The California Accountable Communities for Health Initiative (CACHI) is implementing a new model for modernizing our health system. By uniting local leaders in the common cause of improving health, local Accountable Communities for Health (ACH) serve as groundbreaking vehicles for collaboration across multiple sectors to address critical community health issues. Recognizing sustainability—and ultimately aligning financing with this new model—is a major challenge, CACHI hosted a three-part roundtable series to explore key financing issues.

**Goals for Roundtable Series:**

- To generate common language and strategies for California Accountable Communities for Health Initiative (CACHI) sites to support their sustainability and financing efforts.
- To continue building the case for investments in ACHs based on their financial, economic, and intangible valuation.
- To inform local, state, and federal policy and the general field of people and organizations working to advance the accountable communities for health-type model.

The attached paper was developed in partnership with Minga Analytics to frame the session on Valuation of an Accountable Community for Health.
Selecting and Valuing Outcomes for an Accountable Community for Health and its Portfolio of Interventions

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Prepared for the California Accountable Communities for Health (CACHI) Sustainability and Financing Three-Part Roundtable Series: Part 1

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Introduction

This paper provides an introduction to the valuation of outcomes that result from community-driven health and wellness enterprises with portfolios of interventions and the infrastructure that supports them. It has been prepared to assist participants in the California Accountable Communities for Health Initiative (CACHI) to describe to funders, partners, and stakeholders the value of these enterprises, the infrastructure, and the economic and health returns from portfolio interventions.

The first step for the Accountable Community for Health (ACH) on the path to community health is the development of the ACH infrastructure for building community support, raising and managing Wellness Trust funds, selecting, managing, and evaluation investments, and communicating the ACH stories. The paper begins with a discussion of a strong local community health infrastructure and provides examples of possible benefits or outcomes, data, and methods for their measurement. Valuing community health infrastructure—and community health—is an emerging area of research. The ACHs are positioned to take advantage of, build upon, and contribute to this work.

The paper then turns to the portfolio of interventions. This section begins with a set of questions and criteria for selecting outcomes. It provides an overview and definitions of various types of outcomes and methods for their valuation. are provided. These methods can be applied to individual interventions, portfolios of interventions, and for investments in a community health infrastructure.

Finally, new methods for valuing infrastructure and portfolios as packages and assessing health equity are discussed. The paper also includes two case studies demonstrating outcomes valuation using different methods, including one that values the combined impact of the community infrastructure and the portfolio of interventions (Appendix A). A glossary is included in Appendix B, which defines many of the terms used in this paper.

The ACH Infrastructure: Outcomes and Valuation

Investment into the ACH health infrastructure is critical to build community support, enable refinement of the portfolio of interventions, identify gaps, and leveraging financing of the Wellness Fund. This infrastructure is managed by a leadership team with the support of a backbone entity, such as a nonprofit organization or local department of public health. The leadership team builds community-wide
support for, directs, funds, and evaluates the health impacts of the portfolio of interventions and other community activities, with attention to attaining greater health equity. Measuring the value associated with this infrastructure can be a challenging task. However, recent studies indicate that certain forms of community infrastructure produce benefits including improvement in health outcomes. (1)

The value of a community infrastructure can be measured on two levels. First, one can attempt to measure the contribution of the collaborative to building community social capital. Valuing social capital is useful during the first stages of an ACH, before the portfolio of interventions has been fully implemented. Such a valuation can be useful in generating further support for the ACH. Second, the ACH infrastructure can be valued based on its contribution to the outcomes of the portfolio of interventions. Here, the infrastructure is treated as a fixed cost of the intervention. For example, a community-wide physical activity or tobacco campaign may attribute a portion of its success to the collaboration and trust built among community institutions by an effectively functioning collaborative table.

**Measuring Social Capital**

*Social capital* refers to the networks of relationships among people and institutions who live and work in a community, enabling the community to function effectively. Social capital has been used to explain the improved performance of diverse groups, the growth of entrepreneurial activities, the value derived from strategic alliances, and the evolution of communities. (2)

Social capital can be measured using indexes that best fit a particular community and the available data. They are useful for tracking progress in community functioning, well-being, and resilience. Indexes may include measures for:

- trust (general and institutional)
- trustworthiness
- network structural characteristics
- association membership and community engagement, and
- voluntary activities.

Other measures can describe relational social capital, which focuses on the strength of social relationships, social cohesion, and social interactions and cognitive social capital, which focuses on shared norms, beliefs, and attitudes.
Communities with a strong local health infrastructure comprised of multi-sector representation, strong linkages, and distributed governance appear to be able to have a greater impact on preventable chronic health conditions than those that do not. (1) ACH infrastructure has the potential to:

- Leverage investment funds
- Stimulate broad community engagement
- Allocate resources across sectors for portfolios of interventions that address complex public health problems
- Monitor and evaluate interventions using multi-sector outcomes
- Link public health system with the health care sector, social services, community programs, and the economic sector
- Identify and address emerging problems early on and effectively strengthen community resiliency.

This increased effectiveness can lead to improved population health, community well-being, and economic vitality. It may be possible to identify outcomes, measures, and sources of data for each of these categories as shown in the following schematic.
# Potential Outcomes, Measures, and Methods for Valuing Community Health Infrastructure

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measures</th>
<th>Methods &amp; Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Health Outcomes</td>
<td>Population Health Measures</td>
<td>Indicator Measures</td>
</tr>
<tr>
<td>• Increased life expectancy</td>
<td>• All-cause mortality rate</td>
<td>• National health data sets</td>
</tr>
<tr>
<td>• Improved health-related quality of life</td>
<td>• Preventable mortality rate</td>
<td>• BRFSS</td>
</tr>
<tr>
<td>• Reduced health disparities</td>
<td>• Life expectancy</td>
<td>• Justice system data</td>
</tr>
<tr>
<td>Community Well-being Outcomes</td>
<td>CDC-HRQOL-4 (BRFSS)</td>
<td>• Purchased indicator dashboard</td>
</tr>
<tr>
<td>• Improved health environment</td>
<td>Select chronic disease prevalence rates</td>
<td>PreExisting Indexes and Composite Measures</td>
</tr>
<tr>
<td>• Safer community</td>
<td>Select health disparity indicators</td>
<td>• County Health Rankings</td>
</tr>
<tr>
<td>• Improved community well-being</td>
<td>Community Well-being Measures</td>
<td>• Community Well-being Index</td>
</tr>
<tr>
<td>• Increased social capital</td>
<td>• Community Health Ranking</td>
<td>• Social Capital Index</td>
</tr>
<tr>
<td>• Increased health equity</td>
<td>• Crime rate</td>
<td>• Social determinants index or composite score</td>
</tr>
<tr>
<td>Economic Well-being Outcomes</td>
<td>Community Well-being Index score</td>
<td>Economic Development Data Methods</td>
</tr>
<tr>
<td>• Vibrant economic climate</td>
<td>Social Capital Index score</td>
<td>• Descriptive statistics</td>
</tr>
<tr>
<td>• Strong economic sector growth</td>
<td>Social determinants of health index or composite score</td>
<td>• Longitudinal analysis</td>
</tr>
<tr>
<td>• Narrowing wealth gap</td>
<td>Economic Well Being Measures</td>
<td>• Community survey</td>
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<tr>
<td></td>
<td>• Worker recruitment and retention</td>
<td>• Proprietary systems dynamics model</td>
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<td></td>
<td>• Worker productivity</td>
<td>• Network and cluster analyses</td>
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<td></td>
<td>• Industry recruitment, expansion, retention</td>
<td>• Qualitative data collection</td>
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<td></td>
<td>• Post secondary education outmigration</td>
<td>• Stories</td>
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<tr>
<td></td>
<td>Income disparity measure</td>
<td></td>
</tr>
</tbody>
</table>
Methods and measures are still in development for valuing community health infrastructure outcomes but it is possible to select key indicators, indexes, and composite measures for which data are available and begin tracking these over time. Even descriptions of the contributions of infrastructure, stories, and case studies will be useful during the first phases of the ACH.

The Portfolio of Interventions: Outcomes and Valuation

Key Points to Consider in the Selection and Valuation of Outcomes

Selecting and valuing outcomes depends on many factors: the goals they reflect, the purpose for which they are intended, available resources, and the ability to measure and value them. Below a list of questions and actions that ACHs can use to help identify the most compelling outcomes for their intended purpose. (3)

1. Are the goals for the ACH and the portfolio of investments well defined? These may be related to health improvement but also may include health equity, community well being, and other goals. Projects with multiple stakeholders may also have other non-health goals such as increase worker productivity, contribute to economic development, and improve a community’s environmental assets.

2. Has the audience for the outcomes valuation been identified? Identify the users of the results of the analysis, and indicate how the results will be used. Determine the information needs of the target audience in reference to the program or intervention. The audience may include collaborators, investors, participants in the intervention, and community residents.

3. Is the intervention, intervention strategy, or community project for the proposed investment clearly defined? This process will assist in identifying the key outcomes of interest. Also clearly describe the baseline comparator (the strategy that best represents current practice or the best alternative) for the outcomes valuation. This step is necessary to measure the quantity of health improvement and other outcomes.

4. Is the perspective of the outcomes valuation specified? The perspective determines whose costs and benefits will be included in the analysis. For example, if the health system perspective were chosen, only health-related costs and benefits would be included. This may be appropriate for a
report for a health care purchaser. The perspective taken will help determine which outcomes to catalog and value.

5. What is the relevant time horizon for the valuation? Determine how long the intervention will be in place and over what period outcomes from the investment will be considered. This step is necessary to determine not only which outcomes are relevant but also whether health outcomes that may not occur for many years can be considered.

6. If outcomes are being collected and valued to determine the value of an investment, what analytic method will be used? This will help determine which outcomes will be collected and the appropriate valuation method.

7. Identify the health and other outcomes of interest based on the previous steps. Determine how to establish the baseline for each outcome, the method for collecting changes in outcomes, and the methods that will be used to value the outcomes.

8. Determine if the distribution of outcomes in the population will differ for alternative investment options, including the baseline comparator. Determine the feasibility of analyzing the distributional effects and intergenerational effects of various investment options. Assess how outcomes will be used to address health equity.

**Economic Evaluation**

One reason for measuring and valuing outcomes is to examine the relationship between the costs and the benefits of one or more interventions. This is an economic evaluation. Benefits can be expressed in monetary terms and as health outcomes. There are several types of economic evaluation depending on its purpose. The types of economic evaluations include:

- Return-on-investment analysis;
- Cost-effectiveness analysis;
- Cost-utility analysis;
- Cost-benefit analysis; and
- Budgetary impact analysis.

More information on economic evaluations is available from a number of sources. (3)
Types of Outcomes

Outcomes—often referred to as benefits—from clinical and community health interventions come in many forms including improved health, savings in health care costs, increased worker productivity, and better health-related quality of life. Community interventions that impact health can also produce social, environmental, and economic outcomes. It is important to select outcomes that people care about and not just measures of disease such as blood pressure or rates of diabetes complications. This section describes the types of outcomes that result from clinical and community health interventions and portfolios of interventions.

Health Outcomes: Health outcomes are the changes in an illness, injury, or health condition that affect morbidity, life expectancy, and health-related quality of life. Health outcomes can be measured for individuals and for populations. Health outcomes can be categorized as short, intermediate, and long term. Short-term outcomes include changes in risk factors such as body mass index, tobacco use, or physical activity level. Examples of intermediate health outcomes include cases of disease prevented or adverse events averted. Long-term health outcomes capture the health-related quality and length of life gained from reduced morbidity and premature mortality.

Other Outcomes: Often community interventions that impact health are implemented in settings outside of the health sector. For example, interventions may be school-based, occur in the workplace, and affect the built environment of a community. These interventions may produce other outcomes in addition to health outcomes. Some of these outcomes may be directly related to the health outcomes; others are a consequence of the health outcome and may reflect changes in both individual and community well-being. Examples include changes in educational attainment, social services utilization, and juvenile and adult justice costs.

Other nonhealth outcomes generally fall into three categories: environmental, social, and economic outcomes. These types of outcomes are most likely to occur when interventions are designed to meet the needs and goals of a diverse set of multi-sector stakeholders.

Environmental outcomes result from changes to the physical landscape of a community such as constructing cycling and walking paths, acquiring parks and green space, changing zoning ordinances, and passing air and water quality policies. Environmental outcomes may include increased biodiversity, better air and water quality, and improved community well-being.
Social outcomes are those that relate to strengthening the community’s social fabric. They may result from interventions in neighborhood safety, affordable housing, the healthy food retail environment, and local school policies. Outcomes may include improved neighborhood security, increased health equity, and community vibrancy and resiliency.

Economic outcomes are changes in community income and employment that result from an intervention. For example, investment in creating a more vibrant streetscape that promotes walking and cycling, and provides a healthy food retail environment may result in increased economic activity and employment in a community.

Intangible Outcomes: Intangible outcomes are those that are difficult to quantify and assign a monetary value. Thus, they are often not included in financial analyses of health interventions. (see below: The Difference Between Financial and Economic Costs). Examples include alleviation of pain and suffering, improved social connectedness, and community resiliency. Methods designed to assess full economic benefits will potentially capture the value of intangible outcomes. This is especially important when there is a need to determine the full value of the benefits of an intervention, such as for proposed regulatory changes. However, these methods are often out of reach for community organizations. When intangible outcomes exist, it is important to list and describe them.

The Difference Between Financial and Economic Costs

Outcomes are often valued in monetary terms. Therefore, it is useful to distinguish between financial and economic costs. (Costs here can also refer to savings, such as health care costs saved by an intervention, and to the value of benefits of an intervention.) Financial costs measure the expenditures or monetary outlays or receipts for the outcomes while economic costs measure the total value of the outcomes to society as a whole where value may not be measured in market (financial) terms or as dollar expenditures.

The decision to use financial or economic valuation depends upon the reason for the analysis and the method selected. Financial ROI, cost effectiveness, cost utility, and budgetary impact analyses use financial costs. Cost benefit analyses use economic valuations. Analyses that use financial costs provide an ACH leadership team with information on the affordability of an investment. They may not, however, include the total value of the project’s outcomes. Analyses using economic valuation provide information on the full value of a project but often little information of the financial consequences of implementation.
Methods for Valuing Outcomes

**Cost of Illness:** The cost-of-illness approach is used to measure the costs from an illness, injury, or health condition and may include the lost productivity due to morbidity and premature mortality. COI is used in cost-effectiveness and cost-utility analyses and can also be used for ROI and budgetary impact analyses. It is the most useful approach when an analysis is done from the health care system perspective or a health care payer perspective (i.e. impact on health care costs is the major concern).

The cost-of-illness approach can use either prevalence- or incidence–based costs depending on the purpose of the analysis. Prevalence-based costs are the total costs associated with specific cases of a health problem that occur in a specific period, usually one year, regardless of when the health condition became evident. Prevalence based costs are useful to decision makers examining the annual impact of a disease, injury, or health condition. These are useful for budgetary impact analyses of proposed legislation. Prevalence-based costs are often estimated using publicly available data sets, thus avoiding the need for primary data collection.

Incidence-based costs are the total costs resulting from new cases of a disease, injury, or health condition that occur within a set time period, usually a lifetime. In other words, incidence-based costs include all of the future health care costs of a health condition that is prevented by an intervention during the period the intervention is in place. Incidence-based costs can include health care costs, other costs associated with the health condition, and the lifetime productivity losses that result from morbidity and premature mortality.

**Health-Related Quality-of-Life Measures:** Health-related quality-of-life (HRQoL) measures are nonmonetary measures designed to capture the impact of an illness, injury, or health condition on health-related quality and length of life. They are multidimensional measures that examine the effects of a health condition on physical functioning, general health, vitality, social function, and emotional, and social health. HRQoL measures capture both information about health states and societal preferences for the health state compared with perfect health. There are several methods used to measure preferences and preference weights are available in the literature.

There are several types of HRQoL measures: quality-adjusted-life-years (QALYs), disability-adjusted life years (DALYs), quality-adjusted life expectancy (QALE), and others. HRQoL measures are especially useful for quantifying and reporting the health impact of an illness, injury, or health condition in terms of both length and quality of life. Because HRQoL measures can convert the impact of any illness, injury, or health condition into a generic health outcome, they can be used to compare the value
and impact of very different health conditions. Many estimates for HRQoL for different health states and health conditions can be found in the literature.

**Contingent Valuation:** Contingent valuation is a set of methodologies that attempt to measure the economic value consumers place on goods and services not usually traded in the marketplace. Contingent valuation generally elicits from individuals their willingness to pay or willingness to accept monetary compensation for receiving or giving up certain nonmarket goods and services. Contingent valuation methods were originally developed to assess the value on nonmarket environmental attributes such as biodiversity, endangered species, and the preservation of wilderness areas.

Contingent valuation and willingness to pay methods can be used to measure the value of both health and other outcomes. Theoretically, contingent valuation can assess the total monetary value an individual places on avoiding an illness, injury, or health condition, not just the health care costs. It is often measured by asking the individual’s willingness to pay for an intervention that would reduce the risk of having that health condition.

Contingent valuation and willingness to pay methods can also be used to value other benefits of an intervention. For example, changes to the built environment to promote physical activity, such as construction of bike paths and green space acquisitions, may also improve the environmental quality and well-being of a community. These methods can be used to assess the monetary value of those attributes. An example of such a valuation is provided in Appendix A.

Contingent valuation and willingness to pay approaches are not without their limitations. Willingness to pay may be constrained by the individual’s ability to pay, thus certain goods and services may be valued more highly by higher income individuals than lower income individuals. Also, it has been suggested that it is difficult for individuals to assess their willingness to pay for interventions that reduce their risk of certain health conditions because they generally do not pay the full cost of their health care.

Contingent valuation and willingness-to-pay surveys can be expensive and time consuming to implement and may be out of reach for many community projects. However, some values can be obtained from the literature using estimates from studies of similar benefits. Contingent valuation and willingness to pay valuations may be difficult for decision makers to interpret, sometimes reducing trust in these estimates.

**Hedonic Pricing:** This method can be used to value both environmental and economic outcomes. Hedonic pricing assesses the portion of the total price of a commodity attributable to a certain
characteristic of that commodity. This is done by using methods that compare the total price of certain commodities with and without the characteristic of interest. In public health studies, hedonic pricing has been used to examine the impact of a variety of environmental characteristics associated with health on housing prices. These might include the location of the house in neighborhoods with low crime rates, high asthma rates, or near parks and green spaces. Hedonic pricing studies may be too resource intensive for community projects to undertake. However, it may be possible to use estimates from the literature for characteristics of interest. The first case study in Appendix A includes hedonic pricing.

Other Techniques for Valuing Nonmarket Outcomes: There are also other techniques for valuing nonmarket health and nonhealth outcomes that may be useful to ACHs. These include the required compensation method, consumer-market studies, past policy decisions, court awards, and expert opinion. All have their limitations but may be useful when other methods, time, and resources are not available.

Economic Multipliers: Some interventions that contribute to the health and well being of a community also generate economic benefits. These economic benefits might be increased sales and services by local businesses and additional jobs created. Economic multipliers, which are generally available from local economic development authorities or the Cooperative Extension Service can be used to capture these economic benefits. Economic multipliers quantify how spending in one sector generates further spending and employment in other sectors. For example, construction of bike trails may bring new users who spend money on refreshments and supplies for each visit. The number of user visits annually multiplied by the spending per visit provides the direct economic benefits. The direct economic benefits multiplied by the multiplier provide the indirect and induced benefits of the investment. The sum of the direct, indirect, and induced benefits is the total annual economic impact of the new bike trail. See the first case study in Appendix A.

Valuing Portfolios and Infrastructure as Packaged Interventions

In recent years, attempts have been made to capture the combined effects of a strong local infrastructure, which subsequently invests in and manages a portfolio of interventions. This has been done using systems dynamics models to predict the impact of the investment packages (infrastructure and groups of interventions) using a wide range of variables including intervention cost, reach, demographic, and epidemiologic data for each community. Systems dynamics models can predict the
impact of these community investment on a variety of outcomes including premature deaths averted, health care costs averted, and productivity losses averted. (4)

Unlike other predictive models, systems dynamics models can analyze complex issues and systems by capturing circular and interlocking relationships between model components. They are able to account for reinforcing and nonexclusionary effects of a portfolio of interventions implemented simultaneously. Exclusion of these effects may lead other models to underestimate synergistic effects of implementing multiple interventions overseen by a robust community coalition.

The biggest drawback to systems dynamics models is their complexity. They are expensive to build and difficult to understand. However, consultants are constructing models that can be adapted to a variety of settings, making it possible for local communities—with consultants—to measure these effects. The second case study in Appendix A used one such model.

Measuring Progress Towards Health Equity

According to the Centers for Disease Control and Prevention “Health equity is achieved when every person has the opportunity to "attain his or her full health potential" and no one is "disadvantaged from achieving this potential because of social position or other socially determined circumstances." Health equity differs from health disparities in that health disparities or inequities are types of unfair health differences closely linked with social, economic or environmental disadvantages that adversely affect groups of people. (5)

Disparities in health include both differences in health between groups and the opportunities for achieving health including income or wealth, education, access to medical care, neighborhood characteristics such as housing and safety, and social inclusion. Progress towards achieving health equity can be measured by identifying key health disparities, selecting measures, and monitoring changes over time. Measures of health status and opportunities for achieving health can be selected based on the baseline disparities in the community.

Measures can be indicators or single measures, an index with multiple indicators already developed and used by other communities, or a composite measure that correlates with health outcomes. A set of recommended measures useful for measuring a community’s progress towards achieving its health equity goals is available in a 2015 report from the Prevention Institute. (6)
Health equity is a fundamental goal of ACHs and attempts should be made to assess progress toward that goal. Methods exist for measuring health disparities and charting progress toward closing those gaps.

**Conclusion**

This paper has described the various health and other outcomes that are produced by community health interventions and identify some of the methods used to value them. It has provided a list of questions for choosing the right set of outcomes for the desired purpose. It has also addressed treatment of outcomes for which quantitative measurement and valuation are difficult, such as strengthening community health infrastructure and achieving improvements in health equity. All are critical to accurately capturing the value of the ACH to the community. The list of methods described here is by no means exhaustive and the definitions are only meant as a brief introduction to each.

Establishing the linkages between interventions and their subsequent outcomes is a complex undertaking not easily described in a short paper but many resources are available that will provide the interested reader with a broader understanding. A few of these are listed in the reference section.

**Key Messages**

1. A strong ACH infrastructure can contribute to the overall well being of a community and the effectiveness of the portfolio of interventions. ACHs should attempt to identify, measure, and value these effects. Qualitative descriptions and stories are useful when it is not possible to quantify outcomes.

2. The outcomes selected for valuation should reflect the contributions of the ACH infrastructure and the goals for the portfolio of interventions. They should also be appropriate for their intended use, such as in an economic evaluation, advocacy materials, funder reports, and proposals. The selected outcomes may reflect the interests of multiple sectors of the community.

3. The valuation method should be appropriate for the use and affordable. The data should be available or able to be collected in a timely manner. Assistance from a local academic institution, Cooperative Extension Service, or the local economic development agency may be available.
4. Interventions strategically implemented as a portfolio may have synergistic effects that positively affect outcomes. Appropriate methods should be identified to capture these effects. When methods are not available, a qualitative listing of potential effects should be undertaken.

5. Progress toward achieving health equity should be charted and measured.
References


Additional Resources


Appendix A. Two Case Studies of Outcome Valuation

Case Study 1: The Benefits of a New Walking and Cycling Trail in a County Park (1)

Project: Construction of a five mile walking and cycling trail through a 40,000 acre county park with open woodland, streams, bird and wildlife habitat. The park is on the edge of a medium-sized metropolitan area and adjacent to a large residential area. The primary goal of the project is to provide new recreational opportunities for area residents. The county also hopes the trail will attract visitors from outside the area and enhance the overall quality of the community.

Benefits Analysis: The County collected information pertinent to the trail project and did an analysis of the value the trail produced over a 10-year period. A survey was administered to collect information on trail usage, necessary to value trail benefits. The survey provided the following information:

- Annual number of trail users – 18,250
- Percent of users who are newly active – 25%
- Percent of users traveling from outside the county – 50%
- Average number of visits per year per trail user – 3
- Average willingness-to-pay (WTP) for each trail use - $2.00
- On average, trail users from outside the county spent $13.54 on food, beverages, and other purchases from local stores per trail visit.

Information obtained from the literature, the local economic development agency, and satellite photos:

- The annual average health care costs saved per newly active trail user is estimated to be $482. (2) Increases in physical activity levels decrease the risk of certain chronic health conditions such as diabetes, cardiovascular disease, and depression.
- The hedonic pricing literature has shown that there is a price premium of $5000 for homes located within a half mile of a recreational trail.
- Analysis of satellite photos showed 200 homes located within a half mile of the trail.
- The county economic multiplier for the sector that includes tourism and recreation is 2.1. In other words, for every dollar spent locally by the trail user from outside the county, another $2.10 in economic activity is generated.
Benefits Calculations

- Health care costs saved from increasing physical activity in newly active trail user: 4,563 users
  newly active trail users (18,250 x .25) x $482 health care savings per newly active trail user = $2,199,125

- Value trail users place on environmental qualities of the areas surrounding the trail: 18,250 trail
  users x 3 visits per year x WTP of $2.00 = $109,500

- Increased property value: 200 homes with half mile of trail x $5000 house price premium = $1,000,000

- Value of increased economic activity associated with trail: 9,125 trail users from outside county
  x 3 visits per year x $13.54 spent per visit = $123,553 (direct affect) + $123,553 x 2.1 (indirect
  affect) = $383,014

<table>
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<th>Benefit</th>
<th>Annual Value</th>
<th>10-year Present Value</th>
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<td>$18,758,982</td>
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<td>Environmental benefits</td>
<td>$109,500</td>
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<td>Increased property values</td>
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<td>New economic activity</td>
<td>$383,014</td>
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<td>Total Benefits</td>
<td>--------------</td>
<td>$22,960,227</td>
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Discounted at 3%

*aOne-time benefit

Other Benefits

This example did not include the value of productivity gains in newly active trail users. It also did not
look at two benefits of interest to the public sector: the revenues generated from increased property
values and sales taxes. Local multipliers are generally available for these calculations.

References

1. Adapted from Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation, 2nd
Case Study 2. Valuing the Benefits of Community Health Infrastructure and its Portfolio of Investments: Communities Putting Prevention to Work (1)

Project: In 2010, the Centers for Disease Control and Prevention (CDC) launched Communities Putting Prevention to Work (CPPW), a program to reduce obesity and tobacco use. The goal was to reduce illness, death, and the economic burden of chronic diseases, which accounts for 85 percent of annual US health expenditures.

CDC funded 28 communities to implement evidence-based policy, systems, and environmental change strategies to address chronic disease risk factors. Communities created local health coalitions that selected and implemented a portfolio of interventions targeting either tobacco or obesity, or both. The four-year program cost $403 million and reached 55 million people.

Community coalitions implemented interventions selected from a set recommended by CDC, including

- Daily PE requirements in schools
- Healthy food and beverages in schools
- Tobacco free hospital campuses
- Physical activity guidelines in childcare settings

Measuring Outcomes: CDC used a systems dynamics model, PRISM, to predict the impact of the investment packages (infrastructure and groups of interventions) using program cost, reach, demographic, and epidemiologic data for each community. The model predicted the impact of the community investment on three outcomes: premature deaths averted, health care costs averted, and productivity losses averted.

Unlike other predictive models, the PRISM model can analyze complex issues and systems by capturing circular and interlocking relationships between model components. It is able to account for reinforcing and nonexclusionary effects of interventions implemented simultaneously. Exclusion of
these effects may lead other models to underestimate synergistic effects of implementing multiple interventions overseen by a robust community coalition.

The PRISM model produced information that allowed investigators to predict that if program investments are maintained through 2020, the program would produce the following outcomes

- 14,000 premature deaths averted
  - 9,400 obesity-related premature deaths averted
  - 4,600 tobacco-related premature deaths averted
- $2.4 billion in medical costs averted
- $9.5 billion in productivity losses averted

The most effective strategies were interventions to increase physical activity in schools and childcare settings, community physical activity promotion, and smoking counter-marketing interventions.

References

Appendix B. Glossary of Terms (1)

**baseline comparator** – the current state against which a prevention strategy is compared in an economic evaluation. May be either the existing intervention/strategy alternative or no intervention/strategy, if no intervention is currently in place.

**budgetary impact analysis** - an economic assessment that estimates the financial consequences of adopting a new intervention within a specific budget time period.

**composite measure** – a measure made up of multiple indicators of a single concept.

**contingent valuation (CV) method** – the use of surveys of individuals conducted in the context of a hypothetical market situation to elicit consumer valuation of goods and services. Used to estimate the willingness-to-pay values of health outcomes.

**cost-benefit analysis (CBA)** – a type of economic analysis in which all of the costs and all of the benefits are converted into monetary (dollar) values and results are expressed as either the net present value or the dollars of benefits per dollars of costs expended.

**cost-effectiveness analysis (CEA)** – an economic analysis in which all of the costs are related to a single common health outcome. Results are usually stated as additional cost expended per additional health outcome achieved.

**cost-of-illness (COI) methodology** – an approach used to estimate the costs of a health intervention in which two types of costs are collected: the direct medical and nonmedical costs associated with the illness, injury, or health condition and the indirect costs associated with lost productivity due to morbidity and premature mortality.

**cost-utility analysis (CUA)** – a type of cost-effectiveness analysis in which benefits are expressed as the number of life years saved adjusted to account for loss of quality from morbidity of the health outcome or side effects of the intervention. The most common outcome measure in CUA is the quality-adjusted life year (QALY).

**discounting** – a method for adjusting the value of future costs and benefits to an equivalent value today to account for time preference and opportunity cost, i.e., a dollar today is worth more than a dollar a year from now (even if inflation is not considered).
**discount rate** – the rate at which future costs and benefits are discounted to account for time preference.

**economic costs** - measure the total value of the outcomes to society as a whole where value may not be measured in market (financial) terms.

**economic multiplier** - the factor by which gains in total output are greater than the change in spending that caused it. This occurs when spending in one sector results in spending in other associated sectors.

**financial costs** - measure the expenditures or monetary outlays or receipts for the outcomes.

**fixed cost** – costs which do not vary with the level of output in the short run (e.g., rent, utilities, and administrative salaries).

**health disparity** - the variation in rates of disease occurrence, disability, and mortality between socioeconomic and/or geographically defined population groups. It also may refer to differences among groups in the opportunities for achieving health.

**health equity** - everyone has a fair and just opportunity to be healthier. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care.

**incidence-based cost** – the total lifetime cost of new cases of disease, injury, or health condition that occur during a certain period of time.

**index** – a measure of change in a group of individual data points that may be derived from any number of sources representing multiple concepts.

**indicator** – a single measurement that indicates the state or level of something.

**intangible costs and benefits** – costs and benefits associated with an attribute of a good or service for which assigning a monetary value is difficult.

**perspective** – the viewpoint from which the analysis is conducted and refers to which costs and benefits are included. The societal perspective, which is the perspective of society as a whole, includes all of the costs and all of the benefits regardless of who incurs them and who receives them.
**prevalence-based cost** – the cost associated with existing cases of disease, injury, or health condition that occur during a specified time period.

**social capital** - the networks of relationships among people who live and work in a particular society or community, enabling that society or community to function effectively.

**social determinants of health** – are the social, economic, and physical conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.

**quality-adjusted life year (QALY)** – a frequently used outcome measure that incorporates the quality or desirability of a health state with the time in that health state, and with the duration of survival. Quality of life is integrated with length of life using a multiplicative formula.

**return on investment (ROI) analysis** – a form of financial analysis that calculates the ratio between the net profit and cost of investment. A high ROI means the investment's gains compare favorably to its cost.

**willingness to pay (WTP)** – in health, a method of measuring the value an individual places on reducing the risk of death and illness by estimating the maximum dollar amount an individual would pay in a given risk-reducing situation.