

Serving High Need/High Cost Patients in the Emergency Department

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SUMMARY

Five percent of patients account for nearly 25 percent of all emergency department (ED) visits in the United States. These “high need/high cost” (HNHC) patients of ED services often do not receive the right care, with the right provider, at the right time—or at the right price. Typical HNHC patient health concerns of chronic disease and low acuity tend to be inappropriately addressed in the ED, which is designed to care for acute, episodic, and emergent health conditions. HNHC programs identify HNHC patients and facilitate alternative care models (e.g., primary care coordination and social service assistance) that promote better HNHC patient health and facilitate appropriate health care service use. HNHC programs generally improve participant health, reduce ED visits, and decrease hospital charges. Typically, hospital-operated HNHC patient programs are generally not profitable without grant support or case management revenue. To optimize the financial benefit of HNHC patient programs, shared savings or global budget agreements between payers, hospitals, and other providers should be developed. This paper describes HNHC patient program design, implementation, operation, and assessment.

EMERGENCY DEPARTMENT HIGH NEED/HIGH COST PATIENTS

A small percentage of patients utilize a disproportionate share of health care services in the United States. In 2013, 5 percent of patients accounted for 50 percent of total health care spending.¹ ED utilization reflects similar health care spending proportions. Although similar data are not available for rural EDs, disproportionate utilization of an annual 28.4 million rural ED visits in 2016² by a small percentage of individuals is likely.

A patient who disproportionately utilizes ED services is considered a “high need/high cost” (HNHC) patient. Although there is no standard definition of a HNHC patient, a Centers for Medicare & Medicaid Services bulletin defined HNHC ED patients as “patients who accumulate large numbers of ED visits and hospital admissions which might have been prevented by relatively inexpensive early interventions and primary care.”³ In a 2012 review of 4 studies that defined HNHC ED patients as those using the ED 3 or more times per year, 5 percent to 8 percent of ED patients accounted for 21 percent to 28 percent of

visits, over 50 percent of ED patients sought care at 2 or more EDs, and 70 percent of visits were on evening or night shifts.⁴ HNHC patients also utilize other health care services with associated costs during ED visits, including laboratory, pharmacy, and radiology services.

The HNHC patient is more likely to be female, Caucasian, between the ages of 25-44, and poor.^{4,5} The HNHC patient is more likely to present to an ED with lower acuity complaints during the evening, yet believe they require immediate medical attention.^{4,6} Most HNHC patients are insured, and they are more likely to be insured through Medicaid than by private insurance.⁷

Most HNHC patients have at least 1 psychiatric diagnosis and 1 or more chronic illnesses.^{5,8} HNHC patients also experience significant barriers to accessing routine health care, including homelessness, substance abuse, severe chronic illnesses, physical disability, dental disease, early life trauma, and mental health problems.⁹⁻¹¹ Due to mental health issues and chemical dependency, many HNHC patients have difficulty navigating the health care system and keeping scheduled health care provider appointments. Additionally, HNHC patients may have had negative experiences with providers during prior encounters.⁵ Nearly 60 percent of Medicaid beneficiaries who were among the most expensive 10 percent in 1 year remained among the top 10 percent in 2 subsequent years.¹² Thus, HNHC patients tend to continue to visit the ED frequently over time and many continue to generate high costs year after year. Other factors that might increase the risk of excessive ED utilization include no recognized source of primary care, multiple chronic diseases, inadequate housing, no transportation options, poor health self-rating, minimal social support, irregular employment, residence proximate to an ED, and lack of trust in the health care system.

HIGH NEED/HIGH COST PROGRAMS

HNHC patients present to the ED primarily with low acuity and chronic disease concerns. Behavioral health issues, substance abuse, and social isolation factors often complicate the clinical situation. The HNHC patient clinical and social profile therefore suggests the need for robust primary care, care coordination, social services, and health advocacy. In contrast, ED care is designed to treat acute, episodic, and emergent clinical situations. Therefore, ED care inadequately meets HNHC patient care needs. Many have called for health care to be at the right place, with the right provider, and at the right time.¹³ The ED is generally the wrong place and the wrong provider for typical HNHC patient health care concerns. Care should also be at the right price. Repeated ED care is likely to be more expensive than care coordinated with the primary care office and in the community.

To address inadequate and inappropriate patient care, and to reduce health care costs, HNHC patient programs have been implemented to provide patient-centered interventions to improve overall health, bolster care coordination, reduce overutilization, and decrease health care spending through directed care management of HNHC patients who disproportionately use health care services.¹⁴ Hospitals generally establish HNHC patient programs, although other organizations (e.g., payers or social service agencies) can also do so. Regardless of organizing entity, HNHC patient programs have the potential to impact hospital ED utilization and financing.

This paper describes HNHC patient program design, implementation, operation, and assessment. In brief, the following HNHC patient program steps will be described:

1. *Establish HNHC patient program goals.* Program goals may be as straightforward as reducing ED utilization or as complex as reducing hospital costs associated with HNHC patients.
2. *Define data required to assess the HNHC patient program.* Availability of various data will be required to identify HNHC patients and evaluate the HNHC patient program.
3. *Identify data sources and data analysis capacity.* Once data needs are defined, the HNHC patient

program should locate required data and ensure capacity to access data in a useable format.

4. *Define an HNHC patient.* The HNHC patient program should define an HNHC patient (e.g., by number of ED visits per year) in order to identify HNHC patients among all ED patients.
5. *Identify HNHC patients.* The HNHC program should use the ED log, electronic health record (EHR), or similar database to develop a list (updated regularly) of all HNHC ED patients.
6. *Identify HNHC patients that can benefit from currently available resources.* Attention should be directed primarily to those HNHC patients likely to benefit from currently available care coordination and social service resources. A more focused HNHC patient identification can be accomplished through computer algorithms or ED leadership knowledge of the patient population and available resources.
7. *Develop an HNHC patient-program business plan.* New program development should include a financial pro forma as part of a business plan to project program costs and savings.
8. *Establish a multidisciplinary care team.* Since the reasons for inappropriate ED use are multiple, multiple skills sets are necessary for effective intervention.
9. *Collaborate with community resources.* HNHC patient program services should not be duplicative of already established community-based services and competencies.
10. *Design alternative care models and intervention plans.* Interventions should flexibly meet the health and human services needs of HNHC patients.
11. *Start with a small number of HNHC patients.* A limited initial caseload allows HNHC patient program team-building and care-process improvement.
12. *Assess HNHC patient program outcomes.* Objective program goals serve as program performance metrics.

HIGH NEED/HIGH COST PROGRAM DESIGN

HNHC patient program design begins with outlining program goals. Explicit program goals will define program data requirements and the program evaluation process. Program goals (and associated indicators in parentheses) may include the following:

- Decreased ED visits (ED visits per HNHC patient)
- Decreased payer costs (hospital revenue received from payer)
- Increased primary care visits (primary care visits per HNHC patient)
- Decreased hospital inpatient admissions (hospital inpatient admissions per HNHC patient)
- Decreased hospital charges (hospital ED and associated ancillary charges)
- Decreased uncompensated care charges (charge-to-revenue ratio)
- Decreased hospital costs (allocated hospital costs)*
- Increased hospital revenue (e.g., grant funds, care management fees, and other revenue sources)
- Increased patient satisfaction and/or self-perception of health (patient surveys)

* A discussion of hospital cost allocation is beyond the scope of this paper. Determining hospital cost for a service line (ED), or a unique service like an ED visit and associated ancillary services, can be challenging. However, the incremental (variable) hospital cost for one ED visit is relatively low. Therefore, while payer expenditure savings from an HNHC patient program may be significant, hospital cost savings may be minimal. As hospitals and payers increasingly enter shared savings payment or global budget agreements, determining which organization saves costs becomes more complex.

- Improved chronic disease status (chronic disease management metrics)
- Decreased admissions for ambulatory care sensitive conditions (ACSCs) (ACSC admissions per HNHC patient)¹⁵

Data sources utilized by the HNHC patient program will depend on the program's HNHC patient definition and the data selected for program evaluation. Typical HNHC patient-program data sources include the following:

- *ED Log* – The ED log is a record of basic ED visit data: date, time, provider, presenting complaint, and discharge disposition. The ED log generally does not include financial data.
- *Claims Data* – Claims data include detailed information required for billing payers: insurance carrier, procedure codes, diagnosis codes, hospital charges, etc. Claims data do not include information for self-pay patient visits and do not include hospital revenue or cost data.
- *Electronic Health Record (EHR)* – A well-developed EHR will contain complete clinical care data and may be linked to the hospital billing system. If the hospital is affiliated with area clinics, longitudinal data that includes multiple visit sites and dates may be available. Most EHRs contain a database function that allows identification of patients or visits based on predetermined parameters such as those that identify an HNHC patient. Not all hospitals and clinics utilize a fully functional EHR.
- *Population Health Systems* – Population health and other similar algorithm-based systems can help identify patients most likely to benefit from care coordination and social service interventions. ED leadership knowledge of the patient population and available resources can substitute for, or supplement, these systems.
- *Cost-Accounting System* – Hospital cost-accounting systems are generally incapable of allocating fixed and variable costs to a unique ED visit or associated ancillary services. However, to assess potential hospital costs saved by reduced HNHC patient utilization of the ED, service cost assumptions are necessary.
- *Health Information Exchange (HIE)* – An HIE (not to be confused with a Health Insurance Exchange) is an electronic connectivity system based at a regional or state level. An HIE is designed to increase connectivity and enable patient-centric information flow to improve the quality and efficiency of care.¹⁶ An HIE should allow data sharing between hospitals and other health care providers.
- *Proprietary ED Systems* – One example of a proprietary HNHC patient data management system is the Emergency Department Information Exchange (EDIE), a web-based application that enables care providers to identify HNHC patients. ED visit information is sent to EDIE through a Health Level Seven International (HL7) feed from the hospital. If the patient has care coordination guidelines in the system, or has exhibited a pattern of over-utilization, a notification is automatically relayed to the facility and other interested parties, such as the primary care provider or case manager.¹⁷

Once HNHC patient program goals are established and data sources identified, organizers should develop a program business plan, or at a minimum, a financial pro forma. Business plan details will not be discussed here, but HNHC patient organizers should make caseload assumptions, estimate program revenue (e.g., grants and reduced hospital costs), and estimate program costs (e.g., data collection, data analysis, data presentation, intervention team compensation, and hospital revenue loss). During HNHC patient program design and implementation, organizers should consider community-based resources (i.e., not hospital- or health system-based) that may already be in place that can coordinate care and assist patients to receive appropriate care. Program organizers also might consider engaging current hospital resources, such as

care management programs to reduce hospital readmissions, to help reduce inappropriate ED utilization.

To evaluate program performance, HNHC patient program organizers must first establish program goal(s), define data requirements, and identify data sources. Baseline data are necessary to compare pre/post implementation performance. The data required will depend on program goals. For example, if the sole program goal is to reduce ED visits for patients identified as HNHC patients, then the only data required are ED visit rates for those patients before and after program implementation. If program goals include a detailed financial impact analysis, a much more robust data set is required, including hospital ED charges, ED revenue, ED costs, and program costs. If program goals include health outcomes, ACSC admission rates, chronic disease management metrics, patient satisfaction surveys, and/or patient self-perception of health data are required.

Program goals and data availability may determine the parameters for HNHC patient definition. In general, HNHC patient programs identify HNHC patients by the number of ED visits within a specified time period. Based on program goals and resources available for HNHC patient intervention, an HNHC patient program can define HNHC patients narrowly or widely. A sample of HNHC patient criteria include the following:

- ED visit rate (published HNHC patient program criteria range from more than 2 visits per year to 5 visits per month)^{4,5,6,18-22}
- A combination of ED and inpatient visits (e.g., 6 ED visits and 2 inpatient admissions per year)^{4,23}
- Patients who account for an upper percentage of all ED visits (e.g., the top 5 percent of ED utilizers)^{4,5,11}
- The top 10 ED utilizers²⁴
- Patients who ED personnel have identified as HNHC patients⁵

HIGH NEED/HIGH COST INTERVENTION

HNHC programs should not only identify HNHC patients based on utilization data, but also develop program inclusion criteria for those patients most likely to benefit from an alternative care model. Patients with complex health care needs, multiple chronic conditions, inappropriate resource use, and high ED or inpatient utilization are typically best suited for intervention. Alternative care models, or HNHC patient interventions, are generally designed by a multidisciplinary team that can vary from a few individuals meeting frequently to larger groups that meet less often. Team members may include physicians, nurses, pharmacists, social workers, behavioral health specialists, health coaches, care coordinators, community health workers, and others. The HNHC patient program team reviews utilization patterns (not necessarily limited to a single hospital) and available medical records to evaluate possible etiologies for excess utilization, including barriers to appropriate health care access.

HNHC programs utilize a variety of approaches to reduce ED utilization, including case coordination, individualized care plans, patient education, primary care partnerships, health coaching, and managed care level interventions.¹⁹ HNHC programs customize interventions based on individual patient needs. For example, an HNHC patient visiting multiple providers may benefit from care coordination. An HNHC patient inappropriately using an ambulance for transport to the ED may benefit from community transportation options. An HNHC patient with active substance use disorder may benefit from rehabilitation program participation or primary care medication contracts.

HNHC program operations and interventions will vary by program, team composition, and available resources. However, a typical HNHC patient program will include the following activities:

- *Initial Contact* – A potential HNHC patient program participant is contacted by a program team

member, preferably while the patient is in the ED. Contact can also occur at the patient’s home or primary care office. If the patient does not agree to participate in the HNHC patient program, the patient is provided team contact information and is invited again to participate during every subsequent ED visit. If the patient agrees to participate in the HNHC patient program, the team assesses patient needs and develops a multidisciplinary intervention care plan.

- *Case Management* – The most frequently cited and studied HNHC patient intervention in the literature is case management. The Case Management Society of America defines case management as “a collaborative process of assessment, planning, facilitation, care coordination, evaluation, and advocacy for options and services to meet an individual’s and family’s comprehensive health needs through communication and available resources to promote quality, cost-effective outcomes.”²⁵ Some case management interventions include referral to substance use disorder services, linkage to community providers, supportive therapy, housing assistance, crisis intervention, and ongoing assertive community outreach.^{22,26} Other interventions include medical home linkage, medication reconciliation, goal setting and planning, health education, self-management coaching, and linkage to community resources.⁶
- *Team Outreach* – Following initial ED contact, team outreach occurs in the patient’s home within 2–3 days. Home visit activities include a description of the HNHC patient program and its goals, and an introduction to the case manager and other team members. Through client interview, the case manager identifies barriers to accessing appropriate care (e.g., lack of transportation or substance use disorder) and answers patient questions. Team members may need to meet with a client multiple times in person in the patient’s home or community setting to build trust and establish a relationship that facilitates intervention plan compliance. Small incentives such as grocery certificates can help encourage HNHC patients to keep appointments.²⁷ If a participating patient presents to an ED, they are flagged in the hospital’s EHR as an HNHC patient program patient to allow timely intervention. Ongoing activities include regular patient contact by phone or in person, patient education, and immediate follow-up if the client presents to an ED.

Many HNHC patient programs begin with only a few patients, as program managers refine intervention plans and other program elements. An initially small patient cohort helps the multidisciplinary team become more cohesive, understand which interventions work (and which do not), and improve program design to increase the likelihood of success. Over time, HNHC patient programs have found the ideal case manager-to-patient ratio to be between 1:25 and 1:50.^{10,24}

The reasons for inappropriate ED utilization are multiple. Therefore, HNHC patient programs must offer a broad range of services to address varying health care and human service needs. If an HNHC patient program multidisciplinary team is unable to provide necessary services, care is coordinated with community-based services. HNHC programs develop partnerships with local health care providers, social service organizations, and community workers.¹⁸ Potential partners for care coordination include the following:

- Mental health centers
- Urgent care clinics
- Primary care clinics
- Free medical clinics
- Homeless shelters
- Faith-based organizations
- Area Agencies on Aging
- Public health departments
- Community health workers
- Community paramedics
- Other care coordination programs

HIGH NEED/HIGH COST PATIENT PROGRAM EVALUATION

Pre-determined HNHC patient program goals are a prerequisite for program evaluation. For example, if the program goal is to reduce ED utilization for a defined cohort of patients (the HNHC patients), performance will be measured as HNHC patient utilization of the ED before/after program implementation and trended over time. Baseline ED utilization (e.g., number of ED visits and/or ED charges) by the HNHC patient cohort is generally measured for the 12-month period prior to program initiation. ED utilization is then measured periodically to identify change from pre-program utilization and to quantify utilization trends. Analysis is more robust with comparisons to a control cohort not participating in the HNHC patient program. However, evaluators should be cautious about selection bias; patients who agree to HNHC patient program participation may be more likely to respond to care alternatives than those who do not agree to participate.

Utilization data analysis and financial analysis are fundamental to HNHC patient program evaluation. Some hospitals employ hospital health information technology staff to provide data analyses.²⁴ Other HNHC patient programs utilize data analysis and visualization software.²⁸ Data are typically presented in simplified cost and utilization reports that include the total number of ED visits and aggregate hospital charges for each patient.¹⁰ Other reports include monthly patient status updates for case manager and/or care coordination team review.

In addition to quantitative HNHC patient program evaluation, frequent HNHC patient program infrastructure and care management review is also important. Queries such as “Is the multidisciplinary team composition correct?” “Have we engaged all appropriate community resources?” and “Is our inter-professional communication strategy effective?” should be considered. Common process improvement strategies (e.g., Lean production and Plan-Do-Study-Act) can be applied to HNHC patient programs just as to other hospital service lines.

Profitability analysis of an HNHC patient program is potentially complex. Revenue may include grants, care management fees, and ED cost savings, but expenses may include HNHC patient team compensation costs, data analysis costs, and reduced insurance payments. Therefore, HNHC patient program financial analysis will likely require assistance from the hospital CFO or comptroller for access to, and analysis of, claims data, Provider Statistical and Reimbursement System reports, and cost allocation methodologies. Without a shared savings agreement with a payer, or external funding for care management, an HNHC patient program is unlikely to increase hospital profits. Yet some HNHC patient programs persist as a mission-driven community service and as opportunities for hospital participation and experience in care management.

HIGH NEED/HIGH COST PROGRAM RESULTS

HNHC program results vary due to differing HNHC patient program inclusion criteria, interventions, locations, assets, staffing, and number of HNHC patients enrolled. HNHC programs have reported decreases in HNHC patient visits to the ED from 31 percent to 83 percent.^{3,6,18,21,22,26,29} Although HNHC patient use of the ED typically decreases over time, HNHC patients with higher levels of prior ED use may continue to access the ED more often than those with lower levels of prior ED use.²² In contrast, two HNHC patient programs reported no reductions in ED use among enrolled HNHC patients.^{20,30} In addition to generally lower HNHC patient utilization of the ED, several programs reported both clinical and social improvements, including reduced inpatient admissions, reduced drug and alcohol use, increased housing stability, and increased Medicaid enrollment.^{3,6,10,18,21,24,26,31,32}

ED charges for HNHC patients have been reported to decrease from 26 percent to 45 percent.^{3,6,18,19,21,22,26} Inpatient charges for HNHC patients also reportedly decreased from 65 percent to 67 percent.^{26,31} HNHC

programs tend to reduce payer costs because hospital charge reductions are typically greater than HNHC patient program costs. Shumway et al reported that for each case management dollar invested in the HNHC patient program, hospital charges were reduced \$1.44.²² Similar savings have been found in other programs.³ However, these program evaluations did not consider additional outpatient HNHC patient care costs.²² In summary, HNHC patient programs likely reduce payer costs, although not all additional outpatient costs have been considered. Conversely, HNHC patient programs likely reduce hospital revenue derived from ED service payments. To optimize the financial benefit of HNHC patient programs, payers, hospitals, and other providers should develop shared savings or global budget agreements.

ADDITIONAL RESOURCES

For comprehensive resources addressing HNHC patients, see:

- Camden Coalition of Healthcare Providers. <https://camdenhealth.org/>
- The Commonwealth Fund. <https://www.commonwealthfund.org/high-need-high-cost-patients>

For HNHC patient case studies, see:

- Mountain Pacific Quality Health. Super-Utilizer Pilot Project. <https://www.ruralhealthinfo.org/project-examples/985>
- California Medicaid. Surprising Results From Pilot Program Aimed at Medi-Cal ‘Super-Utilizers.’ <https://californiahealthline.org/news/surprising-results-from-pilot-program-aimed-at-medical-superutilizers/>
- American Hospital Association. Super Utilizers – Using Data and Innovation to Treat Our Most Vulnerable; an Urban And Rural Perspective. <https://www.aha.org/system/files/2018-03/2017-06-29-superutilizers.pdf>
- Veterans Health Administration. Embedding Social Workers In Veterans Health Administration Primary Care Teams Reduces Emergency Department Visits. <https://www.healthaffairs.org/doi/10.1377/hlthaff.2019.01589>

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