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Establishing Common Cost Measures to Evaluate the Economic Value of Patient Navigation Programs

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Abstract

Background—Patient navigation is an intervention aimed at reducing barriers to healthcare for underserved populations as a means to reduce cancer health disparities. Despite the proliferation of patient navigation programs across the United States, information related to the economic impact and sustainability of these programs is lacking.

Method—Following a review of the relevant literature, the Health Services Research (HSR) cost workgroup of the American Cancer Society National Patient Navigator Leadership Summit met to examine cost data relevant to assessing the economic impact of patient navigation and to propose common cost metrics.

Results—Recognizing that resources available for data collection, management and analysis vary, five categories of core and optional cost measures were identified related to patient navigator programs, including, program costs, human capital costs, direct medical costs, direct non-medical costs and indirect costs.

Conclusion(s)—Information demonstrating economic as well as clinical value is necessary to make decisions about sustainability of patient navigation programs. Adoption of these common cost metrics are recommended to promote understanding of the economic impact of patient navigation and comparability across diverse patient navigation programs.

Keywords

cost; patient navigation; disparities; economic evaluation

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BACKGROUND

Patient navigation (PN) is an intervention that can potentially reduce health disparities by reducing barriers to healthcare for underserved populations through patient-centered assistance and support.¹⁻⁵ Since the concept of PN was proposed in 1990, it has quickly grasped the attention of various stakeholders, such as providers, healthcare systems, federal agencies and private foundations.

Today there are a number of PN programs targeted at cancer care, sponsored by the American Cancer Society (ACS), National Cancer Institute (NCI), Centers for Medicare and Medicaid Services (CMS) and Centers for Disease Control and Prevention (CDC), among others. These programs seek to improve patient care by reducing barriers to care, through the provision of information, social and emotional support, links to existing services and resources, as well as patient referrals to service providers. However, despite the growing interest among health policy makers, hesitation remains for a widespread adoption of PN services in underserved populations or for providing reimbursement for PN services due to a lack of economic information related to establishing, implementing, and sustaining these programs, as well as the economic value.

Evaluating the economic impact of PN is complex because of the wide variety of activities involved in PN services and the different settings in which it is offered. Also, as a fast-evolving new field, the literature provides very little information on the costs or cost-effectiveness associated with PN, nor guidance on conducting economic analyses of PN. What adds to the complexity of this research endeavor is that the relevant cost elements to be included in these analyses differ by the study perspective. A number of stakeholders are present in interventions involving patient navigators; each stakeholder has his/her objective, which then determines the cost measures relevant to assess the economic value of PN program for the stakeholder. Ramsey and colleagues (2009) published the first methodological discussions related to the economics of PN.⁶ The authors proposed a conceptual model to evaluate the cost-effectiveness of patient navigation interventions in the context of comparing navigation versus usual care under NCI's Patient Navigator Research Program (PNRP). Although the conceptual model offers a helpful analytical framework to evaluate the cost-effectiveness of interventions involving PN services, practical applications of this framework to evaluate ongoing PN programs or compare programs implemented at various sites may be hindered by a lack of validation of the model and identification of common cost measures commonly collected across all intervention sites.

Motivated by the need for common metrics to facilitate comparisons among PN programs of different sponsoring agencies and across various sites, the ACS initiated the National Patient Navigator Leadership Summit in April 2010. During this meeting, several workgroups were formed to study various aspects of PN services, including cost. The Health Services Research (HSR)-Cost workgroup consisting of healthcare administrators (Whitley, Valverde), a healthcare researcher (Williams), a patient navigator (Teschner), a psychologist (Wells) and an economist (Shih), was charged to discuss cost data relevant to assessing the economic impact of patient navigation and to establish a list of common cost measures.

The objectives of this article are to describe the list of common cost metrics established by the HSR-Cost workgroup and to discuss how such information can be collected and used in the economic evaluation of patient navigation. Through the recommendations proposed in this study, the authors wish to stimulate discussion, promote shared understanding and enhance awareness of the importance of evaluating the cost of programs and interventions involving PN services. Ultimately, the intention is to promote the ability to utilize cost analyses within and across patient navigation programs.

COST METRICS FOR PN PROGRAMS

When collecting cost information to assess the economic impact of PN programs, it is extremely important to recognize that sites deploying patient navigators vary in resources available for data collection, management and analysis; therefore a two-tiered approach is proposed for the collection of cost data with core cost items expected to be standardized across all sites and optional cost items to be adopted in sites with more resources. We determined whether a cost item should be categorized as a core item based on two criteria: (a) the item is expected to be regularly collected and readily available in most healthcare facilities, and (b) the item contains critical site-specific information to assess the economic value of PN programs and the information cannot be estimated using cost data collected from other sites. Therefore, it is important for researchers analyzing PN-related cost data to keep in mind that economic analyses based only on the core items may not capture the full cost impact of PN programs and it may be necessary to supplement cost estimates derived from the “core cost items” with that estimated using the “optional items” from other sites to obtain information on the full economic impact.

We extended the conceptual framework proposed by Ramsey et al.,⁶ and classified cost items related to PN programs into five categories: program costs, human capital costs, direct medical costs, direct non-medical costs and indirect costs. Detailed items in each cost category are described below, along with our recommendations on whether a specific item should be considered core versus optional in the collection of cost data.

Program Costs

Implementation and management of any healthcare intervention or program consume resources that could have otherwise been used for other purposes (i.e., the concept of opportunity cost in economics). The cost or value of each resource can be determined by its prevailing market price, which can vary by geographic locations or possibly over time. In program evaluations, the costs associated with a program often constitute two types of costs: fixed and variable costs.⁷ Fixed costs are resources consumed as long as the program exists and do not vary by the number of patients navigated or the type of services provided by the navigators, whereas variable costs are correlated with the frequency, intensity, and type of PN services. Table I summarizes the core and optional items for program costs. Also included in Table 1 are actual data of some cost items based on preliminary data from one patient navigation program. It should be noted that these numbers were included to provide an estimate of costs associated with various components of patient navigation programs and cannot be viewed as estimates representative of all PN programs.

Fixed Program Costs—The core items of fixed program costs include office space and furnishings, phones, pagers, computers and any PN-specific office equipment as well as educational materials developed or purchased for the program participants. Cost of office space is calculated by multiplying the square footage allocated to the PN program by the cost per square foot for that space, which is a measure that varies widely, depending on the healthcare setting, geographic locations and whether the office space is purchased or rented. Similarly, the cost of furnishings in office space also depends on whether they are purchased or rented. Speaking strictly from economics theory, one should not have to differentiate between offices in purchased and rental properties or between purchased or rental furniture because rent is viewed as the opportunity cost of a purchased good at its next best use. However, given that PN sites may not have the option to choose between purchasing or renting, we recommend taking a more accounting approach. Under this approach, sites that own their office space or furniture need to apply appropriate accounting rules to spread the cost over time by either applying annual depreciation of the property value or using the

annual mortgage rate of financing. Cost for telecommunications, such as phones and pagers, includes purchase or rental as well as monthly user charges. Cost for computers and other office equipment, such as printers, scanners and fax machines, will be estimated by the purchase or rental prices, as well as fees established in the maintenance agreements. Costs for patient education materials, such as brochures, will cover the design and printing costs. These cost items should be readily available in the program's accounting records.

The development and establishment of a PN program and the associated infrastructure are not always well documented and thus these fixed program costs are considered optional. Examples include staff time spent developing standard work processes, or designing questionnaires to gather participants' feedback or databases to track navigation activities.

When determining fixed program costs, it is important to take into consideration resources shared between a PN program and other concurrent programs. For example, the same office space and furniture may be shared between a PN program and a quit-line program for smoking cessation. In the case of shared resources, only the portion of fixed costs relevant to the PN program should be reported.

Variable Program Costs—Core items of variable program costs include the number of patients navigated by each patient navigator within a fixed period of time (e.g., per week or per month), travel costs associated with PN services, office supplies consumed by navigators, excess costs of telecommunication and program expenses related to patient assistance activities, such as food and transportation. In order to determine the number of patients navigated by each navigator, navigators are asked to keep records of each patient interaction occurring during each work period. The creation of a PN activity log is useful for this purpose. Records of reimbursement for mileage, parking or tickets/passes from public transportation can be used to determine PN-related travel costs. Office supplies, such as pens, paper, and notepads, can be tracked by charges made to the supply budget line of the PN accounting unit. Telecommunication costs for time spent communicating with patients that exceeds the maximum hours of usage allowed by the plan can be identified from phone bills. In addition, expenses related to patient assistance are usually documented by the navigators and can be tracked through petty cash receipts or interdepartmental transfer records.

Optional variable program costs include the time each navigator spent with or on behalf of a patient, as well as costs associated with outreach to and recruitment of participants to take part in PN programs. The use of time logs kept by patient navigators in one, five, or fifteen minute increments is a more robust way to measure the time spent in navigating patients than counting the number of patients with which each patient navigator worked. However, keeping time logs poses a greater data collection burden on patient navigators as well as a greater data processing burden for the PN site. Implementing a time log periodically would provide a sample to use rather than a continuous log for the entire program period.

Human Capital Costs

The employment, training and supervision of patient navigators can be viewed as human capital investment for organizations that hire patient navigators or offer on-site navigation services. Table II lists the core and optional items for human capital costs, with examples of some cost items from a PN program already in place.

Employment Costs—Employment costs are typically the largest proportion of program costs and are well documented for book-keeping purposes. Therefore, it is reasonable to consider all cost items related to employment core items. Employment costs vary widely depending on whether the patient navigators are volunteers or paid employees and whether

they are lay or professional staff and full-time or part-time. These costs include efforts from the human resources department for the recruitment, interviewing and hiring of patient navigators, as well as conducting institutional orientation and managing wages and fringe benefits for the hired patient navigators. Also included are the wages plus fringe benefits paid to the PN personnel and additional employment costs incurred as a result of staff turnovers. However, the calculation of employment costs related to staff turnovers needs to avoid double counting of the component of variable program costs that captures the time navigators spent with patients. If the variable cost is associated with navigating activities for a patient transitioning from a navigator who had left the organization to his/her current navigator, then the same cost should not be included in the cost of turnovers. It should be noted that facilities that implement PN programs with volunteer workers serving as patient navigators also incur costs of recruitment, selection and institutional orientation. Whether wages and fringe benefits should also be assigned to volunteer patient navigators would depend on the study perspective. Currently there is no guideline for valuing employment costs for these patient navigators, although some have suggested using the national average of wage plus fringe benefits as proxy employment costs for volunteer workers.⁸

Training Costs—The training of patient navigators can take place at local, regional and national levels. Core items for training costs are those associated with initial training and continuing education and include tuition or registration fee for the training courses, travel expenses as well as time spent in training. Core training costs should also include the time patient navigators spend in team conferences and the time senior patient navigators or others spend in training new hires. Another core item is additional training costs incurred as a result of turnover. Typically, the time patient navigators spend in various training activities are captured in the PN activity log. For sites that develop their own training materials, costs associated with curriculum development are considered an optional cost item because many sites do not have the resources to invest in this activity.

Supervision and Administrative Costs—Supervision responsibilities can be assumed by senior patient navigators or other non-PN personnel in a facility. Core supervision costs include the time senior patient navigators or non-PN personnel spend in supervising new staff and can be captured by the PN activity log. Supervision and administrative support costs can be estimated as a percent of wages and benefits according to the percentage of the time allocated to the patient navigator program.

Direct Medical Costs

All medical costs for care provided by the participating facilities throughout the entire continuum of care are considered core items of direct medical costs. Table III provides an example from an existing PN program of direct medical costs for patients in the breast cancer care continuum. We categorize these costs as core items because health care facilities routinely keep track of patient charges for billing purposes; thus it is relatively straightforward to obtain estimates of direct medical costs incurred in these facilities by applying published cost-to-charge ratios.⁹ Genetic testing, counseling, prophylaxis for high risk patients, out-of-pocket expenses and patient assistance with pharmacy and visit co-payments are considered optional items because they are challenging to collect and are reflected by hospital accounting of reimbursement and payor source.

Although desirable, it is difficult to capture costs of medical care services that occur outside the participating facilities since this requires record linkage across different facilities. Therefore, we considered these cost items optional. Costs associated with paid caregivers, such as home health nurses, and outpatient prescription drugs are also considered optional because utilization of these resources may not appear in the medical or billing databases of

the facilities that provided the cancer care. We emphasize again that these cost items were categorized as optional due to the practical consideration that some sites lack the staff, resources, and experience to collect such information. It does not mean that these costs do not apply to these sites.

Direct Non-Medical Costs

This cost category captures resources consumed as a result of seeking or receiving care, such as costs of transportation, parking and hired help for the care of children or elderly family members while patients are undergoing treatment, or the time that friends or family members spend accompanying patients receiving treatment or providing care for patients at home. Although studies have documented that direct non-medical costs are not trivial for cancer patients,¹⁰⁻¹² these costs are not routinely collected and costs incurred outside a program setting are difficult to gather. Collection of these supplemental data would require surveying the caregivers and patients for actual or estimated costs. Therefore, all costs in this category are considered optional.

Indirect Costs

Indirect costs measure productivity loss due to morbidity or mortality (i.e., premature deaths from cancer). Morbidity cost includes productivity loss due to absence (absenteeism) as well as reduced productivity while at work (presenteeism).¹³ Although there are a number of validated instruments to measure health-related productivity loss, such as the Work Limitations Questionnaire¹⁴ and the Work Productivity and Activity Impairment Questionnaire,¹⁵ we considered all items in this cost category optional because collection of this information would require sites to administer questionnaires to all patients participating in the PN programs. As for mortality cost, estimation of this cost requires knowledge of patients' life expectancy without cancer and the age of death if due to cancer. Since this information is beyond the scope of data collection in most PN programs, these costs are considered optional.

DISCUSSION

The purpose of collecting cost data is to provide information to help decision-makers evaluate the economic impact as well as the cost-effectiveness of a PN program and to decide whether such programs should be sustained or perhaps replicated at additional sites. To facilitate economic evaluation of PN programs, the collection of cost data should be discussed at the program planning stage so that data collection tools can be identified or developed and the core cost items standardized across sites. In our experience, collection of cost data retrospectively is difficult, at best. Moreover, the accuracy and reliability of such data might be questionable.

Once the cost data are collected, sites that only have capacity to gather core cost items need to be aware that cost estimated from all core items is underestimated. For a comprehensive economic assessment, it is necessary to add estimates of costs associated with optional cost items obtained from other sites. Through the establishment of common cost measures, our ultimate goal is to generate high-quality data to allow us to build a reference case for cost-effectiveness of PN programs, such as the reference cases presented by the Panel on Cost-Effectiveness in Health and Medicine.¹⁶ In addition, to facilitate information exchange across sites with varying levels of sophistication of data collection, it is recommended that costs be presented in a disaggregated format, stratified by cost categories and separate for core and optional items respectively. This disaggregated format will not only make estimates of optional cost items available to sites that have only collected core items, it also allows decision-makers to identify the most relevant cost components for their assessment.

Compared with other measures discussed in this supplement issue, the analysis of cost data is more complex because the relevant cost elements included in the analysis differ by stakeholder perspectives. For example, from a payors' (e.g., Medicare) perspective, only costs that are potentially reimbursable under the agreement with third-party payors will be included. From a health care providers' (e.g., hospitals or community health centers) perspective, costs associated with hiring and training patient navigators will need to be considered, as well as any potential reduction in the time that clinical or administrative staff spend in helping patients navigate through the health care system or in the number of "no shows" at the facility. From a societal perspective, all cost items, irrespective of whether they are reimbursable, should be included.

The analytical approach employed by decision-makers to determine the economic value further complicates the analysis of cost data. Despite the popularity of cost-effectiveness analysis (CEA), many decision-makers pay equal or more attention to the financial impact of an intervention and seek such information from budget impact analysis (BIA).¹⁷ While CEA evaluates the additional costs to achieve an unit of improvement in effectiveness (e.g., quality-adjusted life years),¹⁸ BIA estimates the financial consequences of adoption of a new technology or implementation of a new intervention within a specific healthcare setting.¹⁹ The ability for BIA to address the issue of affordability has motivated an increasing number of payers to request evidence from BIA in addition to CEA when making coverage decisions since it is possible that a new medical technology or intervention can be cost-effective and yet unaffordable. This practical aspect likely makes BIA an appealing analytical approach to those who are involved in the decision-making of whether to initiate and/or continue a PN program. The various combinations of study perspective with analytical approach will likely result in stakeholders reaching different conclusions regarding the economic value of PN programs.

When studying the economics of PN programs, an important aspect to consider is the aspect of human capital investment. The hiring, training, supervision and retention of patient navigators represent investment in human capital for organizations that employ these patient navigators, and turnover adds additional costs to the organizations due to the need for additional recruitment and training. Even in the case of volunteer patient navigators, these organizations still invest in training and also assume the costs of turnover.

With the exception of volunteer work, there are in general two forms of employment for patient navigators. Some are hired by health care providers, whereas others are employees of organizations that champion a PN program. Examples of the former model are patient navigators employed by hospitals. Examples of the latter model are patient navigators hired by the American Cancer Society to work at community hospitals or cancer centers. A third, less common model are patient navigators that are employed by community based organizations, most often engaged in navigation to cancer screening.

It is possible that a program might be considered cost-effective from a societal perspective, but is deemed neither cost-saving nor cost-neutral by decision-makers at a community hospital. In this case, regardless of the favorable cost-effective conclusion for society, the PN program may not be sustained if patient navigators are employed by the community hospital. The above scenario speaks to the importance of considering the human capital investment aspect in studies assessing the economic value of PN programs, because these programs cannot exist without patient navigators. As discussed in the previous section, the human capital costs of patient navigators vary by the qualification and type of navigators employed. The cost can vary substantially between a nurse navigator and a lay navigator. Given the wide range of activities involved in patient navigation services, an efficient allocation of resources will require better alignment of navigator qualifications with their

anticipated job functions. The heterogeneity among navigators thus adds to the level of complexity in the analysis of the economic value of PN programs.

Another important aspect to consider is the timeframe applied to the assessment of the economics of PN programs. The purpose of PN services is to assist patients in conquering access barriers; therefore, a successful PN program most likely will lead to an immediate increase in the utilization of medical care services. Due to the nature of PN services, studies with a short study timeframe are unlikely to find PN programs cost-effective, as many benefits associated with PN services may not be realized in the short term. This concern is especially pertinent if a PN program targets efforts to improve cancer screenings. It should be noted that cost measures discussed in our paper are applicable to short-term studies and may not provide sufficient information for long-term economic evaluations. As mentioned in Ramsey et al.,⁶ such evaluations often involve development of mathematical models that describe the natural history of a disease process and thus can capture the effect of PN services in altering the disease process through early detection and timely treatment. However, it is not realistic to expect each site to collect cost data for long-term evaluations. Researchers will have to rely on other sources, such as published studies or secondary data, to extract relevant cost information for the model.

A number of large scale PN programs, such as the Patient Navigation Research Program sponsored by the NCI and the Centers for Medicare and Medicaid Services (CMS) Patient Navigation Demonstration Project, have reached or are soon reaching the point that a funding or reimbursement decision must be made regarding whether these programs are to be sustained. The timing of decisions critical to the future of PN programs coincides with the period of healthcare reform, making economic information about PN programs even more important. Sustainability of these programs likely hinges upon the ability of these programs to demonstrate clinical and economic value in meaningful ways to multiple stakeholders, including healthcare providers, healthcare systems, payers and policymakers. Our recommendation of common cost metrics is timely and highly significant in today's health care environment as collective understanding of the value of PN will be enhanced by the adoption of common measures to facilitate comparability across heterogeneous PN programs.

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Table I

Fixed and Variable Patient Navigator Program Costs

	Core	Optional
Fixed Costs	<ul style="list-style-type: none"> • Office space and furnishings • Phones, pagers, computers • PN specific office equipment • Patient materials 	Program development, including development of policies and procedures
Examples:	\$1,700 Facility overhead (=100×\$17/sq ft) \$1,800 Office furnishings (=3×\$600) \$6,000 Computer and software (=3×\$2000) \$1,080 Cell phone (=3×12×\$30/mo)	
Variable Costs	<ul style="list-style-type: none"> • Number of patients/time worked • PN travel including mileage and parking • Office supplies • Additional minutes of phones or pagers usage • Patient assistance including food and transportation 	Costs of outreach and recruitment of PN clients
Examples:	\$420 PN mileage and parking (from expense reimbursement records) \$720 Office Supplies (from accounting unit expense report) \$380 Postage (from accounting unit expense report) \$7,500 Patient bus tokens & co-pays (from interdepartmental transfer records)	

Note: All costs are expressed in 2010 US dollars.

Table II

Patient Navigator Employment, Training and Supervision Costs

	Core	Optional
Employment	<ul style="list-style-type: none"> HR costs for recruitment, hiring and orientation of PNs Wage and benefits of PNs 	
Examples:	Yearly employment costs of 3 PNs \$1,326 HR recruitment, hiring ($=3 \times 17\text{hr} \times \$26/\text{hr}$) \$600 PN background check and occupational health visit ($=3 \times \$200$) \$117,698~\$133,305 wage + fringe (lay PN) ($=3 \times 2050\text{hr} \times 1.226^a \times (\$15.61/\text{hr} \sim \$17.68/\text{hr})$)	
Training	<ul style="list-style-type: none"> Site specific PN training PN training, including tuition, travel, PN time PN continuing education including registration, travel, and PN time PN time spent in supervision, care and team conferences 	<ul style="list-style-type: none"> Curriculum development
Examples:	Yearly training costs of 3 PNs \$1,722~\$1,951 PN training and continuing education ($=3 \times 30\text{hr} \times 1.226 \times (\$15.61/\text{hr} \sim \$17.68/\text{hr})$)	
Supervision & Administrative	<ul style="list-style-type: none"> Supervision by senior patient navigators Supervision by non-PN personnel Administrative support services 	
Examples:	Yearly supervision & administrative costs for 3 PNs \$8,313 program manager/ supervisor ($=5\text{hr}/\text{wk} \times 1.226 \times \$26.08/\text{hr}$) \$1,084 administrative support ($=1\text{hr}/\text{wk} \times 1.226 \times \$17.00/\text{hr}$)	

Note: All costs are expressed in 2010 US dollars; a: 22.6% fringe benefits.

Table III

Example of Direct Medical Costs for Breast Cancer Care (12 months)

	Charge	Cost
Preventive:		
Primary Care Provider visit	\$379	\$169
Screening:		
Mammogram	\$112	\$50
Diagnostic:		
Ultrasound, Mammography and Ultrasound guided biopsy	\$3,086	\$1,378
Treatment:		
Mastectomy	\$51,000	\$21,602
7 oncology visits	\$2,660	\$1,188
Chemotherapy infusion	\$10,000	\$4,466
Port removal	\$748	\$334
MRI	\$3,200	\$1,429
Urgent Care (1)	\$295	\$132
Arimidex (3 months)	\$3,540	\$1,416
Survivorship:		
2 oncology visits	\$760	\$339
Surveillance mammography	\$165	\$74
Hospice:		
N/A for this example		

Note: All costs are expressed in 2010 US dollars.