander	22.3%	15.0%	21.5%	14.4%	20.8%	14.0%	21.2%	14.4%	21.8%	14.6%	21.3%	13.5%
Other	4.1%	3.0%	3.9%	2.8%	3.8%	2.7%	3.1%	2.8%	3.1%	2.3%	3.0%	2.1%
Unknown	8.3%	6.3%	8.3%	6.7%	8.4%	6.7%	8.3%	6.1%	8.5%	5.6%	8.7%	6.0%
Language (%)												
English	41.6%	38.0%	43.7%	39.8%	45.2%	41.1%	47.4%	42.8%	50.2%	42.5%	53.9%	43.5%
Spanish	2.4%	7.2%	2.6%	7.8%	3.0%	8.1%	2.3%	6.9%	2.6%	7.9%	2.9%	8.6%
European Languages	1.4%	0.9%	1.4%	0.9%	1.4%	0.9%	1.3%	1.2%	1.5%	1.2%	1.5%	1.2%
East Asian Languages	1.0%	2.5%	0.9%	2.5%	0.9%	2.7%	0.9%	2.3%	0.8%	2.5%	0.9%	2.4%
Southeast Asian Languages	10.6%	5.2%	10.4%	5.2%	10.1%	4.9%	11.1%	5.8%	12.0%	6.5%	12.1%	6.0%
Other Languages	2.0%	14.8%	2.1%	14.1%	2.0%	14.0%	2.1%	13.0%	2.4%	16.3%	2.4%	18.2%
Unknown Language	40.9%	31.3%	38.9%	29.7%	37.4%	28.3%	35.0%	27.9%	30.6%	23.0%	26.3%	20.1%
County (%)												
Los Angeles	78.8%	74.1%	79.0%	74.4%	79.2%	74.0%	79.3%	72.4%	79.1%	75.0%	78.5%	75.1%
Alameda	21.2%	25.9%	21.0%	25.6%	20.8%	26.0%	20.7%	27.6%	20.9%	25.0%	21.5%	24.9%
Disabled (%)												
No	2.6%	3.7%	3.0%	3.6%	3.0%	3.6%	2.9%	2.9%	2.9%	3.0%	2.7%	4.0%
Yes	97.4%	96.3%	97.0%	96.4%	97.0%	96.4%	97.1%	97.1%	97.1%	97.0%	97.3%	96.0%
Comorbidity (%)												
No	56.9%	50.0%	58.7%	52.6%	59.2%	53.7%	50.8%	55.9%	49.5%	44.8%	50.1%	44.8%
Yes	43.1%	50.0%	41.3%	47.4%	40.8%	46.3%	49.2%	44.1%	50.5%	55.2%	49.9%	55.2%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 20: Self-Reported Change in Asthma Clinical Outcomes from First to Last Assessment, by Number of Assessments Completed

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times

Maximum Number of Respondents (N)	**545**	**232**			**113**			**86**		
	Statistic (Respondents)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Fourth Assessment Statistic** (Respondents)	Change (Significance)
Has Asthma Action Plan	**6.0%** (545)	**7.3%** (232)	**13.7%** (232)	**6.4%(***)**	**8.8%** (113)	**17.6%** (113)	**8.8%(***)**	**1.1%** (86)	**27.9%** (86)	**26.7%(***)**
Self-Reported Health Status	**2.30** (545)	**2.28** (232)	**2.39** (232)	**0.11(*)**	**2.22** (113)	**2.32** (113)	0.10	**2.26** (86)	**2.37** (86)	0.12
Treated for Depression	**49.5%** (545)	**48.2%** (232)	**50.8%** (232)	2.5%	**61.0%** (113)	**65.4%** (113)	4.4%	**63.9%** (86)	**62.7%** (86)	-1.1%
Functionally Limited	**98.1%** (545)	**99.1%** (232)	**98.2%** (232)	-0.8%	**99.1%** (113)	**100.0%** (113)	0.8%	**98.8%** (86)	**100.0%** (86)	1.1%
Use Rescue Inhaler Daily	**40.2%** (425)	**46.7%** (184)	**33.1%** (184)	**-13.5%(***)**	**40.2%** (92)	**33.6%** (92)	-6.5%	**45.7%** (70)	**47.1%** (70)	1.4%
Use Rescue Inhaler Seasonally	**57.6%** (151)	**77.4%** (31)	**74.1%** (31)	-3.2%				**54.5%** (11)	**54.5%** (11)	0.0%
Know Asthma Triggers	**81.8%** (545)	**78.4%** (232)	**79.7%** (232)	1.2%	**80.5%** (113)	**82.3%** (113)	1.7%	**80.2%** (86)	**88.3%** (86)	8.1%
Use Peak Flow Meter	**11.1%** (333)	**8.5%** (128)	**14.0%** (128)	**5.4%(*)**	**22.8%** (57)	**19.2%** (57)	-3.5%	**14.2%** (14)	**42.8%** (14)	**28.5%(**)**
Mean Days of Work or School Missed due to Asthma	**0.88** (43)									

Source: UCLA Analysis of MHS Clinical Assessments

Notes: (1) Measures with fewer than 11 respondents are blinded due to insufficient sample size.

(2) Statistically significant differences are denoted at three levels: *10% **5% ***1%

Appendix 2, Table 21: Demographic Characteristics of Beneficiaries with Asthma in Assessment-based Clinical Analysis

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times
Total (N)	**545**	**232**	**113**	**86**
Age Group (%)				
22-34	9.6%	9.0%	6.0%	4.7%
35-44	8.5%	9.0%	9.0%	9.3%
45-54	23.2%	23.0%	17.6%	24.4%
55-64	35.0%	29.0%	35.2%	40.7%
65+	23.6%	29.9%	32.2%	20.9%
Gender (%)				
Female	57.0%	56.8%	55.8%	57.0%
Male	43.0%	43.2%	44.2%	43.0%
Ethnicity (%)				
White	25.2%	23.4%	22.6%	29.1%
Latino	26.3%	26.5%	32.2%	18.6%
African American	25.6%	27.4%	22.6%	32.6%
Asian/Pacific Island	13.5%	14.6%	13.6%	8.1%
Other	1.4%	1.9%	2.5%	2.3%
Unknown	8.0%	6.3%	6.5%	9.3%
Language (%)				
Armenian	7.3%	6.3%	6.5%	7.0%
East Asian Languages	4.8%	4.9%	5.0%	3.5%
English	49.9%	51.3%	47.7%	54.7%
European Languages	0.7%	0.7%	0.5%	1.2%
Other Languages	2.9%	3.2%	5.0%	3.5%
Southeast Asian Languages	3.9%	2.6%	3.5%	1.2%
Spanish	18.8%	19.0%	22.1%	14.0%
Unknown Language	11.7%	12.1%	9.5%	15.1%
County (%)				
Los Angeles	78.8%	76.6%	80.4%	72.1%
Alameda	20.5%	23.0%	19.6%	26.7%
Unknown	0.7%	0.5%	0.0%	1.2%
Disabled (%)				
No	21.7%	26.2%	28.6%	15.1%
Yes	78.3%	73.8%	71.4%	84.9%

Source: UCLA Analysis of MHS Clinical Assessments and Medi-Cal eligibility data

Complete Clinical Findings for Beneficiaries with COPD

Appendix 2, Table 22: Claims-Based Clinical Indices for Beneficiaries with COPD by Year and Group

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**7,358**	**4,080**	**8,365**	**4,604**	**8,861**	**4,777**	**5,777**	**2,750**	**6,343**	**2,859**	**7,226**	**3,594**
Long Acting Beta Agonist Rx												
Proportion	23.4%	17.6%	24.8%	18.5%	25.9%	20.4%	29.9%	24.1%	29.0%	25.5%	28.3%	26.7%
95% CI	(22.4%, 24.3%)	(16.5%, 18.8%)	(23.9%, 25.7%)	(17.4%, 19.7%)	(25.0%, 26.8%)	(19.3%, 21.6%)	(28.7%, 31.1%)	(22.5%, 25.8%)	(27.8%, 30.1%)	(23.9%, 27.1%)	(27.3%, 29.4%)	(25.2%, 28.1%)
Short Acting Beta Agonist Rx												
Proportion	50.0%	40.7%	50.7%	41.4%	50.7%	43.0%	51.4%	46.5%	50.5%	45.0%	50.2%	43.5%
95% CI	(48.8%, 51.1%)	(39.1%, 42.2%)	(49.7%, 51.8%)	(40.0%, 42.9%)	(49.7%, 51.8%)	(41.5%, 44.4%)	(50.1%, 52.7%)	(44.6%, 48.4%)	(49.3%, 51.8%)	(43.1%, 46.8%)	(49.1%, 51.4%)	(41.9%, 45.2%)
Flu Vaccination												
Proportion	7.9%	5.7%	10.5%	8.9%	17.2%	13.6%	34.6%	32.7%	30.4%	26.7%	20.2%	17.8%
95% CI	(7.3%, 8.5%)	(5.0%, 6.4%)	(9.9%, 11.2%)	(8.1%, 9.7%)	(16.5%, 18.0%)	(12.6%, 14.6%)	(33.4%, 35.8%)	(31.0%, 34.5%)	(29.2%, 31.5%)	(25.1%, 28.4%)	(19.3%, 21.1%)	(16.5%, 19.1%)
Blood Gas or Oxymetry												
Proportion	14.5%	12.4%	13.1%	10.2%	13.5%	10.5%	13.0%	11.3%	12.2%	9.4%	5.3%	3.1%
95% CI	(13.7%, 15.3%)	(11.4%, 13.5%)	(12.4%, 13.9%)	(9.3%, 11.1%)	(12.8%, 14.3%)	(9.6%, 11.4%)	(12.2%, 13.9%)	(10.1%, 12.6%)	(11.4%, 13.0%)	(8.4%, 10.6%)	(4.8%, 5.8%)	(2.5%, 3.7%)
Corticosteriod Rx												
Proportion	35.5%	28.0%	37.4%	29.1%	39.1%	32.2%	42.2%	36.5%	41.2%	35.5%	40.6%	36.7%
95% CI	(34.4%, 36.6%)	(26.6%, 29.4%)	(36.4%, 38.5%)	(27.8%, 30.4%)	(38.0%, 40.1%)	(30.9%, 33.5%)	(40.9%, 43.5%)	(34.7%, 38.3%)	(39.9%, 42.4%)	(33.7%, 37.3%)	(39.4%, 41.7%)	(35.1%, 38.3%)
Antibotic Rx												
Proportion	62.8%	63.4%	60.7%	63.6%	58.7%	61.9%	58.3%	59.3%	56.7%	62.0%	54.0%	57.5%
95% CI	(61.7%, 63.9%)	(61.9%, 64.9%)	(59.6%, 61.7%)	(62.2%, 65.0%)	(57.6%, 59.7%)	(60.5%, 63.3%)	(57.0%, 59.6%)	(57.4%, 61.1%)	(55.5%, 58.0%)	(60.2%, 63.8%)	(52.9%, 55.2%)	(55.9%, 59.2%)

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 23: Demographic Characteristics of Beneficiaries with COPD in Claims Based Clinical Analysis

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**7,358**	**4,080**	**8,365**	**4,604**	**8,861**	**4,777**	**5,777**	**2,750**	**6,343**	**2,859**	**7,226**	**3,594**
Age Group (%)												
22-34	4.0%	3.1%	3.8%	2.8%	3.7%	2.7%	3.1%	2.4%	3.4%	2.2%	3.8%	2.1%
35-44	12.8%	10.5%	11.2%	9.1%	9.6%	7.7%	8.8%	6.5%	8.2%	6.1%	8.0%	6.3%
45-54	35.7%	33.3%	33.9%	31.3%	31.5%	29.2%	31.3%	27.5%	31.4%	27.0%	29.2%	24.7%
55-64	43.3%	46.8%	45.6%	49.5%	46.3%	49.2%	47.2%	53.9%	46.9%	54.0%	49.0%	54.7%
65+	4.2%	6.2%	5.6%	7.3%	8.9%	11.3%	9.6%	9.7%	10.1%	10.7%	10.1%	12.2%
Gender (%)												
Female	53.4%	46.6%	53.2%	46.0%	52.9%	45.9%	52.5%	46.3%	53.8%	47.7%	53.7%	47.1%
Male	46.6%	53.4%	46.8%	54.0%	47.1%	54.1%	47.5%	53.7%	46.2%	52.3%	46.3%	52.9%
Ethnicity (%)												
White	52.9%	44.8%	52.8%	44.7%	52.8%	44.7%	55.4%	46.4%	53.3%	46.3%	51.7%	46.8%
Latino	9.6%	11.5%	9.7%	11.8%	9.9%	11.8%	9.4%	11.0%	9.9%	11.8%	10.8%	10.8%
African American	17.3%	27.0%	17.1%	27.2%	17.1%	27.2%	16.6%	27.4%	16.9%	26.2%	17.8%	27.4%
Asian/Pacific Islander	9.1%	8.5%	9.3%	8.2%	9.2%	8.4%	7.8%	7.4%	8.9%	8.3%	8.5%	8.2%
Other	2.2%	1.9%	2.2%	1.8%	2.1%	1.9%	1.9%	2.1%	2.0%	2.0%	2.2%	1.6%
Unknown	8.9%	6.3%	9.0%	6.2%	8.9%	6.1%	8.9%	5.6%	9.0%	5.5%	9.0%	5.2%
Language (%)												
English	44.6%	38.8%	46.9%	40.6%	48.5%	41.6%	50.3%	42.7%	53.6%	43.2%	58.0%	46.3%
Spanish	2.0%	4.7%	2.1%	5.0%	2.4%	5.1%	2.5%	4.3%	2.4%	5.1%	2.8%	4.2%
European Languages	0.8%	1.3%	0.9%	1.3%	0.9%	1.3%	1.0%	1.7%	1.0%	1.6%	0.9%	1.6%
East Asian Languages	0.5%	2.1%	0.6%	2.0%	0.7%	2.1%	0.6%	1.7%	0.5%	2.2%	0.4%	2.2%
Southeast Asian Languages	3.8%	2.0%	3.9%	1.9%	3.8%	1.9%	3.1%	1.9%	4.1%	2.5%	4.2%	2.2%
Other Languages	1.2%	14.8%	1.2%	14.9%	1.2%	15.0%	1.1%	14.5%	1.2%	17.5%	1.4%	19.0%
Unknown Language	47.1%	36.4%	44.4%	34.3%	42.5%	32.9%	41.5%	33.2%	37.3%	27.9%	32.3%	24.5%
County (%)												
Los Angeles	84.5%	80.7%	84.5%	80.9%	84.2%	80.8%	83.9%	78.0%	84.1%	80.0%	83.5%	80.5%
Alameda	15.5%	19.3%	15.5%	19.1%	15.8%	19.2%	16.1%	22.0%	15.9%	20.0%	16.5%	19.5%
Disabled (%)												
No	2.7%	5.0%	2.9%	5.3%	3.0%	5.4%	2.4%	3.6%	2.3%	3.8%	2.4%	4.8%
Yes	97.3%	95.0%	97.1%	94.7%	97.0%	94.6%	97.6%	96.4%	97.7%	96.2%	97.6%	95.2%
Comorbidity (%)												
No	26.6%	21.5%	28.4%	23.3%	28.8%	23.9%	28.6%	34.4%	24.2%	19.8%	23.4%	18.6%
Yes	73.4%	78.5%	71.6%	76.7%	71.2%	76.1%	71.4%	65.6%	75.8%	80.2%	76.6%	81.4%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 24: Self-Reported Change in COPD Clinical Outcomes from First to Last Assessment, by Number of Assessments Completed

	Assessed Once	Assessed Twice			Assessed Three Times			Assessed Four or More Times		
Maximum Number of Respondents (N)	**618**	**289**			**133**			**113**		
	Statistic (Respondents)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Fourth Assessment Statistic** (Respondents)	Change (Significance)
Has COPD Action Plan	**10.8%** (618)	**11.4%** (289)	**17.6%** (289)	**6.2%(**)**	**9.0%** (133)	**23.3%** (133)	**14.2%(***)**	**7.9%** (113)	**20.3%** (113)	**12.3%(***)**
Treated for Depression	**49.8%** (618)	**52.9%** (289)	**53.9%** (289)	1.00%	**60.1%** (133)	**60.9%** (133)	0.70%	**54.8%** (113)	**57.5%** (113)	2.60%
Underweight	**8.8%** (618)	**8.3%** (289)	**8.9%** (289)	0.60%	**9.0%** (133)	**8.2%** (133)	-0.70%	**2.6%** (113)	**4.4%** (113)	1.70%
Normal Weight	**22.9%** (618)	**23.5%** (289)	**22.1%** (289)	-1.30%	**18.0%** (133)	**16.5%** (133)	-1.50%	**20.3%** (113)	**14.1%** (113)	**-6.1%(*)**
Overweight	**29.4%** (618)	**21.4%** (289)	**21.7%** (289)	0.30%	**24.8%** (133)	**22.5%** (133)	-2.20%	**23.8%** (113)	**30.0%** (113)	6.10%
Obese	**38.6%** (618)	**46.7%** (289)	**47.0%** (289)	0.30%	**48.1%** (133)	**52.6%** (133)	4.50%	**53.0%** (113)	**51.3%** (113)	-1.70%
Functionally Limited	**98.5%** (618)	**99.6%** (289)	**100.0%** (289)	0.30%	**99.2%** (133)	**100.0%** (133)	0.70%	**100.0%** (113)	**100.0%** (113)	0.00%
Ever Had Pneumonia Shot	**40.1%** (618)	**42.9%** (289)	**55.7%** (289)	**12.8%(***)**	**45.8%** (133)	**57.1%** (133)	**11.2%(***)**	**48.6%** (113)	**64.6%** (113)	**15.9%(***)**
Uses Oxygen	**97.4%** (77)	**97.4%** (39)	**100.0%** (39)	2.50%	**100.0%** (17)	**100.0%** (17)	0.00%	**89.4%** (19)	**100.0%** (19)	10.50%
Increased Symptoms	**43.2%** (618)	**42.2%** (289)	**36.3%** (289)	-5.80%	**43.6%** (133)	**36.8%** (133)	-6.70%	**30.9%** (113)	**30.0%** (113)	-0.80%
Limited by COPD	**95.3%** (618)	**96.5%** (289)	**95.8%** (289)	-0.60%	**98.4%** (133)	**96.9%** (133)	-1.50%	**90.2%** (113)	**93.8%** (113)	3.50%
Mean BMI	**29.57** (618)	**30.02** (289)	**30.10** (289)	0.08	**32.42** (133)	**32.58** (133)	0.16	**33.10** (113)	**32.53** (113)	-0.57

Source: UCLA Analysis of MHS Clinical Assessments

Notes: (1) Measures with fewer than 11 respondents are blinded due to insufficient sample size.

(2) Statistically significant differences are denoted at three levels: *10% **5% ***1%

Appendix 2, Table 25: Self-Reported Proportion of Beneficiaries with COPD who Ever Smoked and Who Ever Quit Smoking

Measure	Ever Self Reported
Ever smoked	
Proportion	90.60%
95% CI	(89.3%, 91.8%)
N	2134
Quit Smoking	
Proportion	0.00%
95% CI	(0%, 0.3%)
N	1153

Source: UCLA Analysis of MHS Clinical Assessments

Appendix 2, Table 26: Demographic Characteristics of Beneficiaries with COPD in Assessment-Based Clinical Analysis

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times
Total (N)	**618**	**289**	**133**	**113**
Age Group (%)				
22-34	10.5%	9.7%	8.1%	10.6%
35-44	8.8%	10.7%	7.3%	10.6%
45-54	22.0%	22.2%	21.5%	24.8%
55-64	31.7%	32.0%	38.2%	31.0%
65+	27.1%	25.4%	24.8%	23.0%
Gender (%)				
Female	55.2%	57.2%	53.7%	52.2%
Male	44.8%	42.8%	46.3%	47.8%
Ethnicity (%)				
White	25.0%	23.4%	25.2%	29.2%
Latino	25.7%	29.9%	26.4%	26.5%
African American	25.5%	26.2%	26.8%	21.2%
Asian/Pacific Island	15.1%	13.6%	11.0%	9.7%
Other	1.9%	1.3%	2.4%	1.8%
Unknown	6.9%	5.6%	8.1%	11.5%
Language (%)				
Armenian	7.1%	6.9%	4.1%	8.0%
East Asian Languages	5.6%	3.9%	2.8%	1.8%
English	49.7%	52.3%	56.1%	51.3%
European Languages	1.0%	0.6%	0.4%	0.9%
Other Languages	3.4%	2.8%	1.2%	3.5%
Southeast Asian Languages	3.0%	3.6%	4.9%	2.7%
Spanish	17.9%	20.4%	17.9%	16.8%
Unknown Language	12.2%	9.5%	12.6%	15.0%
County (%)				
Los Angeles	78.5%	75.5%	75.6%	78.8%
Alameda	20.9%	24.3%	23.2%	19.5%
Unknown	0.6%	0.2%	1.2%	1.8%
Disabled (%)				
No	24.2%	23.4%	20.3%	21.2%
Yes	75.8%	76.6%	79.7%	78.8%

Source: UCLA Analysis of MHS Clinical Assessments and Medi-Cal eligibility data

Complete Clinical Findings for Beneficiaries with Diabetes

Appendix 2, Table 27: Claims-Based Clinical Indices for Beneficiaries with Diabetes by Year and Group

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	**Intervention**	**Control**	**Intervention**	**Control**	**Intervention**	**Control**	**Intervention**	**Control**	**Intervention**	**Control**	**Intervention**
Total (N)	**9,402**	**4,698**	**11,253**	**5,766**	**12,307**	**6,373**	**12,646**	**6,718**	**10,860**	**5,409**	**10,560**	**5,470**
Eye Exam												
Proportion	31.6%	31.4%	30.6%	31.9%	28.6%	30.9%	26.9%	30.3%	27.2%	31.0%	13.5%	17.4%
95% CI	(30.6%, 32.5%)	(30.0%, 32.7%)	(29.7%, 31.5%)	(30.7%, 33.1%)	(27.8%, 29.4%)	(29.8%, 32.1%)	(26.1%, 27.7%)	(29.2%, 31.4%)	(26.4%, 28.1%)	(29.8%, 32.3%)	(12.9%, 14.2%)	(16.4%, 18.4%)
Hemoglobin A1c (Once per Every 6-Month Period)												
Proportion	19.7%	19.7%	20.3%	20.9%	21.0%	22.9%	19.9%	23.5%	20.6%	22.6%	20.0%	21.8%
95% CI	(18.9%, 20.5%)	(18.5%, 20.8%)	(19.6%, 21.1%)	(19.8%, 22.0%)	(20.3%, 21.7%)	(21.9%, 23.9%)	(19.2%, 20.6%)	(22.5%, 24.5%)	(19.8%, 21.3%)	(21.5%, 23.7%)	(19.2%, 20.8%)	(20.7%, 22.9%)
Hemoglobin A1c (Once per Every 12-Month Period)												
Proportion	50.9%	49.4%	53.0%	52.6%	54.6%	54.8%	54.1%	57.0%	51.8%	54.4%	49.2%	50.9%
95% CI	(49.9%, 51.9%)	(48.0%, 50.8%)	(52.1%, 53.9%)	(51.3%, 53.9%)	(53.7%, 55.4%)	(53.5%, 56.0%)	(53.2%, 54.9%)	(55.8%, 58.2%)	(50.8%, 52.7%)	(53.1%, 55.7%)	(48.2%, 50.1%)	(49.5%, 52.2%)
Cholesterol Check												
Proportion	62.7%	66.9%	62.4%	67.5%	64.1%	68.3%	62.2%	69.4%	62.5%	69.4%	60.0%	66.8%
95% CI	(61.7%, 63.6%)	(65.6%, 68.3%)	(61.5%, 63.3%)	(66.3%, 68.7%)	(63.2%, 64.9%)	(67.2%, 69.5%)	(61.4%, 63.1%)	(68.3%, 70.5%)	(61.6%, 63.4%)	(68.1%, 70.6%)	(59.1%, 60.9%)	(65.5%, 68.0%)
Lipid Lowering Agent												
Proportion	44.3%	47.2%	46.3%	46.8%	50.8%	50.5%	53.5%	54.6%	51.8%	54.2%	50.6%	51.4%
95% CI	(43.3%, 45.3%)	(45.7%, 48.6%)	(45.4%, 47.2%)	(45.5%, 48.1%)	(49.9%, 51.7%)	(49.2%, 51.7%)	(52.6%, 54.3%)	(53.4%, 55.8%)	(50.9%, 52.8%)	(52.9%, 55.6%)	(49.6%, 51.5%)	(50.1%, 52.8%)
Aspirin/Antiplatelet												
Proportion	9.4%	12.9%	10.3%	12.9%	12.6%	14.8%	14.3%	19.7%	14.0%	18.9%	13.3%	17.5%
95% CI	(8.8%, 10.0%)	(11.9%, 13.8%)	(9.7%, 10.8%)	(12.1%, 13.8%)	(12.0%, 13.2%)	(13.9%, 15.7%)	(13.7%, 14.9%)	(18.7%, 20.7%)	(13.3%, 14.6%)	(17.9%, 20.0%)	(12.7%, 14.0%)	(16.5%, 18.5%)
Flu Vaccination												
Proportion	6.2%	4.9%	7.8%	7.1%	12.4%	10.2%	15.8%	13.4%	17.7%	14.1%	13.8%	11.7%
95% CI	(5.7%, 6.7%)	(4.3%, 5.6%)	(7.3%, 8.3%)	(6.4%, 7.8%)	(11.8%, 13.0%)	(9.5%, 11.0%)	(15.2%, 16.5%)	(12.6%, 14.2%)	(17.0%, 18.5%)	(13.2%, 15.1%)	(13.2%, 14.5%)	(10.8%, 12.6%)

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 28: Demographic Characteristics of Beneficiaries with Diabetes in Claims Based Clinical Analysis

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**9,402**	**4,698**	**11,253**	**5,766**	**12,307**	**6,373**	**12,646**	**6,718**	**10,860**	**5,409**	**10,560**	**5,470**
Age Group (%)												
22-34	6.4%	4.9%	6.0%	4.7%	5.5%	4.2%	4.7%	3.3%	4.9%	3.9%	5.4%	4.4%
35-44	13.5%	11.2%	12.4%	9.8%	10.9%	8.7%	9.5%	7.2%	10.0%	7.9%	10.3%	8.6%
45-54	30.9%	29.2%	28.8%	26.5%	27.0%	23.9%	26.0%	22.1%	25.5%	21.8%	24.8%	21.7%
55-64	43.4%	48.7%	44.8%	52.0%	44.6%	51.7%	46.8%	55.0%	46.1%	54.1%	46.1%	52.7%
65+	5.9%	6.0%	7.9%	7.0%	12.0%	11.6%	13.0%	12.4%	13.4%	12.3%	13.5%	12.7%
Gender (%)												
Female	62.8%	61.7%	61.7%	61.1%	61.4%	60.7%	62.8%	62.1%	61.6%	61.2%	60.1%	59.6%
Male	37.2%	38.3%	38.3%	38.9%	38.6%	39.3%	37.2%	37.9%	38.4%	38.8%	39.9%	40.4%
Ethnicity (%)												
White Other	28.3%	34.8%	28.7%	33.6%	28.4%	32.7%	29.5%	37.3%	28.9%	35.5%	27.6%	34.9%
Latino	17.7%	22.7%	18.4%	23.9%	19.5%	25.4%	18.8%	23.7%	18.7%	24.9%	19.5%	25.0%
African American	13.1%	18.7%	13.3%	19.0%	13.2%	18.2%	13.8%	17.2%	13.0%	16.9%	13.3%	17.5%
Asian/Pacific Islander	26.7%	14.3%	25.7%	13.8%	25.0%	13.9%	24.9%	13.3%	26.1%	14.5%	25.9%	14.1%
Other	5.1%	3.1%	4.8%	2.8%	4.7%	2.9%	4.3%	2.4%	4.6%	2.2%	4.5%	2.2%
Unknown	9.0%	6.5%	9.0%	6.8%	9.2%	7.0%	8.7%	6.2%	8.8%	6.0%	9.1%	6.3%
Language (%)												
English	33.1%	28.2%	36.1%	30.1%	37.8%	30.9%	38.6%	29.5%	39.2%	29.5%	41.1%	32.1%
Spanish	5.0%	13.2%	5.7%	15.0%	6.7%	16.2%	6.5%	14.7%	6.7%	15.9%	7.2%	15.4%
European Languages	2.1%	1.6%	2.2%	1.6%	2.2%	1.7%	2.6%	2.0%	2.6%	1.9%	2.6%	1.8%
East Asian Languages	1.4%	2.4%	1.5%	2.5%	1.5%	2.8%	1.4%	2.7%	1.5%	2.7%	1.7%	3.0%
Southeast Asian Languages	12.7%	4.7%	12.2%	4.7%	11.9%	4.6%	12.8%	4.5%	14.1%	5.4%	14.6%	5.4%
Other Languages	2.5%	17.5%	2.5%	17.0%	2.6%	16.6%	2.6%	20.8%	2.5%	19.9%	2.9%	19.7%
Unknown Language	43.2%	32.4%	39.8%	29.1%	37.3%	27.2%	35.5%	25.8%	33.4%	24.5%	30.0%	22.5%
County (%)												
Los Angeles	80.1%	76.6%	80.4%	77.4%	80.5%	77.9%	80.3%	79.0%	81.0%	79.5%	80.7%	78.9%
Alameda	19.9%	23.4%	19.6%	22.6%	19.5%	22.1%	19.7%	21.0%	19.0%	20.5%	19.3%	21.1%
Disabled (%)												
No	4.8%	6.4%	5.4%	6.5%	5.8%	7.1%	4.9%	6.3%	5.2%	5.9%	5.5%	6.5%
Yes	95.2%	93.6%	94.6%	93.5%	94.2%	92.9%	95.1%	93.7%	94.8%	94.1%	94.5%	93.5%
Comorbidity (%)												
No	92.4%	89.7%	93.2%	91.1%	93.6%	91.7%	64.9%	81.4%	71.8%	66.2%	76.3%	72.1%
Yes	7.6%	10.3%	6.8%	8.9%	6.4%	8.3%	35.1%	18.6%	28.2%	33.8%	23.7%	27.9%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 29: Self-Reported Change in Diabetes Clinical Outcomes from First to Last Assessment, by Number of Assessments Completed

	Assessed Once	Assessed Twice			Assessed Three Times			Assessed Four or More Times		
Maximum Number of Respondents (N)	**1,029**	**463**			**289**			**97**		
	Statistic (Respondents)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Fourth Assessment Statistic** (Respondents)	Change (Significance)
Has Diabetes Action Plan	**14.2%** (1,029)	**14.9%** (463)	**23.1%** (463)	**8.2%(***)**	**16.2%** (289)	**30.1%** (289)	**13.8%(***)**	**5.1%** (97)	**13.4%** (97)	**8.2%(**)**
Treated for Depression	**35.7%** (1,029)	**35.6%** (463)	**39.7%** (463)	**4.1%(**)**	**41.1%** (289)	**45.6%** (289)	**4.4%(**)**	**37.1%** (97)	**42.2%** (97)	5.1%
Underweight	**3.0%** (1,011)	**2.4%** (448)	**2.6%** (448)	0.2%	**1.4%** (282)	**1.0%** (282)	-0.3%	**3.1%** (95)	**4.2%** (95)	1.0%
Normal Weight	**19.9%** (1,011)	**16.0%** (448)	**14.7%** (448)	-1.3%	**8.8%** (282)	**9.5%** (282)	0.7%	**13.6%** (95)	**14.7%** (95)	**1.0%(***)**
Overweight	**29.3%** (1,011)	**29.4%** (448)	**29.6%** (448)	0.2%	**31.2%** (282)	**31.2%** (282)	0.0%	**27.3%** (95)	**17.8%** (95)	**-9.4%(***)**
Obese	**47.5%** (1,011)	**52.0%** (448)	**52.9%** (448)	0.8%	**58.5%** (282)	**58.1%** (282)	-0.3%	**55.7%** (95)	**63.1%** (95)	**7.3%(**)**
Functionally Limited	**97.3%** (1,029)	**96.9%** (463)	**97.8%** (463)	0.8%	**96.5%** (289)	**98.6%** (289)	**2.0%(**)**	**98.9%** (97)	**96.9%** (97)	-2.0%
Foot Exam	**64.1%** (1,029)	**62.6%** (463)	**63.2%** (463)	0.6%	**72.4%** (287)	**68.2%** (287)	-4.1%	**65.6%** (96)	**57.2%** (96)	**-8.3%(***)**
Low Hemoglobin A1C	**95.1%** (1,029)	**93.3%** (463)	**93.3%** (463)	0.0%	**95.1%** (289)	**85.1%** (289)	**-10.0%(***)**	**96.9%** (97)	**89.6%** (97)	**-7.2%(**)**
Medium Hemoglobin A1C	**2.7%** (1,029)	**3.0%** (463)	**3.2%** (463)	0.2%	**3.1%** (289)	**10.0%** (289)	**6.9%(***)**	**100.0%** (97)	**8.2%** (97)	-91.7%
High Hemoglobin A1C	**2.1%** (1,029)	**3.6%** (463)	**3.4%** (463)	-0.2%	**1.7%** (289)	**4.8%** (289)	**3.1%(**)**	**3.0%** (97)	**2.0%** (97)	-1.0%
Low LDL	**48.0%** (25)									
Blood Pressure in Acceptable Limits	**23.3%** (326)	**27.1%** (107)	**29.9%** (107)	2.8%	**36.2%** (69)	**40.5%** (69)	**4.3%(**)**	**37.5%** (16)	**43.7%** (16)	6.2%
Ever Had Pneumonia Shot	**27.0%** (936)	**1.0%** (295)	**17.9%** (295)	**16.9%(***)**	**0.7%** (141)	**19.1%** (141)	**18.4%(***)**	**100.0%** (38)	**5.2%** (38)	-94.7%
Mean Days of Work or School Missed due to Diabetes	**0.93** (41)	**0.47** (15)	**0.67** (15)	0.20						
Mean BMI	**31.02** (1,011)	**31.15** (448)	**31.16** (448)	0.01	**33.88** (282)	**33.86** (282)	-0.02	**32.83** (95)	**33.38** (95)	0.55

Source: UCLA Analysis of MHS Clinical Assessments

Notes: (1) Measures with fewer than 11 respondents are blinded due to insufficient sample size.

(2) Statistically significant differences are denoted at three levels: *10% **5% ***1%

Appendix 2, Table 30: Demographic Characteristics of Beneficiaries with Diabetes in Assessment-Based Clinical Analysis Completed

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times
Number of Respondents (N)	**1,029**	**463**	**289**	**97**
Age Group (%)				
22-34	8.9%	9.1%	9.8%	7.2%
35-44	8.3%	9.1%	7.3%	8.2%
45-54	20.3%	19.6%	21.8%	19.6%
55-64	32.4%	33.0%	31.6%	39.2%
65+	30.1%	29.3%	29.5%	25.8%
Gender (%)				
Female	54.3%	55.5%	56.2%	51.5%
Male	45.7%	44.5%	43.8%	48.5%
Ethnicity (%)				
White	27.3%	28.2%	21.5%	18.6%
Latino	27.8%	26.5%	30.1%	32.0%
African American	22.0%	21.3%	21.2%	25.8%
Asian/Pacific Island	14.3%	16.4%	16.8%	14.4%
Other	1.9%	1.5%	2.6%	1.0%
Unknown	6.8%	6.1%	7.8%	8.2%
Language (%)				
Armenian	11.1%	9.8%	6.0%	7.2%
East Asian Languages	4.6%	6.1%	5.7%	2.1%
English	46.6%	46.4%	47.9%	49.5%
European Languages	0.9%	0.5%	0.8%	0.0%
Other Languages	3.5%	3.9%	2.8%	3.1%
Southeast Asian Languages	3.6%	3.5%	3.9%	6.2%
Spanish	20.7%	18.7%	21.0%	22.7%
Unknown Language	9.1%	11.1%	11.9%	9.3%
County (%)				
Los Angeles	80.1%	77.5%	77.2%	72.2%
Alameda	19.3%	22.1%	22.0%	26.8%
Unknown	0.6%	0.4%	0.8%	1.0%
Disabled (%)				
No	27.0%	27.6%	28.2%	22.7%
Yes	73.0%	72.4%	71.8%	77.3%

Source: UCLA Analysis of MHS Clinical Assessments and Medi-Cal eligibility data

Complete Clinical Findings for Beneficiaries with CHF

Appendix 2, Table 31: Claims-Based Clinical Indices for Beneficiaries with CHF by Year and Group

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**4,710**	**2,841**	**5,541**	**3,281**	**5,962**	**3,464**	**3,124**	**1,724**	**3,375**	**1,788**	**3,894**	**2,163**
Beta Blocker Rx (continuous supply)												
Proportion	20.3%	21.6%	22.8%	23.0%	26.5%	28.9%	28.8%	32.6%	31.7%	33.7%	29.7%	32.7%
95% CI	(19.2%, 21.5%)	(20.1%, 23.1%)	(21.7%, 23.9%)	(21.6%, 24.5%)	(25.4%, 27.7%)	(27.4%, 30.4%)	(27.3%, 30.5%)	(30.4%, 34.9%)	(30.1%, 33.3%)	(31.5%, 36.0%)	(28.2%, 31.1%)	(30.7%, 34.7%)
ACE/ARB Rx (continuous supply)												
Proportion	31.7%	32.5%	33.5%	34.7%	36.5%	38.7%	36.2%	40.1%	38.6%	42.8%	39.7%	45.8%
95% CI	(30.3%, 33.0%)	(30.8%, 34.2%)	(32.2%, 34.7%)	(33.1%, 36.3%)	(35.3%, 37.8%)	(37.1%, 40.4%)	(34.5%, 37.9%)	(37.8%, 42.5%)	(36.9%, 40.2%)	(40.5%, 45.2%)	(38.1%, 41.2%)	(43.7%, 47.9%)
Creatinine and Potassium Check												
Proportion	73.8%	83.2%	75.8%	84.5%	78.8%	85.5%	77.2%	84.7%	78.5%	86.6%	77.6%	84.2%
95% CI	(72.5%, 75.1%)	(81.8%, 84.6%)	(74.6%, 76.9%)	(83.2%, 85.7%)	(77.8%, 79.8%)	(84.2%, 86.6%)	(75.7%, 78.7%)	(83.0%, 86.4%)	(77.0%, 79.8%)	(85.0%, 88.2%)	(76.2%, 78.9%)	(82.6%, 85.7%)
Loop Diuretic Rx (continuous supply)												
Proportion	25.8%	21.6%	27.5%	23.7%	30.9%	26.2%	33.2%	29.5%	31.6%	29.9%	29.2%	27.0%
95% CI	(24.6%, 27.1%)	(20.1%, 23.2%)	(26.3%, 28.6%)	(22.3%, 25.2%)	(29.7%, 32.1%)	(24.7%, 27.7%)	(31.6%, 34.9%)	(27.3%, 31.7%)	(30.1%, 33.2%)	(27.8%, 32.0%)	(27.7%, 30.6%)	(25.1%, 28.9%)
Cholesterol Check												
Proportion	58.6%	68.9%	58.9%	70.1%	60.7%	71.5%	57.9%	71.0%	61.7%	74.3%	60.8%	71.7%
95% CI	(57.2%, 60.0%)	(67.1%, 70.6%)	(57.6%, 60.2%)	(68.5%, 71.7%)	(59.4%, 61.9%)	(70.0%, 73.0%)	(56.2%, 59.7%)	(68.8%, 73.1%)	(60.0%, 63.3%)	(72.2%, 76.3%)	(59.2%, 62.3%)	(69.8%, 73.6%)
Aspirin/Anti-platelet Rx (conintuous supply)												
Proportion	15.7%	21.5%	17.5%	24.1%	19.7%	27.7%	20.9%	28.2%	22.0%	31.7%	21.3%	32.9%
95% CI	(14.6%, 16.7%)	(20.0%, 23.1%)	(16.5%, 18.5%)	(22.6%, 25.6%)	(18.7%, 20.8%)	(26.2%, 29.2%)	(19.5%, 22.4%)	(26.1%, 30.4%)	(20.7%, 23.5%)	(29.6%, 33.9%)	(20.0%, 22.6%)	(30.9%, 34.9%)
Flu Vaccination												
Proportion	5.9%	5.0%	7.9%	8.6%	12.0%	10.7%	15.0%	13.1%	18.8%	14.5%	13.6%	11.7%
95% CI	(5.3%, 6.6%)	(4.2%, 5.8%)	(7.2%, 8.7%)	(7.7%, 9.6%)	(11.2%, 12.8%)	(9.7%, 11.8%)	(13.8%, 16.3%)	(11.5%, 14.7%)	(17.5%, 20.2%)	(12.9%, 16.2%)	(12.6%, 14.8%)	(10.4%, 13.2%)

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 32: Demographic Characteristics of Beneficiaries with CHF in Claims Based Clinical Analysis

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**4,710**	**2,841**	**5,541**	**3,281**	**5,962**	**3,464**	**3,124**	**1,724**	**3,375**	**1,788**	**3,894**	**2,163**
Age Group (%)												
22-34	3.1%	1.8%	3.1%	1.8%	2.6%	1.8%	3.1%	1.7%	2.6%	1.3%	3.2%	1.2%
35-44	8.2%	6.7%	7.1%	6.0%	6.4%	5.0%	6.8%	4.5%	7.0%	3.7%	6.5%	3.1%
45-54	31.1%	27.0%	28.7%	25.3%	26.1%	22.6%	25.4%	21.8%	24.5%	19.4%	24.3%	18.4%
55-64	49.8%	54.2%	51.5%	55.7%	50.8%	54.6%	51.1%	56.3%	50.7%	61.2%	51.4%	60.7%
65+	7.7%	10.3%	9.7%	11.2%	14.1%	15.9%	13.6%	15.7%	15.2%	14.3%	14.6%	16.6%

Gender (%)												
Female	59.9%	59.1%	58.7%	57.7%	57.9%	57.1%	57.7%	57.1%	59.2%	59.3%	57.7%	56.3%
Male	40.1%	40.9%	41.3%	42.3%	42.1%	42.9%	42.3%	42.9%	40.8%	40.7%	42.3%	43.7%
Ethnicity (%)												
White	43.4%	47.6%	43.1%	46.5%	42.6%	46.0%	41.6%	46.4%	41.8%	48.7%	40.5%	50.5%
Latino	14.4%	13.0%	15.1%	13.7%	15.6%	14.2%	14.8%	14.8%	15.9%	15.7%	15.0%	14.6%
African American	19.8%	26.6%	19.4%	26.8%	19.5%	26.4%	21.2%	28.1%	21.1%	26.3%	22.1%	25.0%
Asian/Pacific Islander	12.2%	6.5%	12.3%	6.7%	12.3%	7.0%	12.4%	6.4%	11.8%	5.5%	12.5%	5.2%
Other	2.0%	1.5%	2.0%	1.5%	1.9%	1.5%	2.0%	0.8%	1.9%	0.7%	2.1%	1.2%
Unknown	8.2%	4.7%	8.1%	4.9%	8.1%	5.0%	8.0%	3.5%	7.4%	3.1%	7.9%	3.5%
Language (%)												
English	51.3%	38.0%	53.4%	39.7%	54.8%	40.6%	57.3%	42.2%	58.7%	40.6%	61.8%	41.0%
Spanish	4.2%	6.7%	4.9%	7.1%	5.4%	7.9%	4.9%	8.2%	5.8%	8.7%	5.5%	9.0%
European Languages	2.2%	3.2%	2.3%	3.3%	2.3%	3.3%	2.2%	3.8%	2.8%	3.4%	2.5%	3.0%
East Asian Languages	0.7%	1.5%	0.8%	1.6%	0.9%	1.8%	0.7%	1.6%	0.7%	1.5%	0.8%	1.3%
Southeast Asian Languages	5.5%	2.0%	5.4%	1.9%	5.3%	2.0%	5.6%	1.5%	5.4%	1.3%	5.8%	1.2%
Other Languages	2.3%	24.4%	2.4%	23.2%	2.5%	22.7%	2.5%	23.8%	2.7%	28.5%	2.8%	31.0%
Unknown Language	33.9%	24.3%	30.9%	23.2%	28.7%	21.9%	26.9%	18.9%	23.9%	16.0%	20.9%	13.5%
County (%)												
Los Angeles	82.1%	81.3%	82.3%	80.6%	82.3%	80.3%	81.6%	78.2%	83.4%	80.5%	83.4%	82.2%
Alameda	17.9%	18.7%	17.7%	19.4%	17.7%	19.7%	18.4%	21.8%	16.6%	19.5%	16.6%	17.8%
Disabled (%)												
No	5.1%	8.6%	5.9%	8.6%	6.4%	8.7%	4.6%	7.4%	4.9%	6.9%	5.0%	8.3%
Yes	94.9%	91.4%	94.1%	91.4%	93.6%	91.3%	95.4%	92.6%	95.1%	93.1%	95.0%	91.7%
Comorbidity (%)												
No	11.3%	9.9%	12.4%	11.4%	12.7%	11.5%	13.6%	16.8%	11.1%	8.8%	10.8%	8.8%
Yes	88.7%	90.1%	87.6%	88.6%	87.3%	88.5%	86.4%	83.2%	88.9%	91.2%	89.2%	91.2%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 33: Self-Reported Clinical Indices for Beneficiaries with CHF, by Number of Assessment Calls Completed

	Assessed Once	Assessed Twice			Assessed Three Times			Assessed Four or More Times		
Maximum Number of Respondents (N)	**786**	**352**			**144**			**118**		
	Statistic (Respondents)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Fourth Assessment Statistic** (Respondents)	Change (Significance)
Has CHF Action Plan	**5.0%** (786)	**4.5%** (352)	**22.4%** (352)	**17.8%(***)**	**4.8%** (144)	**19.4%** (144)	**14.5%(***)**	**1.6%** (118)	**14.4%** (118)	**12.7%(***)**
Treated for Depression	**38.5%** (786)	**36.3%** (352)	**40.0%** (352)	**3.6%(*)**	**36.8%** (144)	**39.5%** (144)	2.7%	**36.4%** (118)	**45.7%** (118)	**9.3%(**)**
Underweight	**3.2%** (375)	**0.9%** (110)	**1.8%** (110)	0.9%	**5.5%** (54)	**3.7%** (54)	-1.8%	**2.3%** (42)	**9.5%** (42)	**7.1%(*)**
Normal Weight	**17.6%** (375)	**21.8%** (110)	**20.9%** (110)	-0.9%	**12.9%** (54)	**16.6%** (54)	3.7%	**21.4%** (42)	**7.1%** (42)	**-14.2%(***)**
Overweight	**26.6%** (375)	**28.1%** (110)	**30.0%** (110)	1.8%	**25.9%** (54)	**24.0%** (54)	-1.8%	**26.1%** (42)	**30.9%** (42)	4.7%
Obese	**52.5%** (375)	**49.0%** (110)	**47.2%** (110)	-1.8%	**55.5%** (54)	**55.5%** (54)	0.0%	**50.0%** (42)	**52.3%** (42)	2.3%
Functionally Limited	**98.7%** (786)	**99.1%** (352)	**100.0%** (352)	0.8%	**99.3%** (144)	**100.0%** (144)	0.6%	**99.1%** (118)	**100.%** (118)	0.8%
Low LDL	**30.0%** (20)									
Ever Had Pneumonia Shot	**36.9%** (765)	**0.9%** (219)	**20.5%** (219)	**19.6%(***)**	**1.5%** (63)	**17.4%** (63)	**15.8%(***)**	**100.0%** (47)	**21.2%** (47)	**-78.7%(***)**
Avoids Salt	**91.8%** (786)	**92.8%** (352)	**96.5%** (352)	**3.6%(**)**	**86.8%** (144)	**95.8%** (144)	**9.0%(***)**	**93.2%** (118)	**97.4%** (118)	4.2%
Knew Their Blood Pressure	**47.3%** (786)	**44.0%** (352)	**49.7%** (352)	**5.6%(**)**	**45.8%** (144)	**47.9%** (144)	2.0%	**38.1%** (118)	**53.3%** (118)	**15.2%(***)**
Blood Pressure in Acceptable Limits	**54.6%** (368)	**47.4%** (116)	**61.2%** (116)	**13.7%(***)**	**54.0%** (50)	**58.0%** (50)	4.0%	**48.4%** (33)	**66.6%** (33)	**18.1%(*)**
Mean Days of Work or School Missed due to CHF	**2.92** (13)				**31.71** (54)	**31.56** (54)	-0.15	**33.85** (42)	**33.47** (42)	-0.38
Mean BMI	**31.98** (375)	**31.95** (110)	**31.48** (110)	-0.47						

Source: UCLA Analysis of MHS Clinical Assessments

Appendix 2, Table 34: Self-Reported Proportion of Beneficiaries with CHF Who Ever Smoked and Who Ever Quit Smoking

Measure	**Ever Self Reported**
Ever smoked	
Proportion	58.9%
95% CI	(56.89%, 60.8%)
N	2679
Quit Smoking	
Proportion	0.0%
95% CI	(0%, 0.3%)
N	1402

Source: UCLA Analysis of MHS Clinical Assessments

Note: people who reported an attempt to quit, but later became smoking again are not counted as having quit.

Appendix 2, Table 35: Demographic Characteristics of Beneficiaries with CHF in Assessment-Based Clinical Analysis

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times
Number of Respondents (N)	**786**	**352**	**144**	**118**
Age Group (%)				
22-34	9.3%	10.3%	8.4%	11.9%
35-44	9.1%	7.7%	9.9%	10.2%
45-54	20.8%	23.6%	18.7%	16.1%
55-64	32.8%	32.9%	34.0%	32.2%
65+	28.0%	25.6%	29.0%	29.7%
Gender (%)				
Female	54.9%	54.2%	56.1%	55.9%
Male	45.1%	45.8%	43.9%	44.1%
Ethnicity (%)				
White	26.0%	23.6%	24.8%	27.1%
Latino	26.0%	29.0%	29.0%	24.6%
African American	23.5%	25.2%	23.7%	30.5%
Asian/Pacific Island	15.3%	13.4%	14.9%	13.6%
Other	2.2%	2.0%	1.1%	0.0%
Unknown	7.1%	6.8%	6.5%	4.2%
Language (%)				
Armenian	8.6%	6.5%	6.1%	11.0%
East Asian Languages	5.3%	4.6%	5.3%	1.7%
English	48.5%	50.7%	48.9%	51.7%
European Languages	0.6%	0.8%	1.1%	0.0%
Other Languages	3.4%	2.4%	3.1%	2.5%
Southeast Asian Languages	3.7%	3.9%	2.7%	1.7%
Spanish	19.2%	19.5%	20.2%	16.9%
Unknown Language	10.8%	11.6%	12.6%	14.4%
County (%)				
Los Angeles	77.6%	77.5%	79.4%	82.2%
Alameda	21.7%	22.0%	19.8%	16.9%
Unknown	0.7%	0.5%	0.8%	0.8%
Disabled (%)				
No	24.8%	23.3%	26.0%	27.1%
Yes	75.2%	76.7%	74.0%	72.9%

Source: UCLA Analysis of MHS Clinical Assessments and Medi-Cal eligibility data

Complete Clinical Findings for Beneficiaries with CAD/ADS

Appendix 2, Table 36: Claims-Based Clinical Indices for Beneficiaries with CAD/ADS by Year and Group

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**4,803**	**4,987**	**5,814**	**5,916**	**6,312**	**6,308**	**5,149**	**4,795**	**4,684**	**4,299**	**4,772**	**4,860**
Flu Vaccination												
Proportion	5.9%	4.7%	8.0%	8.7%	12.3%	12.2%	14.3%	14.2%	17.3%	15.0%	14.5%	12.8%
95% CI	(5.2%, 6.6%)	(4.2%, 5.4%)	(7.3%, 8.7%)	(8.0%, 9.5%)	(11.5%, 13.1%)	(11.4%, 13.0%)	(13.4%, 15.3%)	(13.2%, 15.2%)	(16.2%, 18.4%)	(14.0%, 16.1%)	(13.5%, 15.5%)	(11.9%, 13.7%)
Cholesterol Check												
Proportion	64.3%	77.4%	62.3%	77.6%	65.1%	78.4%	61.6%	77.4%	63.1%	78.1%	61.8%	78.3%
95% CI	(62.9%, 65.6%)	(76.2%, 78.6%)	(61.0%, 63.5%)	(76.5%, 78.6%)	(63.9%, 66.3%)	(77.4%, 79.4%)	(60.2%, 62.9%)	(76.2%, 78.6%)	(61.7%, 64.5%)	(76.8%, 79.3%)	(60.4%, 63.2%)	(77.1%, 79.4%)
Statin Rx (continuous supply)												
Proportion	37.5%	47.3%	38.9%	49.5%	43.2%	53.8%	43.3%	57.4%	43.3%	58.8%	42.6%	58.9%
95% CI	(36.2%, 38.9%)	(45.9%, 48.7%)	(37.6%, 40.2%)	(48.2%, 50.8%)	(42.0%, 44.5%)	(52.5%, 55.0%)	(42.0%, 44.7%)	(55.9%, 58.8%)	(41.9%, 44.7%)	(57.3%, 60.2%)	(41.2%, 44.0%)	(57.4%, 60.2%)
ACE or ARB Rx (continuous supply)												
Proportion	26.4%	29.8%	27.5%	32.3%	31.9%	36.8%	28.6%	38.0%	30.6%	40.0%	30.2%	41.7%
95% CI	(25.1%, 27.6%)	(28.5%, 31.1%)	(26.3%, 28.7%)	(31.1%, 33.5%)	(30.7%, 33.0%)	(35.6%, 38.0%)	(27.3%, 29.8%)	(36.6%, 39.4%)	(29.2%, 31.9%)	(38.6%, 41.5%)	(28.9%, 31.5%)	(40.3%, 43.1%)
Beta Blocker Rx (continuous supply)												
Proportion	18.8%	21.2%	20.6%	22.7%	23.6%	26.7%	23.9%	30.7%	24.5%	31.7%	23.2%	30.7%
95% CI	(17.7%, 19.9%)	(20.1%, 22.4%)	(19.6%, 21.7%)	(21.7%, 23.8%)	(22.5%, 24.7%)	(25.6%, 27.8%)	(22.8%, 25.1%)	(29.4%, 32.0%)	(23.3%, 25.8%)	(30.3%, 33.1%)	(22.0%, 24.4%)	(29.4%, 32.0%)

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 37: Demographic Characteristics of Beneficiaries with CAD/ADS in Claims Based Clinical Analysis

	Baseline Year One		Baseline Year Two		Baseline Year Three		Program Year One		Program Year Two		Program Year Three	
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention
Total (N)	**4,803**	**4,987**	**5,814**	**5,916**	**6,312**	**6,308**	**5,149**	**4,795**	**4,684**	**4,299**	**4,772**	**4,860**
Age Group (%)												
22-34	2.4%	1.3%	2.2%	1.2%	2.2%	1.1%	2.2%	0.9%	2.5%	1.2%	3.0%	1.5%
35-44	8.6%	4.8%	7.4%	4.3%	6.2%	3.6%	5.5%	3.3%	5.3%	2.9%	5.4%	3.1%
45-54	27.8%	23.8%	25.4%	21.0%	23.3%	18.0%	22.5%	15.9%	22.5%	14.8%	21.0%	14.8%
55-64	52.3%	60.3%	54.0%	62.1%	52.2%	59.9%	52.9%	62.7%	52.4%	64.8%	52.7%	63.6%
65+	8.9%	9.8%	10.9%	11.4%	16.2%	17.4%	17.0%	17.1%	17.3%	16.3%	17.8%	17.0%
Gender (%)												
Female	59.2%	61.7%	58.0%	61.5%	57.9%	60.9%	57.5%	59.6%	58.5%	61.6%	57.9%	61.0%
Male	40.8%	38.3%	42.0%	38.5%	42.1%	39.1%	42.5%	40.4%	41.5%	38.4%	42.1%	39.0%
Ethnicity (%)												
White	37.1%	58.4%	36.5%	56.8%	36.5%	56.2%	39.0%	60.8%	36.9%	61.5%	36.7%	61.5%
Latino	15.7%	14.9%	16.1%	15.8%	17.0%	16.3%	14.5%	13.2%	15.9%	13.6%	16.1%	13.6%
African American	15.2%	10.3%	15.1%	10.2%	14.7%	10.0%	15.0%	9.3%	14.8%	8.4%	14.0%	9.3%
Asian/Pacific Islander	20.4%	9.5%	20.2%	9.9%	19.9%	10.1%	19.8%	10.3%	20.3%	10.0%	20.3%	9.7%
Other	3.0%	1.7%	3.1%	1.7%	3.0%	1.7%	2.9%	1.4%	3.0%	1.1%	3.1%	1.0%
Unknown	8.6%	5.2%	8.9%	5.6%	8.8%	5.7%	8.8%	4.9%	9.1%	5.3%	9.8%	4.9%
Language (%)												
English	36.3%	21.0%	38.5%	22.0%	40.3%	22.3%	40.9%	21.8%	42.3%	21.2%	43.3%	23.7%
Spanish	5.8%	9.2%	6.6%	10.1%	7.3%	10.8%	5.7%	8.2%	6.5%	9.2%	7.1%	8.5%
European Languages	3.8%	4.6%	3.9%	4.6%	3.9%	4.6%	4.1%	4.8%	4.0%	4.7%	4.0%	4.9%
East Asian Languages	1.2%	2.4%	1.4%	2.8%	1.4%	2.9%	1.2%	2.7%	1.7%	2.8%	1.6%	2.9%
Southeast Asian Languages	8.6%	2.2%	8.4%	2.3%	8.2%	2.3%	8.6%	2.8%	8.8%	3.1%	9.4%	3.0%
Other Languages	4.5%	40.0%	4.8%	39.3%	4.9%	39.0%	5.9%	43.0%	6.5%	44.7%	7.5%	44.6%
Unknown Language	39.8%	20.6%	36.4%	18.9%	34.0%	18.1%	33.6%	16.7%	30.3%	14.4%	27.1%	12.4%
County (%)												
Los Angeles	81.4%	91.7%	81.6%	91.8%	81.4%	91.8%	82.9%	91.9%	81.8%	92.8%	82.3%	92.3%
Alameda	18.6%	8.3%	18.4%	8.2%	18.6%	8.2%	17.1%	8.1%	18.2%	7.2%	17.7%	7.7%
Disabled (%)												
No	6.9%	9.4%	7.7%	9.8%	8.1%	10.3%	6.9%	9.0%	6.4%	8.0%	6.7%	9.2%
Yes	93.1%	90.6%	92.3%	90.2%	91.9%	89.7%	93.1%	91.0%	93.6%	92.0%	93.3%	90.8%
Comorbidity (%)												
No	16.5%	15.7%	17.3%	16.8%	17.1%	16.7%	25.5%	30.0%	23.7%	20.2%	22.9%	17.8%
Yes	83.5%	84.3%	82.7%	83.2%	82.9%	83.3%	74.5%	70.0%	76.3%	79.8%	77.1%	82.2%

Source: UCLA analysis of 6 years Medi-Cal claims and eligibility data.

Appendix 2, Table 38: Self Reported Change in CAD/ADS Clinical Outcomes from First to Last Assessment, by Number of Assessments Completed

	Assessed Once	Assessed Twice			Assessed Three Times			Assessed Four or More Times		
Maximum Number of Respondents (N)	**580**	**258**			**110**			**68**		
	Statistic (Respondents)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Last Assessment Statistic** (Respondents)	Change (Significance)	**First Assessment Statistic** (Respondents)	**Fourth Assessment Statistic** (Respondents)	Change (Significance)
Has CAD/ADS Action Plan	**7.4%** (580)	**5.8%** (258)	**18.6%** (258)	**12.7%(***)**	**2.7%** (110)	**24.5%** (110)	**21.8%(***)**	**8.8%** (68)	**17.6%** (68)	**8.8%(*)**
Mean Self-Reported Health Status	**2.06** (549)	**2.12** (225)	**2.10** (225)	-0.02	**2.08** (99)	**2.05** (99)	-0.03	**2.06** (63)	**2.11** (63)	0.05
Treated for Depression	**43.4%** (580)	**42.6%** (258)	**46.1%** (258)	3.4%	**48.1%** (110)	**59.0%** (110)	**10.9%(***)**	**63.2%** (68)	**60.2%** (68)	-2.9%
Underweight	**3.1%** (580)	**2.3%** (258)	**1.5%** (258)	-0.7%	**3.6%** (110)	**2.7%** (110)	-0.9%	**2.9%** (68)	**1.4%** (68)	-1.4%
Normal Weight	**18.7%** (580)	**19.7%** (258)	**21.7%** (258)	1.9%	**17.2%** (110)	**18.1%** (110)	0.9%	**7.3%** (68)	**8.8%** (68)	1.4%
Overweight	**33.9%** (580)	**32.5%** (258)	**30.2%** (258)	-2.3%	**22.7%** (110)	**24.5%** (110)	1.8%	**33.8%** (68)	**27.9%** (68)	-5.8%
Obese	**44.1%** (580)	**45.3%** (258)	**46.5%** (258)	1.1%	**56.3%** (110)	**54.5%** (110)	-1.8%	**55.8%** (68)	**61.7%** (68)	5.8%
Functionally Limited	**99.8%** (580)	**99.2%** (258)	**99.6%** (258)	0.3%	**99.0%** (110)	**100.0%** (110)	0.9%	**95.5%** (68)	**100.0%** (68)	4.4%
Mean Days of Work or School Missed due to CAD/ADS	**0.00** (12)							**32.73** (68)	**33.07** (68)	0.34
Mean BMI	**29.94** (580)	**30.28** (258)	**30.46** (258)	0.17	**31.79** (110)	**31.72** (110)	-0.07			

Source: UCLA Analysis of MHS Clinical Assessments

Notes: (1) Measures with fewer than 11 respondents are blinded due to insufficient sample size.

(2) Statistically significant differences are denoted at three levels: *10% **5% ***1%

Appendix 2, Table 39: Self Reported Proportion of Beneficiaries with CAD/ADS Who Ever Smoked and Who Ever Quit Smoking

Measure	**Ever Self Reported**
Ever smoked	
Proportion	55.10%
95% CI	(52.80%, 57.40%)
N	819
Quit Smoking	
Proportion	0.00%
95% CI	
N	0

Source: UCLA Analysis of MHS Clinical Assessments

Note: people who reported an attempt to quit, but later became smoking again are not counted as having quit.

Appendix 2, Table 40: Demographic Characteristics of Beneficiaries with CAD/ADS in Assessment-Based Clinical Analysis

	Assessed Once	Assessed Twice	Assessed Three Times	Assessed Four or More Times
Total (N)	**580**	**258**	**110**	**68**
Age Group (%)				
22-34	10.1%	9.6%	6.2%	8.8%
35-44	9.1%	8.9%	7.3%	7.4%
45-54	22.0%	23.2%	25.3%	20.6%
55-64	32.6%	33.5%	33.7%	38.2%
65+	26.1%	24.8%	27.5%	25.0%
Gender (%)				
Female	56.0%	59.4%	53.9%	61.8%
Male	44.0%	40.6%	46.1%	38.2%
Ethnicity (%)				
White	23.6%	25.5%	25.3%	26.5%
Latino	27.0%	27.1%	29.8%	17.6%
African American	26.4%	24.8%	28.1%	27.9%
Asian/Pacific Island	13.6%	13.3%	9.6%	17.6%
Other	1.5%	1.6%	2.2%	2.9%
Unknown	8.0%	7.8%	5.1%	7.4%
Language (%)				
Armenian	6.8%	7.1%	5.6%	5.9%
East Asian Languages	4.8%	4.6%	2.2%	5.9%
English	50.3%	49.1%	52.8%	60.3%
European Languages	0.9%	0.7%	0.0%	0.0%
Other Languages	3.4%	3.2%	2.8%	2.9%
Southeast Asian Languages	3.0%	3.2%	3.4%	8.8%
Spanish	18.6%	19.3%	21.9%	13.2%
Unknown Language	12.2%	12.8%	11.2%	2.9%
County (%)				
Los Angeles	78.3%	77.5%	79.2%	77.9%
Alameda	21.1%	22.0%	20.2%	20.6%
Unknown	0.6%	0.5%	0.6%	1.5%
Disabled (%)				
No	23.4%	23.2%	21.3%	23.5%
Yes	76.6%	76.8%	78.7%	76.5%

Source: UCLA Analysis of MHS Clinical Assessments and Medi-Cal eligibility data

Financial Outcomes

Appendix 2, Table 41: Cost Savings Analysis for the New Aid Code Population Alone

	Projected Expenditures	**Total Savings**		**Vendor Fees & Net Savings**			**Per Member Savings**				**Return on Investment**
	12-Month Projected Expenditures	Total 12-Month Savings	Total % Change from Projected Expenditures	12-Month Vendor Fees Adjusted for New Aid Codes	**Net 12-Month Savings**	Net % Change from Projected Expenditures	Members	Member Months	Average Net Savings per Member, 12 months	Average Net Savings per Member per Month (PMPM)	12-Month Return on Investment (ROI)
Program Total Savings (36 Months)	**$78,398**	**$196,541**	**250.70%**	**$1,188,215**	**-$991,674**	**-1264.92%**	**12,574**	**104,098**	**-$78.87**	**-$9.53**	**(0.83)**
Asthma Savings (36 Months)	$11,929	$65,890	552.34%	$85,341	**-$19,451**	-163.05%	977	7,933	-$19.91	-$2.45	(0.23)
CAD & ADS Savings (36 Months)	$12,560	-$202,788	-1614.50%	$340,611	**-$543,398**	-4326.29%	3,757	31,630	-$144.64	-$17.18	(1.60)
CHF Savings (36 Months)	$27,805	$547,380	1968.65%	$103,928	**$443,451**	1594.87%	1,156	9,372	$383.61	$47.32	4.27
COPD Savings (36 Months)	$16,343	-$919,258	-5624.93%	$101,019	**-$1,020,277**	-6243.06%	1,054	8,956	-$968.00	-$113.92	(10.10)
Diabetes Savings (36 Months)	$9,761	$705,317	7225.91%	$576,905	**$128,412**	1315.57%	5,630	46,207	$22.81	$2.78	0.22

Notes:

1) Estimates are presented for the program as a whole, as well as each disease group individually.
2) This finding is for the three 'new' Aid Codes only.
3) "Projected Expenditures" are adjusted control group expenditures in the post period. This represents the estimate of expenditures that would have occurred within the intervention population in the absence of the pilot program.
4) Savings estimate is cumulative over the 12-month intervention for the new Aid Code population. "Total" savings (Column B) are savings before accounting for vendor fees; "Net" savings (Column E) account for vendor fees.
5) Calculation uses 7-month claims run out and 3-month claims lag period in both baseline and project periods.
6) For Disease-specific calculations, credits in vendor fee amount that are not disease specific are proportionally distributed across disease groups.

Appendix 3: UCLA Quality of Life Survey

Survey Instrument

1. Would you say that in general your health is:

   ❑ Excellent

   ❑ Very good

   ❑ Good

   ❑ Fair

   ❑ Poor

   ❑ Don't Know

2. Now, thinking about your physical health which includes physical illness and injury, for how many days during the past 30 days your physical health was not good?

   Number of Days __ __

   ❑ None

   ❑ Don't Know

3. Now, thinking about your mental health which includes stress, depression, and problems with emotions, for how many days during the past 30 days your mental health was not good?

   Number of Days ___ ___

   ❑ None

   ❑ Don't Know

If you answered "None" to both Q2 and Q3, please skip to Q5

4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

   Number of Days ___ ___

   ❑ None

   ❑ Don't Know

5. A personal doctor is the health provider who knows you best. Using any number from 1 to 10, where 1 is the worst personal doctor possible and 10 is the best personal doctor possible, what number would you use to rate your personal doctor?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

6. We want to know your rating of the specialist you saw most often during the past 6 months. Using any number from 1 to 10, where 1 is the worst specialist possible and 10 is the best specialist possible, what number would you use to rate the specialist?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

7. Your health plan is Medi-Cal. Using any number from 1 to 10, where 1 is the worst health plan possible and 10 is the best health plan possible, what number would you use to rate your health plan now?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

8. Using any number from 1 to 10 where 1 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all of your health care in the last 6 months?

1	2	3	4	5	6	7	8	9	10
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

This is the end of the survey.
Thank you very much for your time.

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