CHAPTER 6: ECONOMIC ANALYSIS AND BUSINESS CASE FOR COLORECTAL CANCER SCREENING PATIENT NAVIGATION

**Goal:** After completing this chapter, you will have an understanding of different types of cost analyses to help make the business case for colorectal cancer screening patient navigation (CRCS PN). You will also be able to identify if and when undertaking a cost-effectiveness study is a valuable use of your time, or if a previously conducted cost analysis of CRCS PN might be better utilized to make the business case. For those who wish to undertake an economic analysis, the measures necessary to complete several types are described, including measures required to speak to various stakeholders. You will also find a list of resources for applying what’s been learned through previously conducted cost analysis, or how to go about it yourself.

**Objectives for Audiences:**

**Program Planners**
1. Understand importance of incorporating cost data collection at program inception
2. Appreciate future programmatic value of incorporating cost data and economic analysis

**Evaluators**
1. Identify appropriate type of economic analysis for program
2. Choose appropriate measures for data collection

**Policy Advocates**
1. Educate other stakeholders about the use of cost data and economic analysis to make the case for patient navigation (PN) reimbursement and to improve patient outcomes and survival
2. Understand the different types of economic analyses, when to use each type of analysis, and what the results indicate

**Clinic Managers**
1. Understand importance of incorporating data collection into workflow
2. Use economic analysis data to advocate for incorporating patient navigators into the clinic
3. Work with analysts to ensure costs are tracked and made available for program evaluation
4. Ensure that economic and outcome evaluation are integrated back into the clinical practice—it must circulate back into clinical quality processes and not be independent of the practice and clinical integration
5. Be certain to think critically about how to show connection between cost and analytical tools for future reporting

**Background and Considerations:**

Let’s start out with a discussion about considerations for performing an economic analysis for some good grounding.

A couple things to make clear at the outset—cost analyses are complex, nuanced, and messy!

- If there are already cost studies and analyses complete that are representative enough of your setting, population, or needs, don’t try to replicate the effort—use what’s already been done.
- You should consider planning your cost analysis prospectively and building it into your program. It is easier and more accurate if you start the planning in advance versus doing it after-the-fact.
- Unless you are skilled and trained in this area, it is not wise to go it alone!
FAQ Answered by a Health Economist

Before you begin a cost analysis, what are the biggest considerations for getting started? It is very important to think about WHOM and why you are trying to make a case for patient navigation.

It is extremely important to know who you are trying to ‘convince’ about the value of PN—this is your audience—and consider what about the value of PN would be convincing from their perspective.

Critical Questions to Ask Before You Start A Cost Analysis:

1. **Who do I need to convince that PN is of value, and that it should be implemented and sustained in a specific setting?**

   *You need to know your audience. This will often answer your question about why you might need to perform a cost analysis.*

   The most common stakeholders are:
   - Administrators and System Level Decision Makers
   - Payors/Insurers
   - Policy Makers/Regulators

2. **In a nutshell, what are the most common types of approaches to thinking about making the business and monetary case for PN?**

   - **More Common Approaches**
     - Return on Investment (ROI): Compares the magnitude and timing of financial returns to the magnitude and timing of investments in a program, which is often measured by Total Program Cost.
     - Programmatic Cost: Measures the cost of developing, implementing and running the program. These costs are required elements of all economic analyses.
     - Cost-Effectiveness Analysis: Compares relative Total Program Cost to a relative Program Outcome of two or more alternative programs.

   - **Less Common Approaches**
     - Budget Impact Analysis: Estimates financial impact of implementing a program or intervention; commonly accompanies a cost-effectiveness analysis.
     - Cost Benefit Analysis: Compares Total Program Costs to Total Program Benefits monetizing both pecuniary (requires placing a monetary value on all benefits and costs) and non-pecuniary benefits.
     - Cost Utility Analysis: A special case of Cost-Effectiveness Analysis where Program Outcomes are measured in terms of Quality Adjusted Life Years (QALYs) or Disability Adjusted Life-Years that includes both the quality and the quantity of life lived.

   The following are the most critical elements to capture to inform the basis of a cost analysis (Figure 1 goes into greater detail about these specific costs):

   - At a Glance-Micro costing framework:
     - Patient Navigator Labor Costs
     - Supervision & Administrative Support
     - Hiring and Training Costs
     - Other Direct Program Costs
     - Facility and other Indirect Program Costs

3. **Why Is This Important... Where is the Value?**
When you know your audience, you can determine the type of analysis you will consider doing either directly, or conducting in partnership with others. The most pressing and important question will be based on perspective:

Based on what’s important from the perspective of your target audience, you will need to choose the type of analysis that gives the information you really need in order to demonstrate the value of patient navigation to that audience!

- Return on Investment (ROI): Might be most important to administrators and system level decision makers and most likely important to payors and insurers
- Cost Benefit Analysis: This type of analysis is not as widely used to make the strongest business case. It looks beyond pecuniary benefits and costs that requires placing a monetary value on all benefits and costs, so it is not as widely implemented because of its complexity and it raises deeper issues including societal benefits that are harder to calculate

4. Are economic analyses hard to do?

The short answer is YES! If you are not trained in this area, do not go it alone! There are many factors to consider and perhaps you need to work with a formally trained acadician or researcher with a health economics background. But, before you take that leap, it’s important to take a step back and consider what’s already been done in the field and how you can take advantage of this information. (See Figure 2)

5. Yes, it’s clear I really need to do an economic analysis myself. I know my audience and I have ideas about partnerships to help me perform this analysis. Now what?

Before you get started, you need to ensure that you have the buy-in from key champions in your organization to

1. perform the programmatic cost analysis and
2. invest in PN services if the results from the economic analysis demonstrate value.

A lot of work and resources will need to be applied to make progress with an economic analysis – make sure you have the champions in place to get this work done!

6. What are the key elements that we will need to consider to demonstrate the value of a CRCS PN program?

At a minimum you will need to consider the following; however, for certain analyses, you will need to know much more:

1. Programmatic Cost Elements (See Figure 1)
2. Patient Outcomes for those Navigated:
   a. No Show Rates for colonoscopy exams
   b. Bowel Preparation Quality
   c. Completed exams (reached cecum)

7. In an environment that has limited funding, which population is it suggested that CRCS PN be directed?

Several research papers have examined this very question, and results from studies of PN for many disease types across the care continuum note that patient navigation should most often be directed to the medically underserved as a priority population. See Chapter 1, the Freundy citation for more detail.

Let’s Now Review Cost Analysis More Deeply!
Economic analysis is a general term that has slightly different meanings to different people. Broadly, “economic analysis” is an assessment in which monetary or somehow tangible outcomes are associated with an investment. Terms such as cost-benefit, cost-effectiveness, and return on investment are all specific types of analyses to explain the outcome associated with a monetary input (described briefly above). This section will dive into the details and provide specific examples for those ready to consider conducting their own analysis.

There is a lot of overlap in collection of information for overall evaluation and cost analysis. Visit Chapter 8 to learn more about overall evaluation metrics and tools to help capture essential PN activities and critical information.

1. How do I initiate an economic analysis of my program? (Seems like Strategic Planning is a good idea!)

Program Not Begun:
- Define question/s to be answered
- Define PN target population (not everyone needs navigation, who is least likely to be screened?)
- Determine limitations of data collection due to program context and resources
- Choose key outcome measures (e.g., # of patients navigated, # of navigated patients screened)
- Assess evaluation capacity of your team and recruit partners if necessary (e.g., a local school of public health or academic institution)
- Consider evaluation burden of program staff (navigators, clinic staff)
- Allocate additional evaluation staff within program plan (if necessary)
- Develop data collection instruments (use what others have used when possible)
- Incorporate economic data collection into routine program data collection

Program Already Begun:
- Identify limitations of retrospective data collection
- Determine limitations of data due to program context
- Define question/s to be answered
- Choose key outcome measures (e.g., # of patients navigated, # of navigated patients screened)
- Assess evaluation capacity of your team and recruit partners if necessary
- Understand adding additional reporting requirements of program participants may change program structure, so provide adequate training to ensure program fidelity
- Develop data collection instruments (use what others have used when possible)

2. What types of analyses are appropriate to assess the economic benefit of CRC PN?

Programmatic Cost Analysis: a required component of all types of economic analyses that measures the dollar amount of the resources required to develop, implement, and operate the program. It is often referred to as the dollar amount investment by the organization implementing the program. For PN programs, this type of analysis would give the total program cost and is often expressed as the cost per person served by the program.

CASE STUDY: What is one example of a cost analysis for patient navigation programs?

Elkin et al. (2012) performed a cost analysis as part of their economic evaluation of the New York City patient navigator program at three NYC public hospitals. Learn more about them in Chapter 3. Data for the cost analysis was obtained primarily through interviews with program staff and hospital administrators with program databases providing procedure and appointment information. The major outcome is cost per patient referred to navigation. These costs were assessed for program initiation, end of program, and overall referral rates, giving a range of cost estimates.
Cost per patient referred: \[ \frac{\text{Total Program Costs}}{\text{# Patients Referred to Program}} \]

**Cost-effectiveness:** another common economic analysis that is often confused with cost-benefit. The difference between a cost-effectiveness analysis and a cost-benefit analysis is in the type of outcome assessed. Whereas cost-benefit analyses compare all benefits and costs in monetary values, cost-effectiveness analyses compare a measurable outcome that is not necessarily easily expressed in monetary terms to the monetary investment in the program and any difference in direct medical costs with and without the program. For a PN program, these outcomes could be number of patients successfully navigated, number of cancers prevented, or increase in screening rate for the population.

Cost-effectiveness is often reported as an incremental cost-effectiveness ratio (ICER). An ICER is a measure to describe the ratio of the increased cost of an intervention over the standard of care versus the monetary benefit of the intervention over the standard of care. Often, the ICER uses the difference in quality-adjusted life-years (QALY) associated with the intervention over the standard care as the outcome, which is a cost utility analysis.

**For example..**

**CASE STUDY:** How does a program collect data to conduct an incremental cost-effectiveness ratio?

Determining incremental cost-effectiveness requires data both on the intervention program and on the usual care condition. Usual care condition data can come from literature or historical data, but the best-case scenario is to set up a program to have a comparison usual care group (i.e., a control group). However, as the field of PN grows and is shown to be effective, there will be an ethical concern about withholding an intervention that has been proven to work.

A multi-site breast and colorectal cancer patient navigation study conducted by Donaldson et al. (2012) determined cost-effectiveness by calculating the net cost of navigation alternatives.

- **Net Cost:**
  \[
  (\text{Cost of Program Implementation}) - (\text{Medical Treatment Costs})
  \]

- **Medical Treatment Costs Saved:**
  \[
  \text{# Patients reach diagnostic resolution} \times \text{Cancer Attributable Treatment Cost}
  \]

**Outcome:**

Measures of the number of patients navigated, time to diagnostic resolution, and cancer stage diagnosis data were collected through aggregate patient data collection. PN program cost data was calculated retrospectively by surveying the PN supervisor. Program cost numbers included direct, nonmedical operating costs, but excluded program start-up costs.

**Return on Investment (ROI):** a term to describe the net monetary gain after accounting for programmatic costs. Cost-benefit analyses are also used to describe return on investment when including monetized values for non-pecuniary benefits.

**For example..**

**CASE STUDY:** What can a ROI study tell us about a PN program? What doesn’t it tell us?

ROI data explains what funders get for their monetary investment. The term comes from the investment literature and translates in a similar way: what is the long-term monetary gain for the current monetary investment? These analyses answer the question “How much can I save by investing an upfront cost now?” This question gets at the heart of the argument for preventive health services (of which CRCS PN is an example). By investing in programs and interventions now, the health care organization will save money in the long run. In the context of colorectal
cancer screening, a ROI analysis reveals the savings in cancer-related costs by paying for preventative screening services.

The outcomes are all economic, so these studies do not capture the “intangibles” of PN and care coordination. Additionally, these analyses do not relate non-monetary program outcomes to the monetary investment. For example, an ROI does not describe extended life-years or productivity gains due to a PN program preventing morbidity and mortality. It does not allow for what many see as the ‘feel good’ benefits from the multi-dimensional components that result in improved care for patients. That said, a basic cost analysis or ROI study can help articulate specific information about program costs associated with program outcomes of interest, such as numbers of patients screened and numbers of cancer diagnoses. Even this limited amount of information can be of interest to key partners and stakeholders.

**Sensitivity Analysis:** A term describing the extent to which results from an analysis are sensitive to variation in key elements of the analysis. Most economic analyses include sensitivity analyses.

For example, cost-benefit analyses require monetary values for non-pecuniary benefits, and one common sensitivity analysis examines the extent to which findings vary if different values are placed on these intangible benefits. Other types of sensitivity analyses include examinations of variations in programmatic cost estimates, variations in outcomes, and variations in interest rates that are used to calculate the present discounted value of future monetary benefits.

3. **What are the economic analysis results for CRCS PN programs?**

When reviewing this section, it is critical to ensure that you understand that each of the examples are provided to exemplify several key elements:

- Setting of where the patient navigation was housed (hospital, community, clinic system, GI Center)
- Who is serving as the patient navigator
- Geographic representation
- The role of the patient navigator or patient navigation in screening, resolution of abnormal finding, and access to treatment
- How the economic analysis was approached – understanding that there are lessons learned in each

* IDEAL: Do this at the start, and plan at the outset rather than retrospectively. You need to identify the purpose of why you are doing this and who your audience is in order to make the ‘business case’ and policy case. Sound familiar? Check out Diana Redwood and Alaska Native Tribe Health Consortium (ANTCH) comments in Chapter 3.

A review of current literature on cost analyses of CRCS PN programs revealed ten publications on program costs, and two articles highlighting important considerations and evaluation of undertaking a cost analysis. Figure 2 details the findings of these studies. The program costs studies included four studies of total costs, three assessments each of an incremental cost effectiveness ratio (ICER), cost-effectiveness, sensitivity analysis, and two evaluations of the PN process (time spent, frequency of barriers).

Process evaluations were included in this table to show outcomes that have a cost associated with them although the evaluation does not include the economic impact. The PN programs examined were predominately based in community health centers, urban hospitals, or Federally Qualified Health Centers (FQHCs).

Although a process evaluation is not an economic analysis, two process evaluation studies were included because the methods are sound and if additional measures were included, the authors could have reported cost analysis outcomes. For example, Paskett et al. (2012) included measures of time spent per patient. If data were collected on patient navigator salary, this measure could have been converted to a cost measure by assigning a personnel cost to the PN process.
Salary data is generally available after a program has completed, so if a program is already collecting time data (i.e., time a patient navigator spends on particular activities over a defined period of time), additional retrospective data collection could provide the details necessary to assign a monetary value to PN services. 

(See Figure #1)

**CASE STUDY:**
*Cost-Effectiveness and Sensitivity Analysis of University Hospital System-Based Patient Navigation Program*

The Colorectal Cancer Male Navigation Program, developed by the University Health System in San Antonio, Texas, provides no-cost screening colonoscopies for Hispanic men with a bilingual patient navigator and provider. Researchers at partner institutions conducted an economic analysis including cost-effectiveness and sensitivity analysis.

Cancer-related costs were obtained from the literature (see resources for this reference list) and navigation program costs were determined from the program itself. Major outcome measures include per PN program cost, per patient status quo cost, quality-adjusted life-years (QALYs), life-years (LYs), and life expectancy. The ICER summarizes the effectiveness of the navigation program.

\[
\text{Navigation Program Cost} = \frac{\text{Total cost of navigation}}{\text{number patients screened}} + \text{colonoscopy} + \text{polypectomy}
\]

QALYs = Utility Weights: 1.0 for normal mucosa/polyps

.74 localized cancer

.61 regional cancer

.26 distant cancer

\[
\text{ICER} = \frac{\text{Cost of Navigation} - \text{Cost of Status Quo}}{\text{Effect of Navigation} - \text{Effect of Status Quo}}
\]

Key Take-Aways:

- Sensitivity analysis is contingent upon assumptions made about disease progression because comparison data is collected retrospectively
- Program is cost-saving with only 18% patients contacted by the patient navigator successfully completing a screen

4. **Which stakeholders care about cost analyses?**

Cost analysis results can help make the case for continued funding or sustainability to funders, program implementers, and program beneficiaries. Often, CRCS PN programs are grant funded through government agencies or non-profit organizations and are time limited. Demonstrating cost-effectiveness to these funders will bolster grant renewal applications or perhaps lead to an institution or other payor sustaining funding of this work.

Additionally, in order to move from grant funding to a sustainable program (funded directly from the state or an insurer), an economic argument must be presented to insurers or entitlement program directors in order to maintain funding for PN.

- **Clinic Managers**
  Cost analyses are also relevant to the clinic in which the PN program is implemented. Clinics must dedicate valuable personnel and staff time to execute these programs, so clinic directors want to be sure staff efforts are being dedicated to the most worthwhile programs. Cost analyses provide
Evidence of effective and cost-reducing programs. Clinic managers can allocate additional personnel to exceptional programs while identifying programs that need reworking in order to be more effective.

In a case study project to make the case for sustaining a CRCS Patient Navigator within the primary care setting, clinic leadership from a multi-site FQHC in Colorado cited the information on PN workflow, cost, and FTE as important in determining additional staffing needs and streamlining the navigation process.

-A Community Health Center in Northern Colorado

- **Program Implementers (the patient navigator)**  
  Program implementers care about cost analyses because the results demonstrate the value of their efforts. Knowing a program has true benefit to patients, clinics, and providers can help validate an individual patient navigator’s efforts to perform high-quality PN to all patients. See Chapter 8 on Evaluation.

- **Funders**  
  Funders will look favorably on grant renewal requests if the submissions include cost and sustainability data. Funding agencies want to ensure their money is used wisely and effectively, and this can be demonstrated through cost analysis and cost-effectiveness studies.

- **Specialty Care Providers (The GI Doctor)**  
  Specialty care providers are interested in cost data for similar reasons to clinic managers. However, they tend to be more interested in the costs associated with decreased no show rates rather than programmatic costs. Because many CRCS PN programs exist in primary care settings, the specialty care group is not spending the money on patient navigation. However, specialty care groups may select which clinic to work with based upon improvements in no show rates.

- **Entitlement Program & HMO Administrators (Medicaid, Medicare, and CHP+)**  
  Entitlement program administrators can use cost data as the reason for changing billable services policies. If data shows a CRCS PN program to be cost-effective, the case can be made for Medicaid (and other entitlement programs) to include PN in their billable services since it would directly effect their bottom line. Similarly, HMOs (Health Maintenance Organizations) would want to encourage cost-saving programs since their insurance pool and provider pool encompass the same patient population.

5. **What are the necessary measures for conducting a high-rigor cost analysis? What are important considerations when designing a cost-analysis study?**

**Key Measures**  
*(See Figure #1 for additional detail)*

- Program Costs (fixed & variable)  
- Administrative Costs  
- Human Capital Costs  
- Direct Medical Costs  
- Direct Non-Medical Costs  
- Indirect Costs

**Key Considerations** *(Ramsey et al. 2009)*

- **Costs are specific to the locale**: provide context for generalizability
- **Include a sensitivity analysis**: show program’s ability to accept changing constraints, but be careful of assumptions in the comparison group
- **Include the common metrics**: cost per QALY, ICER, diagnosis and treatment delays, patient satisfaction, survival, percent receiving and completing therapy
• Acknowledge challenges: non-linear relationship between PN efforts and endpoints measured; consistent data collection across program sites is difficult; modest decreases are difficult to detect

6. Why are high-rigor cost analyses necessary?

High-rigor cost analyses of CRCS PN programs are necessary to make the case to policy, insurance, and entitlement stakeholders that PN is a cost-effective component of the patient-centered medical home. The literature does not currently include many high-rigor analyses. Aside from the realities of resource constraints, this fact is largely due to program planners not building in sufficient data collection methods from program inception. This problem can be solved with additional research and publication using the guidelines described throughout this chapter. Check out Chapters 5 and 7 to see how this all applies!

Current limitations include studies with purely retrospective data collection and analysis, comparison groups of historical data rather than simultaneous data collection, a lack of generalizability, and no calculation of the economic impact of improved no-show rate. Generalizability is an issue for two reasons:

- Sensitivity analyses are contingent upon the assumptions used, and collecting less data on the sample leads to more assumptions
- Some studies have very specific patient populations or PN context

7. How do we measure intangible benefits to society and systems?

It is much more complicated to assess the larger societal and health system impacts of a CRCS PN program than it is to simply assess the economic, health, and quality of life impacts of the intervention.

The downstream effects of cancer screening and early detection include saved lives, reduced morbidity, and fewer treatment costs. In addition to these patient-centered effects, there are effects of PN that are difficult to measure accurately. An individual’s successful navigation experience can lead to increased connection to the medical home, including increased utilization of preventative services, and referral of other family members to the medical home for preventative services and routine care. These effects impact not only the family members’ in terms of their overall health and quality of life, but also the medical home in which they interact because the clinic is able to bill for these services and provide lower-cost preventive care rather than higher-cost treatment of preventable conditions.

8. Who can I partner with to conduct a cost analysis of my CRCS PN program?

It is imperative to know that the vocabulary used in cost analysis, public health, and academia might be different when referring to key concepts or variables. It’s important to understand the definitions of the cost analysis constructs to be able to provide sufficient and reliable information.

It is not expected that all organizations coordinating CRCS PN have the in-house expertise to conduct a high-rigor cost analysis. However, resources exist. Organizations can tap into these local resources to conduct high-rigor cost analyses. Partnering with academic research centers, health research organizations, or local schools of public health in the planning and evaluation stages is critical to implementing a program that includes the requisite data collection and evaluation components.

Consulting with experts when planning the PN program will ensure there are adequate data collection procedures in place at program inception to gather appropriate data. Additionally, discussing the evaluation needs before implementing the program may lead program planners to alter certain aspects of the program to facilitate data collection. To get a good grasp on the CRCS PN evaluation metrics, visit Chapter 8.

It should go without saying that including experts in the evaluation phase of a program will aid in conducting the cost analyses. If an organization does not have the capacity to take on a cost analysis evaluation on their own, contracting a health economist researcher to conduct the analysis will ensure the evaluation is thorough.
and accurate. Ideally, the same expert should be consulted during program planning and evaluation to provide consistency in measures and language.

**Types of Organizations to Partner With:**

- **Local university**
  - Cancer research center
  - Health care administration academic program or researchers
  - Public health program evaluators
  - Business school

- **Non-academic research organization**
  - Non-profit health research groups
  - Research organizations

The Colorado Cancer Screening Program (CCSP) partnered with two clinic systems to conduct case study evaluations of the data needed to make the case for sustainability of CRCS PN in the primary care setting. The clinic systems involved cited the advantage of having “another set of eyes reviewing the program” as a benefit of working with a university entity to conduct the evaluation. The full results of this project are available at [http://pntoolkitresources.weebly.com](http://pntoolkitresources.weebly.com).

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**Stop and Reflect:**

Based on the cost analyses already completed, is there specific information that might help inform your efforts?

Are there specific partnerships you should consider before you move forward with implementation of a cost analysis examination?

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**REFERENCES:**


