

User's Guide to the ROI Forecasting Calculator for Health Home and Medical Home Programs

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The **Center for Health Care Strategies** is a nonprofit health policy resource center dedicated to improving health care quality for low-income children and adults, people with chronic illnesses and disabilities, frail elders, and racially and ethnically diverse populations experiencing disparities in care. CHCS works with state and federal agencies, health plans, providers, and consumer groups to develop innovative programs that better serve people with complex and high-cost health care needs. Its program priorities are: enhancing coverage and access to services; improving quality and reducing racial and ethnic disparities; integrating care for people with complex and special needs; and building Medicaid leadership and capacity.

For more information, visit www.chcs.org.

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I. Introduction

Increasingly, policymakers and health care payers recognize medical homes as possible solutions to escalating health care costs, fragmented care delivery, and a badly strained primary care delivery system. Increasing evidence demonstrates that medical homes help coordinate care, improve health outcomes, reduce avoidable and costly services like emergency department visits and inpatient admissions, provide much-needed financial supports to primary care practices, and have the potential to transform primary care delivery. Medical homes focus on a variety of strategies to improve care delivery which may include improved access and communication for patients; care management; patient self-management support; and adoption and use of health information technology for population management and performance measurement.

The Affordable Care Act (ACA) in 2010 gave Medicaid an additional opportunity to improve quality and bend the cost trend through enhanced care management and care coordination services for eligible Medicaid beneficiaries. Section 2703 of ACA gives states the option to pay for five new health homes services which are:

- Care management and care coordination;
- Health promotion;
- Transitional care from inpatient and other settings;
- Patient and family support; and
- Referrals to community and social support services.

Policymakers and health care payers across the country are exploring options to invest in these new care models to bend the cost trend. Indeed, health care reform presents an opportunity for Medicaid programs to reimburse for these services for patients with chronic conditions and complex medical and/or behavioral health care needs.

To assist in efforts to launch and assess these innovative programs, the Center for Health Care Strategies (CHCS) developed the *ROI Forecasting Calculator for Health Home and Medical Home Programs (ROI Calculator)*.¹

The *ROI Calculator* is a web-based tool designed for use by state Medicaid agencies, health plans, regional quality improvement coalitions, and other stakeholders interested in assessing the cost-savings potential of health home and medical home initiatives. Users of the *ROI Calculator* enter detailed assumptions about their proposed health home or medical home initiative, including target population characteristics, program costs, and changes in health care service utilization that are expected to result from the program. Based on the assumptions entered, the *ROI Calculator* forecasts the return on investment (ROI) that may result from the proposed health home or medical home program, including a range of estimates based on sensitivity analysis.

This guide was developed to help users navigate the *ROI Calculator* to generate forecasts for health home and medical home programs, and use this information to shape program design and implementation.

¹ The *ROI Forecasting Calculator for Health Home and Medical Home Programs* is available for public use and can be accessed at www.chcsroi.org.

Why Conduct ROI Analyses?²

The *ROI Calculator* can facilitate value-based purchasing in a wide range of ways – from aiding resource allocation decisions to establishing realistic cost-savings expectations during various phases of program implementation. By including ROI forecasting as a component of broader health home and medical home planning activities, purchasers can better position themselves to maximize the impact of their investments.

States, policymakers, regional coalitions, and health plans across the country recognize that connecting consumers to high quality health homes or medical homes offers an opportunity to “bend the trend” in health care costs. By supporting care management and coordination, health promotion, transitional care, patient self-management, linkages to community and social supports, health information technology, and other program elements, health home and medical home programs present an opportunity to reduce avoidable and costly hospitalizations and emergency room visits.

Components of the ROI Forecasting Calculator

The *ROI Forecasting Calculator for Health Home and Medical Home Programs* is a web-based tool designed to help stakeholders assess and demonstrate the cost-savings potential of health home and medical home initiatives. The chart below summarizes the major components of the *ROI Calculator*. In creating a forecast, users navigate through each of these components in a step-by-step fashion. This guide addresses the key analytical issues and best practices to consider for each step in the process.

Visit CHCSROI.org to use the *ROI Forecasting Calculator for Health Home and Medical Home Programs*.

Component	Purpose
Forecasts	Access, copy, export, or delete saved forecasts.
Program	Define key characteristics such as forecast time horizon and ramp-up period for enrollment in the health home or medical home initiative.
Target Population	Specify the composition and size of the target population using characteristics such as risk-stratification (if applicable), and the expected enrollment rate.
Utilization	Identify historical medical expenditures, trended growth rates, and changes in utilization patterns expected to result from the health home or medical home initiative.
Program Costs	Estimate the financial investment required to develop and administer the health home or medical home initiative over time.
Analysis	Define parameters for sensitivity analysis, identify the discount rate, and review forecast results.
Utilization and Cost Database	Review program costs and utilization results of existing health home or medical home initiatives to assist the development of utilization change and program cost assumptions.

² Adapted from A. Hamblin and C. Shearer. *Maximizing Quality and Value in Medicaid: Using Return on Investment Forecasting to Support Effective Policymaking*, The Commonwealth Fund, April 2009.

ROI Solver

Input a targeted ROI and identify changes in forecast assumptions required to achieve this target.

II. Understanding ROI Analysis

Framework for Calculating ROI

The underlying premise for the *ROI Calculator* is that health home and medical home initiatives may generate a positive ROI if cost savings resulting from changes in health care utilization are sufficient to offset program administration costs. Under this framework, “returns” are any financial savings from the net change in utilization patterns resulting from a health home or medical home, whereas “investments” represent the costs of developing and operating the program over time.

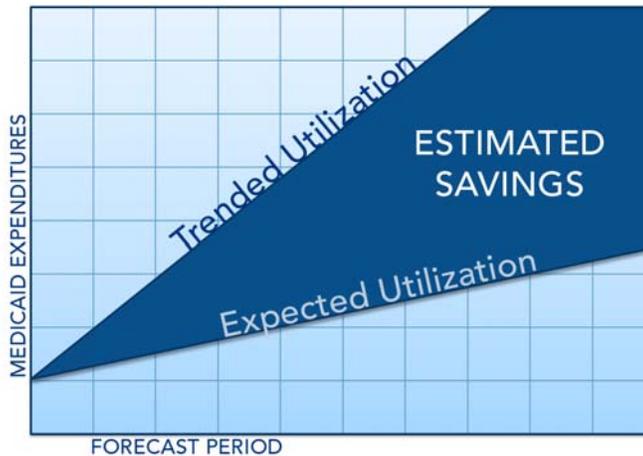
Exhibit 1: Benefit to Cost Ratio for Calculating ROI

$$\text{ROI} = \frac{\text{Net Savings from Changes in Utilization}}{\text{Program Costs}}$$

Calculating Returns and Investments

To calculate returns, users first identify the baseline utilization costs for their target population and trend these costs forward using historical growth rates, thereby estimating future health care costs under the status quo. Next, users indicate changes to these trended utilization patterns that are expected to result from the health home or medical home program. For example, a state launching a health home program for patients with complex care needs might expect emergency room visit and inpatient admission rates to decrease and office visits and pharmacy costs to increase following the program implementation. Finally, the *ROI Calculator* compares the trended utilization costs under the status quo to the expected utilization costs following the program implementation to estimate the associated savings or cost increases (Exhibit 2).

Exhibit 2: Calculating Estimated Savings from Utilization Changes



To calculate investments, users are asked to indicate the expected costs of implementing and operating the health home or medical home initiative. For example, these costs might include program planning and administration time; investments in personnel such as nurse case managers, health coaches, community health workers, and practice quality improvement coaches; training and education; health technology and equipment; and bonus payments to participating providers or health teams.

Interpreting ROI Results

As summarized in Exhibit 1, ROI is a benefit to cost ratio, comparing financial gains to financial costs. For any given forecast, the value for ROI can fall into one of three categories:

- *ROI greater than 1:* When projected ROI is greater than one, the savings expected to be generated by the program are greater than the costs of development and implementation. In this case, ROI is considered to be “positive.” For example, an ROI of 1.5 indicates that for every \$1 invested, \$1.50 will be gained through reductions in health care expenditures.
- *ROI less than 0:* With an ROI of less than zero, a health home or medical home initiative is not expected to generate any net savings from changes in utilization. In this case, ROI is considered to be “negative.” For example, an ROI of -2 indicates that for every \$1 invested, an additional \$2 will be spent through increased health care expenditures.
- *ROI between 0 and 1:* When ROI is a positive number less than one, the program is expected to generate net savings from favorable changes in utilization patterns; however, these savings are too small to fully recoup the cost of operating the program. Here as well, ROI is considered to be “negative.” For example, an ROI of 0.5 indicates that for every dollar invested, 50 cents will be recouped through reductions in health care expenditures.

Net Present Value

In addition to presenting forecast results in terms of ROI, the *ROI Calculator* also estimates the Net Present Value (NPV) for each forecast. NPV reflects the net cash value of an investment, as discounted over time (see discussion of discounting below). As an indicator of the *absolute magnitude* of savings or loss associated with the investment, NPV provides additional information regarding a program's financial impact relative to ROI. Similar to the ROI metric, the larger the NPV, the greater the financial return. An NPV greater than 0 indicates a positive return, whereas an NPV less than 0 indicates a negative return.

For example, consider two programs, both of which have a projected ROI of 2.0. Suppose one program will cost \$500,000 to implement, but is expected to save \$1,000,000 through reduced health care claims. Meanwhile, suppose the other program will cost \$5,000 to implement, and has the potential to reduce health care expenditures by \$10,000. By ROI alone, the two programs appear to have the same financial impact. However, given the differences in the magnitude of investment required and potential savings to be generated, the financial impacts of these programs are much different than their ROI metrics would suggest. NPV reflects these differences directly. Assuming the investments and savings were spread equally over three years for each of the programs, the former would have an NPV of approximately \$415,000, while the latter would have an NPV of approximately \$4,150.³

³ Assumes a discount rate of 10%.

III. Best Practices in ROI Forecasting

The following sections address many of the quantitative and qualitative questions users must answer when using the *ROI Calculator*. These best practices, which include tips and considerations for each step of the forecasting process, are intended to be a useful guide for those developing health home or medical home forecasts. For technical forecasting issues not addressed in this guide, please refer to the help buttons (indicated with a “?”) located throughout the *ROI Calculator*.

A. Analytical Perspectives

Before beginning a forecast, users should understand how the ROI for a health home or medical home initiative may vary for different stakeholders and how different systems of care (e.g., fee-for-service vs. managed care) might affect the analytical perspective.

Building Analyses for the Right Audience

When starting an ROI forecast, one must consider the perspective of the analysis. The ROI for a given program will be different for each stakeholder, depending on the sources of funding (e.g., investments), and on the nature of the financial risk borne by each organization. Any financial costs or benefits not borne by the target audience for the analysis should not affect its ROI.

Exhibit 3: Analysis Summary Page



The web-based *ROI Forecasting Calculator* can be accessed by visiting CHCSROI.org.

For example, suppose the target population for a health home initiative includes dual eligibles — that is, patients eligible for both Medicare and Medicaid benefits. As Medicare is responsible for most costs related to inpatient care for this population, a state Medicaid agency might not want to include Medicare-reimbursed inpatient costs in its ROI calculation if it is specifically concerned with the program's direct financial impact to the state. Instead, the state would focus on Medicaid-covered expenditures, such as inpatient deductibles and co-payments, as well as non-Medicare-covered long-term care and home and community-based services.

However, in some cases there may be value in capturing a program's broader financial impact for multiple stakeholders. Going back to the example of dual eligibles, the state may be interested in quantifying the gains that Medicare may realize as a result of enrolling dual eligibles in health homes, even though those savings would not directly benefit the state. Such calculations could inform discussions with CMS regarding gain-sharing opportunities, or could be used to analyze the merits of developing integrated care programs for duals, whereby the state (or contracted health plans) would manage the full spectrum of Medicare and Medicaid benefits for the dual eligible population.

To accommodate this type of analysis, the *ROI Calculator* can differentiate between an internally captured ROI and the broader ROI for the health home or medical home initiative as a whole. By indicating whether the target audience is financially responsible for specific categories of utilization (e.g., inpatient, pharmacy) on the Utilization Change page of the *ROI Calculator*, a user can specify which sources of financial return will be included in the "internal ROI" calculation, while preserving the ability to look at the broader impact on multiple stakeholders.

Implications for Fee-for-Service versus Managed Care Settings

For states using the *ROI Calculator*, it is important to recognize whether benefits are delivered in a fee-for-service or capitated managed care system of care. The ROI analysis for fee-for-service systems is relatively straightforward, as the state will directly bear the costs or savings associated with changes in utilization among beneficiaries. However, in capitated managed care environments, the state will not be directly affected by changes in utilization patterns until capitation rates are adjusted to reflect the revised patterns of service use among the population. Still, as future rate adjustments will likely reflect these changes, states operating in partial or fully capitated systems should find the *ROI Calculator* useful for estimating future financial impacts of health home and medical home initiatives.

Distinguishing Health Homes from Medical Homes

Before starting an ROI forecast, users will want to determine whether the program being analyzed is a health home or medical home. Although the two programs often overlap across a spectrum of features, such as the types of services provided and the clinical profile of enrolled patients, there are key features of health homes that differ from medical homes, and vice versa, which users will need to account for in their ROI forecasts.

Within the context of Section 2703 of the Accountable Care Act (ACA), the term "health home" is defined in terms of six specific services provided, the eligible patient characteristics, and the types of providers that may act as a health home. Effective January 1, 2011 through December 31, 2015, the federal government will reimburse 90 percent of the costs for health home services for eight consecutive quarters for Medicaid agencies that choose to establish health home services through an approved state plan amendment. Defined under ACA's Section 2703, health homes are designed to enhance the integration and coordination of primary, acute, behavioral health, and long-term care services and supports for Medicaid enrollees with multiple chronic conditions.

The provision defines eligible patients as having:

- Two or more chronic conditions; or
- One condition and the risk of developing another; or
- At least one serious and persistent mental health condition.

The chronic conditions include:

- Mental health conditions
- Substance abuse disorders
- Asthma
- Diabetes
- Heart disease
- Obesity (BMI > 25)
- HIV

The health home services are defined broadly within the Section 2703 of ACA so as to provide states the flexibility to define these services as they see fit. As a program partially funded by federal dollars, users may choose to include in their ROI forecast only those program costs which CMS deems eligible for the federal match.

Health home services must include:

- Comprehensive care management;
- Care coordination and health promotion;
- Comprehensive transitional care from inpatient to other settings;
- Individual and family support;
- Referral to community and social support services; and,
- Use of health information technology, as feasible and appropriate.

Medical home programs may or may not include these elements and are not limited by this programmatic definition. Broadly speaking, a medical home is an advanced primary care model that relies on team-based care using health information technology. As defined by the Agency for Healthcare Research and Quality, medical homes provide health care with the following core functions and attributes:

- Patient-centered care
- Comprehensive care
- Coordinated care
- Superb access to care
- A systems-base approach to quality and safety

Many states, health plans, and multi-payer collaboratives use the National Committee for Quality Assurance's Physician Practice Connections Patient-Centered Medical Home (PCMH) program standards for their medical home program requirements. In contrast to the health homes services, for example, Level 1 PCMH standards provide detailed requirements on how practices must deliver specific medical home services:

- Electronic system for clinical data
- Preventive service clinician reminders
- Prescribing decision support-safety
- Electronic system for managing tests
- Standardized Measures of performance
- Reporting to physicians

B. Target Population

The first component of the ROI forecasting process involves identifying the target population for the proposed health home or medical home initiative. Users may use the tool to help narrow down the target population, starting with the entire eligible population base and targeting based on risk stratification. Alternatively, if users have already identified and estimated the size of the target population, by using the prevalence rates of targeted conditions (e.g., diabetics, individuals with serious and persistent mental illness) for example, they may input that figure directly into the web-based tool. Lastly, the ultimate size of the patient population participating in the health home or medical home program will be influenced by the expected program enrollment rate.

Condition-Specific Versus Non-Condition-Specific Programs

The *ROI Calculator* is designed for use with programs that may or may not be targeted to patients with specific chronic conditions. For programs such as health homes that are targeted by conditions or sets of conditions, users can identify a target population based on the prevalence of the conditions of interest among the eligible beneficiaries (e.g., percent of adults with diabetes and heart disease).

For programs that are not targeted to individuals with particular conditions (e.g., a medical home program for all patients in participating provider groups), users of the *ROI Calculator* may decide to enroll a fixed number of individuals based on existing provider relationships, capacity or other constraints, or may plan to enroll a fixed percentage of the eligible population based on predictive modeling, risk-stratification, or other methods. Users developing a health home or medical home program who have a pre-determined number of patients may choose not to conduct a condition-specific analysis.

Estimating the Target Population Size for Condition-Specific Programs

For programs that target individuals with specific chronic conditions, users can input a target population size based on the combined prevalence for the targeted condition(s).

To identify disease prevalence, users typically rely on diagnosis codes included in administrative claims data. If available, information from disease registries may provide another source of information for this purpose. Whatever sources of data are used, the method used for forecasting purposes should be consistent with the method expected to be used for targeting and enrolling beneficiaries in the program. This will ensure that the estimated size of the target population is as accurate as possible.

When relying on claims data to identify disease prevalence, users will want to consider whether to include only primary diagnoses or also secondary diagnoses included in the claim to identify the presence of a given condition. This decision should be made based on local coding practices as well as clinical considerations. Questions to consider include:

- Do providers prioritize between primary and other diagnoses when coding claims, or rather are diagnoses listed in no particular order?
- Does the diagnosis of interest need to be the primary reason for the patient encounter to be of interest for the proposed program?

For example, suppose a health plan is launching a pediatric medical home program for children with asthma that focuses on children who have visited the emergency room with an asthma diagnosis in the last 12

months. The plan may want to target only those children for whom asthma was the primary reason for visiting the emergency room, thus relying solely on the primary diagnosis for purposes of identification. However, if the plan believes that an underlying condition of uncontrolled asthma may be contributing to emergency room visits with other primary diagnoses (e.g., upper respiratory infection), it may choose to include more than the primary diagnosis in its identification of the target population.

Using Risk Stratification to Identify the Target Population

Users may choose to identify the target population on the basis of their risk profile (e.g., high, medium, or low risk). Users can employ any method of risk stratification, and can also choose to include all risk groups in the target population. In selecting a method for risk stratification, users should consider available tools and data, as well as existing standards or best practices for particular clinical conditions. In general, options for risk stratification include analyses of historical claims data, use of predictive modeling software (either developed in-house or purchased from a third party), and/or use of self-reported data available through tools such as health risk assessments.

Historical claims can be used to identify risk groups based on prior utilization, expenditures, or diagnostic information.

- *Prior utilization:* Claims can be used to assign risk based on identified utilization criteria. For example, within the asthma literature, “high-risk” is commonly defined as one or more emergency room visits or hospitalizations with a primary diagnosis of asthma in the last 12 months.
- *Prior expenditures:* Claims can be used to rank the target population by historical health care expenditures to indicate risk for future expenditures. Once ranked, criteria for inclusion can be made using deciles, quartiles, or other natural cut-off points. With this method, exclusion criteria could be applied to remove patients whose health care expenditures have been affected by conditions not considered to be impacted by the programs under consideration (e.g., trauma).
- *Diagnoses:* Claims can be used to identify patients with individual or combinations of diagnoses associated with various levels of health care needs or expenditures. For example, to be eligible for health home services, Medicaid beneficiaries must have two or more eligible chronic conditions, or one and be at risk of a second. Patients with multiple chronic conditions or with co-occurring physical and mental illness may be considered higher-risk than patients with a single chronic condition, and thus may warrant a different intensity of health home or medical home services.

Predictive modeling tools link the occurrence of one or more independent factors or variables with dependent variables of interest. For health care purchasers, predictive modeling tools are used to predict or explain medical expenditure variation at an individual level, or to classify individuals in a population into defined groups. Although predictive modeling tools were originally developed for payment and rate-setting purposes, they are also being used by some states and health plans to identify high-need target populations for specialized interventions, including medical home and health home programs. A number of commercial entities offer predictive modeling tools, and some states are beginning to internally develop their own tools as well.⁴

Lastly, self-reported data, often conveyed through health risk assessments, provide another valuable source of information for purposes of risk stratification. In particular, these assessments can be used to identify psychosocial risk factors not otherwise available through administrative datasets. Such risk factors include,

⁴ D. Knutson. *Predictive Modeling: A Guide for State Medicaid Purchasers*. Center for Health Care Strategies, Inc., August 2009.

for example, poor self-rated health status, lack of social supports and stable housing, and limitations with activities of daily living.

Estimating Enrollment Rates

Although all members of the target population might benefit from a health home or medical home, it is unlikely that all beneficiaries eligible for one will be successfully enrolled in one. To accurately estimate the size of the target population, the *ROI Calculator* requires that users input an estimated participation or enrollment rate that accounts for the various challenges associated with patient enrollment. Depending on the target population and the environmental context, these challenges might include imperfect or outdated contact information, inadequate resources to support outreach activities, difficulties with patient engagement or consent (particularly if research is involved), existence of cultural or language barriers, availability of health home providers, and maintenance of benefit eligibility. The enrollment rate will also be affected by the enrollment model employed, as “opt-in” models typically engender lower participation rates than “opt-out” approaches.

In some cases, users of the *ROI Calculator* may not have an accurate sense for the expected enrollment rate in a health home or medical home program. In these instances, users could run multiple scenarios of their ROI forecast using a range of enrollment rate estimates in order to understand how ROI will be impacted under different assumptions. Alternatively, users could account for the uncertainty in the enrollment rate through the sensitivity analysis function built into the tool, as discussed in more detail below.

C. Utilization

The second component of the ROI forecasting process involves estimating the net increases or decreases in expenditures that are expected to result from changes in health care utilization patterns. Users first identify the baseline health care expenditures for the target population by reviewing historical claims data, and then trend these expenditures forward using historical growth rates to estimate future spending under the status quo. Lastly, users indicate the expected impact of the health home or medical home program on these trended expenditures, thereby allowing the calculation of projected savings or cost increases.

Baseline Costs

Baseline costs represent the historical medical expenditures for the target population. Users analyze claims data to determine the average per member per year costs for the target population, allocating these costs to individual categories of service (e.g., inpatient, pharmacy).

Allocating Baseline Costs to Categories of Service

Since the *ROI Calculator* requires users to indicate expected changes in utilization patterns or service use, baseline costs must be provided by individual category of service. The *ROI Calculator* specifies eight categories, including inpatient, emergency department, outpatient, office-based care, laboratory, pharmacy, long-term care, and home/community-based services. To provide users with additional forecasting flexibility, two optional “blank” categories are available and can be defined by the user. For example, a state may divide its outpatient claims into multiple expenditure categories (e.g., outpatient procedures, durable medical equipment, etc.). In identifying baseline costs, the state could either combine those costs under the outpatient category or could separate them using the blank fields in order to analyze exactly where and how utilization changes in these subcategories may affect ROI.

D. Trend

In forecasting ROI, it is important to estimate how health care costs change over time for the population that is targeted for enrollment in the health home or medical home. Since health care costs typically rise

each year, baseline costs need to be trended forward to estimate future costs in the absence of intervention. For example, a health home program that holds medical expenditures flat from one year to the next would be considered a financial success if costs would otherwise have been expected to grow. Calculating trend requires users to analyze historical claims data to make assumptions about future expenditures. In most cases, users will rely on internal resources or external actuarial support to generate trend assumptions.

In estimating trend, users may assume that health care expenditures for the target population will continue to grow at previous rates absent an intervention. Trend assumptions are required for each category of baseline costs (e.g., inpatient, pharmacy, etc.). This level of detail enables forecasters to capture the differential rates of growth that can be observed across service categories – for example, pharmacy cost growth may be expected to outpace inpatient cost growth in many environments. If users do not have access to detailed trend information for each individual category of service, aggregate or average trend estimates can be used instead. The way this trend interacts with assumptions for utilization changes and overall ROI is discussed in greater detail below.

E. Utilization Changes

One of the most challenging components to the ROI forecasting process is estimating the change in utilization patterns that will potentially result from a health home or medical home program. Whereas users of the *ROI Calculator* typically have access to substantial data to derive target population, baseline costs, and trend assumptions, many users find themselves without reliable data sources to estimate program impacts on cost and utilization. Given the sensitivity of the model to assumptions regarding changes in utilization, it is important to understand how these assumptions affect savings calculations and what evidence is available to generate informed assumptions.

Understanding Utilization Change Calculations

For each forecast year, the utilization change assumptions should represent the program's expected impact relative to what would otherwise be expected based on trend. For example, suppose that baseline inpatient expenditures for the target population averaged \$1,000 over the last 12 months. Further suppose that actuarial analysis identified a 5% trend, or expected annual growth rate in inpatient expenditures over the next several years. Finally, suppose that inpatient utilization is expected to decrease as a result of enrolling in a health home or medical home, by 10% relative to trended expenditures for each forecast year. Exhibit 4 summarizes the forecasted expenditure and savings resulting from these assumptions:

Exhibit 4: Sample Forecast Using Utilization Change Assumptions

	Baseline	Year 1	Year 2
Trended Expenditure	\$1,000.00	\$1,050.00	\$1,102.50
Forecasted Utilization Change		-10%	-10%
Forecasted Expenditure		\$945.00	\$992.25
Forecasted Savings		\$105.00	\$110.25

Developing Assumptions for Changes in Utilization

As discussed previously, the *ROI Calculator* quantifies savings by applying expected changes in utilization patterns to trended health care expenditures. To develop utilization change assumptions, users have three general options:

- *Past experience/prior data:* If the health home or medical home represents an expansion, continuation, or renewal of a previous program, and if data are available to assess the utilization impacts from past efforts, those data should form the basis for forecast assumptions. To the extent that formal evaluations were not conducted, users should carefully consider their methods for retrospectively analyzing claims data to maximize the ability to isolate the effects of the health home or medical home. For example, it is preferable to identify a comparison group for this analysis — rather than just looking at target population costs before and after the program — in order to tease out any confounding effects such as regression to the mean.
- *Data from existing health home and medical home programs:* When internal data are not available, another option for developing assumptions is to rely on others' experience with similar programs. Users can search the published literature for studies on medical home and health home programs (when they become available) that report utilization or cost outcomes, and can also look for evaluation reports from similar programs launched in other states or regions. To assist in these efforts, the *ROI Calculator* includes a database of utilization changes achieved by medical home initiatives across the U.S. (see *Using the Utilization Database* below). In reviewing this evidence, users should consider the comparability of the services provided, target population, and health care setting for their own purposes, as well as the reliability of the reported results (e.g., statistical significance, quality of study design).
- *Hypotheses and best estimates:* Users may choose to rely on their own hypotheses and best estimates for what changes are likely to occur following their health home or medical home implementation. Users should think through the logic of their programs and assess what changes are reasonable to expect. For example, many medical home programs aim to reduce emergency room visits through improved self-management, access to primary care, and use of medications. Accordingly, the expected utilization changes for an ROI forecast might include decreases in emergency department claims, at least partially offset by increases in claims for office visits and pharmaceuticals.

Quantifying such increases and decreases can be more challenging, however, and it may be most appropriate to test these assumptions through an iterative process, using the *ROI Calculator* to understand the magnitude of change needed to generate various thresholds of financial impact. Through this process, one may determine that the magnitude of change required to generate a positive ROI is too high to be plausibly achievable within the forecast period. For example, if a state identifies that a 90% reduction in inpatient utilization must occur within one year in order to generate a positive financial return, it might determine that the proposed program will not likely have a positive ROI as currently envisioned, and might adjust either the program features or the expectations of financial savings accordingly. In general, when relying on hypotheses and best estimates, users are strongly encouraged to focus on the sensitivity analysis for their forecasts (discussed in more detail below), so that the appropriate amount of uncertainty is incorporated in the results.

Using the Utilization Database

Determining the likely magnitude of utilization increase or decrease can be difficult, especially considering the lack of internal evidence to generate these assumptions in most instances. As mentioned above, when internal data are not available, users can look to results achieved by programs similar to their proposed health home or medical program. The published literature is admittedly limited, particularly with regard to programs targeting populations relevant to Medicaid. However, there are a number of program evaluations that users can reference when making utilization change assumptions, which are included in the Utilization Database component of the *ROI Calculator*. This database includes a selection of medical home program

evaluations collected from a variety of sources, including peer-reviewed journals as well as self-published results, and using a variety of evaluation techniques (e.g. random control trial, pre/post analysis, etc.).

The Utilization Database can be accessed through the Utilization Change page of the *ROI Calculator*. If relevant, the results of individual studies can be used to inform one's forecast assumptions for utilization changes. Users may wish to peruse the database to help assess the validity of their own utilization change estimates, or to understand the upper and lower bounds of what changes might be reasonable to expect from similar implementations. Given the variation in medical home and health home models, it is critical that users carefully consider the extent to which these studies employed similar program elements to the initiative being forecasted.

The Law of Large Numbers

The magnitude of calculated savings — and thus ROI — is influenced by three primary factors: 1) the size of the target population; 2) the magnitude of baseline costs; and 3) the percentage change in utilization expected to result from intervention. Therefore, when any one of these factors is “large” – e.g., statewide enrollment, a particularly high-cost patient population, or substantial expected decreases in visits/admissions – it is not difficult to obtain unreasonably high estimates for savings and ROI.

There are a few implications to this “law of large numbers” for users to consider. First, when developing utilization change assumptions for large populations, users should carefully consider what magnitude of change is reasonable to expect across thousands of patients (or more). As the utilization change assumption should reflect the *average* impact across the entire group, users should bear in mind that the desired or potential impact may only be achieved in a subset of the population, with many not affected at all.

Second, when deriving utilization change assumptions from the results of prior studies, users should consider differences in scale of the interventions and adjust assumptions accordingly. For example, suppose a previous study observed a 50% decrease in admissions among a sample size of 100 patients. In adapting these results to estimate ROI for a statewide initiative involving several thousand patients, it may not be reasonable to expect a similar impact across the population as a whole.

Finally, when targeting particularly high-cost populations for health home and medical home programs, users should carefully consider which portion of expenditures is truly amenable to intervention. For example, for complex populations with multiple, chronic health care needs, a certain level of utilization in any given service category may be necessary and/or desirable. Therefore, in developing utilization change assumptions for health homes and medical homes targeting these populations, one should think about which portion of spending may be affected, and that effect should be quantified relative to the total array of expenditure in that service category.

F. Program Costs

Health homes and medical homes require financial investment. Realistic assumptions around program costs are just as critical to accurate ROI forecasting as are the various assumptions around target population and utilization described above. Program costs should reflect all costs associated with launching and administering the proposed health home or medical home initiative, including the opportunity costs for personnel or resources that might otherwise be allocated for other purposes. Health home and medical home program costs are likely to include: 1) additional staffing, such as practice-based nurse case managers, community health teams, and quality improvement coaches; 2) additional PMPM and/or bonus payments to providers; 3) training and education; 4) health information technology such as registries and electronic health records; and 5) other direct or indirect expenses. In the absence of detailed cost-accounting data, identifying program costs often requires some degree of estimation or high-level cost allocation. In making

these assumptions, users are encouraged to err on the side of over-allocating costs to a proposed initiative, to ensure that forecasted ROI and the associated payback period are as conservative as possible.

Program Inputs that Do Not Require New Outlays

For many health home and medical home programs, stakeholders may decide to reallocate funding from another program to fund health home or medical home program costs. For example, Medicaid programs may decide to redirect care management fees that are currently paid directly to managed care organizations or incorporated into their capitation payments and use those resources to directly fund practice- or field-based case managers. Users should decide if they want to include these outlays in their ROI forecast. Planners that are using program inputs intended to be “budget neutral” across a larger budget may choose not to include these inputs in the Program Cost section of the *ROI Calculator*. Other users may choose to include these expenses because they are interested in an ROI forecast which examines the ROI associated with overall health home or medical home program expenditures, regardless of whether those expenditures represent a new budgetary expense. Users should note that the most accurate calculation of ROI would include all associated program costs, regardless of whether those expenditures represent new or repurposed budgetary expenses.

Programs Funded with Federal Matching Funds

Categories of program costs included in the Calculator are not intended to represent all costs eligible for enhanced federal match under health homes. Instead, they are deliberately broad to encourage consideration of the full range of costs that might be needed in launching a new program. Users should think about whether they want to include the full costs of the program, or just the costs that they will bear (e.g., state share, at appropriate matching rates). Full costs will more directly reflect the total benefit/cost of the program; state share would best reflect the budget impact to the state.

Allocating Staff Time to Program Costs

Health home and medical home initiatives may require administrative staff time to plan, develop, and manage the initiative. These costs should be included in program costs to reflect the opportunity cost of that staff time not being available for other efforts. This should be factored in even if the health home or medical home administration would normally fall within the duties of the staff allocated to the project. It may be helpful to think about allocated personnel costs on the basis of full-time-equivalent (FTE) percentages, applying those percentages to the fully-loaded costs (salary plus fringe benefits) for each employee. Users should also consider allocating costs for management and support staff resources to the extent they will be dedicating any of their time to program development or administration and should either include these costs in the personnel line item or in the indirect cost category discussed below.

Incorporating Other Direct Personnel Costs

Many health home and medical home initiatives directly invest in and provide personnel such as care managers, community health workers, and quality improvement coaches. For example, such resources may be used to provide services like care coordination, health education, linking patients to community services, and workflow redesign. To estimate the costs associated with the program personnel, users will need to carefully evaluate:

- The specific health home or medical home services that will be provided;
- The type and number of personnel needed to provide those services;
- The expected frequency and intensity of contact with enrollees;
- The salary and benefits associated with the personnel;

- Whether the resources will be embedded directly within each health or medical home or may be “shared supports” that are deployed across the homes, which will impact the personnel cost structure; and
- The extent to which the state or health plan will directly fund the services and deploy the necessary personnel versus paying the provider a fixed per member per month (PMPM) fee.

Incorporating External Costs

Depending on how the health home or medical home program is structured, the program costs may be primarily external rather than internal. For example, if a state or health plan hires an external vendor to deploy nurse case managers or quality improvement coaches, the costs associated with the contract should be entered in the *ROI Calculator* (e.g., negotiated care management fees). Yet another example can be found where states contract with managed care organizations to implement the medical home program. The cost of implementing these initiatives may represent one small component of a broader capitation rate, but should be broken out and included in program costs to accurately reflect total investments in the program.

Incorporating PMPM and Bonus Payments

Health home and medical home programs may provide direct PMPM payments for all or a portion of services provided and/or bonus payments to participating practices. These payments are in addition to existing PMPM or bonus payments, and may be tiered to reflect varying levels of services provided or quality attained. Such payments can serve a variety of purposes, for example:

- *PMPM payments to reimburse providers for all program costs.* Some programs opt to fund all program costs, including all necessary personnel and technology costs, through a PMPM payment to the providers. From a program administration perspective, this approach may be the least costly and provides the providers with the flexibility to individually determine their resource needs and how to purchase those resources. Under this funding structure, users evaluate the services they expect health home or medical home programs to provide and estimate the costs associated with those services. The aggregate costs are then allocated across the enrollee population as a PMPM payment to each provider. If users take this approach to funding the health home or medical home program costs, they should only enter those program costs in the PMPM payment section, and should not enter these costs in any other cost category.
- *PMPM payment to reimburse providers for a portion of program costs.* Alternatively, some programs may be structured to reimburse providers for funding a portion of health home or medical home services, but not all. States or health plans may choose to directly purchase supports that are most efficiently shared across providers, but direct the providers to purchase other services and supports themselves using the PMPM payment. For example, states or health plans may fund a pool of quality improvement coaches to support all participating providers, but will direct the providers to purchase other services such as care managers or electronic health records and will provide a PMPM payment to cover these costs. This approach maximizes efficiency by taking advantage of services with economies of scale and enabling providers to use their discretion to allocate resources to best meet their unique needs.
- *Bonus payments to encourage high-quality care.* Additionally, many medical home programs use quality bonus incentives to stimulate or sustain quality achievements among participating providers. These bonus payments provide incentives to improve quality while reducing overall health care costs and utilization through better care coordination and management.

Identifying and Including Indirect Costs

Most costs associated with a medical homes are readily identifiable and can be directly associated with the program (e.g., salaries, fringe benefits, travel, consultants, etc.). Other costs may not be directly connected with the program, but may still be necessary for the general operation of the organization and facilitation of the initiative (e.g., utilities, general supplies, support personnel, accounting, etc.). The components of these indirect costs are often so numerous that it may be impossible or, at the very least, inefficient to identify each individual cost item and determine the correct portion to allocate to the program. Thus, a more reasonable approach to calculating indirect costs may be to use an indirect cost rate and apply that rate to the direct costs of the program. It is important to note that individual accounting systems treat indirect costs differently, and users should consider any internal organization rules regarding allocating indirect costs, or use an otherwise approved indirect cost ratio if one is available from existing grants or other funding sources.

Using the Program Cost Database

Determining the likely program inputs and magnitude of costs can be difficult, especially considering the lack of internal evidence to generate these estimates in most instances. When internal data are not available, users can look to program costs incurred by programs similar to their proposed health home or medical home program. There are a number of existing medical home and care management programs with similar program components, such as nurse care managers and registries, which users can reference when estimating their own costs. Some of these programs are included in the Program Cost Database component of the *ROI Calculator*. This database includes a selection of medical home program costs collected from a variety of programs.

G. Scenario Testing and Sensitivity Analysis

All forecasting efforts rely on estimates and expectations that may or may not materialize as anticipated, although the magnitude of uncertainty may vary between one forecast and another. Users of the *ROI Calculator* are encouraged to account for the appropriate degree of uncertainty in their forecasts by running multiple scenarios for each forecast (e.g., “best” and “worst” cases), and by using the Sensitivity Analysis component of the *ROI Calculator*.

Scenario Testing

The *ROI Calculator* allows users to easily copy and save multiple versions of each forecast by clicking “copy” on the Forecast page and saving the forecast under a new name. This feature can be particularly useful for running multiple forecast scenarios. For example, a state launching a new health home program may be interested in developing and presenting a number of ROI forecasts for the program based on a range of expected outcomes. Under an optimistic scenario, the state may assume that targeted levels of enrollment are reached and that the intervention achieves the anticipated cost/utilization outcomes that similar care management/care coordination programs have achieved. However, the state may also envision a more conservative scenario, under which enrollment takes longer and never reaches targeted levels, and implementation challenges lead to a weaker utilization impact. By forecasting and reviewing both scenarios, the state will have a more informed view of how the range of potential outcomes will affect ROI, and may be more prepared to think about implications of the “best” and “worst” cases for program funding and other planning purposes.

Sensitivity Analysis

Whereas scenario testing allows users to consider what happens to ROI when one or more specific forecast assumptions are changed, sensitivity analysis allows users to account for an overall level of uncertainty across all forecast assumptions. It can also help account for unforeseen variation in assumptions, and can

allow users to see where an analysis might cross from positive to negative ROI within a range. Furthermore, sensitivity analysis allows users to develop and communicate a realistic range of expected outcomes for ROI, rather than a single point estimate that may overstate the certainty of forecasted outcomes.

To conduct a sensitivity analysis with the *ROI Calculator*, users input a sensitivity range that will be applied to estimated savings in the final analysis. As the sensitivity range is used to both increase and decrease expected savings by the percentage entered, this analysis creates an upper and lower bound for expected savings and resulting ROI estimates.

Exhibit 5: Sample Uses of Scenario Testing and Sensitivity Analysis

Method	Examples
Scenario Testing	<ul style="list-style-type: none"> ▪ What if enrollment is achieved for 50% of the target population instead of 60%? ▪ What if utilization impacts occur in Year 2 instead of Year 1?
Sensitivity Analysis	<ul style="list-style-type: none"> ▪ What if, for any number of reasons, the savings estimates are off by 20%?

Determining an Appropriate Sensitivity Range

In general, the size of the sensitivity range should match the overall degree of uncertainty in the ROI forecast. If users are fairly certain about the accuracy of their forecast assumptions, a narrow sensitivity range may be reasonable. However, increasing degrees of uncertainty should lead to broader sensitivity range percentages. Some users will take a “ball-park” approach to determining a sensitivity range, estimating, for example, that savings projections may be off by approximately “25%” in either direction for any number of reasons. For others seeking a more scientific approach, there are a number of techniques statisticians use to account for uncertainty, including standard deviation and confidence intervals. As desired, users might consider engaging statisticians and/or actuaries in their organizations to discuss appropriate sensitivity ranges given the tools and techniques used for making forecasting assumptions in other program areas (e.g., future cost trends).

Limitations of Sensitivity Analysis

There are a number of limitations to consider regarding sensitivity analysis in the *ROI Calculator*. First, sensitivity analysis cannot account for grossly incorrect assumptions in underlying forecast parameters. If, for example, an intervention leads to vastly different utilization patterns than anticipated, sensitivity analysis will likely not have captured the full extent of this deviation from expectations. Second, sensitivity analysis is limited to an aggregate accounting of uncertainty across all forecast parameters, as users cannot attach discrete sensitivity ranges to individual forecast assumptions. For example, a user may be very confident about forecasted changes to inpatient utilization, but significantly less confident about assumed changes to outpatient utilization. To account for uncertainty in specific parameters, users are encouraged to conduct scenario testing in addition to sensitivity analysis, as described above. Finally, as indicated in Exhibit 5, sensitivity ranges are applied only to savings estimates and not to forecasted program costs.

H. Discount Rate

The final step in completing an ROI forecast is to input a discount rate, which is used to calculate the net present value (NPV) of the investment in the proposed program. It is important to note that the discount rate does not affect ROI calculations in the *ROI Calculator*.

In financial analysis, discounting is the process of finding the present value of an amount of money at some future date (based on the concept that a dollar today is worth more than a dollar tomorrow). The discount rate is usually chosen to be equal to the cost of capital for the investing organization.

Discount rates vary by organization, but can generally be thought of as the rate of return that the organization could achieve by investing the allocated funds in an alternative use with similar risk. Some organizations use interest rates as a proxy for the discount rate, as they represent the rate of return one could obtain by investing in available financial instruments rather than in the proposed quality improvement project. These rates can vary greatly based on the risk of these instruments and should closely mirror the perceived risk of the project. Other organizations use a weighted average cost of capital that reflects the organization's actual cost of capital based on access to equity and debt financing. Users of the *ROI Calculator* should consider consulting with budgeting and financial analysis experts in their organizations to determine the appropriate discount rate for their forecasts based on organizational practices.

I. Using the ROI Solver

In some cases, users of the *ROI Calculator* may have a target threshold for financial performance in mind. In these instances, users may be interested in working backward, starting with a targeted ROI and using the *ROI Calculator* to understand what assumptions are required to get there. To facilitate this analysis, the *ROI Calculator* includes an ROI Solver component.

To use the ROI Solver, one must first complete a forecast through the *ROI Calculator*'s step-by-step process of identifying the target population, baseline costs, utilization changes, and program costs. If the ROI estimate generated by these assumptions does not meet the desired or required threshold for financial performance, users can directly manipulate individual forecast assumptions to test their impact on ROI, or they can visit the ROI Solver page. The ROI Solver allows users to input a targeted ROI and immediately see what changes would be needed in existing forecast parameters in order to achieve that target. Specifically, the ROI Solver identifies needed changes in four discrete forecast parameters:

- Target population size;
- Year 1 inpatient utilization change;
- Year 1 emergency department utilization change; and
- Program costs.

In calculating these changes, the ROI Solver holds all other assumptions constant except the parameter in question. For example, suppose a forecast includes the following assumptions and resulting ROI:

Exhibit 6: Sample Use of ROI Solver

Target population	2,000
Year 1 inpatient change	-10%
Program costs	\$300,000
Year 2 ROI	1.50

Now suppose that a user is interested in seeing what it would take to generate a higher return of 2.0 in two years. The user would enter a target ROI of 2.0, and would see that to achieve this return, any one of the following assumptions would need to be true — either the target population would have to increase to

2,800, or the Year 1 inpatient utilization impact would have to reach -14%, or the program costs would have to decrease to \$215,000.

One of the more valuable uses of the ROI Solver is to test the reasonableness of various ROI expectations. For example, if the ROI Solver indicates that in order to achieve a positive ROI, inpatient utilization needs to decrease dramatically in one year's time, a user can consider whether such a change is reasonable to expect. If not, it may be appropriate to either reset expectations about the program's ability to pay for itself, or to modify the program design in order to make it more financially sustainable (e.g., target a different or more stratified population, consider changing the intensity of the intervention, etc.).

J. Communicating ROI Analyses

When sharing ROI forecasts with colleagues, managers, government officials, or other stakeholders, it is important to keep a number of considerations in mind.

Importance of Transparency

One of the key benefits to using the *ROI Calculator* is the transparency it creates for sharing analyses with broader audiences. Accordingly, the *ROI Calculator* can be used to foster dialogue with multiple stakeholders who may be interested in the prospective financial impact of a given quality initiative. When communicating ROI analyses conducted with the *ROI Calculator* or elsewhere, users are encouraged to provide maximum transparency including:

- Description of the methodology used to calculate costs and savings;
- Justification for key forecast assumptions;
- Identification of sources of uncertainty in the estimates; and
- Indication of how such uncertainty may have been accounted for through scenario testing or sensitivity analyses.

By fully explaining the methodology and limitations of ROI analysis, users of the *ROI Calculator* can assure their audiences of complete transparency, opening the door for substantive discussions on specific areas of question or dissent and limiting arguments over methodology and assumptions. These conversations have the potential to lead to further refinements of the analyses through collaboration with stakeholders, thereby increasing buy-in for the validity of the results. For example, conversations could concentrate on expected participation rates in the program, or around the anticipated effects of the program on emergency department use – instead of on skepticism around methodology and concerns of “funny math.”

IV. Conclusion

ROI forecasting is a valuable technique for Medicaid policymakers, regional multi-stakeholder collaboratives, health plan officials, and other stakeholders interested in implementing health homes and medical homes to improve quality outcomes and control program costs. The *ROI Calculator* is one of a number of tools available for this purpose, and presents a straightforward and transparent methodology for projecting the financial impact of proposed health home or medical home programs. In addition to the help buttons available within the *ROI Calculator* itself, the information provided in this Guide should provide a useful resource for those interested in developing ROI forecasts and sharing their results with others.