NORTH COUNTRY HEALTHCARE
MEDICAL STAFF DEVELOPMENT PLAN

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APRIL 2017

North Country Healthcare
Medical Staff Development Plan
2016

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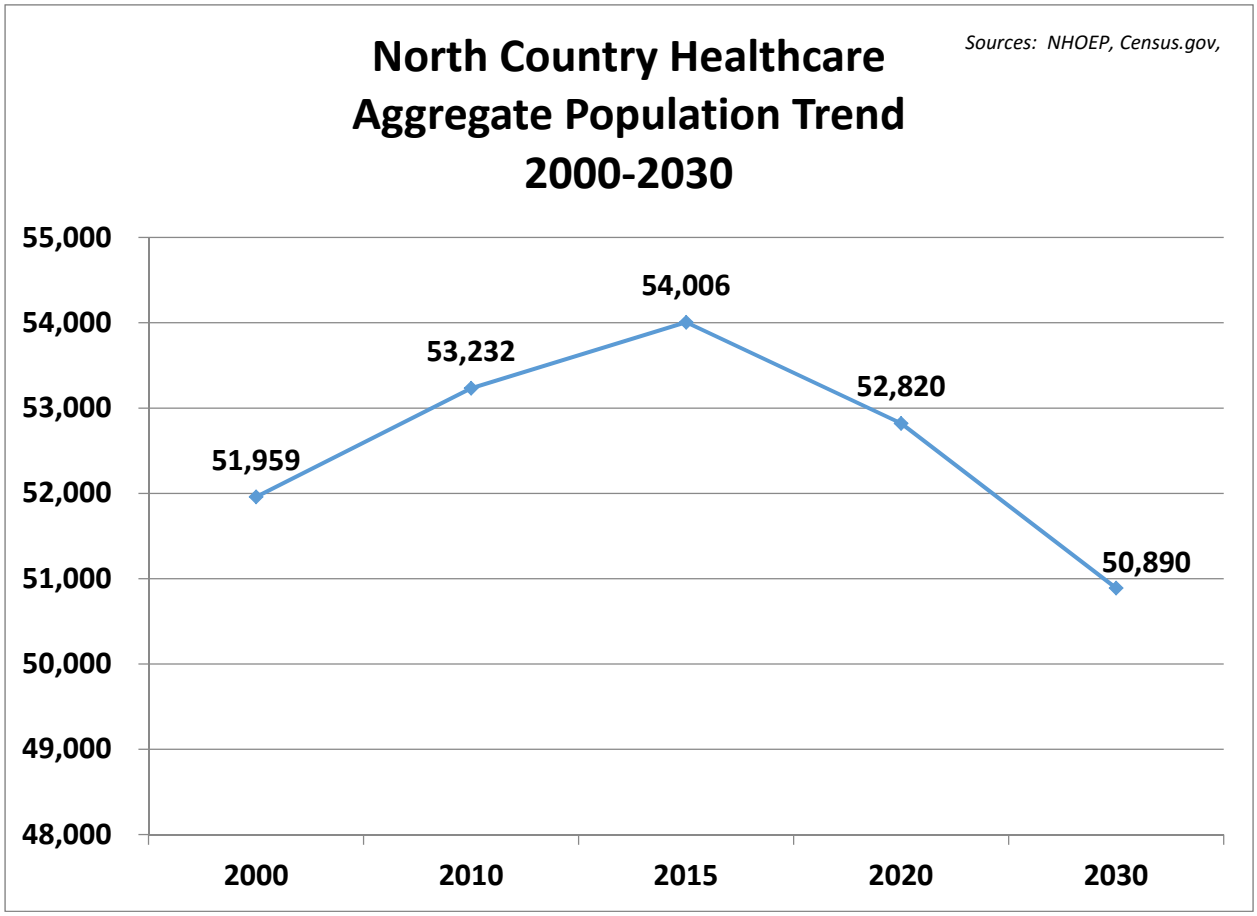
EXECUTIVE SUMMARY

The North Country Healthcare parent company was approved and activated on March 31, 2016. In preparation for this new organization, the governance of the four subsidiaries as well as the proposed governance and leadership of the new parent company created the outline of benefits to be achieved by the new affiliation. Providing health care in a rural environment with an aging and declining population requires new strategies intended to drive efficiency, high quality and needed services. New Hampshire and Vermont are both seeing some of the highest median ages in the U.S. as well as population stagnation (northern NH) or decline (northern VT).



The motivation for the affiliation was to create a more sustainable platform for the delivery of care to the patients in the service area of the four subsidiary hospitals (Androscoggin Valley in Berlin, Littleton Regional in Littleton, Upper Connecticut Valley in Colebrook and Weeks

Medical in Lancaster). As health care financing and delivery systems are rapidly changing, it was essential to:

- Learn new ways of providing care emphasizing value over volume which requires a larger population base than any of the hospitals individually serve
- Through integration, create new economies of scale that can't be achieved by individual organizations
- As a system, optimize the services that can be provided in the region
- Optimize high quality patient centered care by developing a clinically integrated network

To accomplish the important work of clinical integration, the North Country Healthcare leadership created a Chief Medical Officers (CMO) forum. The four CMOs meet regularly along with the parent CEO. To support and facilitate the clinical work, Helms & Company, Inc. was engaged in July, 2016 to assist in the following specific initiatives:

- Assess where the residents of the region are currently receiving their care, particularly when it is received outside of the region
- Analyze current volumes of specialty care provided in the region
- Facilitate networking and communication among the providers within the system
- Create a medical staff development plan that will do the following:
  - Inventory and quantify the existing Primary Care and Specialty providers located in the NCH region (including hospital-related providers and those providers associated with Federally Qualified Health Centers in the geography)
  - Match the existing capacity of health care providers to industry population based metrics
  - Assess gaps in the existing health service providers
  - Address succession planning for retirements
  - Ascertain from the working providers their assessment of the strengths and weaknesses of the clinical system of today and articulate needs and opportunities for the system going forward

This NCH Medical Staff Development plan will focus on the quantitative findings, highlight the qualitative themes, and present some observations and recommendations for consideration as elicited from this process. It should be noted that all involved in the creation of this report from collecting data to volunteering time to be interviewed were enthusiastic and very positive about the opportunities for creating a more sustainable health care system for the residents served by NCH.

Major Findings:

- Not unlike the population of the region, there are segments of the provider population that are aging and will require succession planning in the short term.
- Recruitment of quality physicians and associate providers, especially for Primary Care, is competitive, particularly in rural areas. It will be important to create a joint recruitment strategy among the system components and others within the region, to reduce competition with each other.

- Mental health and behavioral health care systems are not meeting the needs of the NCH population. As we know, this is a state and national issue but one that has large implications on the cost and outcomes of care of those served within the NCH system.
- Creating opportunities for common standards of care, quality expectations, and matching services to population and community needs will be essential in optimizing services that can be provided in the region as well as the ability to retain primary and specialty care providers. The provider community is optimistic about enhanced services but naturally anxious and concerned about probable change.
- Generally the NCH region has an adequate supply of specialist FTEs among those disciplines currently offered. A common challenge in rural systems is the historic need to provide 24/7 call for certain specialty services without enough population to provide sufficient demand for the capacity needed for call which increasingly is financially prohibitive. The system has an opportunity to consider options that will better match demand and capacity. This opportunity will also reduce the need for patients to leave the system in order to seek care elsewhere.
- In addition to Behavioral Health, the information gathered suggests that NCH could support an additional Dermatologist and more Ophthalmology capacity. There also may be a need for more primary care physician capacity especially to support the clinically fragile patients coming out of hospital care.
- Dartmouth-Hitchcock Medical Center is the provider of the most amount of care rendered by outside providers to North Country residents. Their evaluation of hospital admissions showed a "bi-modal" distribution with the most patients having a case mix index above 1.2 – likely appropriate admissions of patients with acute clinical needs beyond the capabilities of a critical access hospital- and a smaller but significant portion of admissions with a case mix index below 1.0. This lower acuity admission population represents incremental revenue opportunity to NCH if the delivery system can be modified to care for them more effectively.
- Cancer services were the single largest clinical area of North Country out-patient volumes to DHMC across all four NCH hospitals. Discussion of possible ways to provide more care locally as extensions of Cancer programs may be an area to explore.

INTRODUCTION

In August of 2016, Helms & Company, Inc. (Helms) began work with the North Country Healthcare Chief Medical Officers (CMO) group. The scope of service for Helms for this CMO work includes:

- Staff support for the CMO group;
- Creating a Medical Staff Development plan;
- Assisting with other identified priority areas, e.g. OR analytics, general surgery assessment, implementation of a Provider Advisory Committee, an all Medical Staff meeting, review of leakage from the North Country, and implementation of other ad hoc meeting groups.

This paper is specific to the Medical Staff Development Plan. The purpose of developing the plan is to review service gaps, assess the needs of the system today and to consider how those needs might be addressed using a regional approach for clinical planning. It is also an opportunity to assess the need for succession planning for providers who may be leaving, retiring or reducing his/her practice.

The process for creating this plan included two phases:

1. **Quantitative Information**
   Medical staff profiles from the four hospitals (AVH, LRH, UCVH and WMC) in addition to the three FQHCs (Ammonoosuc, Coos County, and Indian Stream) are collated. The collated information is matched to regional and national benchmarks to provide a general assessment of existing capacity needed for the service area population. Gaps and opportunities can then be assessed for the NCH system.

2. **Qualitative Information**
   Interviews of providers and leaders from the hospitals and the FQHCs were conducted during November. The interviews were constructed to allow the providers to comment on strengths and needs of their local community and to identify opportunities for enhanced services or infrastructure for the system as it matures.

The first two phases of this plan will allow the NCH clinical and leadership teams to use this information going forward as an important adjunct tool in creating a strategic plan with prioritized initiatives in the development of an integrated system.

MEDICAL STAFF PROFILE

Quantitative Profile

Each hospital and FQHC submitted a profile of the physician and allied health providers. The template requested the names, specialty and years of service for each provider. Per diems were not included in the counts nor were independent providers who do not have privileges at the organizations. Cumulatively, the North Country Healthcare region reflects the following numbers and FTEs of providers by specialty:

SUMMARY OF FOUR HOSPITALS & FQHCS Medical Staff					
Primary/Hospital Based	**Number**	**FTE**	**Surgical**	**Number**	**FTE**
Family Practice/GIM	37	26.9	Anesthesiology MD/DO	2	1.0
FP Allied	32	23.9	Anesthesiology Allied	12	11.3
Pediatrics MD/DO	4	4.1	Gastroenterology	2	2.0
Pediatrics Allied	1	0.8	General Surgery	6	5.7
OB/G	6	5.7	Ophthalmology	2	1.0
Women's Health Allied	3	2.3	Orthopedics MD/DO	9	7.8
ED MD/DO	18	15.9	Orthopedics Allied	7	6.2
ED Allied	4	4.1	Otolaryngology	4	2.8
Hospitalist MD/DO	8	7.7	Otolaryngology Allied	1	1.0+
Hospitalist Allied	4	3.2	Podiatry DPM	4	3.5
Pathology	2	0.9	Urology	4	3.7
Radiology	3	2.2			
Medical	**Number**	**FTE**	**Other**	**Number**	**FTE**
Cardiology/Cardiovascular	5	3.7	Behavioral MD/DO/PhD	2	0.4
Cardiology Allied	1	0.8	Behavioral Allied	10	7.7
Dermatology	1	1.0	Occ Med Allied	1	1.0
Endocrinology	1	1.0	Oral Health DDS	2	2.0
Neurology	2	2.0	Oral Health Allied	2	2.0
Oncology	4	1.1	Pain Allied	2	1.8
Pulmonology	2	2.0	RPh Pharm D	3	1.5
Rheumatology	1	1.0	Wound Care Allied	2	2.0
Sleep Medicine	3	2.3			
TOTAL NUMBER OF PROVIDERS AS SUBMITTED			**Number:** **FTEs:**	**219** **177**	

SUMMARY OF FOUR HOSPITALS & FQHCS Years on Staff – Average All		
Provider	**FQHC**	**Hospital**
MD/DO	9	8
Allied/Other	7	3

SUMMARY OF FOUR HOSPITALS & FQHCS Average Age	
Provider	**Age***
MD/DO	53
Allied Health	47
**Hospital data only*	

SUMMARY OF FOUR HOSPITALS & FQHCS Average Age of Physicians by Category 55 Years Old or Greater	
Provider	**Age***
Cardiology	55
Dermatology	56
Emergency Medicine	56
Oncology	62
Radiology	64
Rheumatology	62
General Surgery	58
OB/Gyn	58
Orthopedics	57
Pulmonology	58

Succession planning is strongly indicated for the near term as the profile and input from the interviews suggest this is a priority. This planning should be conducted in conjunction with the strategic plan development for the system.

MEDICAL STAFF PROFILE

I. Qualitative Input

Interviews of clinical providers located at the four North Country Healthcare organizations and three FQHC organizations were conducted by Kevin Stone and Deanna Howard from Helms & Company during the month of November. Kevin completed eleven interviews in Colebrook and Berlin and Deanna completed fourteen interviews including reps from CCFHS, UCVH, ACHS, WMC and LRH. Interviews generally lasted for one hour. All providers were very forthcoming, in general very positive, and optimistic about enhanced care in the North Country because of the "Alliance." (Note – interviews with CCFHS and ACHS were conducted with just the CEOs of those organizations).

The design of the interviews was to secure input on strengths, needs and opportunities, both for the local as well as the regional healthcare system. The interviewees were encouraged to think about the local "community" in which they practice, considering the other community assets such as transportation, home health, Primary Care, etc. When thinking about the system, interviewees were asked to identify specific infrastructure that may be needed, concerns, opportunities to enhance services and ways to reduce leakage. Input was also asked on specific or general knowledge of potential retirements in the foreseeable future of key providers. Interviewees were encouraged to speak top of mind to these issues rather than having a tightly structured interview. All interviews were conducted in person except for two phone interviews.

INTERVIEW SUMMARIES

Location of Interviews	
Practice Site	**Specialty**
UCVH	2 ED providers 1 Hospitalist 1 General Surgery
ISHC	1 CEO 1 PCP MD
AVH	1 Sleep Medicine 1 Cardiology 1 Orthopedics 2 ED/PCP 1 General Surgery
CCFHS	1 CEO
ACHS	1 CEO
WMC	4 PCPs 1 Anesthesia 1 General Surgery
LRH	1 General Surgery 2 OB/GYN 1 Pediatrics 1 Pulmonology 1 Hospitalist

ANDROSCOGGIN VALLEY HOSPITAL INTERVIEWS

Strengths of Local Community

- Good relations between ED and Hospitalist service.
- Hospitalist service has good quality and supports ambulatory care
- Some strong specialist services: ENT, urology and cardiology
- Good therapy and imaging services

Needs/Barriers in Local Community

- Psychiatric care of all kinds (in-patient, out-patient)
- Primary care to handle patients with complex illnesses
- Neurology service enhancement needed due to limited access
- Lab service transition is a concern, especially microbiology
- Gastroenterology service needed although aware this has implications for general surgery and future recruitment
- Anesthesia service needs stabilization
- Improved access to select specialties: general surgery, orthopedics and neurology

Regional Opportunities

- A system for pediatric in-patient coverage and care although this has implications for hospitalist recruitment
- Orthopedic call coverage and provision for consults
- General surgery coverage including in-patient
- Broader anesthesia service across the hospital
- Consider creating one combined ED and Hospitalist group for better coverage and staffing efficiency
- Consider CMC electrophysiology service for entire region

Suggestions for Moving Forward in Regional System (Infrastructure)

- Evaluate establishment of pediatric support and orthopedic relationship for the entire region
- Develop ways to enhance primary care delivery for complex patients
- Evaluate being a Durable Medical Equipment (DME) vendor for the region or create a regional contract that will improve reliability

LITTLETON REGIONAL HEALTHCARE INTERVIEWS

Strengths of Local Community

- Very good referral service in place for the region, specifically cited were OB/GYN, neurology, GI, pulmonary and orthopedics
- Amazing breadth of specialties for a 25-bed hospital
- The hospital has a high-quality brand and high-quality providers
- There is little leakage of most specialties (cited were OB, sleep, pulmonary), for appropriate level of care services provided at LRH
- LRH can manage a large scope of conditions for the local population

Needs/Barriers in Local Community

- Mental and behavioral health services are insufficient
- Home health and hospice services are inconsistent throughout the region (cited were nursing and rehab skills/capacity); hospice services are also not consistent across the region
- Primary care across the region is inconsistent. Patients are often held too long before being referred to a specialists which may result in delay of treatment and over-testing
- Ammonoosuc Community Health Services (ACHS) provides appropriate team-based population health care for patients
- Perhaps there are opportunities to bring the FQHCs closer to each other
- There is inability to share clinical information among providers of care; this is inefficient and can be a safety issue. IT in general is a significant issue.
- The labor pool is an issue, making it difficult to attract newly trained nurses and other ancillary staff
- Low volumes (e.g. ICU) are also an issue
- Call vs. capacity for specialists – an ongoing issue. There is no depth of specialists; if one leaves, it often ends the service line
- Service improvement opportunities: pathology and radiology
- Compensation, call, work requirements are all issues
- Employed practices would benefit from performance reviews which would include data such as source of referrals, financial performance, a three to five year plan for the practice, etc.
- If specialists will be required to travel, it may impact recruitment and retention as it may impact quality of life and satisfaction

Regional Opportunities

- Address mental health across the continuum
- Primary care should be resourced to develop common metrics and protocols. There should be clear expectations and accountability
- Address a regional education program for training; nursing and ancillary care skill levels are uneven

- Better of coordination of care. Sometimes patients are shuffled among specialists with no one provider responsible
- Standardize wound care across the region
- Increase access to dermatology and neurology
- Imbed an oncologist in the region (although the provider may remain part of a tertiary group)
- Look for opportunities to strengthen relationships with D-H (subspecialists)

<u>Suggestions for Moving Forward in a Regional System (Infrastructure)</u>

- Common EMR, common approach to guidelines, algorithms, etc.
- Ability to share information via information technology among providers across the system
- Assess over-testing throughout the region
- Succession Planning – consider that newly trained physicians sometimes have a more limited scope of practice. Conversely, newly trained residents are current with best practices
- We should plan recruitment jointly across the system
- Governance
    - Who will make the decisions on what resources and services will be placed where? How will providers have input into those decisions?
    - What are the clinical indicators for making these difficult decisions?
    - It will be essential to build trust with system administration
    - We will need better communication about the system, what is the future role of each organization, what is the why, how will it impact me?
- Address palliative and hospice care as a region

UPPER CONNECTICUT VALLEY HOSPITAL

Strengths of Local Community

- Lab and imaging support is appropriate
- Hospitalist service and relationship with the ED are strengths
- There is a stellar cardiology service
- D-H Tele-ED is a valuable support
- Opinion – it is important for patients to have access locally to emergency services, day surgery, and in-patient care

Needs/Barriers in Local Community

- There is governance confusion on what the vision is for care in the community
- Inconsistent investments have been made in service lines and therefore the competency of care has suffered
- There is a need to create and adhere to a common set of common clinical protocols (e.g. admission criteria)
- There is a need for enhanced nursing manager capabilities
- There is a need to create an urgent care service to support primary care and relieve the ED of providing lower level care in an expensive setting
- There is a need for improved access to neurology services
- There is a break-down in communication and cultural barriers between specialists/ hospital staff and Indian Stream
- The primary care base is narrow and is a consistent problem. There are continued relationship issues between UCVH and ISHC
- The limited labor pool create turnover and low clinical volumes are a constant issue
- There is a need for primary care enhancement to manage complex patients and post-hospital care
- Great need for psychiatry and behavioral health services of all kinds (e.g. substance misuse and detox resources)
- There is need for a pain management program
- There is a need for a patient transportation system to facilitate transfer

Regional Opportunities

- Enhanced communications across the community and the region
- Create a parent-wide ED group and hospitalist group
- Create job training/work rotations for in-patient nursing and OR staff to enhance skills and enhance retention
- Create cross-coverage expectations among Parent members to reduce locum tenens utilization and dependence for physician coverage
- Create patient transfer service among the members

Suggestions for Moving Forward in Regional System (Infrastructure)

- Decision-making process and implementation for allocation of services and resources across the system
- Develop a system-wide credentialing process and standards for credentialing
- Hold inter-facility case conferences and clinical chiefs meetings
- Consider having Parent CNO work on a training, education, recruitment and retention program for nurses across the system (Note – there presently is no System CNO position)
- Establish specialty clinics in Indian Stream facility
- Improve access to endocrinology and dermatology clinical services and relationships
- Consider primary care residency program in the longer term
- Develop a common EMR and capability to share clinical information across the system

WEEKS MEDICAL CENTER

Strengths of Local Community

- Primary care practice is headed in the right direction, with strength in prevention and wellness care
- Care management has been introduced and will improve patient care
- WMC is a great place to work – there is good team support and loyalty
- There is good support from administration
- Tele-ED and tele-Chronic Kidney Disease clinic work well
- There is great IT support and a good EMR
- The hospital is good but inconsistent in terms of coverage, hospitalists, etc.
- WMC is a true community hospital but can't be all things to all people
- There is a good surgical program with a good and capable team

Needs/Barriers in Local Community

- Mental and behavioral health plus wrap-around services
- Invest in better coding in the practices
- Low volumes and lack of specialists makes it difficult to recruit
- There is a need to assess the level of acuity that should remain at WMC, particularly given low volumes in some areas such as pediatric surgery
- Invest in home health, home health wound care, and home health rehab
- Primary care is inconsistent in work ethic and quality; (mention of "dumps" on specialists)
- The labor pool is small which in addition to low volumes makes recruitment of better trained nursing and ancillary staff difficult
- The workforce of physicians and staff is aging

Regional Opportunities

- Primary care standardization across the region (guidelines, metrics, perhaps the drug formulary and coordinated imaging standards)
- Cardiology seems conservative – may be a regional opportunity
- Orthopedic transfers are sometimes difficult
- Enhance access to neurology and dermatology
- General surgery – should be a regional opportunity
    - Look at opportunity to standardize meds, carts, equipment as a start
- Invest in education program for upgrading skills for nursing and ancillary staff
- Specialty groups could meet to discuss regional opportunities; there may be opportunities to increase scope of imaging that would allow expanded scope for specialists

Suggestions for Moving Forward in Regional System (Infrastructure)

- Common EMR and interoperability

- Succession planning – consider that new specialists usually don't have same scope of training
- Decision-making about allocation of services and resources – what are the criteria?
- Tele-neuro service not meeting time standards today but telemedicine services do have a role in the region
- Address coordinated home health and hospice – create more networking among services
- Develop quality metrics for use in credentialing which will require the development of common data
- System imaging is an opportunity to enhance the service regionally (mention is made that the D-H service is good)
- Transportation is a problem in the entire area

FEDERALLY QUALIFIED HEALTH CENTER INTERVIEWS

Strengths of Local Community

- FQHCs have been successful in creating a population-based approach to primary care
- FQHCs are participating in the ACO with NCH
- There are strong partnerships with local hospitals (ACHS and CCFHS cited)

Needs/Barriers in Local Community

- It is difficult to recruit; we are competing with each other around PCP recruitment. Key primary care providers are approaching three to five years until retirement.
- Mental health services are a major deficit in the region
- Home health has capacity issues

Regional Opportunities

- Will FQHCs and others be required to lead solutions to mental health?
- There is room for increased collaboration among the FQHCs

Suggestions for Moving Forward in Regional System (Infrastructure)

- Consider a primary care residency program for the region
- Consider regional IT opportunities; seek ways to share clinical information
- Need more hard wiring for transportation, schools, housing, etc. that will enhance population health
- Consider a system/region-wide joint recruitment program

COMMON CONCERNS & OBSERVATIONS

I. Quality

- Inconsistent level of quality in providers across the region (PCPs, allied health, certain specialists, home health/hospice, nursing specialties)
- Sense of over-testing in general
- Need to consider setting system-wide quality parameters and process for accountability
- Inconsistent skill set among nursing and OR technicians

II. Infrastructure for Clinical Decision-Making/Governance

- As the system develops, there will be a need to have conversations about what services are provided where.
  - What metrics and data will be used to determine that?
  - Who will make those decisions? Who will have input into the process prior to decisions being made?
  - What will be the clinical governance structure?
  - What will be the level of staffing/competency requirements?
  - What services will not be appropriate to provide within the system?
  - This is recognized as a difficult issue; many think clinicians need to have some early wins to begin building trust before addressing this difficult area.
- I.T. is a large and expensive issue. What will be the plan for creating a regional EMR that can allow notes to be shared among all providers? IT is essential to creating an integrated system, with common quality standards, and more efficient patient care.

III. Communication

- The Alliance has been put together without clinician involvement. How will this change going forward?
- Providers in general have significant anxiety about how the system will impact each of them. There is a sense that decisions about provider reductions (jobs and/or reimbursement) have already been made. There is concern that higher work expectations will be imposed without addressing compensation. Providers have not heard clarity about the benefits and rationale for the Alliance other than financial sustainability. What is the why? What are the benefits? What are the risks? Will the organization and its providers need to "average down" to build the system?
- There is confusion about the Alliance and the ACO – described as an identity crisis. There is a sense that a great deal of overhead has been added without clarifying the value. There is some worry that sufficient integration cannot be demonstrated in three years to prove the value of the Alliance.
- There is poor understanding about capabilities within the system beyond local hospital. Patient transfers within system may be more difficult than to outside providers (CMC; Concord; D-H).
- Need to establish standards for coverage clinicians responding to ER and Referring clinicians- timeliness; patient acceptance; admission criteria; etc.

IV. Other – Minority Observations

- Creating better specialty partnerships with Dartmouth-Hitchcock (in terms of purchased services for consultation, enhanced tele-med, CME, etc.).
- Separation of FQHCs from hospitals is an issue (they are isolated). Several mentioned the high quality of ACHS care and how that standard should be recognized for the system. Is there an opportunity for enhanced collaboration of FQHCs with each other and with existing other PCP groups? Should all Primary Care be provided by FQHCs?
- Provider groups need to become a Clinically Integrated Network – there are examples of these around the country.
- We must be careful not to set up itinerant surgery scenarios.
- Patients should have access to basic surgical services (e.g. scopes) at all locations in system.
- Many specialty services are "fragile"- depending on one to two individuals – how can the system develop more service depth and reliability?

SUMMARY OF INTERVIEWS– IDENTIFIED OPPORTUNITIES

I. Major Regional Deficit – Mental/Behavioral Health

- No access to psychiatry, in-patient services
- Holding patients in ED who need mental health services
- Mental health centers underfunded and "antiquated"
- No wrap-around services, e.g. drug counseling, job counseling, drop in centers, etc.
- Need better system for detox and substance abuse management

II. Enhance Existing Services

- Neurology (needs more capacity)
- Dermatology (needs more capacity)
- Oncology (need an oncologist imbedded in north country that can participate in medical staff affairs and create opportunities for learning such as tumor boards)
- Explore imaging and pathology opportunities (re: service, quality, timeliness, tech capabilities, etc.)
- Explore System-wide approach to ER; Hospitalist; Anesthesia
- Develop Complex Care Management Program "link" between primary and specialty care

III. Additional Services (via Partnerships or Innovative Solutions)

- Infectious disease
- Pediatric subspecialties
- Relationship with other subspecialists at Academic Medical Center

IV. Adjunct Tools

- e-ICU
- e-ED
- e-Hospitalist consults
- e-Neuro/Stroke (if it meets timeliness requirements)
- e-Psych

V. Data Assessment Needed for Leakage

- Orthopedics
- General Surgery
- Cardiology
- Gastroenterology

VI. Infrastructure

- Common EMR with ability to share across system and building a base for system-wide care management
- Joint recruitment
- Development of regional quality program
    - Including standards of care, standards of credentialing/privileging, etc.

SERVICE AREA DEFINITION & POPULATION
LEAKAGE & ACUITY OF D-H IN-PATIENT VOLUMES

One angle of assessment to help inform a medical staff development plan is the volume by service type that is provided by providers outside of the North Country service area to residents living within that service area. Based on review of Emergency Department transfer data, three Hospital health systems – Dartmouth-Hitchcock Medical Center (DHMC); Catholic Medical Center (CMC); and Concord Hospital (CH) – render the vast majority of care rendered to North Country residents by providers outside of the North Country service area. DHMC is by far the largest single provider representing half to two-thirds of this care depending on North Country community. DHMC agreed to provide its internal data of care rendered to North Country residents over a five year time frame to give both volume magnitude and trend information. This data was provided by North Country Hospital Service Area using the towns designated by the State of NH as the pertinent service area geography. Because both Littleton and Weeks have the town of Littleton considered in their service area Consultant determined to allocate this volume to the Littleton Hospital service are solely to avoid double counting.

The full summary of this North Country volume serviced by DHMC for each of the four hospital communities is contained in ***Appendix A.*** The volume can be considered "leakage" from the North Country although much of this represents clinical services not currently available in the North Country or patient acuity that may be inappropriate for critical access hospitals. Some leakage, however, could represent an opportunity for "repatriation" to the North Country that would impact medical staff development planning.

The five year trend data shows an increasing volume of "leakage" to DHMC. (Note- the year 2012 data represents only nine months of volume to DHMC because of conversion to a different fiscal year). There has been a general trend of increasing leakage to DHMC over the past three years. This has been true for both in-patient and out-patient services and experienced by all four of the North Country communities.

In-Patient Services – The DHMC data evaluated admissions from the North Country by acuity as measured by case mix index (CMI). The admission totals at DHMC were segregated into those with CMI below 1.0; those with CMI between 1.0 and 1.2; and those with CMI above 1.2. It is presumed that patients with CMI above 1.2 would have clinical needs that would exceed that which a critical access hospital could provide. Thus, these would be ineligible for repatriation. Some of those with CMI from 1.0 – 1.2 might be able to be retained and serviced by a north country CAH depending on their clinical condition and available services at the CAH. Most of these, however, are likely to require the clinical services of a larger PPS or referral hospital. The admissions with CMIs below 1.0 are the most likely to represent volumes that could be retained in the North Country. To achieve this might require some clinical service augmentation or enhanced cross-community communications but presumably the North Country could have or develop the clinical capabilities necessary to keep a portion of these volumes. The Elective Admissions also might represent a repatriation opportunity however this is a DHMC specific

categorization and further analysis would be needed to better understand this population. The DHMC designation of "Elective Admission" is a reflection of the urgency of admission, and does not necessarily represent lower acuity. For example, 60% of all craniotomy DRG patients were categorized as "Elective" by D-H and only 40% were categorized as "Emergency" yet clearly these are all high acuity patients.

Consultant performed a sensitivity analysis on both the three year average volumes with CMIs below 1.0 and those with CMIs between 1.0 and 1.2 as well as on DHMC categorized "Elective" admission volumes. This sensitivity analysis is shown in the table below.

Lower Acuity Annual Admissions					
Repatriation Scenarios					
Admission Type	North Country Total	Volume at 5%	Volume at 10%	Volume at 20%	Volume at 33%
CMI < 1.0	403	20	40	81	133
CMI 1.0 - 1.2	175	9	17	35	58
Elective Admissions	461	23	46	92	152

Using "Keepage" rates of 5% up to 33%, the total potential incremental admissions from among the lowest CMIs would be 20–133. Applying those same rates to the CMIs of 1.0-1.2 the further potential incremental admissions would be 9-58 for an annual total of 29-191. These total volumes are similar to those that would be derived by applying the same "Keepage" rates to the total elective admissions that went to DHMC.

Out-Patient Services – The magnitude of out-patient visit increase was similar to that seen for in-patient visits. Over the past three years, DHMC has seen an increase of out-patient visit volumes from the North Country of 10.5% with a three year annual average of almost 31,000 visits. While many of these DHMC visits were to specialties not available in the North Country, some were to clinical specialties that are present in the North Country while others are for clinical specialties that the North Country may consider adding in the future. The table below shows the potential volumes under the same "keepage" rates as was used for in-patient admissions applied to the out-patient volumes for clinical specialties that either exist, or could readily added, in the North Country. Also shown in this table is the number of annual encounters that would be provided by a 1.0 MD clinical FTE for each of the specialties.

Out-Patient Clinical Visit Volumes						
Repatriation Scenarios						
Specialty Type	North Country Total	Volume at 5%	Volume at 10%	Volume at 20%	Volume at 33%	Visit Volume per MD FTE
Dermatology	6,826	341	683	1,365	2,253	4,821
GI	1,203	60	120	241	397	2,586
Ortho	1,873	94	187	375	618	3,210
Urology	935	47	94	187	309	3,378
Neurology	933	47	93	187	308	2,137
ENT	748	37	75	150	247	3,428
Ophthalmology	1,354	68	135	271	447	4,119
Endocrinology	726	36	73	145	240	2,963
Rheumatology	529	26	53	106	175	3,141
Pain	462	23	46	92	152	3,222
Vascular	601	30	60	120	198	2,800
Cardiology	2,167	108	217	433	715	3,588

One clinical area where a lot of volume currently goes to DHMC is Dermatology (although D-H provider is located in Littleton). The total volumes represent more than one physician FTE and at a 33% capture rate the volumes that would be retained would represent a one-half clinical FTE. Since Dermatology does not require much for hospital sophistication to support this could be a specialty that is relatively easy to expand operationally and was identified in the interviews as a clinical need for more capacity. However, nationally dermatology recruitment is expensive and difficult; thus this specialty might better lend itself to a tele-medicine solution rather than direct recruitment.

The interviews also identified Neurology as needing enhancement. In total almost one-half of an MD FTE is leaking to DHMC. One area that was consistently the top one or two clinical disciplines that DHMC provided to each of the four communities was Cancer services. Of the total out-patient visits rendered to North Country patients, Cancer represented between 15%-20%. (Note: D-H oncology providers are located in Littleton and Lancaster.) Cardiology also represented a top 5% clinical services leakage area for three of the four hospitals but this may represent invasive and interventional cardiology services that are not available in the North Country so whether this represents any true incremental volume opportunity is uncertain. Given the Orthopedic capacity available in the North Country the DHMC Orthopedic volumes may suggest an incremental volume opportunity although to the extent some of this leakage is for back treatments that capacity does not exist currently. Gastroenterology represents another area where fairly significant out-patient volume leakage occurs and may be an area for consideration to add/enhance capacity.

COMPARISON OF PHYSICIAN-TO-POPULATION RATIOS & KEY FINDINGS

Consultant evaluated the current number of physician clinical full time equivalents that exist in the four North Country communities. This FTE data was then compared to population based needs assessments derived from the average of five Assessment Tools. The predicted physician needs, based on the aggregate North Country population, were compared to the existing number of physicians by specialty resulting in an FTE "gap" (where needed physicians were greater than existing capacity) or "surplus" (existing physicians exceeded the predicted need for the population). The table below contains this assessment for the 2015 population and also for the expected population in 2020 and 2025.

The population based predictive models represent one angle of determining true clinical need. These models provide only a gross indication as generally they do not incorporate the increased use of Allied Professionals (such as Nurse Practitioners and Physician's Assistants) and they are not sensitive to the underlying demographics of the population (actual age and illness burden relative to a 'normal bell curve' population. Nevertheless, the results from these models coupled with the local knowledge about access and community specific needs gained from interviews can help shape a staffing plan. The Models used in this assessment were:

- Solucient;
- Hicks & Glenn;
- Health Strategies;
- Health Affairs; and
- Kaiser/Group Health

Overall, two areas of significant need were identified- Psychiatry and Ophthalmology. Both these disciplines have a current need of more than 1 additional MD. Additionally, there was some shortage in predicted Dermatology need although this was less than a full time doctor. However, when this assessment is coupled with the leakage volumes to DHMC and the interview information this appears to be a clinical discipline where adding another physician should be considered.

In evaluating Primary Care Capacity vs. Need, there is much variation across the models in part depending on the underlying population needs and the intensity of primary care that is required. Generally, the older the population the greater the demand is placed on primary care. Also, in communities where there are fewer available specialists, the greater the primary care burden. Thus, Consultant showed both an "average" primary care need and the need based on "higher intensity requirements" of primary care (which likely is the more appropriate view of primary are need in the North Country). Using the ***average*** for primary care need, there was a slight surplus of adult Primary Care. However, when combined adult is combined with pediatrics the overall Primary Care capacity was in line with the predicted need. When the ***higher intensity*** primary care need is used, there is a shortfall of almost five MD FTEs currently. This would diminish to a shortfall of three FTEs by 2025 because of the population loss over

that time. The North Country does have a substantial number of Associate Provider and it should be noted that there are no established predictive models for Associate Providers (Physician Assistants and Nurse Practitioners). These clinicians do help serve the population and the North Country has almost as many adult Primary Care Associate Providers as it has physicians. In managed care health systems, often a primary care mid-level provider is considered as a 0.5 MD FTE from a patient panel management perspective. The Population Based needs assessment models used were predicated on some mid-level provider capacity existing, but this was not explicitly incorporated into these models as a variable. The total Allied Provider capacity resident in the North Country is summarized in a distinct chart below.

While generally the existing complement of specialists is adequate for the population using the predictive models, four surgical areas showed a surplus of almost two MDs or more. These were Orthopedics (4.6 FTE surplus); Urology (2.0 FTE surplus); ENT (1.3 FTE surplus); and General Surgery (1.3 FTE surplus). The magnitude of the orthopedic capacity surplus is overstated because this capacity also serves other communities outside the North Country hospitals service areas (e.g., Newport, Vt.; Plymouth; Woodsville; etc.).

Aggregate North Country Parent Level MD Needs Assessment

SPECIALTY	Current FTES	Current 2016 Need	Surplus (Gap)	2020 Need	Surplus (Gap)	2025 Need	Surplus (Gap)
Population		54,006		52,820		51,579	
Adult Primary Care MD	27.13	25.23	1.90	24.67	2.45	24.09	3.03
Pediatric MD	4.09	6.46	(2.37)	6.32	(2.23)	6.17	(2.08)
Primary Care MD Total – Average	31.22	31.68	(0.47)	30.99	0.23	30.26	0.95
Primary Care MD Total – Hi Intensity	31.22	35.91	(4.70)	35.13	(3.91)	34.30	(3.09)
Ob/GYN MD	5.42	4.94	0.49	4.83	0.60	4.72	0.71
Gastroenterology	2.00	1.34	0.66	1.31	0.69	1.28	0.72
General Surgery	5.70	4.43	1.27	4.33	1.37	4.23	1.47
Ophthalmology	1.00	2.52	(1.52)	2.47	(1.47)	2.41	(1.41)
Orthopedics MD* **	7.79	3.16	4.63	3.09	4.70	3.01	4.78
Otolaryngology	2.80	1.45	1.35	1.42	1.38	1.38	1.42
Urology	3.70	1.65	2.05	1.61	2.09	1.57	2.13
Cardiovascular	3.70	2.42	1.28	2.37	1.33	2.31	1.39
Dermatology	1.00	1.39	(0.39)	1.36	(0.36)	1.32	(0.32)
Endocrinology	1.00	0.42	0.58	0.41	0.59	0.40	0.60
Neurology	2.00	1.17	0.83	1.14	0.86	1.11	0.89
Oncology	1.10	1.06	0.04	1.03	0.07	1.01	0.09
Psychiatry	1.60	3.74	(2.14)	3.66	(2.06)	3.58	(1.98)
Pulmonology	2.00	0.99	1.01	0.97	1.03	0.95	1.05
Rheumatology	1.00	0.49	0.51	0.48	0.52	0.47	0.53
****Orthopedic Capacity serves other areas beyond the North Country*							

Allied Provider Capacity

Specialty	Number	Clinical FTE	Specialty	Number	Clinical FTE
PRIMARY CARE			**MEDICAL**		
Adult	32	24.6	**Emergency Department**	4	4.0
Pediatric	1	0.8	**Hospitalist**	4	3.2
Primary Care Total	33	25.4	**Medical Total**	8	7.2
SURGICAL & OTHER			**ANESTHESIA**		
Ob/Gyn Women's Health	3	2.3	**Anesthesia**	12	11.3
Orthopedics	7	6.2	**Anesthesia Total**	12	11.3
All Other	6	5.8	**Behavioral Health**	11	7.9
Surgical & Other Total	16	14.3			

OBSERVATIONS & RECOMMENDATIONS

OBSERVATIONS

I. Just as with the entire U.S., mental and behavioral health needs were felt to be one of the most pressing issues in the health delivery system in the NCH region.

II. Primary Care is essential and fundamental to the creation of a clinically integrated network. Today, the FQHCs provide a large proportion of Primary Care to the NCH region. Some of the hospitals also employ Primary Care providers and there are a few independent Primary Care providers in the region as well. Recruitment of high quality Primary Care physicians and associate providers is highly competitive and especially so in rural parts of the country.

III. Communication at the start-up of any new organization is always challenging. When direct and transparent communication isn't established, misperceptions and less than positive rumors may fill the void.

IV. Start-up health systems, like many new ventures, require investments in the front end. Prioritizing the investments in a carefully communicated plan is essential in clinical integration.

V. The Chief Medical Officers of the four subsidiary organizations have galvanized into a fully functioning, positive and trusted forum to lead the clinical integration effort.

VI. Succession planning for some of the specialties should be at the forefront of short-term planning.

RECOMMENDATIONS

I. NCH leadership is engaged in discussions in NH regarding mental health and behavioral health issues, including access sites for service, the possibility of being involved in the 1115a waiver, and workforce issues. This nation-wide issue is a long-term one with no easy solutions. Given the recent elections, it will be important to stay fully engaged with the state government so that the North Country region will be heard.

II. Competition in the region for hiring high quality Primary Care providers will continue. However, the NCH system has the opportunity to bring the stakeholders together and facilitate discussions about joint recruitment, workforce development issues, enhanced contracting with payers to financially reward the work of Primary Care, and to create a coordinated Primary Care service line across the system.

III. Communication with the clinical providers has commenced. The Chief Medical Officers are meetings routinely with system leadership; the group is developing discussion forums with other groups throughout the system, and creating the expectation of an open process for two-way communication between the clinical leadership and the medical staffs in the communities. A Provider Advisory Council has been created which will meet quarterly and ad hoc specialty groups have started having dialogue with the CMOs regarding priorities, opportunities, process improvements, staffing needs, etc.

IV. The NCH system has framed its three-year work plan and has included the need for investment to support clinical information. This includes short and long term approaches for clinical information technology, investment in the clinical leadership of the system, and investment in the ability to create a value-based Community Care Organization which can potentially contract advantageously with third party payers. As communication of these priority initiatives and timeline proceeds, the clinical providers will have a voice in providing guidance on the details of their development.

V. The Chief Medical Officer group (CMO) has established itself as a key clinical leadership forum for the system. The work plan established by the CMOs will necessarily be integrated into the system-wide strategic plan. The efforts of the CMO group will require change from the providers, new standards, focus on services and core needs of each subsidiary location, compliance with payer expectations, investigation of infrastructure required for clinical integration, e.g. information technology, common medical staff credentialing and privileging systems, joint recruitment, care management processes across the system and a vast number of similar needs. A three-year plan which is in development will begin to address these and other important clinical integration issues.

VI. Succession planning broadly should be considered for the specialties listed on page 8 of this report.

NEXT STEPS

Moving the 2016-2017 NCH Medical Staff Development Plan Forward

- Communication of Medical Staff Development Plan
  - Gather input on Draft Plan and incorporate necessary revisions as identified;
  - Communicate and distribute the plan across the system stakeholders

- Timeline for Review of Medical Staff Development Plan
  - Finalize draft February
  - Communicate and distribute draft: April-June, 2017

- Finalize Report and Other Data and Analytics for NCH
  - Finalize capacity and benchmark data
  - Assess leakage opportunities
  - Gather volume data of procedures performed in the NCH system
  - Prepare final written report based on feedback to draft

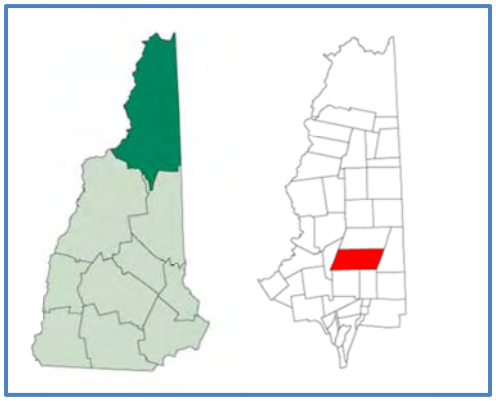
- Collate Analysis and Prepare Recommendations for Parent Board
  - Combine into one consolidated report the findings from the following:
    - Medical Staff Development Plan
    - General Surgery program evaluation
    - Operating Room utilization analysis
    - Initial results from Emergency Department transfer data analysis
    - Pertinent data/population information from the NH Rural ACO Caravan data
  - Apply analytics to the information gathered and combine with the consolidated findings to inform the refinement of the system's strategic plan and development of accompanying initiatives to achieve
  - Incorporate the Strategic Plan and Initiatives to inform/modify the Chief Medical Officers work plans
  - Communicate this updated parent strategic plan and initiatives to North Country Health Care key stakeholders
  - Communicate Chief Medical Officer work plans as appropriate to involved stakeholders.

- Timeline for Next Steps in Calendar Year 2017
  - Distribute and communicate the Medical Staff Development Plan – April-June
  - Develop plans for General Surgery and operating room changes based on analysis – May-July
  - Review/analyze first 1-2 quarters of ED transfer data – April-July
  - Develop ACO Plan based on Caravan data and begin working with CCO – May-August
  - Initiate three year CMO work plan – July-September
  - Communicate CMO work plan – October-December

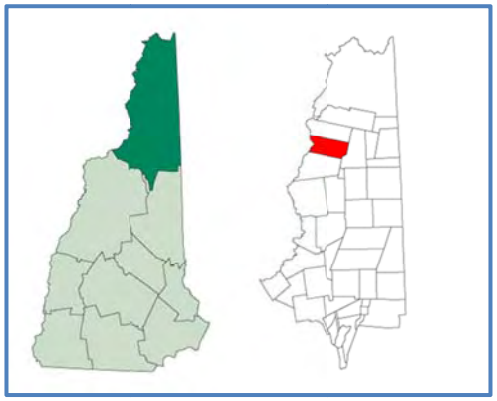
Appendix A

North Country Healthcare Aggregate Strategic Profile

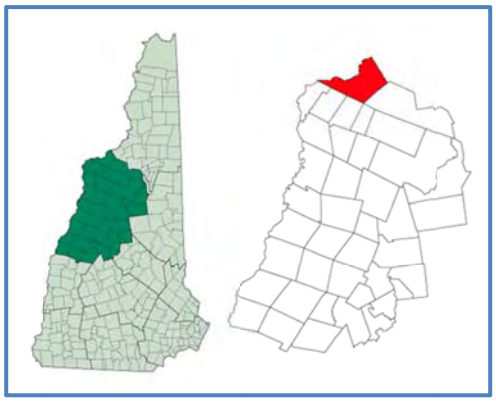
December 2016 - DRAFT



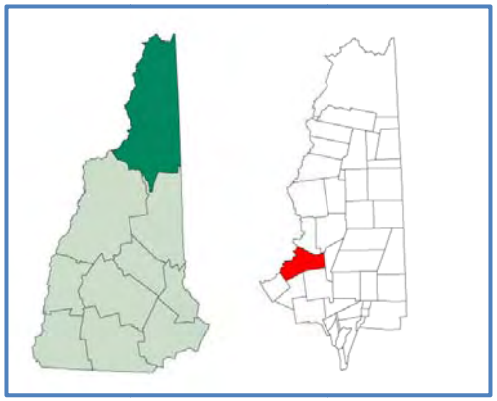
Berlin



Colebrook



Littleton

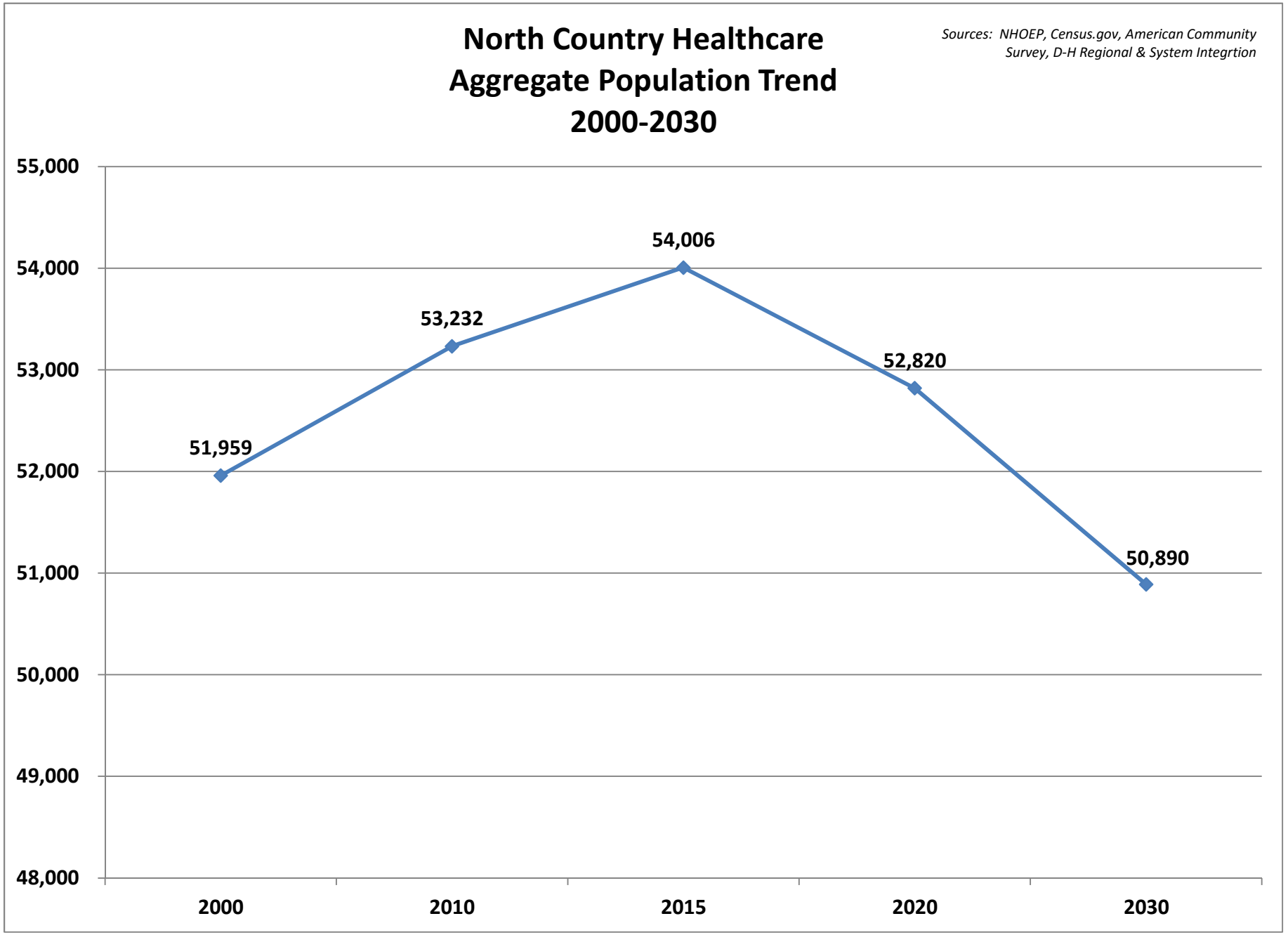


Lancaster

Data compiled by Dartmouth-Hitchcock

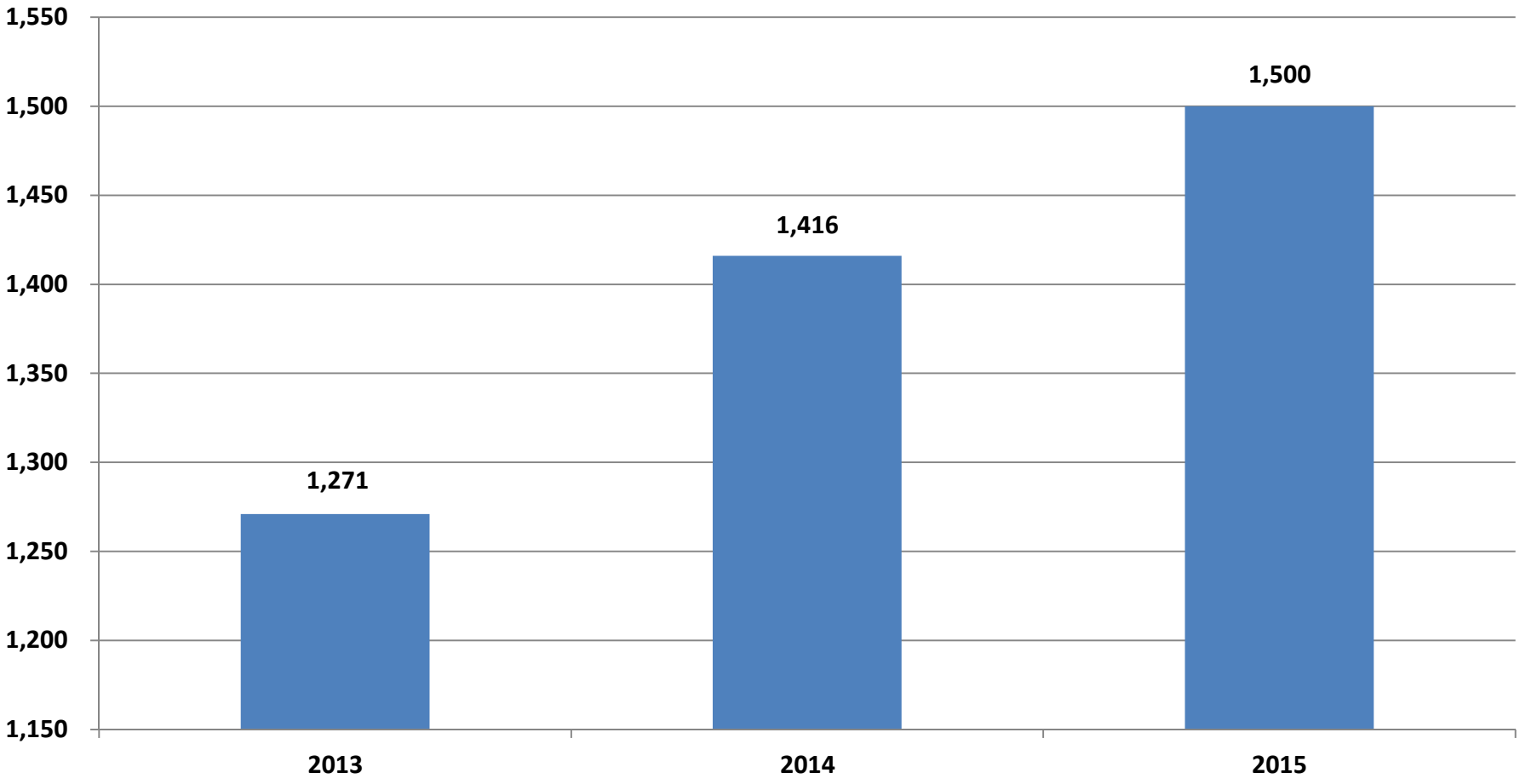
North Country Healthcare
Aggregate Population Trend
2000-2030

Sources: NHOEP, Census.gov, American Community Survey, D-H Regional & System Integrtion



North Country Healthcare
Aggregate Inpatient Visit Trend
2013-2015

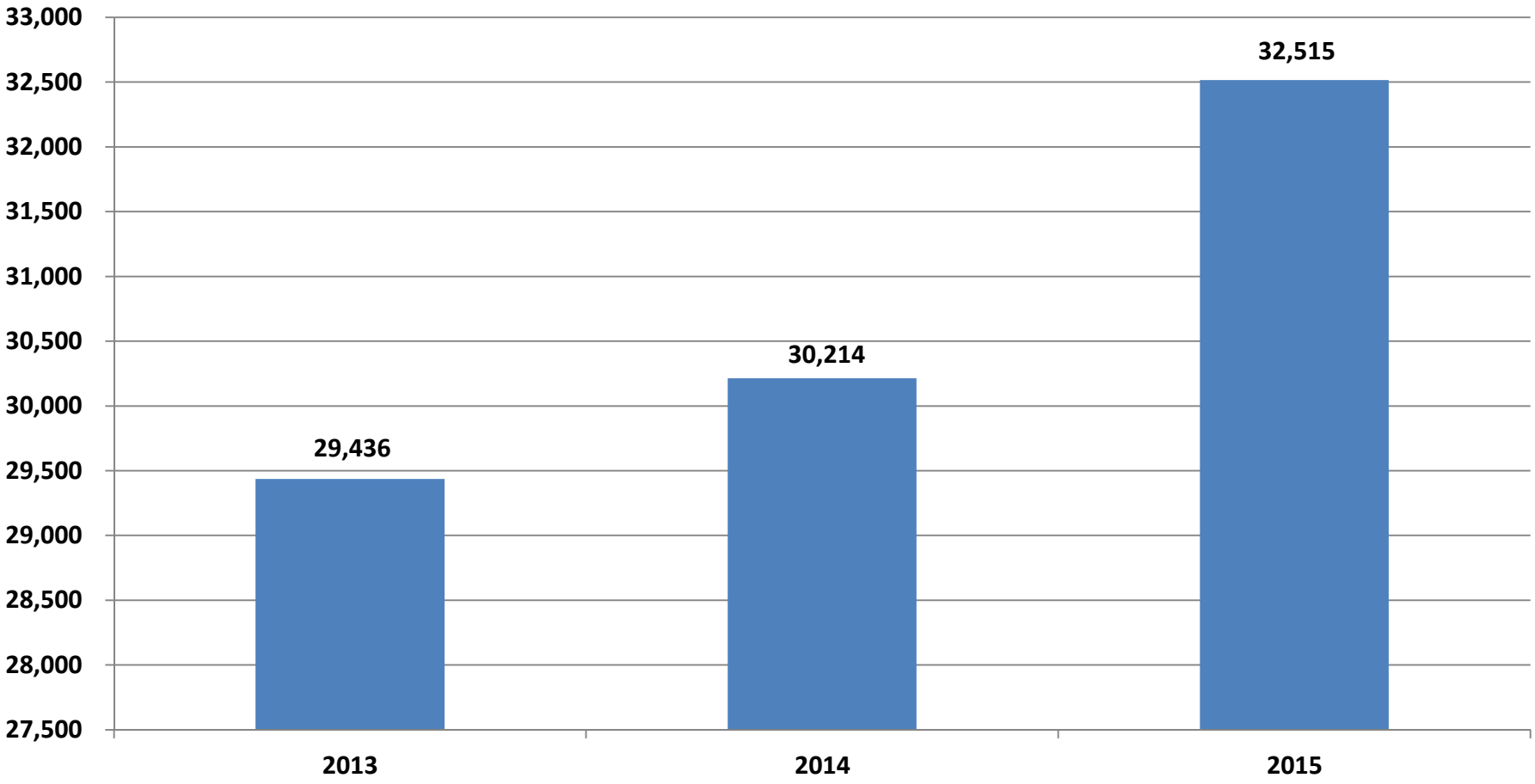
Source: D-HDRS



Average Annual % Change	3-Year Cumulative % Change
8.7%	18%

North Country Healthcare
Aggregate Outpatient Visit Trend
2013-2015

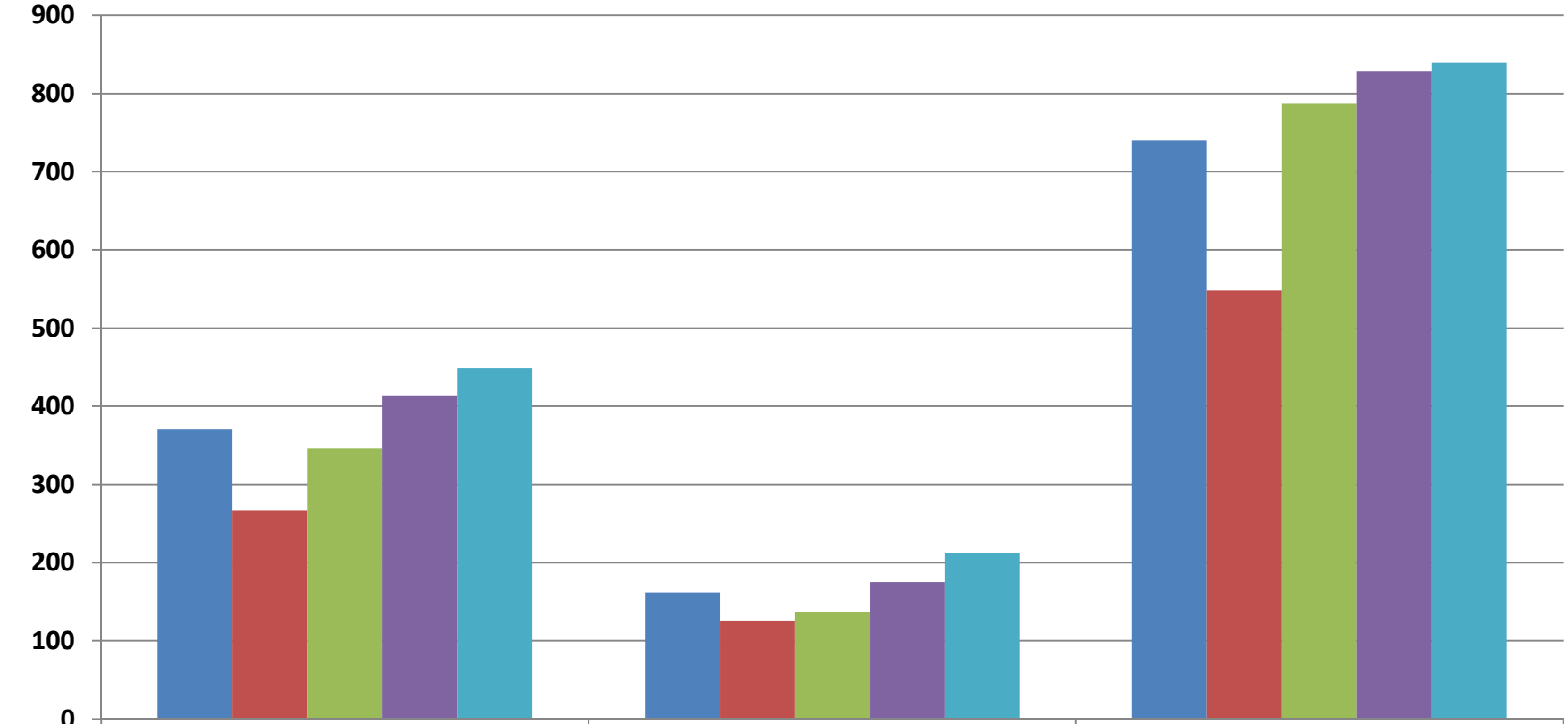
Source: D-HDRS



Average Annual % Change	3-Year Cumulative % Change
5.1%	10.5%

North Country Healthcare
Aggregate DHMC Inpatient Acuity Trend
2011-2015

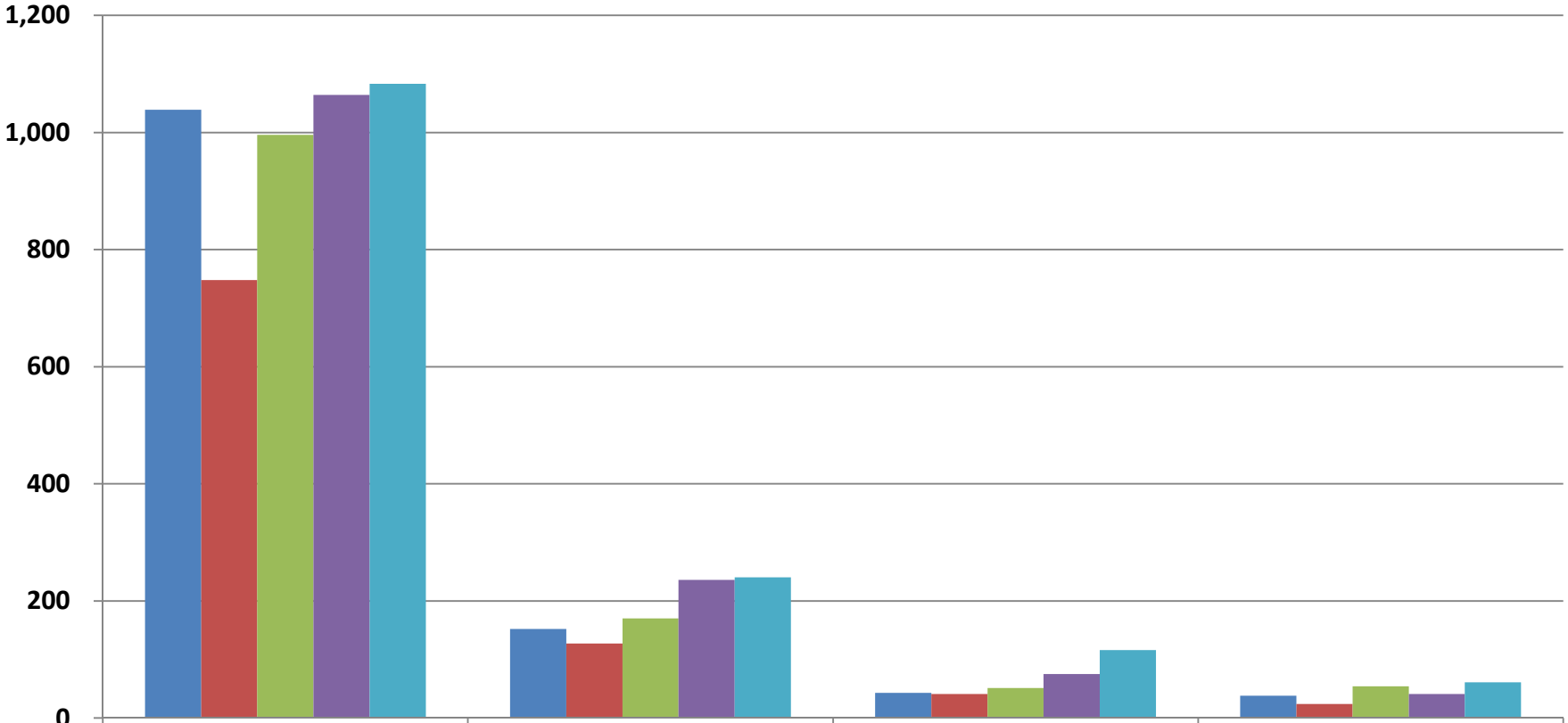
Source: D-HDRS



	<1.0	1.0 - 1.2	>1.2
2011	370	162	740
2012	267	125	548
2013	346	137	788
2014	413	175	828
2015	449	212	839

North Country Healthcare
DHMC Patient Type Trend
2011-2015

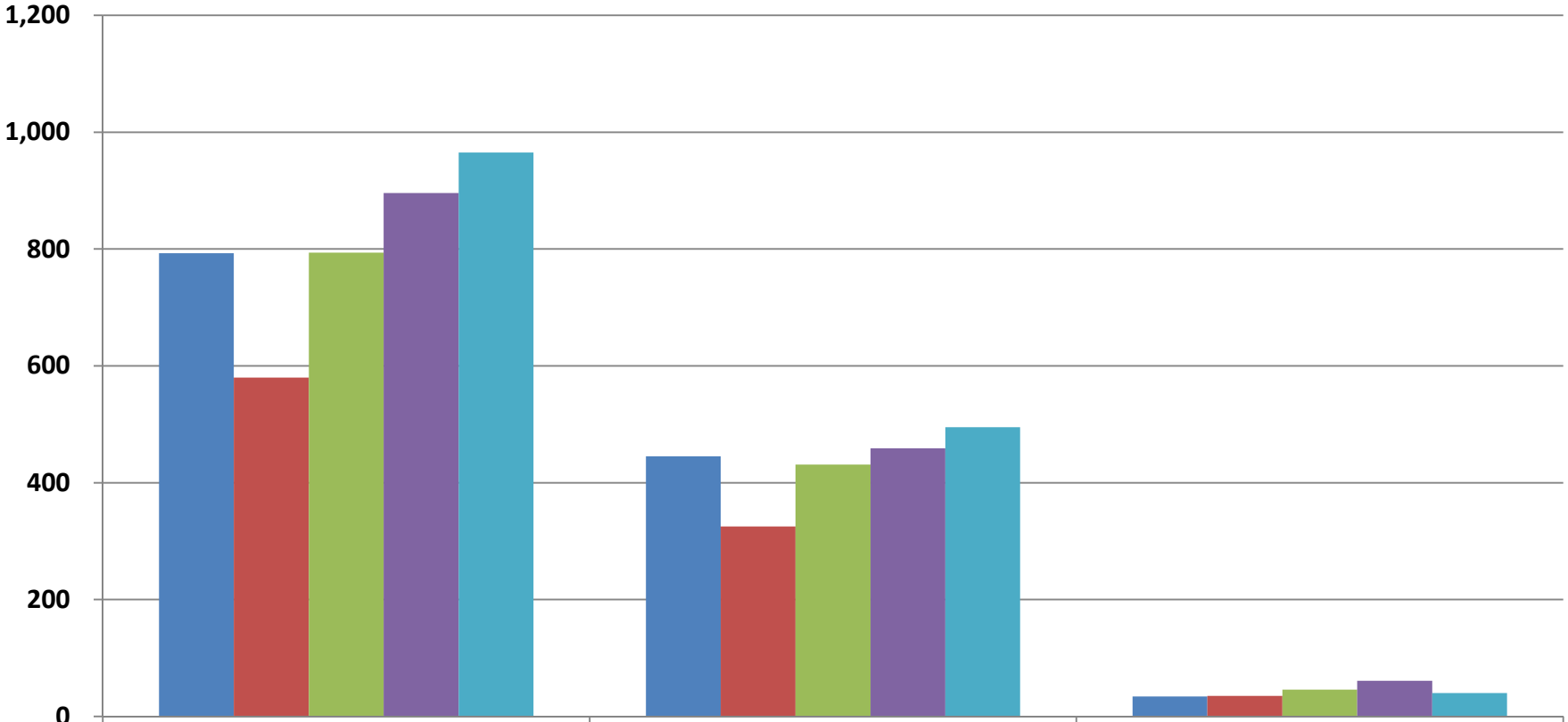
Source: D-HDRS



	Inpatient	Observation	Inpatient Psychiatry	Same Day Night Over
2011	1,039	152	43	38
2012	748	127	41	24
2013	996	170	51	54
2014	1,064	236	75	41
2015	1,083	240	116	61

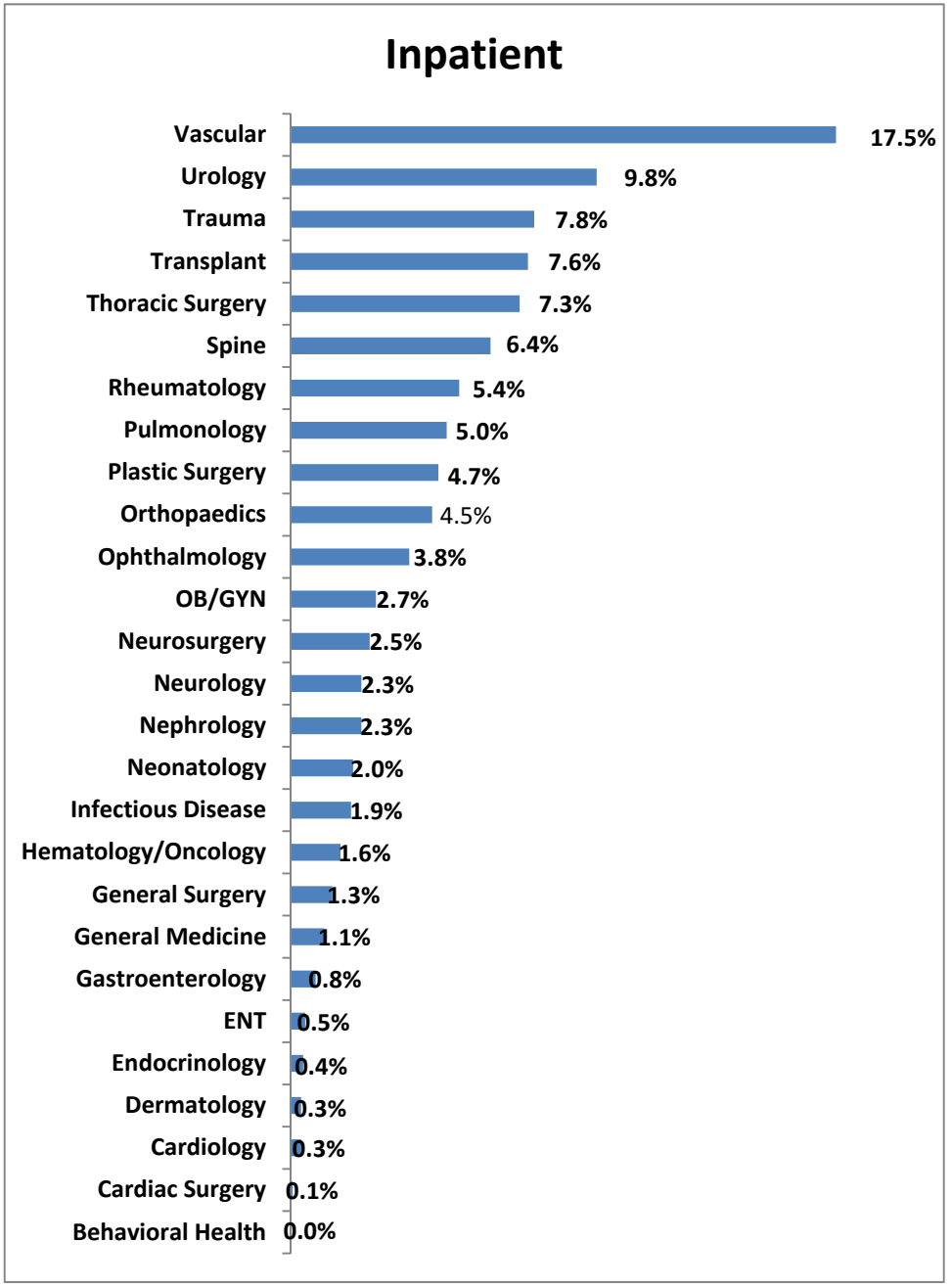
North Country Healthcare
DHMC Admit Type Trend
2011-2015

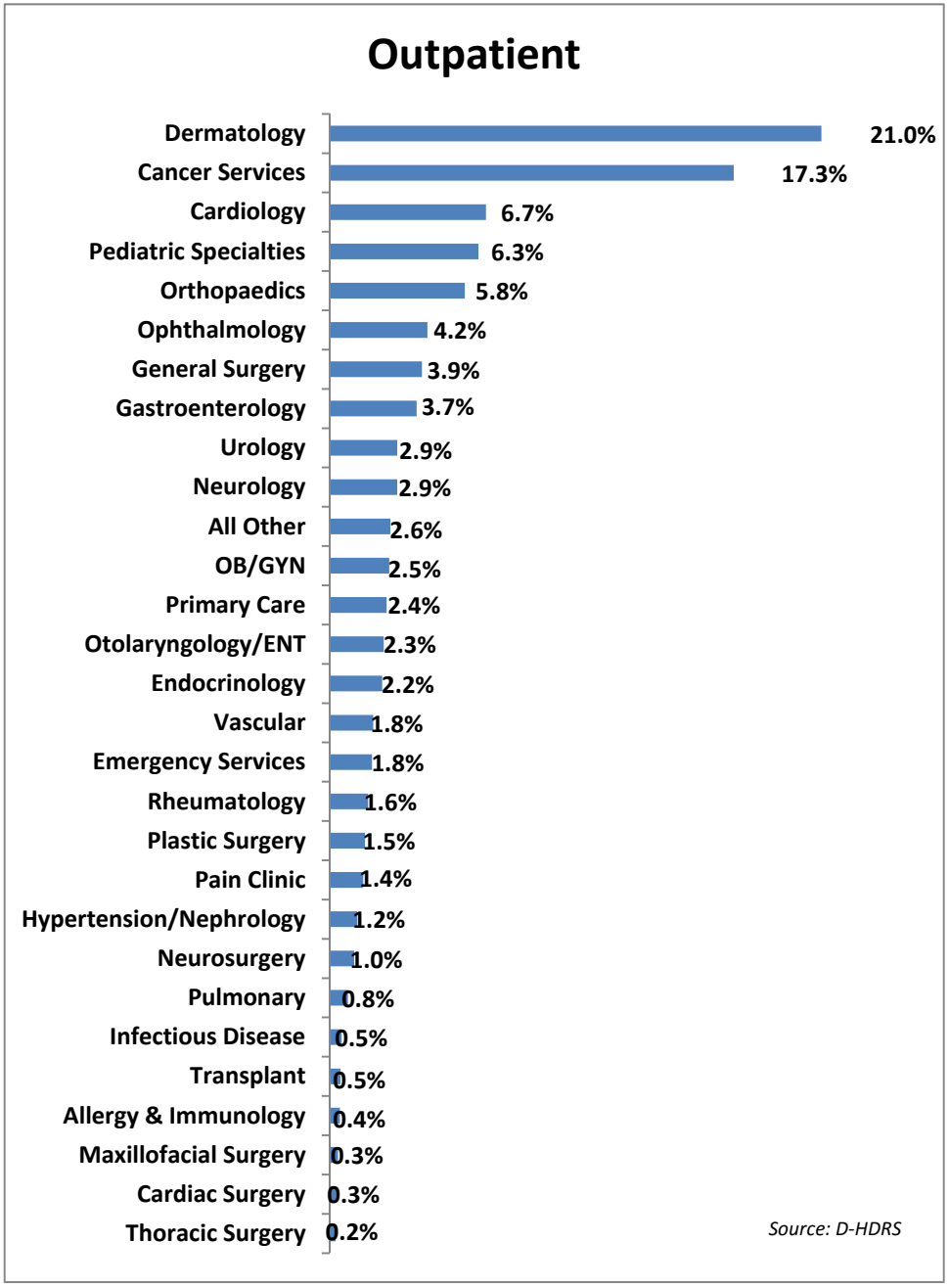
Source: D-HDRS



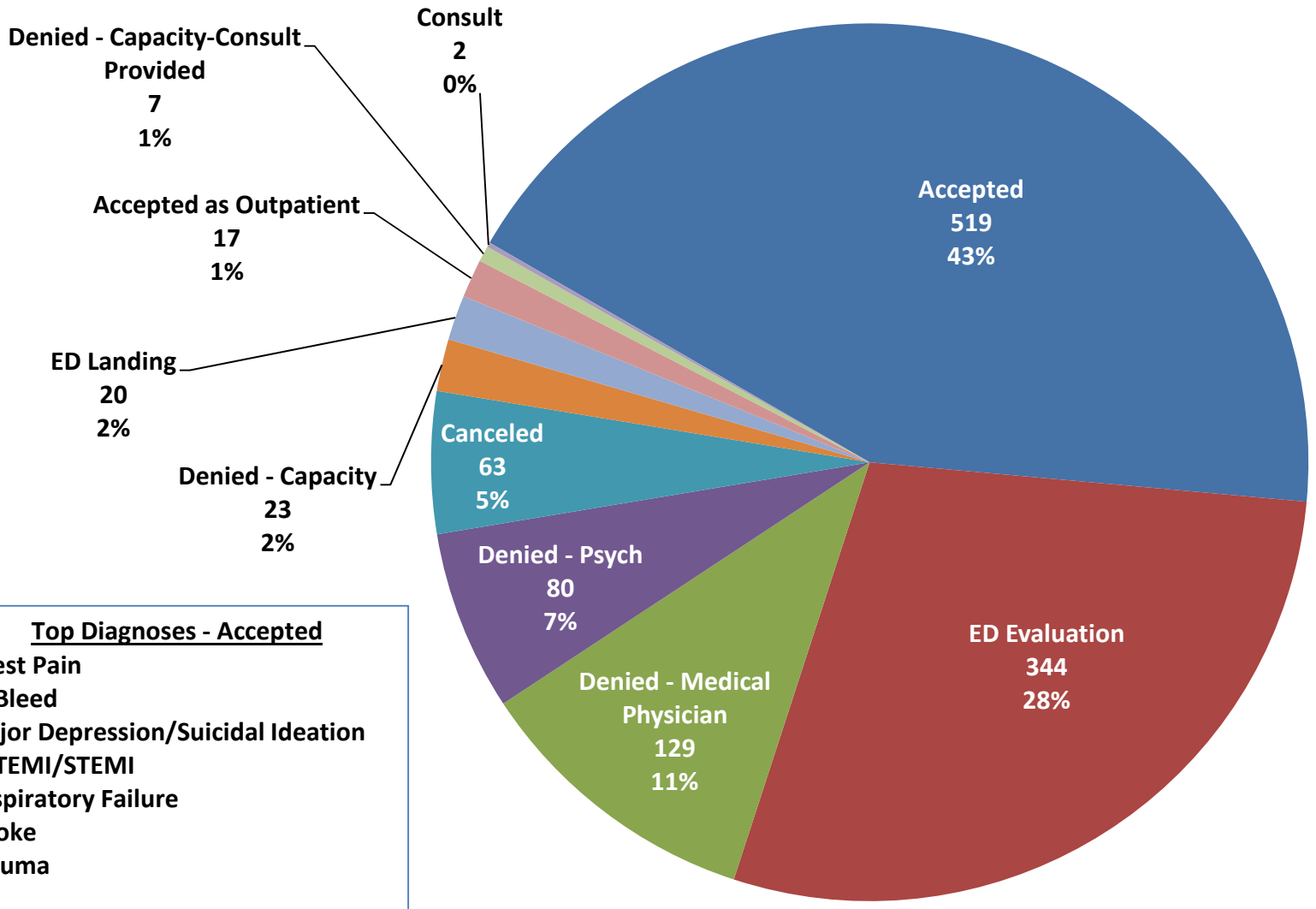
	Emergency	Elective	Urgent
2011	793	445	34
2012	580	325	35
2013	794	431	46
2014	896	459	61
2015	965	495	40

North Country Healthcare
Demand for Services by Specialty





North Country Healthcare
DHMC Transfer Center Volume
2016 TYD

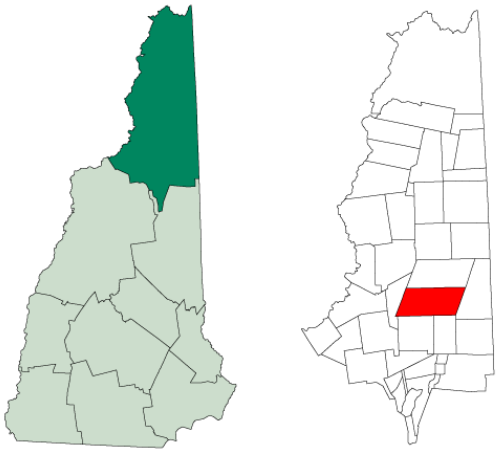


Top Diagnoses - Accepted

Chest Pain
GI Bleed
Major Depression/Suicidal Ideation
NSTEMI/STEMI
Respiratory Failure
Stroke
Trauma

Berlin HSA Strategic Profile

December 2016 – DRAFT

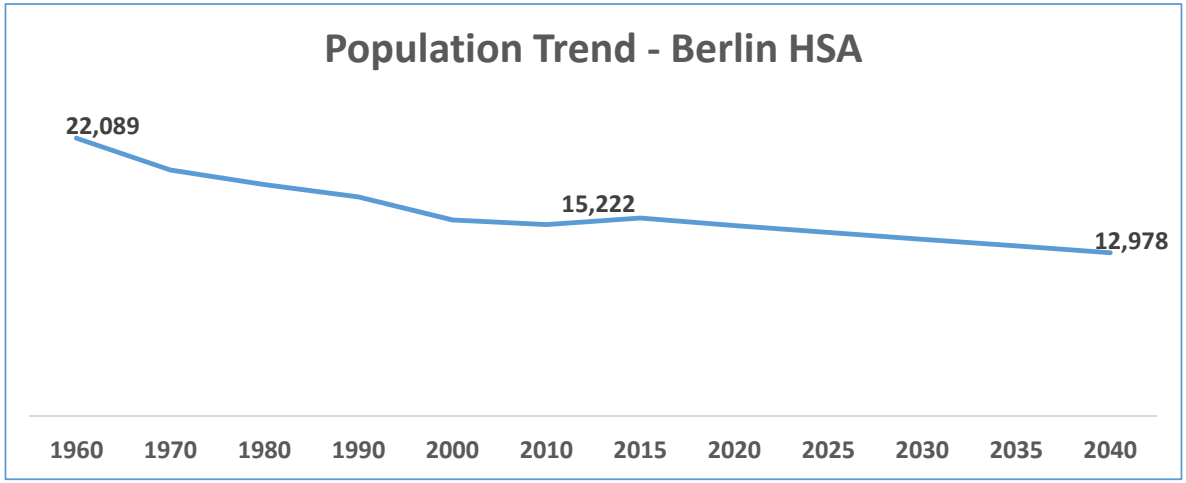


Dartmouth-Hitchcock

A CULTURE OF CARING

Demographic Overview

Berlin, NH HSA

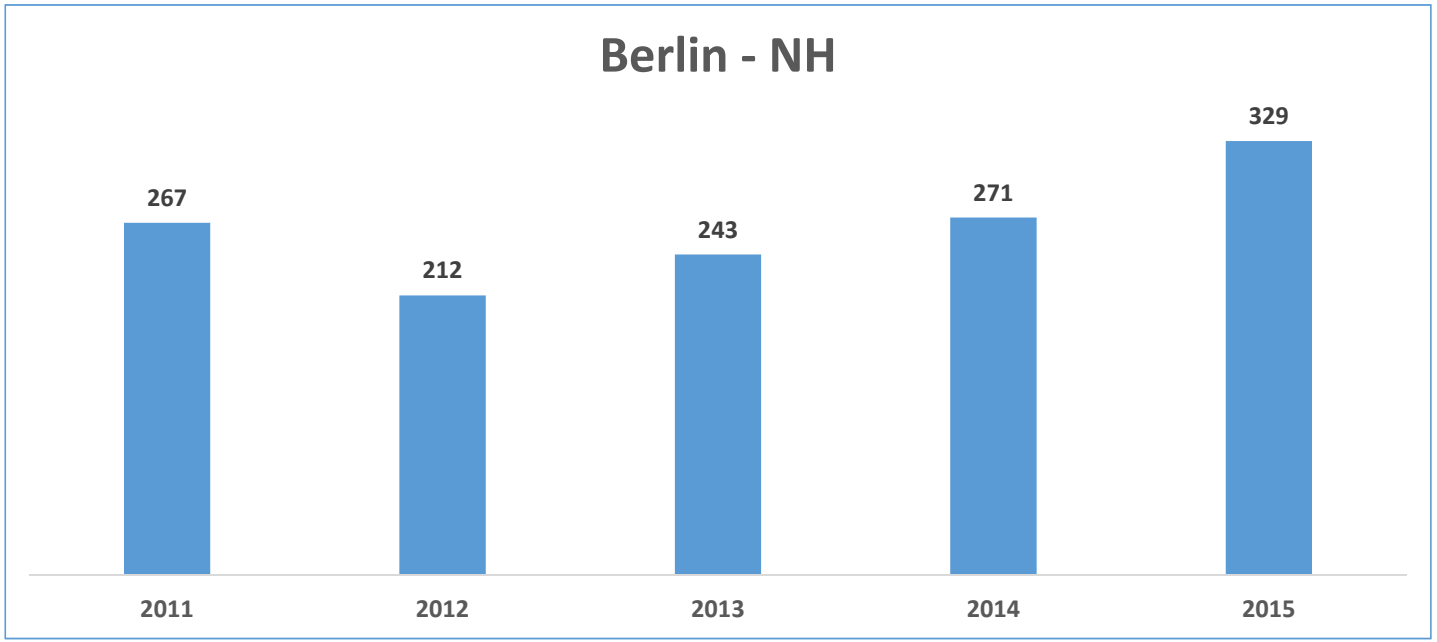


	2000	2010	2015	2020	2025	2030	2035	2040
Berlin	10,331	10,051	10,607	10,302	10,016	9,648	9,282	8,909
Dummer	309	304	301	284	268	258	248	238
Gorham	2,895	2,848	2,809	2,643	2,489	2,398	2,307	2,214
Milan	1,331	1,337	1,338	1,276	1,218	1,173	1,128	1,083
Randolph	339	310	308	285	264	254	244	235
Shelburne	379	372	373	354	336	324	311	299
TOTAL	**15,584**	**15,222**	**15,736**	**15,143**	**14,591**	**14,054**	**13,521**	**12,978**

KEY DEMOGRAPHIC MEASURES		
Category	**Coos County**	**NH**
Median HH Income	$42,407	$65,986
Unemployment	2.8%	2.3%
Poverty		
All People	14.9%	8.2%
Health Insurance		
With	85.0%	92.5%
Without	15.0%	7.5%
Educational Level		
High School or Higher	86.6%	92.0%
Bachelor's Degree or Higher	17.8%	34.4%
Housing		
Owner Occupied	70.3%	71.0%
Renter Occupied	29.7%	29.0%

Sources: NHOEP, Census.gov, American Community Survey, D-H Regional & System Integration

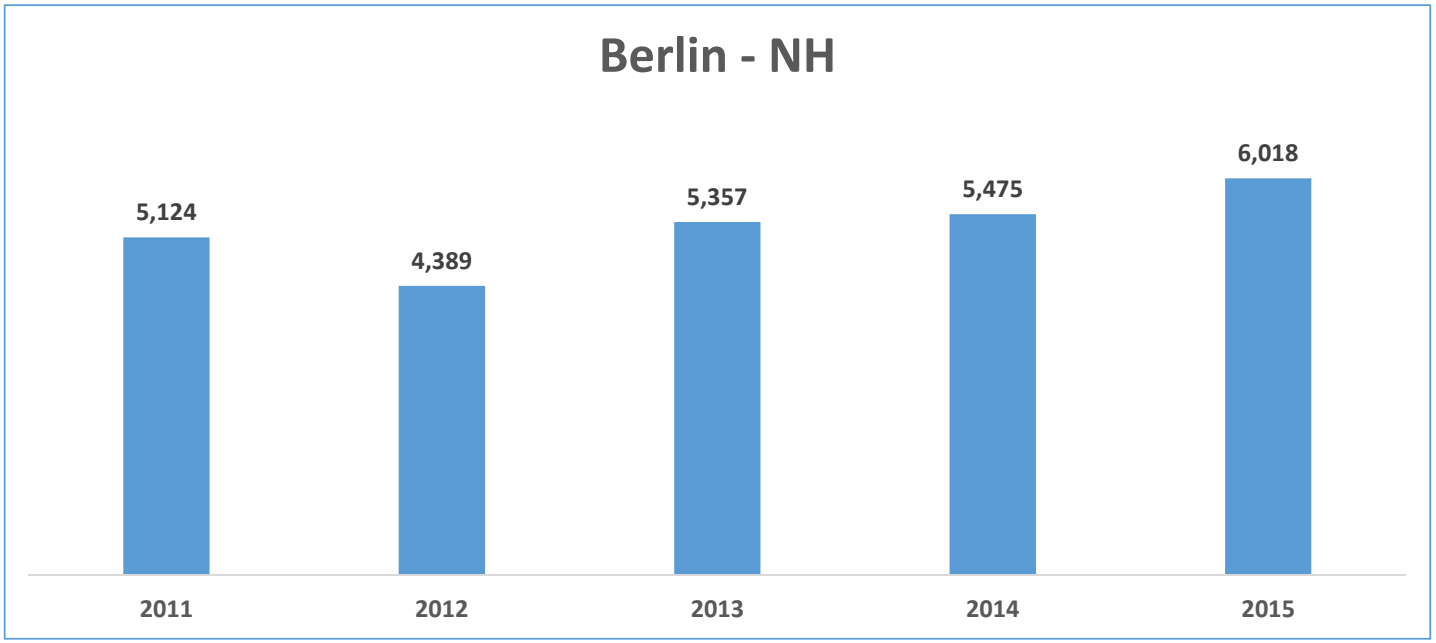
DHMC Inpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
21.4%	23.2%

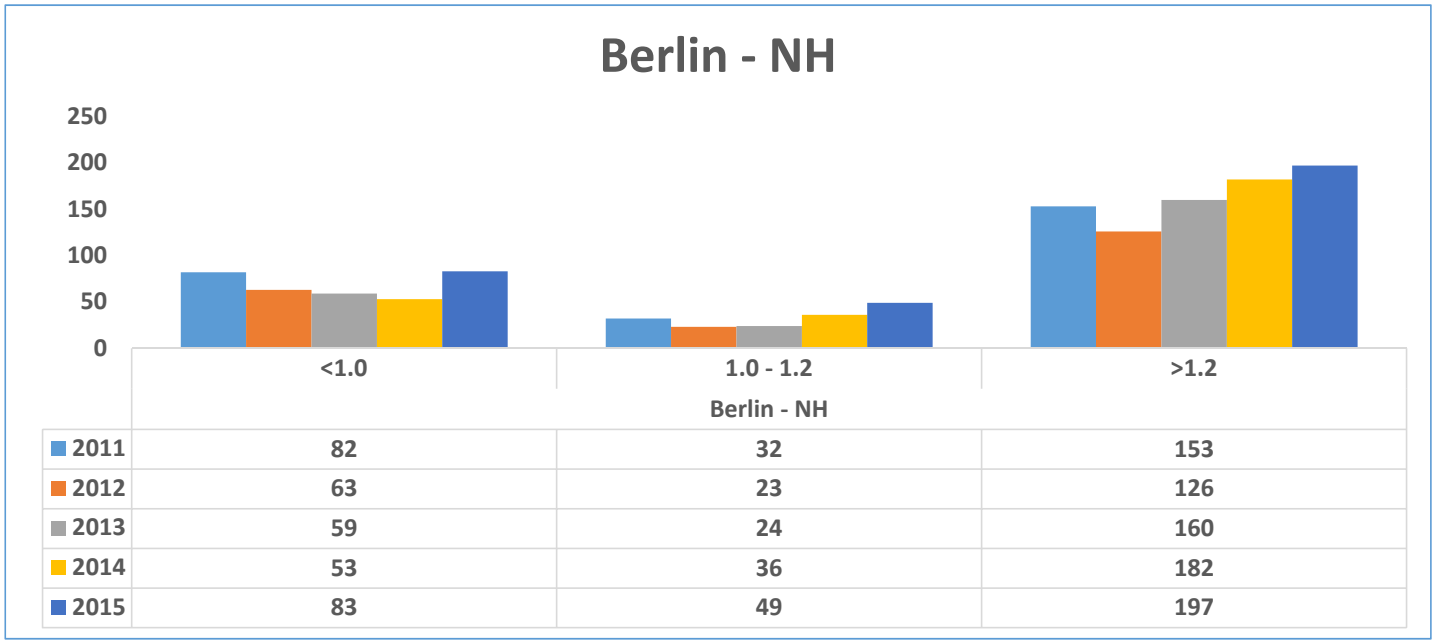
DHMC Outpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
9.9%	17.4%

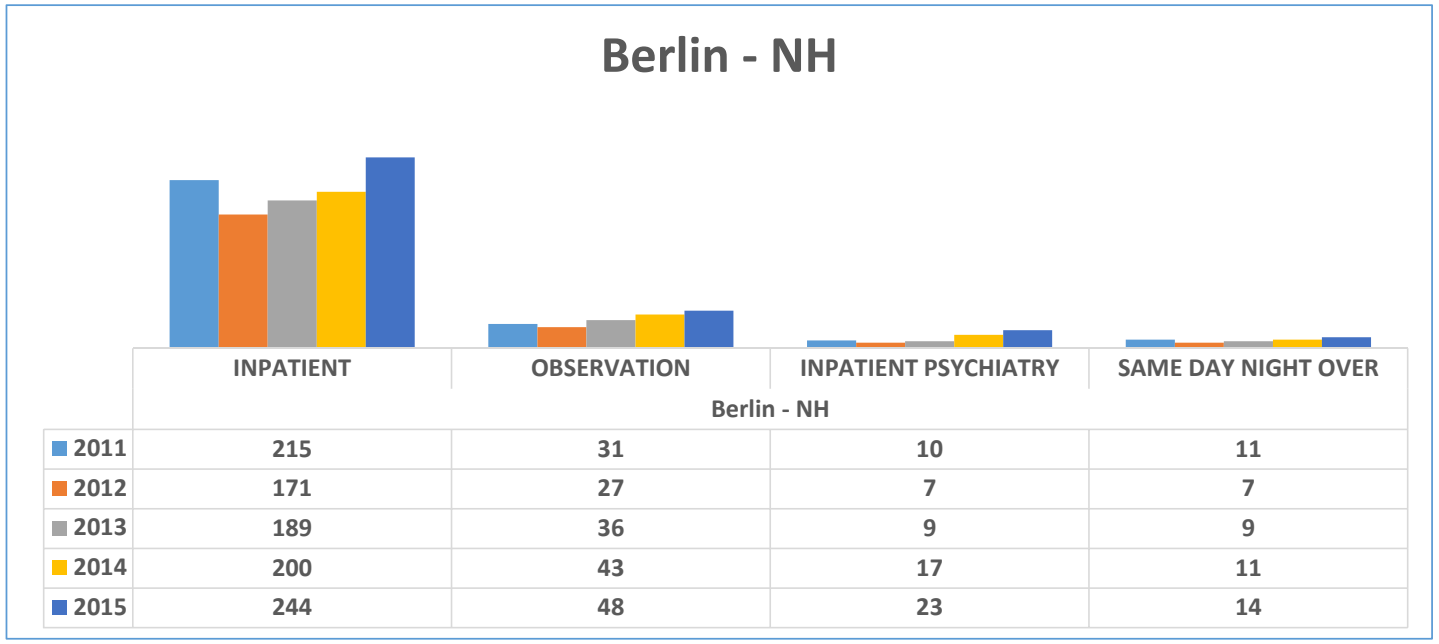
DHMC Inpatient Acuity Trend 2011-2015



Berlin - NH	<1.0	1.0 - 1.2	>1.2
2011	82	32	153
2012	63	23	126
2013	59	24	160
2014	53	36	182
2015	83	49	197

Source: D-HDRS

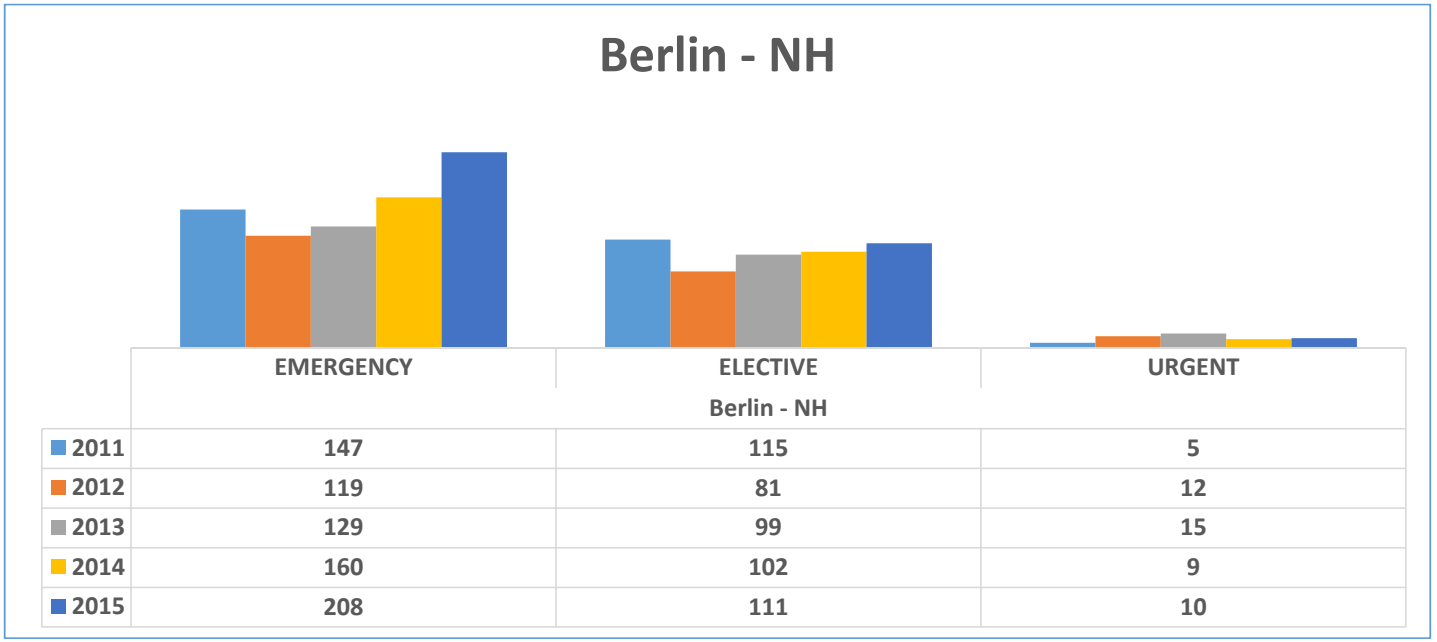
DHMC Patient Type Trend 2011-2015



	INPATIENT	OBSERVATION	INPATIENT PSYCHIATRY	SAME DAY NIGHT OVER
	Berlin - NH			
2011	215	31	10	11
2012	171	27	7	7
2013	189	36	9	9
2014	200	43	17	11
2015	244	48	23	14

Source: D-HDRS

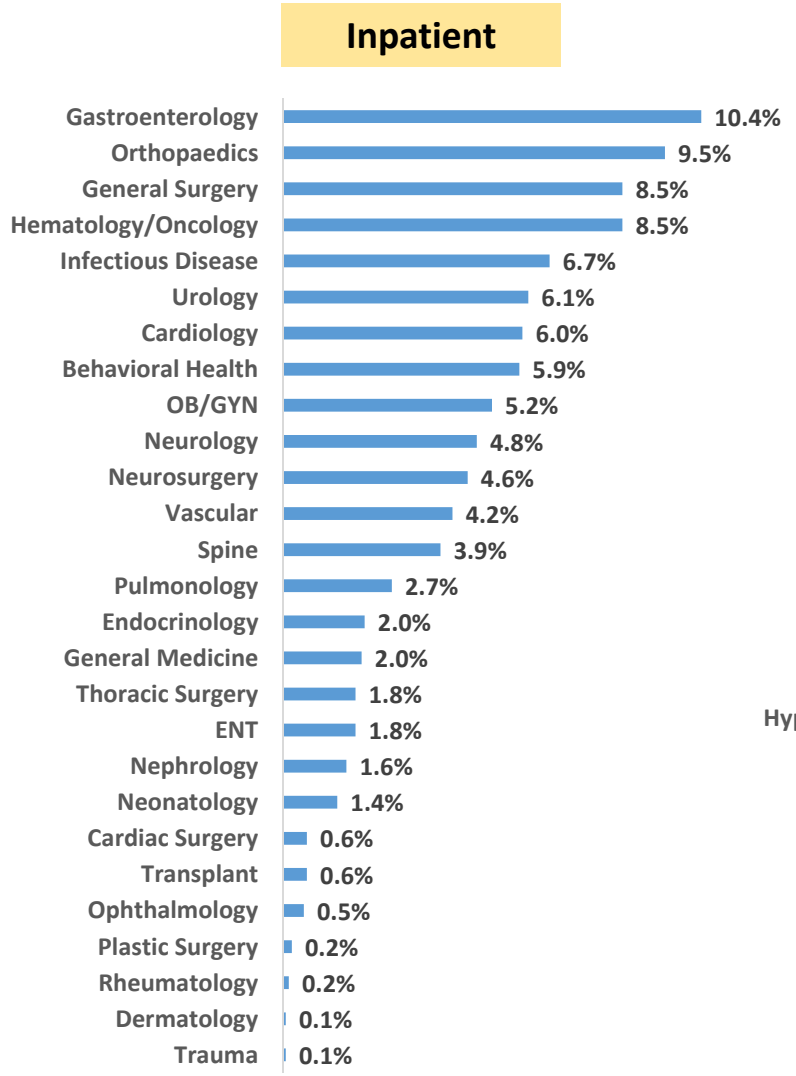
DHMC Admit Type Trend 2011-2015

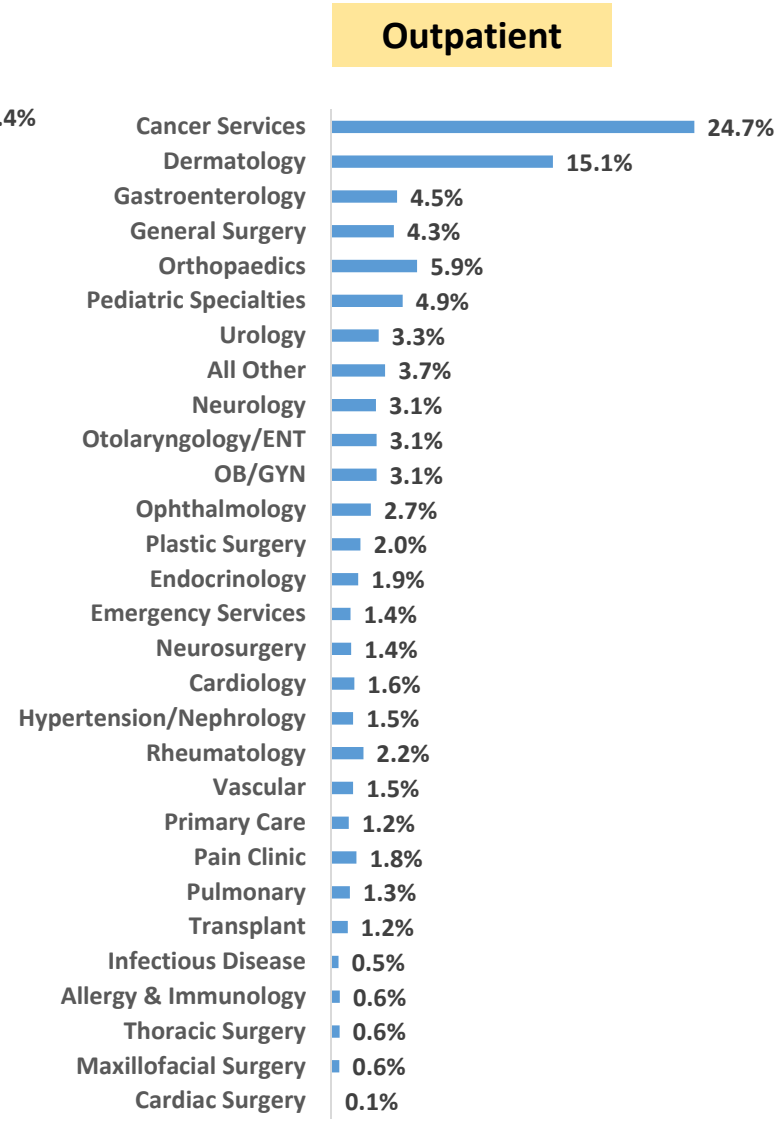


	EMERGENCY	ELECTIVE	URGENT
	Berlin - NH		
2011	147	115	5
2012	119	81	12
2013	129	99	15
2014	160	102	9
2015	208	111	10

Source: D-HDRS

Demand for Services By Specialty





Source: D-HDRS

Inpatient Visits By Clinical Section - Trend

BERLIN - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Gastroenterology	24	24	24	30	36	20.0%	50.0%
Orthopaedics	32	21	24	19	30	57.9%	-6.3%
Behavioral Health	15	7	13	17	26	52.9%	73.3%
Infectious Disease	12	16	13	21	26	23.8%	116.7%
General Surgery	28	21	10	28	25	-10.7%	-10.7%
Cardiology	14	17	15	9	24	166.7%	71.4%
Hematology/Oncology	24	11	31	24	22	-8.3%	-8.3%
OB/GYN	14	16	14	5	20	300.0%	42.9%
Urology	13	12	21	16	19	18.8%	46.2%
Vascular	9	5	12	12	18	50.0%	100.0%
Neurology	13	8	8	20	15	-25.0%	15.4%
Neurosurgery	6	6	11	24	14	-41.7%	133.3%
Spine	12	9	9	9	13	44.4%	8.3%
Pulmonology	7	4	11	6	8	33.3%	14.3%
General Medicine	5	5	5	5	6	20.0%	20.0%
Nephrology	6	4	5	1	5	400.0%	-16.7%
Endocrinology	8	10	2	3	4	33.3%	-50.0%
Neonatology	5	3	4	2	4	100.0%	-20.0%
Thoracic Surgery	4	5	4	7	4	-42.9%	0.0%
ENT	5	4	3	9	3	-66.7%	-40.0%
Cardiac Surgery	2	1	1	2	2	0.0%	0.0%
Ophthalmology	1	2		2	2	0.0%	100.0%
Plastic Surgery	1		1		1		
Rheumatology	1				1		
Transplant	4	1	2		1		
Dermatology	1						
Trauma	1						

Source: D-HDRS

Outpatient Visits By Clinical Section - Trend

BERLIN - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Cancer Services	1,122	1,030	1,466	1,395	1,505	7.9%	34.1%
Dermatology	593	595	755	873	1,168	33.8%	97.0%
Gastroenterology	160	123	236	328	344	4.9%	115.0%
General Surgery	227	185	232	222	268	20.7%	18.1%
Orthopaedics	409	274	299	300	267	-11.0%	-34.7%
Pediatric Specialties	304	285	251	207	244	17.9%	-19.7%
Urology	191	148	163	149	212	42.3%	11.0%
All Other	194	178	201	210	194	-7.6%	0.0%
Neurology	183	111	174	162	184	13.6%	0.5%
Otolaryngology/ENT	178	144	154	176	173	-1.7%	-2.8%
OB/GYN	223	121	173	154	153	-0.6%	-31.4%
Ophthalmology	135	131	153	152	151	-0.7%	11.9%
Plastic Surgery	97	119	92	89	138	55.1%	42.3%
Endocrinology	104	93	101	82	115	40.2%	10.6%
Emergency Services	52	57	47	89	112	25.8%	115.4%
Neurosurgery	72	44	63	84	107	27.4%	48.6%
Cardiology	78	81	87	79	102	29.1%	30.8%
Hypertension/Nephrology	69	83	97	75	80	6.7%	15.9%
Rheumatology	139	105	154	110	80	-27.3%	-42.4%
Vascular	95	67	80	85	76	-10.6%	-20.0%
Primary Care	69	79	54	57	66	15.8%	-4.3%
Pain Clinic	177	108	58	57	63	10.5%	-64.4%
Pulmonary	64	81	76	70	56	-20.0%	-12.5%
Transplant	63	36	70	83	55	-33.7%	-12.7%
Infectious Disease	43	28	11	26	34	30.8%	-20.9%
Allergy & Immunology	46	35	29	22	33	50.0%	-28.3%
Thoracic Surgery	19	29	34	60	19	-68.3%	0.0%
Maxillofacial Surgery	14	16	40	74	13	-82.4%	-7.1%
Cardiac Surgery	4	3	7	5	6	20.0%	50.0%

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined)

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Allergy	• Allergic reactions • Other upper respiratory disease • Asthma • Other lower respiratory disease	**Dermatology**	• Other skin disorders • Other inflammatory condition of skin • Other and unspecified benign neoplasm • Allergic reactions	**General Surgery**	• Other gastrointestinal disorders • Other fractures • Abdominal hernia
Cancer Services	• Cancer of bronchus; lung • Cancer of head and neck • Secondary malignancies • Cancer of breast • Cancer of pancreas	**Emergency Services**	• Other nervous system disorders • Other injuries and conditions due to external causes • Abdominal pain • Other fractures	**High-Risk OB**	• Other complications of birth; puerperium affecting management of mother • Other complications of pregnancy • Normal pregnancy and/or delivery
Cardiac Surgery	• Coronary atherosclerosis and other heart disease • Heart valve disorders	**Endocrinology**	• Thyroid disorders • Diabetes mellitus with complications • Other endocrine disorders	**Infectious Disease**	• Bacterial infection; unspecified site • Immunizations and screening for infectious disease • Infective arthritis and osteomyelitis (except that caused by tuberculosis)
Cardiology	• Cardiac dysrhythmias • Coronary atherosclerosis and other heart disease • Conduction disorders • Heart valve disorders • Congestive heart failure; nonhypertensive	**Gastroenterology**	• Other gastrointestinal disorders • Other liver diseases • Esophageal disorders	**Maxillofacial Surgery**	• Disorders of teeth and jaw • Cancer of head and neck

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined) – cont.

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Neurology	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Hereditary and degenerative nervous system conditions • Epilepsy; convulsions • Acute cerebrovascular disease	**Orthopaedics**	• Fracture of lower limb • Fracture of upper limb • Connective tissue disease • Non-traumatic joint disorders • Spondylosis; intervertebral disc disorders; other back problems	**Thoracic Surgery**	• Cancer of bronchus; lung • (N/A) • Other lower respiratory disease • Cancer of esophagus
Neurosurgery	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Intracranial injury • Acute cerebrovascular disease	**Otolaryngology (ENT)**	• Ear and sense organ disorders • Otitis media and related conditions • Cancer of head and neck • Upper respiratory disease	**Urology**	• Genitourinary symptoms and ill-defined conditions • Diseases of bladder and urethra • Diseases of kidney and ureters • Calculus of urinary tract
OB/GYN	• Complications of birth; Other female genital disorders • Complications of pregnancy • Genitourinary symptoms and ill-defined conditions	**Pulmonary**	• Other lower respiratory disease • Chronic obstructive pulmonary disease and bronchiectasis • Cystic fibrosis	**Vascular Surgery**	• Peripheral and visceral atherosclerosis • Other circulatory disease • Aortic; peripheral; and visceral artery aneurysms • Phlebitis; thrombophlebitis and thromboembolism • Aortic and peripheral arterial embolism or thrombosis
Ophthalmology	• Retinal detachments; defects; vascular occlusion; and retinopathy • Blindness and vision defects • Glaucoma • Cataract	**Rheumatology**	• Connective tissue disease • Non-traumatic joint disorders • Osteoarthritis • Spondylosis; intervertebral disc disorders; other back problems • Systemic lupus erythematosus and connective tissue disorders		

Source: D-HDRS

Top Procedures (Min. 10 Procedures)

Procedure	2011	2012	2013	2014	2015
Respiratory intubation and mechanical ventilation	48	31	36	37	40
Enteral and parenteral nutrition	23	20	9	19	29
Blood transfusion	43	31	38	30	29
Incision of pleura, thoracentesis, chest drainage	17	16	8	13	21
Psychological and psychiatric evaluation and therapy	39	23	2	15	20
Other vascular catheterization, not heart	64	47	33	18	20
Other diagnostic procedures (interview, evaluation, consultation)	21	6	13	20	20
Other therapeutic procedures	44	50	43	8	19
Cancer chemotherapy	13	1	22	14	18
Other OR procedures on vessels other than head and neck	40	12	24	9	16
Diagnostic cardiac catheterization, coronary arteriography	32	19	22	7	16
Other therapeutic procedures, hemic and lymphatic system	29	19	25	11	15
Hemodialysis	7	5	15	11	15
Insertion of catheter or spinal stimulator and injection into spinal cord	46	25	14	2	14
Abdominal paracentesis	13	7	7	7	14
Diagnostic bronchoscopy and biopsy of bronchus	20	13	17	9	13
Other OR lower GI therapeutic procedures	12	9	6	4	12
Debridement of wound, infection or burn	3	8		6	12
Other non-OR gastrointestinal therapeutic procedures	34	24	26	8	12
Hip replacement, total and partial	12	10	12	10	12
Oophorectomy, unilateral and bilateral	6	4	3	3	11
Other therapeutic procedures on muscles and tendons	12	23	4	9	11
Other non-OR therapeutic procedures on respiratory system	3		5	2	11
Other non-OR therapeutic cardiovascular procedures	19	4	18	5	11
Cerebral arteriogram	5	5	5	1	10
Upper gastrointestinal endoscopy, biopsy	63	45	35	11	10
Laminectomy, excision intervertebral disc	8	12	8	5	10
Ureteral catheterization	16	4	11	4	10

Source: D-HDRS

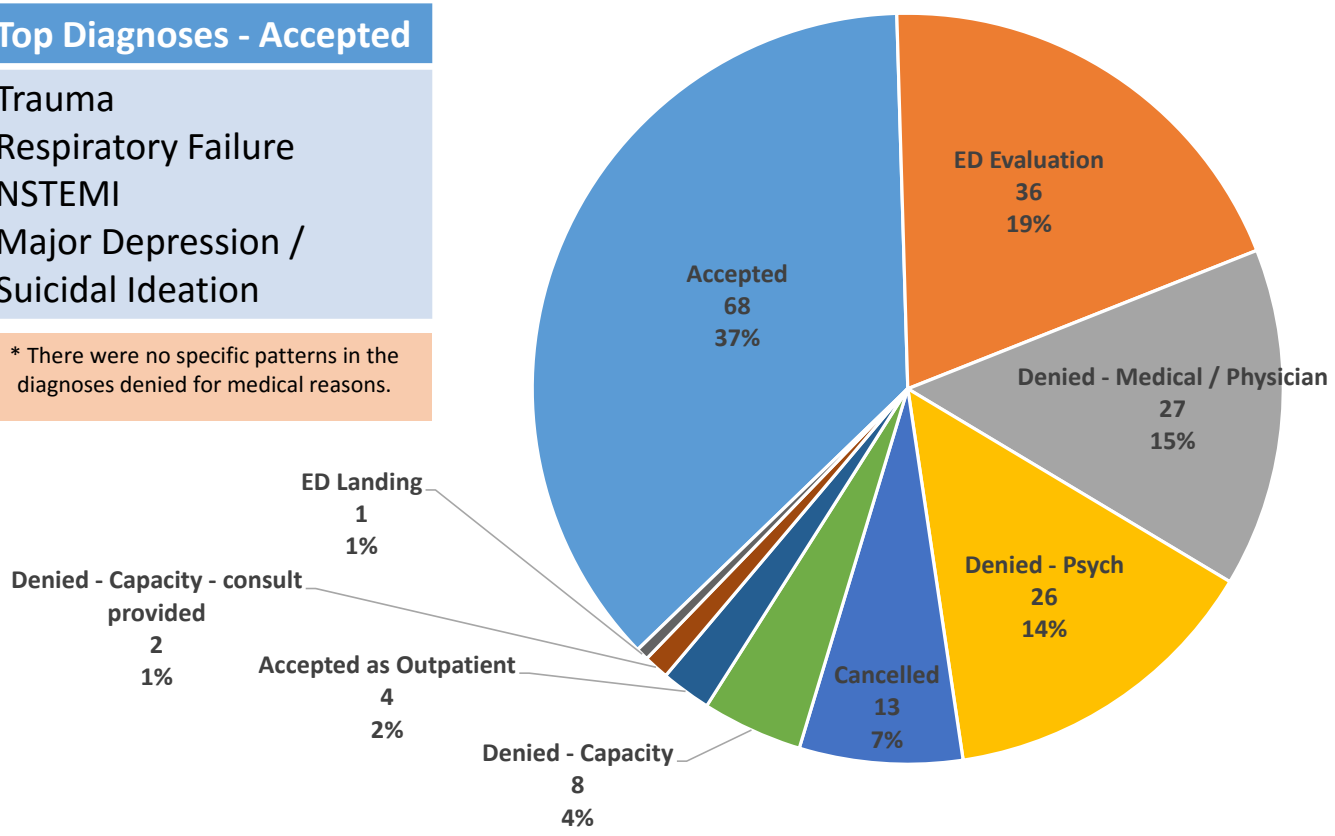
DHMC Transfer Center Volume 2016 YTD – Berlin HSA

Total - 185

Top Diagnoses - Accepted

Trauma
Respiratory Failure
NSTEMI
Major Depression / Suicidal Ideation

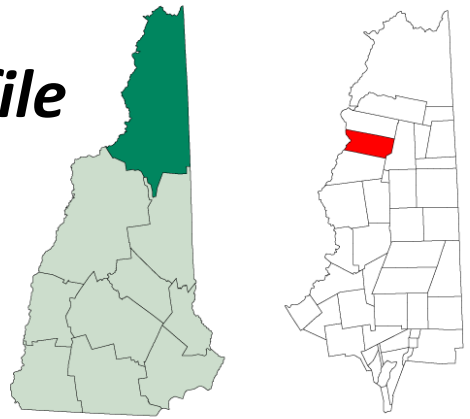
* There were no specific patterns in the diagnoses denied for medical reasons.



Source: D-H Connected Care Center - Forefront

Colebrook HSA Strategic Profile

December 2016 – DRAFT

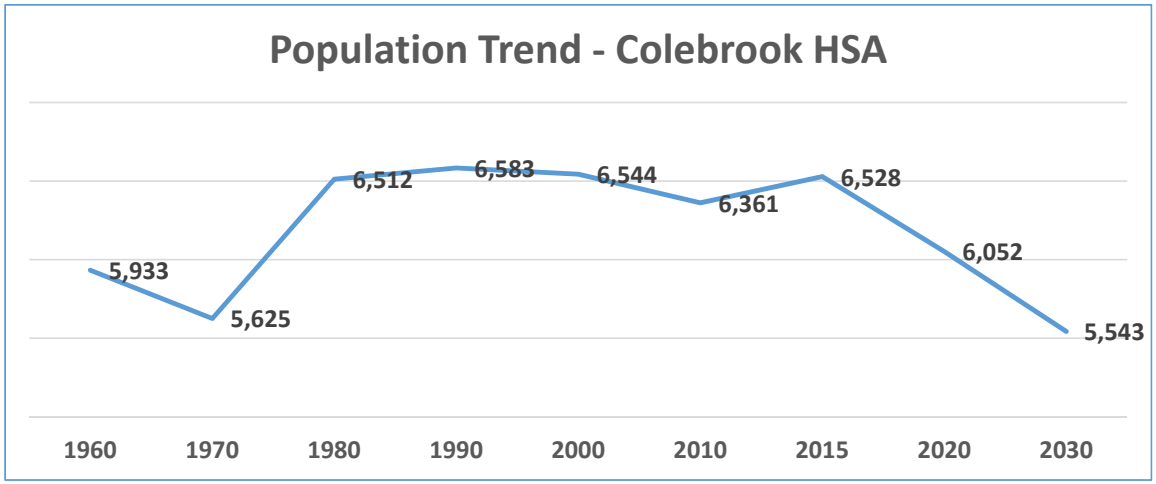


Dartmouth-Hitchcock

A CULTURE OF CARING

Demographic Overview

Colebrook, NH HSA

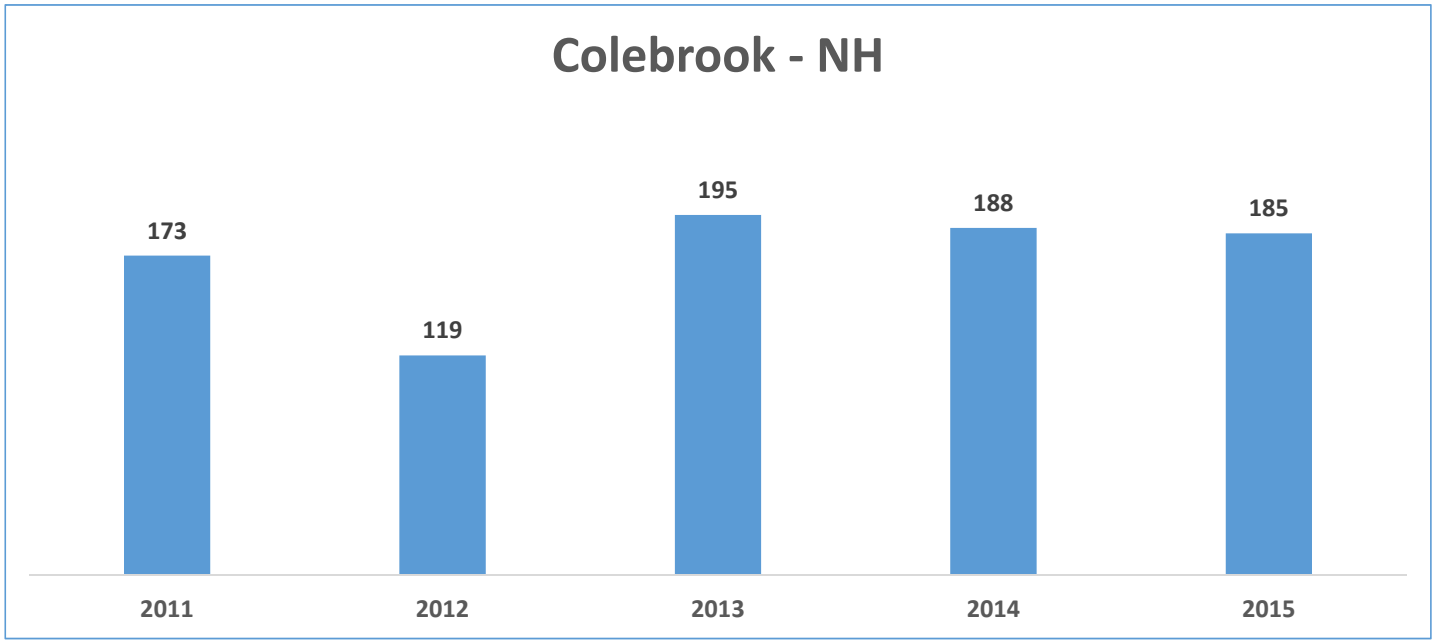


	2000	2010	2015	2020	2030
Clarksville	294	265	274	258	234
Colebrook	2,321	2,301	2,300	2,184	2,000
Columbia	750	757	758	724	666
Pittsburg	867	869	871	831	764
Stewartstown	1,012	1,004	1,035	999	929
Averill	8	24	23	46	73
Beecher Falls (Canaan)	1,078	972	1,107	858	743
Norton	214	169	160	153	133
TOTALS	**6,544**	**6,361**	**6,528**	**6,052**	**5,543**

Sources: NHOEP, Census.gov, American Community Survey, D-H Regional & System Integration

KEY DEMOGRAPHIC MEASURES		
Category	**Coos County**	**NH**
Median HH Income	$42,407	$65,986
Unemployment	2.8%	2.3%
Poverty		
All People	14.9%	8.2%
Health Insurance		
With	85.0%	92.5%
Without	15.0%	7.5%
Educational Level		
High School or Higher	86.6%	92.0%
Bachelor's Degree or Higher	17.8%	34.4%
Housing		
Owner Occupied	70.3%	71.0%
Renter Occupied	29.7%	29.0%

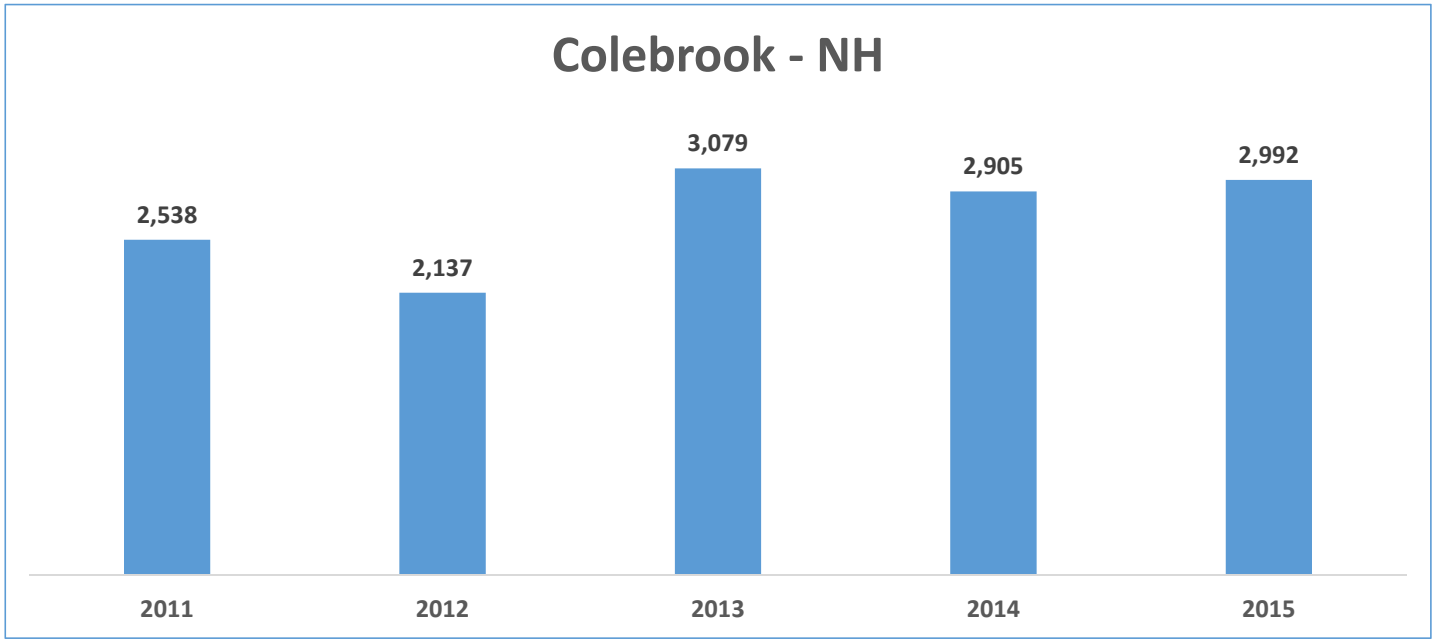
DHMC Inpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
(1.6%)	6.9%

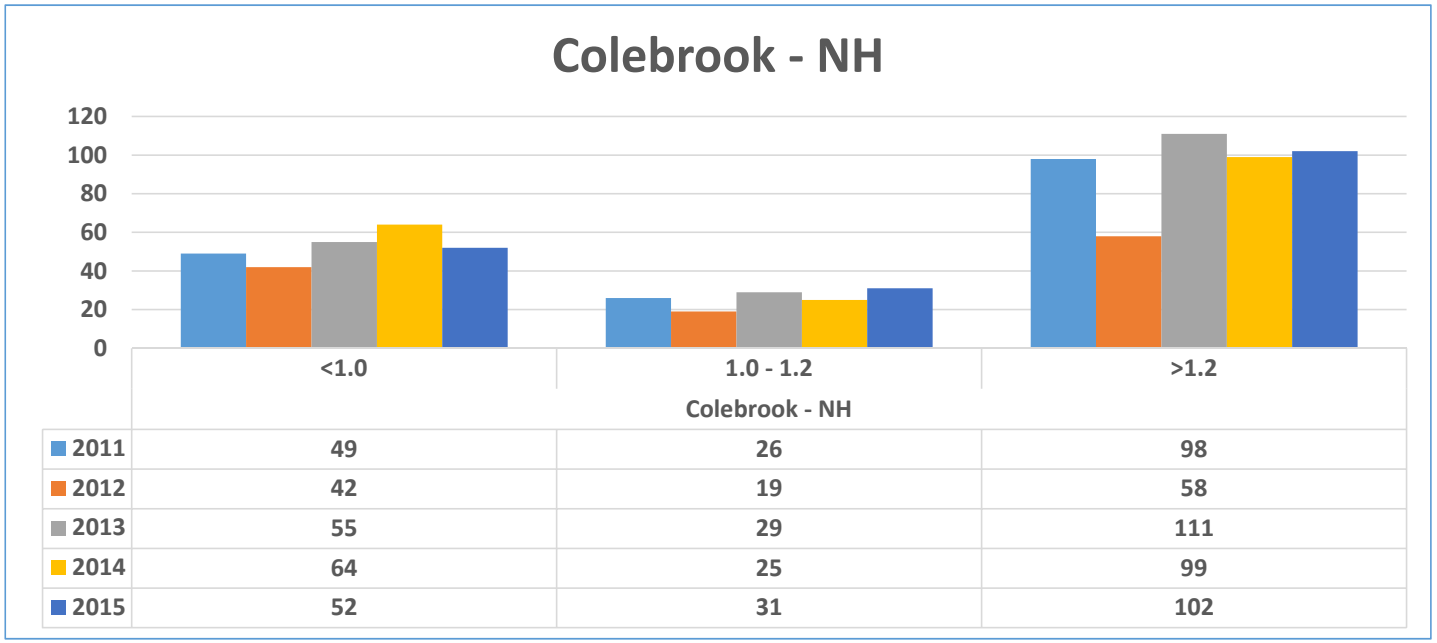
DHMC Outpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
3.0%	17.9%

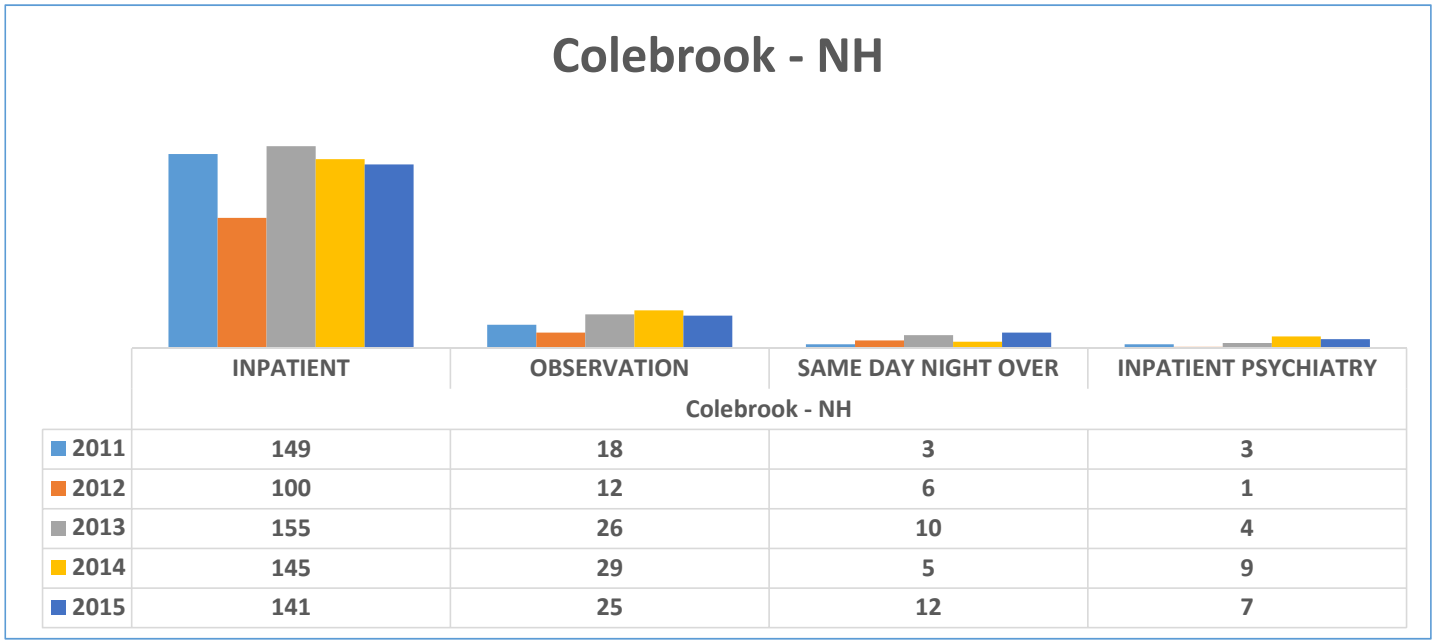
DHMC Inpatient Acuity Trend 2011-2015



Colebrook - NH	<1.0	1.0 - 1.2	>1.2
2011	49	26	98
2012	42	19	58
2013	55	29	111
2014	64	25	99
2015	52	31	102

Source: D-HDRS

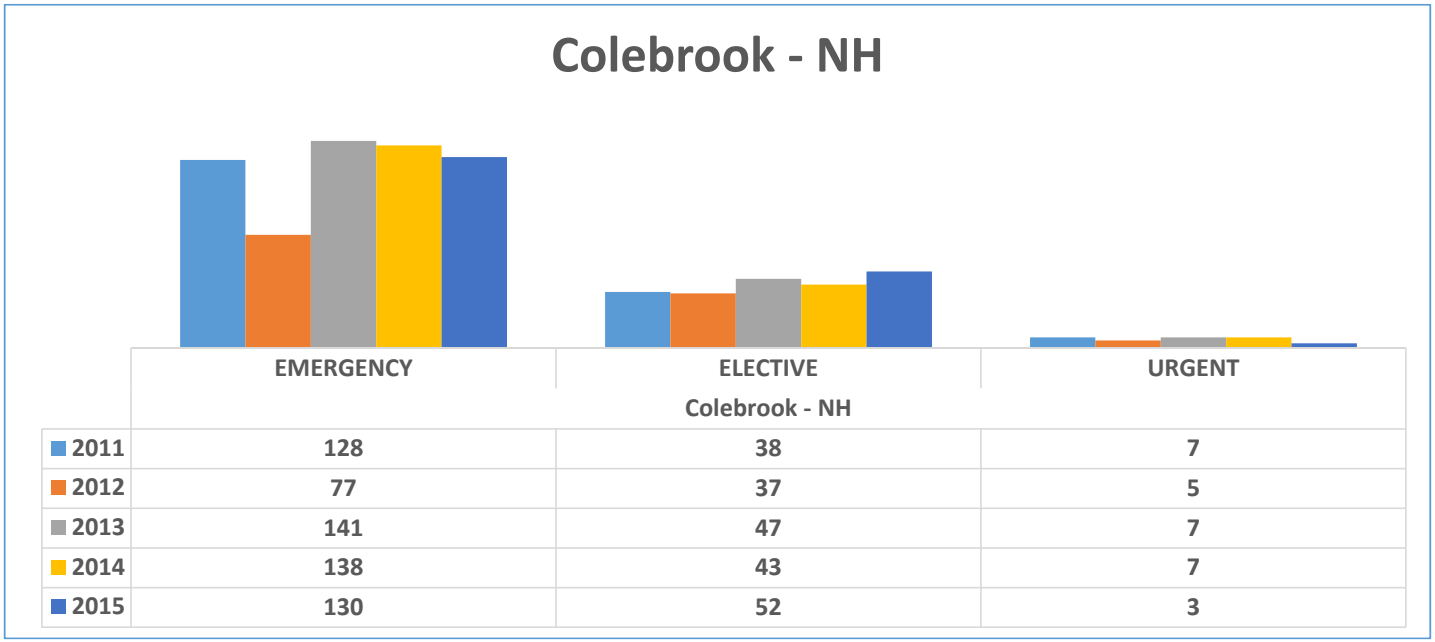
DHMC Patient Type Trend 2011-2015



	INPATIENT	OBSERVATION	SAME DAY NIGHT OVER	INPATIENT PSYCHIATRY
	Colebrook - NH			
2011	149	18	3	3
2012	100	12	6	1
2013	155	26	10	4
2014	145	29	5	9
2015	141	25	12	7

Source: D-HDRS

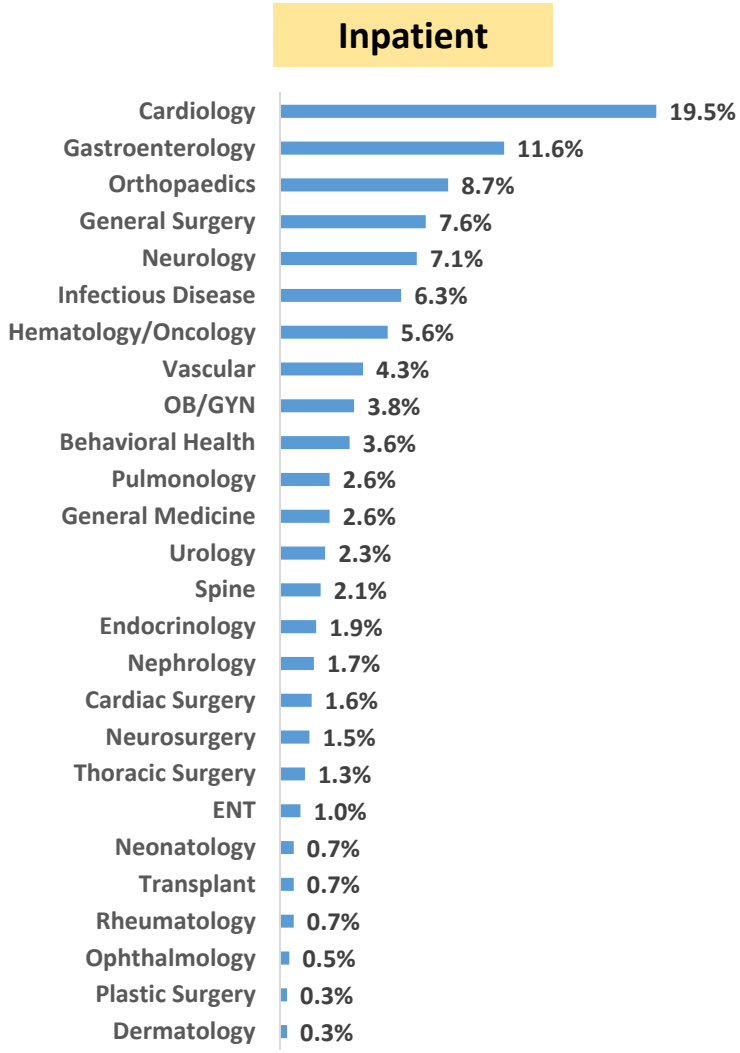
DHMC Admit Type Trend 2011-2015

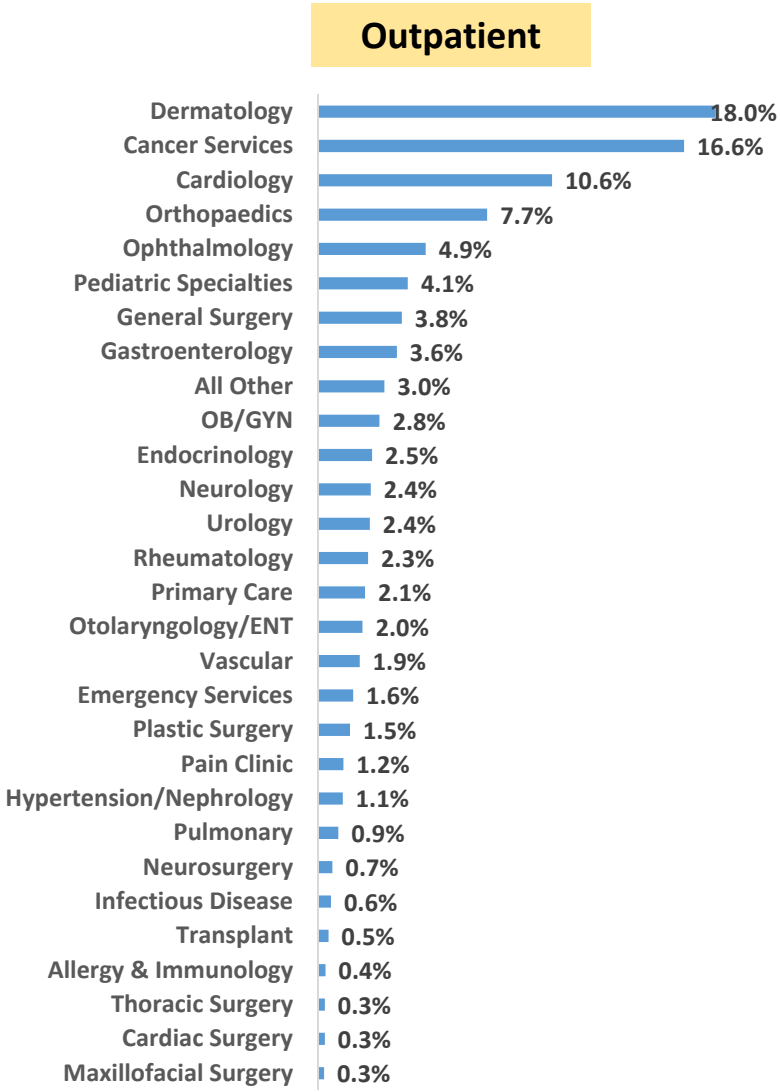


	EMERGENCY	ELECTIVE	URGENT
	Colebrook - NH		
2011	128	38	7
2012	77	37	5
2013	141	47	7
2014	138	43	7
2015	130	52	3

Source: D-HDRS

Demand for Services By Specialty





Source: D-HDRS

Inpatient Visits By Clinical Section - Trend

COLEBROOK - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Cardiology	49	17	40	26	36	38.5%	-26.5%
Gastroenterology	22	9	27	16	26	62.5%	18.2%
Orthopaedics	9	14	18	14	20	42.9%	122.2%
Neurology	14	9	11	11	16	45.5%	14.3%
Hematology/Oncology	10	4	10	11	13	18.2%	30.0%
OB/GYN	3	4	7	10	9	-10.0%	200.0%
Vascular	7	3	12	6	9	50.0%	28.6%
Behavioral Health	3	2	6	12	8	-33.3%	166.7%
General Surgery	14	5	20	18	8	-55.6%	-42.9%
Infectious Disease	12	12	10	12	8	-33.3%	-33.3%
Cardiac Surgery	2	2	4	1	5	400.0%	150.0%
Nephrology	5	2	3	1	4	300.0%	-20.0%
Urology	3	5	1	7	4	-42.9%	33.3%
Neurosurgery	1	4	3	2	3	50.0%	200.0%
Endocrinology	2	3	3	6	2	-66.7%	0.0%
ENT	2	2	2	1	2	100.0%	0.0%
Ophthalmology				2	2	0.0%	
Pulmonology	4	4	6	6	2	-66.7%	-50.0%
Spine	4	3	5	4	2	-50.0%	-50.0%
Thoracic Surgery	1	2	3	3	2	-33.3%	100.0%
General Medicine	6	4	2	9	1	-88.9%	-83.3%
Neonatology		3		2	1	-50.0%	
Plastic Surgery				2	1	-50.0%	
Transplant		2	1	2	1	-50.0%	
Dermatology		1		2			
Rheumatology		3	1	2			

Source: D-HDRS

Outpatient Visits By Clinical Section - Trend

COLEBROOK - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Dermatology	513	362	455	539	589	9.3%	14.8%
Cancer Services	348	357	514	479	568	18.6%	63.2%
Cardiology	308	229	357	290	265	-8.6%	-14.0%
Orthopaedics	183	138	309	216	202	-6.5%	10.4%
Ophthalmology	116	137	111	168	136	-19.0%	17.2%
Pediatric Specialties	138	86	135	85	113	32.9%	-18.1%
Gastroenterology	57	59	149	115	109	-5.2%	91.2%
General Surgery	90	88	122	117	103	-12.0%	14.4%
Urology	64	43	48	69	98	42.0%	53.1%
Otolaryngology/ENT	37	35	50	68	87	27.9%	135.1%
All Other	91	90	80	66	85	28.8%	-6.6%
Endocrinology	51	60	79	69	77	11.6%	51.0%
Neurology	50	50	83	72	73	1.4%	46.0%
Vascular	57	40	59	34	70	105.9%	22.8%
Emergency Services	33	20	43	65	58	-10.8%	75.8%
OB/GYN	71	63	102	94	52	-44.7%	-26.8%
Primary Care	68	53	74	47	51	8.5%	-25.0%
Rheumatology	59	50	89	66	47	-28.8%	-20.3%
Hypertension/Nephrology	21	23	32	37	42	13.5%	100.0%
Pulmonary	24	30	22	22	29	31.8%	20.8%
Plastic Surgery	32	24	50	67	27	-59.7%	-15.6%
Pain Clinic	50	26	22	38	23	-39.5%	-54.0%
Neurosurgery	19	16	14	21	21	0.0%	10.5%
Infectious Disease	11	16	24	15	16	6.7%	45.5%
Transplant	11	10	17	14	15	7.1%	36.4%
Allergy & Immunology	6	8	8	15	11	-26.7%	83.3%
Thoracic Surgery	9	9	9	6	11	83.3%	22.2%
Cardiac Surgery	10	5	14	6	9	50.0%	-10.0%
Maxillofacial Surgery	11	10	8	5	5	0.0%	-54.5%

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined)

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Allergy	• Allergic reactions • Other upper respiratory disease • Asthma • Other lower respiratory disease	**Dermatology**	• Other skin disorders • Other inflammatory condition of skin • Other and unspecified benign neoplasm • Allergic reactions	**General Surgery**	• Other gastrointestinal disorders • Other fractures • Abdominal hernia
Cancer Services	• Cancer of bronchus; lung • Cancer of head and neck • Secondary malignancies • Cancer of breast • Cancer of pancreas	**Emergency Services**	• Other nervous system disorders • Other injuries and conditions due to external causes • Abdominal pain • Other fractures	**High-Risk OB**	• Other complications of birth; puerperium affecting management of mother • Other complications of pregnancy • Normal pregnancy and/or delivery
Cardiac Surgery	• Coronary atherosclerosis and other heart disease • Heart valve disorders	**Endocrinology**	• Thyroid disorders • Diabetes mellitus with complications • Other endocrine disorders	**Infectious Disease**	• Bacterial infection; unspecified site • Immunizations and screening for infectious disease • Infective arthritis and osteomyelitis (except that caused by tuberculosis)
Cardiology	• Cardiac dysrhythmias • Coronary atherosclerosis and other heart disease • Conduction disorders • Heart valve disorders • Congestive heart failure; nonhypertensive	**Gastroenterology**	• Other gastrointestinal disorders • Other liver diseases • Esophageal disorders	**Maxillofacial Surgery**	• Disorders of teeth and jaw • Cancer of head and neck

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined) – cont.

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Neurology	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Hereditary and degenerative nervous system conditions • Epilepsy; convulsions • Acute cerebrovascular disease	**Orthopaedics**	• Fracture of lower limb • Fracture of upper limb • Connective tissue disease • Non-traumatic joint disorders • Spondylosis; intervertebral disc disorders; other back problems	**Thoracic Surgery**	• Cancer of bronchus; lung • (N/A) • Other lower respiratory disease • Cancer of esophagus
Neurosurgery	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Intracranial injury • Acute cerebrovascular disease	**Otolaryngology (ENT)**	• Ear and sense organ disorders • Otitis media and related conditions • Cancer of head and neck • Upper respiratory disease	**Urology**	• Genitourinary symptoms and ill-defined conditions • Diseases of bladder and urethra • Diseases of kidney and ureters • Calculus of urinary tract
OB/GYN	• Complications of birth; Other female genital disorders • Complications of pregnancy • Genitourinary symptoms and ill-defined conditions	**Pulmonary**	• Other lower respiratory disease • Chronic obstructive pulmonary disease and bronchiectasis • Cystic fibrosis	**Vascular Surgery**	• Peripheral and visceral atherosclerosis • Other circulatory disease • Aortic; peripheral; and visceral artery aneurysms • Phlebitis; thrombophlebitis and thromboembolism • Aortic and peripheral arterial embolism or thrombosis
Ophthalmology	• Retinal detachments; defects; vascular occlusion; and retinopathy • Blindness and vision defects • Glaucoma • Cataract	**Rheumatology**	• Connective tissue disease • Non-traumatic joint disorders • Osteoarthritis • Spondylosis; intervertebral disc disorders; other back problems • Systemic lupus erythematosus and connective tissue disorders		

Source: D-HDRS

Top Procedures (Min. 5 Procedures)

Procedure	2011	2012	2013	2014	2015
Diagnostic cardiac catheterization, coronary arteriography	71	33	54	39	33
Blood transfusion	31	26	19	18	20
Other OR procedures on vessels other than head and neck	14	7	16	5	13
Respiratory intubation and mechanical ventilation	28	20	30	31	11
Other vascular catheterization, not heart	58	24	12	19	10
Insertion, revision, replacement, removal of cardiac pacemaker or card	12	4	1	6	10
Other diagnostic procedures (interview, evaluation, consultation)	13	5	9	7	10
Coronary artery bypass graft (CABG)	4	3	8		9
Other therapeutic procedures on muscles and tendons	2	10	6	4	9
Enteral and parenteral nutrition	15	14	17	12	9
Diagnostic ultrasound of heart (echocardiogram)	11	7	8	6	9
Cancer chemotherapy	1	1	3	5	8
Amputation of lower extremity	1		3		8
Hemodialysis	2		3	7	8
Upper gastrointestinal endoscopy, biopsy	34	28	31	5	7
Other therapeutic procedures	30	38	15	9	6
Extracorporeal circulation auxiliary to open heart procedures	2	2	7	2	6
Other non-OR therapeutic cardiovascular procedures	12	1	7	2	6
Diagnostic spinal tap	1	4	6	3	5
Other OR lower GI therapeutic procedures	8	8	9	3	5
Colorectal resection	2	1	3	1	5

Source: D-HDRS

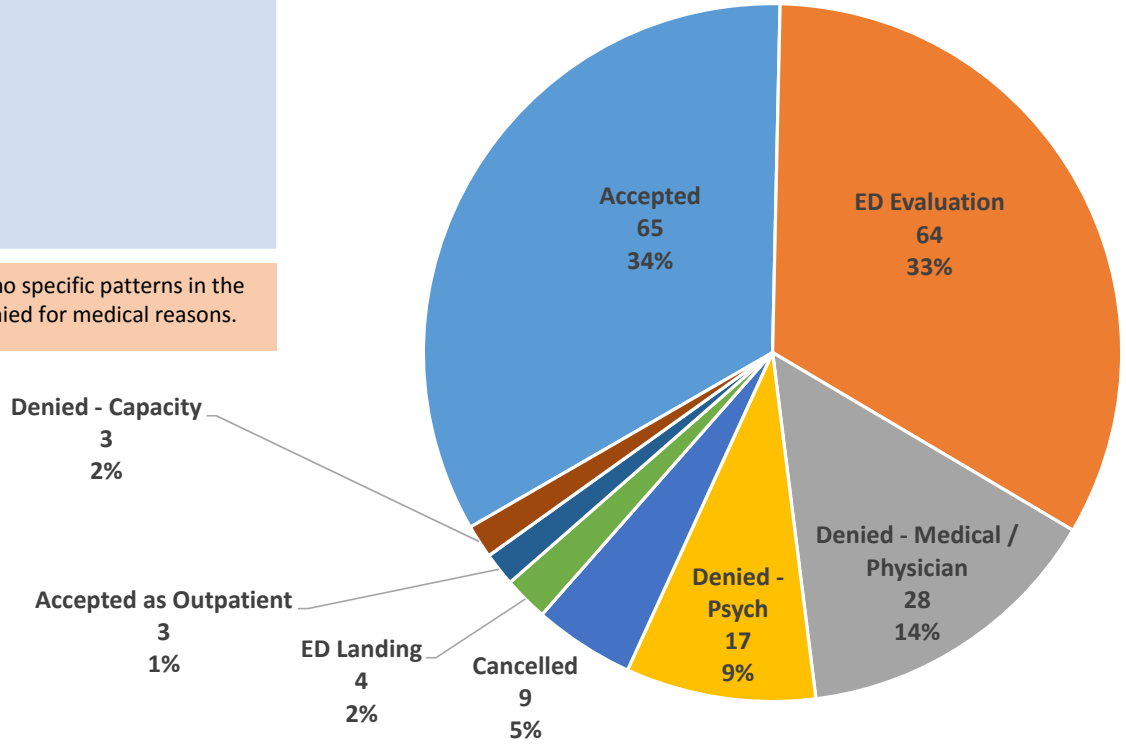
DHMC Transfer Center Volume 2016 YTD – Colebrook HSA

Total - 193

Top Diagnoses - Accepted

Trauma
NSTEMI
Stroke
STEMI
GI Bleed

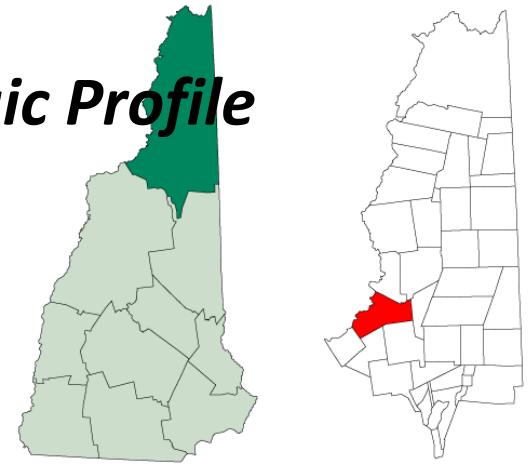
* There were no specific patterns in the diagnoses denied for medical reasons.



Source: D-H Connected Care Center - Forefront

Lancaster, NH HSA Strategic Profile

December 2016 – DRAFT



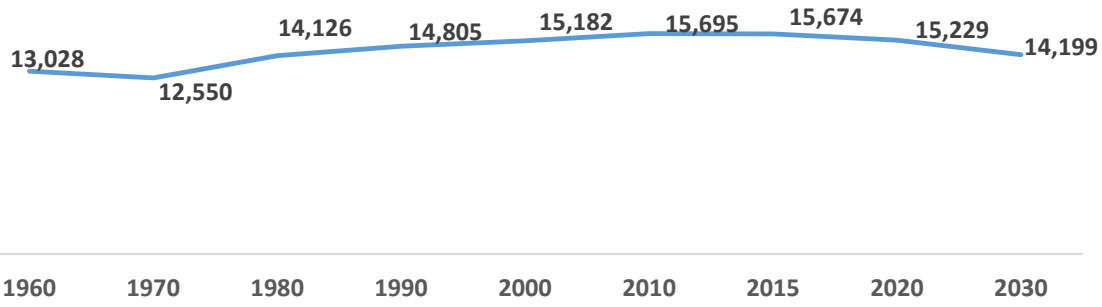
Dartmouth-Hitchcock

A CULTURE OF CARING

Demographic Overview

Lancaster, NH HSA

Population Trend - Lancaster HSA

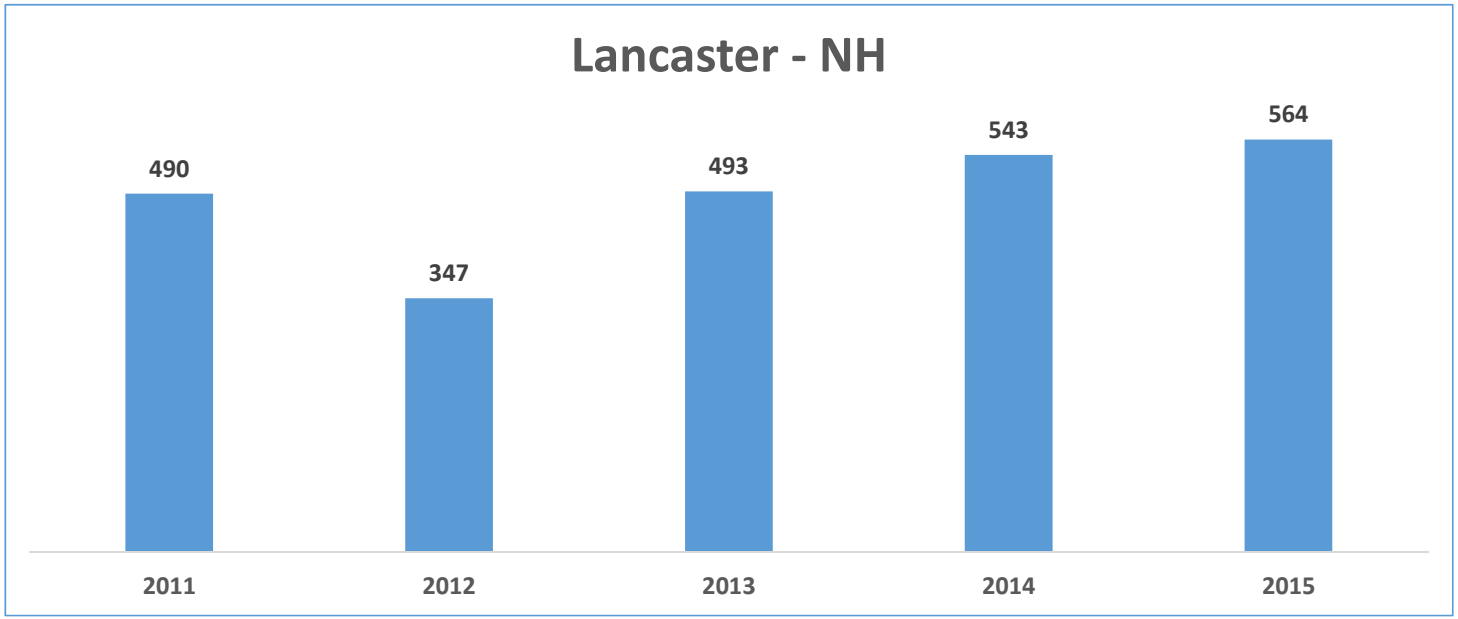


	2000	2010	2015	2020	2030
Bloomfield VT	261	221	215	192	166
Brunswick VT	107	112	115	112	106
Carroll	663	763	778	773	739
Concord VT	1,209	1,235	1,203	1,199	1,116
Dalton	927	979	977	942	876
Guildhall VT	268	261	255	240	216
Jefferson	1,006	1,107	1,108	1,080	1,015
Lancaster	3,280	3,507	3,541	3,443	3,229
Lemington VT	107	104	101	97	88
Lunenburg VT	1,315	1,302	1,270	1,248	1,151
Maidstone VT	105	208	202	281	339
Northumberland	2,438	2,288	2,249	2,085	1,861
Stark	516	556	564	551	518
Stratford	942	746	747	663	564
Whitefield	2,038	2,306	2,349	2,323	2,214
TOTALS	**15,182**	**15,695**	**15,674**	**15,229**	**14,199**

KEY DEMOGRAPHIC MEASURES		
Category	**Coos County**	**NH**
Median HH Income	$42,407	$65,986
Unemployment	2.8%	2.3%
Poverty		
All People	14.9%	8.2%
Health Insurance		
With	85.0%	92.5%
Without	15.0%	7.5%
Educational Level		
High School or Higher	86.6%	92.0%
Bachelor's Degree or Higher	17.8%	34.4%
Housing		
Owner Occupied	70.3%	71.0%
Renter Occupied	29.7%	29.0%

Sources: NHOEP, Census.gov, American Community Survey, D-H Regional & System Integration

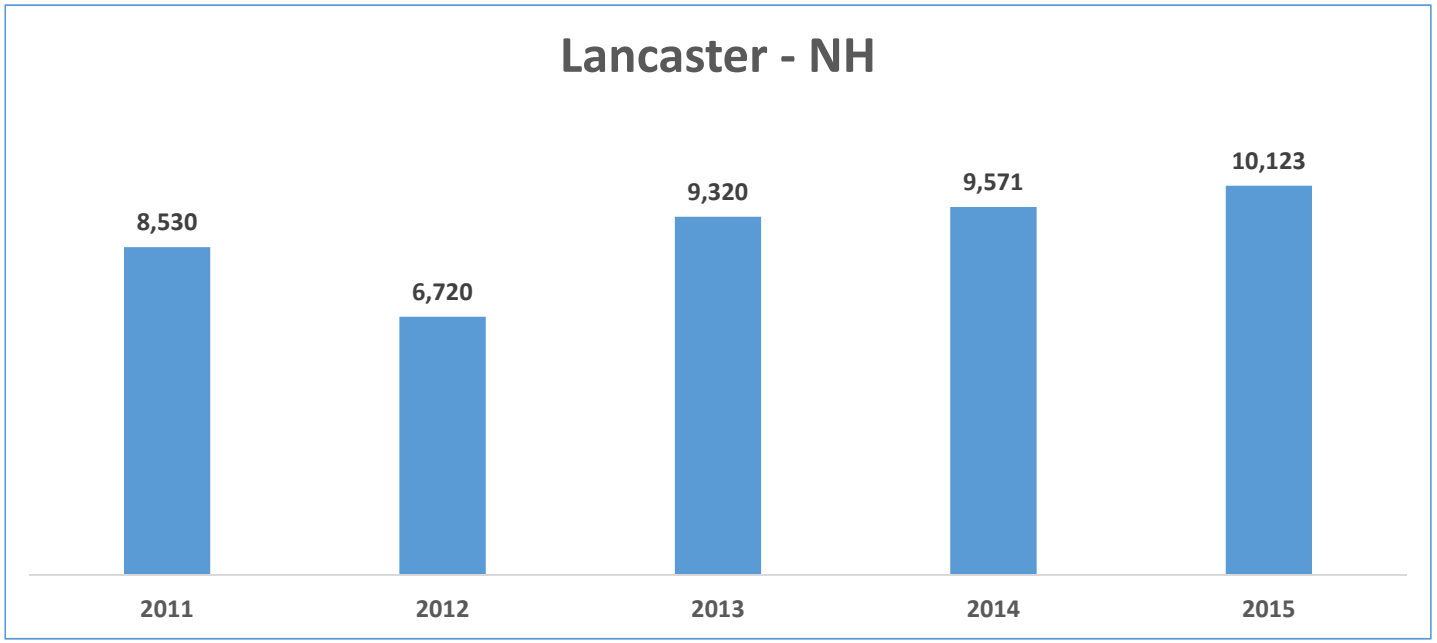
DHMC Inpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
3.9%	15.1%

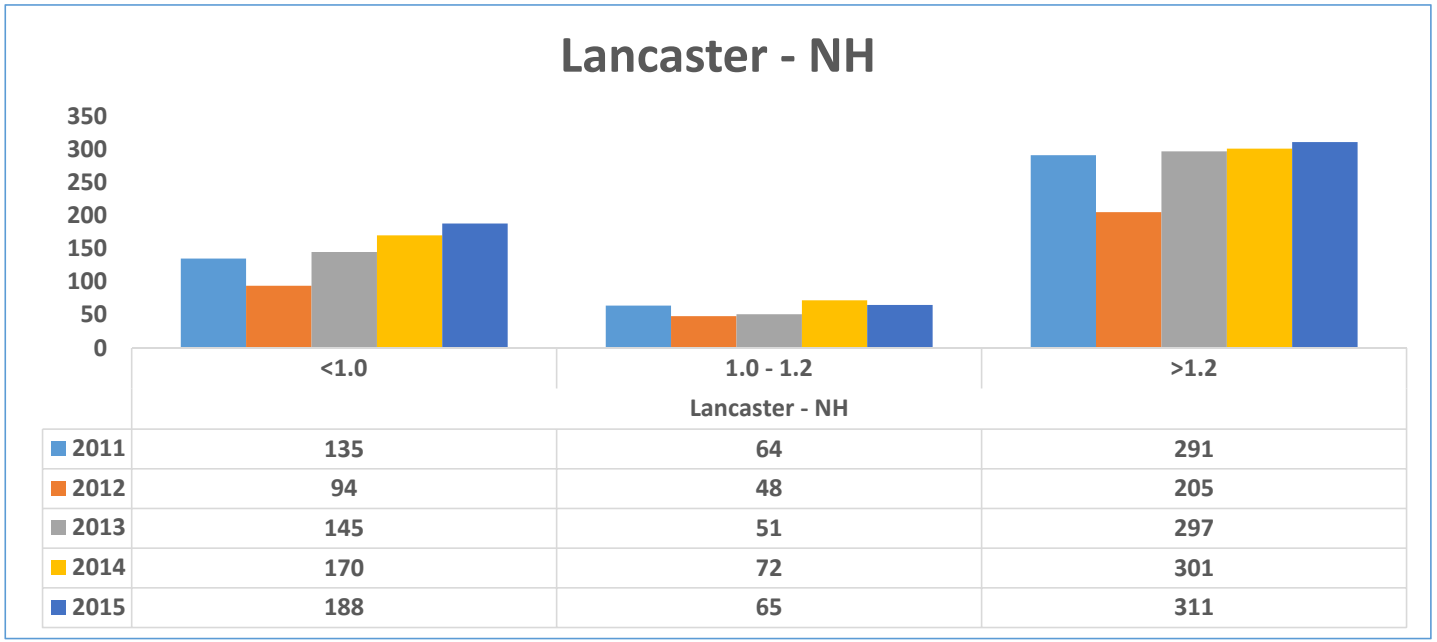
DHMC Outpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
5.8%	18.7%

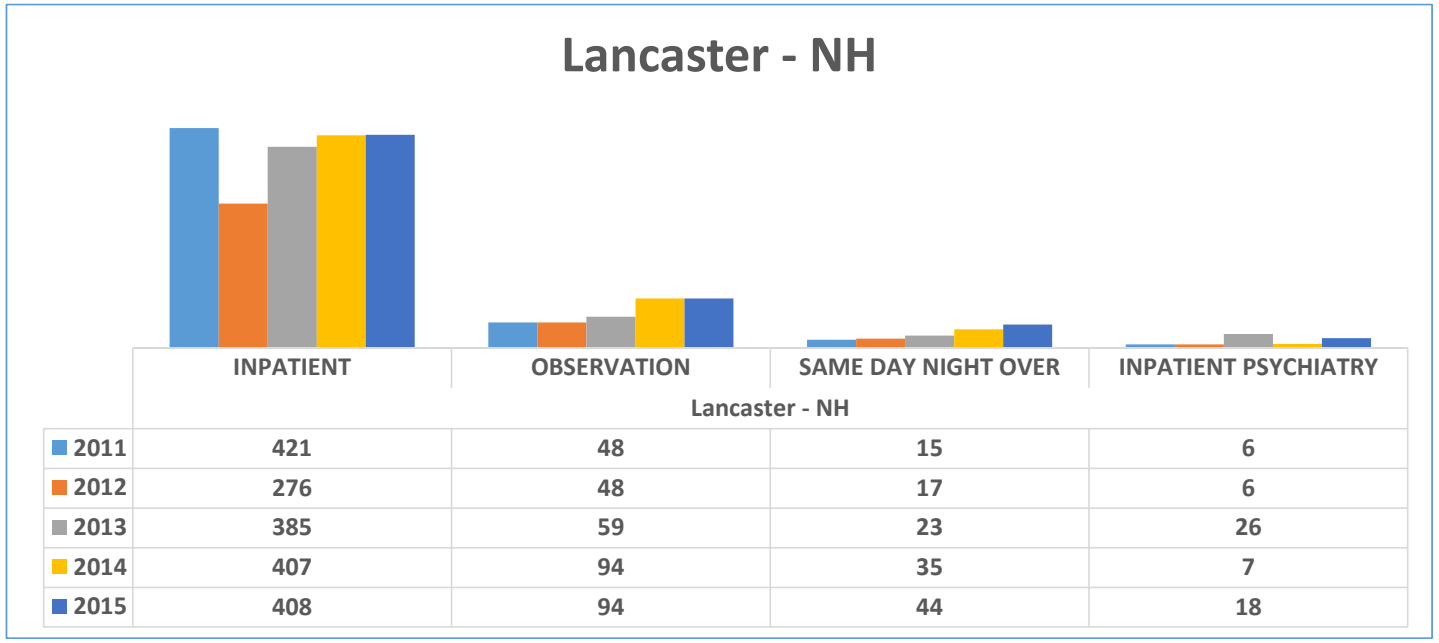
DHMC Inpatient Acuity Trend 2011-2015



Lancaster - NH	<1.0	1.0 - 1.2	>1.2
2011	135	64	291
2012	94	48	205
2013	145	51	297
2014	170	72	301
2015	188	65	311

Source: D-HDRS

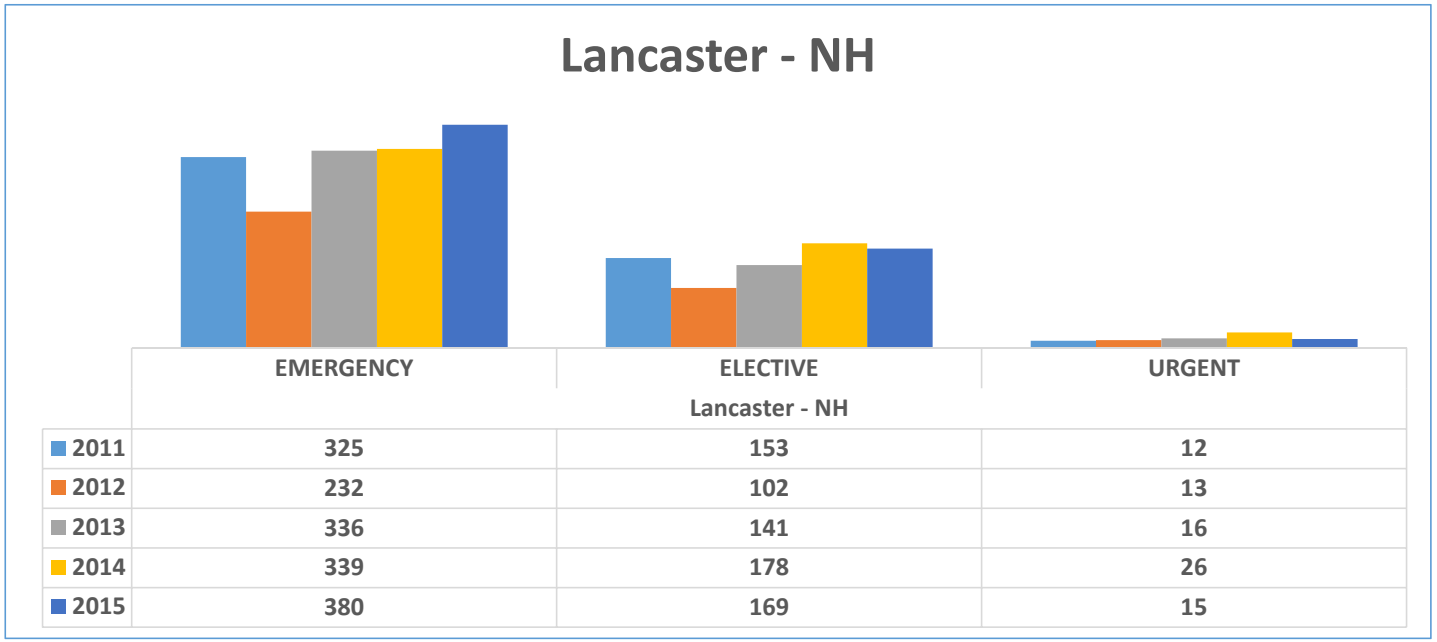
DHMC Patient Type Trend 2011-2015



	INPATIENT	OBSERVATION	SAME DAY NIGHT OVER	INPATIENT PSYCHIATRY
	Lancaster - NH			
2011	421	48	15	6
2012	276	48	17	6
2013	385	59	23	26
2014	407	94	35	7
2015	408	94	44	18

Source: D-HDRS

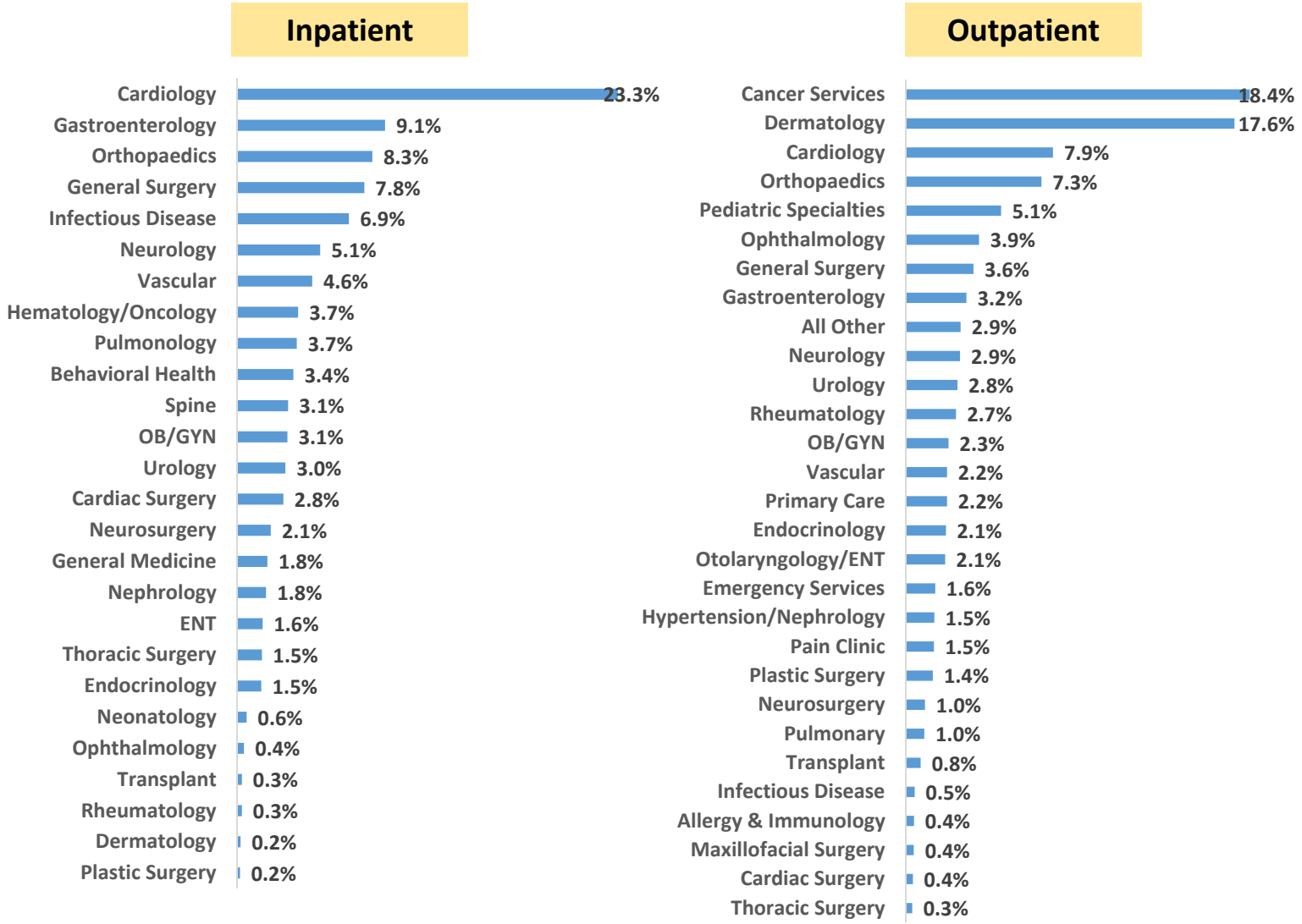
DHMC Admit Type Trend 2011-2015



	EMERGENCY	ELECTIVE	URGENT
	Lancaster - NH		
2011	325	153	12
2012	232	102	13
2013	336	141	16
2014	339	178	26
2015	380	169	15

Source: D-HDRS

Demand for Services By Specialty



Source: D-HDRS

Inpatient Visits By Clinical Section - Trend

LANCASTER - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Cardiology	100	95	113	121	140	15.7%	40.0%
Gastroenterology	49	29	32	61	50	-18.0%	2.0%
Infectious Disease	33	23	27	37	47	27.0%	42.4%
General Surgery	29	27	42	46	46	0.0%	58.6%
Orthopaedics	39	31	57	36	39	8.3%	0.0%
Vascular	23	21	21	20	27	35.0%	17.4%
Neurology	25	20	24	31	24	-22.6%	-4.0%
OB/GYN	14	8	14	15	24	60.0%	71.4%
Behavioral Health	9	8	30	15	22	46.7%	144.4%
Pulmonology	23	11	15	19	21	10.5%	-8.7%
Urology	18	9	11	15	19	26.7%	5.6%
Hematology/Oncology	25	2	24	24	16	-33.3%	-36.0%
Spine	13	12	10	25	16	-36.0%	23.1%
General Medicine	8	6	7	10	14	40.0%	75.0%
Endocrinology	8	4	4	10	10	0.0%	25.0%
Cardiac Surgery	19	7	24	10	9	-10.0%	-52.6%
Nephrology	12	4	7	11	9	-18.2%	-25.0%
Neurosurgery	12	9	8	13	8	-38.5%	-33.3%
ENT	5	6	7	13	7	-46.2%	40.0%
Thoracic Surgery	12	6	10	3	6	100.0%	-50.0%
Dermatology	1	1			3		200.0%
Neonatology	5	3	1	3	2	-33.3%	-60.0%
Ophthalmology	2	4	2		2		0.0%
Transplant	4			1	2	100.0%	-50.0%
Plastic Surgery		1	1	1	1	0.0%	
Rheumatology	2		2	3		-100.0%	-100.0%

Source: D-HDRS

Outpatient Visits By Clinical Section - Trend

LANCASTER - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Dermatology	1,392	1,134	1,483	1,777	1,998	12.4%	43.5%
Cancer Services	1,449	1,314	1,660	1,820	1,902	4.5%	31.3%
Cardiology	606	514	784	734	847	15.4%	39.8%
Orthopaedics	673	492	779	644	623	-3.3%	-7.4%
General Surgery	298	202	285	370	444	20.0%	49.0%
Pediatric Specialties	444	341	525	511	434	-15.1%	-2.3%
Ophthalmology	341	330	346	347	369	6.3%	8.2%
Gastroenterology	228	153	367	346	339	-2.0%	48.7%
Neurology	277	159	264	271	312	15.1%	12.6%
All Other	295	198	301	220	281	27.7%	-4.7%
Urology	330	213	234	190	255	34.2%	-22.7%
OB/GYN	250	142	176	190	250	31.6%	0.0%
Endocrinology	185	145	206	164	247	50.6%	33.5%
Otolaryngology/ENT	154	154	183	221	217	-1.8%	40.9%
Vascular	223	148	197	201	205	2.0%	-8.1%
Emergency Services	99	76	150	165	204	23.6%	106.1%
Rheumatology	205	218	307	255	200	-21.6%	-2.4%
Primary Care	200	158	191	231	194	-16.0%	-3.0%
Pain Clinic	144	93	117	159	150	-5.7%	4.2%
Hypertension/Nephrology	127	106	143	160	138	-13.8%	8.7%
Plastic Surgery	134	79	143	155	125	-19.4%	-6.7%
Neurosurgery	92	81	97	107	75	-29.9%	-18.5%
Pulmonary	103	100	99	63	71	12.7%	-31.1%
Transplant	72	48	83	87	58	-33.3%	-19.4%
Infectious Disease	46	36	39	41	46	12.2%	0.0%
Maxillofacial Surgery	33	8	53	48	44	-8.3%	33.3%
Allergy & Immunology	46	42	31	36	36	0.0%	-21.7%
Cardiac Surgery	39	21	41	31	32	3.2%	-17.9%
Thoracic Surgery	45	15	36	27	27	0.0%	-40.0%

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined)

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Allergy	• Allergic reactions • Other upper respiratory disease • Asthma • Other lower respiratory disease	**Dermatology**	• Other skin disorders • Other inflammatory condition of skin • Other and unspecified benign neoplasm • Allergic reactions	**General Surgery**	• Other gastrointestinal disorders • Other fractures • Abdominal hernia
Cancer Services	• Cancer of bronchus; lung • Cancer of head and neck • Secondary malignancies • Cancer of breast • Cancer of pancreas	**Emergency Services**	• Other nervous system disorders • Other injuries and conditions due to external causes • Abdominal pain • Other fractures	**High-Risk OB**	• Other complications of birth; puerperium affecting management of mother • Other complications of pregnancy • Normal pregnancy and/or delivery
Cardiac Surgery	• Coronary atherosclerosis and other heart disease • Heart valve disorders	**Endocrinology**	• Thyroid disorders • Diabetes mellitus with complications • Other endocrine disorders	**Infectious Disease**	• Bacterial infection; unspecified site • Immunizations and screening for infectious disease • Infective arthritis and osteomyelitis (except that caused by tuberculosis)
Cardiology	• Cardiac dysrhythmias • Coronary atherosclerosis and other heart disease • Conduction disorders • Heart valve disorders • Congestive heart failure; nonhypertensive	**Gastroenterology**	• Other gastrointestinal disorders • Other liver diseases • Esophageal disorders	**Maxillofacial Surgery**	• Disorders of teeth and jaw • Cancer of head and neck

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined) – cont.

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Neurology	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Hereditary and degenerative nervous system conditions • Epilepsy; convulsions • Acute cerebrovascular disease	**Orthopaedics**	• Fracture of lower limb • Fracture of upper limb • Connective tissue disease • Non-traumatic joint disorders • Spondylosis; intervertebral disc disorders; other back problems	**Thoracic Surgery**	• Cancer of bronchus; lung • (N/A) • Other lower respiratory disease • Cancer of esophagus
Neurosurgery	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Intracranial injury • Acute cerebrovascular disease	**Otolaryngology (ENT)**	• Ear and sense organ disorders • Otitis media and related conditions • Cancer of head and neck • Upper respiratory disease	**Urology**	• Genitourinary symptoms and ill-defined conditions • Diseases of bladder and urethra • Diseases of kidney and ureters • Calculus of urinary tract
OB/GYN	• Complications of birth; Other female genital disorders • Complications of pregnancy • Genitourinary symptoms and ill-defined conditions	**Pulmonary**	• Other lower respiratory disease • Chronic obstructive pulmonary disease and bronchiectasis • Cystic fibrosis	**Vascular Surgery**	• Peripheral and visceral atherosclerosis • Other circulatory disease • Aortic; peripheral; and visceral artery aneurysms • Phlebitis; thrombophlebitis and thromboembolism • Aortic and peripheral arterial embolism or thrombosis
Ophthalmology	• Retinal detachments; defects; vascular occlusion; and retinopathy • Blindness and vision defects • Glaucoma • Cataract	**Rheumatology**	• Connective tissue disease • Non-traumatic joint disorders • Osteoarthritis • Spondylosis; intervertebral disc disorders; other back problems • Systemic lupus erythematosus and connective tissue disorders		

Source: D-HDRS

Top Procedures (Min. 10 Procedures)

Procedure	2011	2012	2013	2014	2015
Diagnostic cardiac catheterization, coronary arteriography	251	178	168	123	115
Respiratory intubation and mechanical ventilation	48	42	52	85	75
Blood transfusion	46	37	51	53	53
Upper gastrointestinal endoscopy, biopsy	84	54	59	24	32
Other OR procedures on vessels other than head and neck	48	42	43	31	30
Enteral and parenteral nutrition	36	16	21	30	30
Other diagnostic procedures (interview, evaluation, consultation)	26	25	29	23	26
Other vascular catheterization, not heart	115	48	44	44	21
Incision of pleura, thoracentesis, chest drainage	22	18	12	29	20
Insertion, revision, replacement, removal of cardiac pacemaker or card	19	14	28	16	19
Other therapeutic procedures, hemic and lymphatic system	25	10	21	8	19
Hemodialysis	43	13	19	33	19
Diagnostic ultrasound of heart (echocardiogram)	32	12	26	17	18
Diagnostic bronchoscopy and biopsy of bronchus	27	24	16	7	18
Other therapeutic procedures on muscles and tendons	16	16	20	8	16
Other OR lower GI therapeutic procedures	13	8	4	7	15
Abdominal paracentesis	18	19	12	14	15
Arterio- or venogram (not heart and head)	57	42	16	21	14
Partial excision bone	12	7	12	8	12
Other non-OR or closed therapeutic nervous system procedures	13	20	19	3	11
Psychological and psychiatric evaluation and therapy	9				11
Other OR heart procedures	8	4	12	13	11
Colorectal resection	3	4	5	4	11
Hip replacement, total and partial	12	15	23	17	11
Conversion of cardiac rhythm	9	8	11	11	10
Other non-OR gastrointestinal therapeutic procedures	29	16	9	17	10
Other OR therapeutic nervous system procedures	21	10	13	6	10
Coronary artery bypass graft (CABG)	27	10	24	18	10

Source: D-HDRS

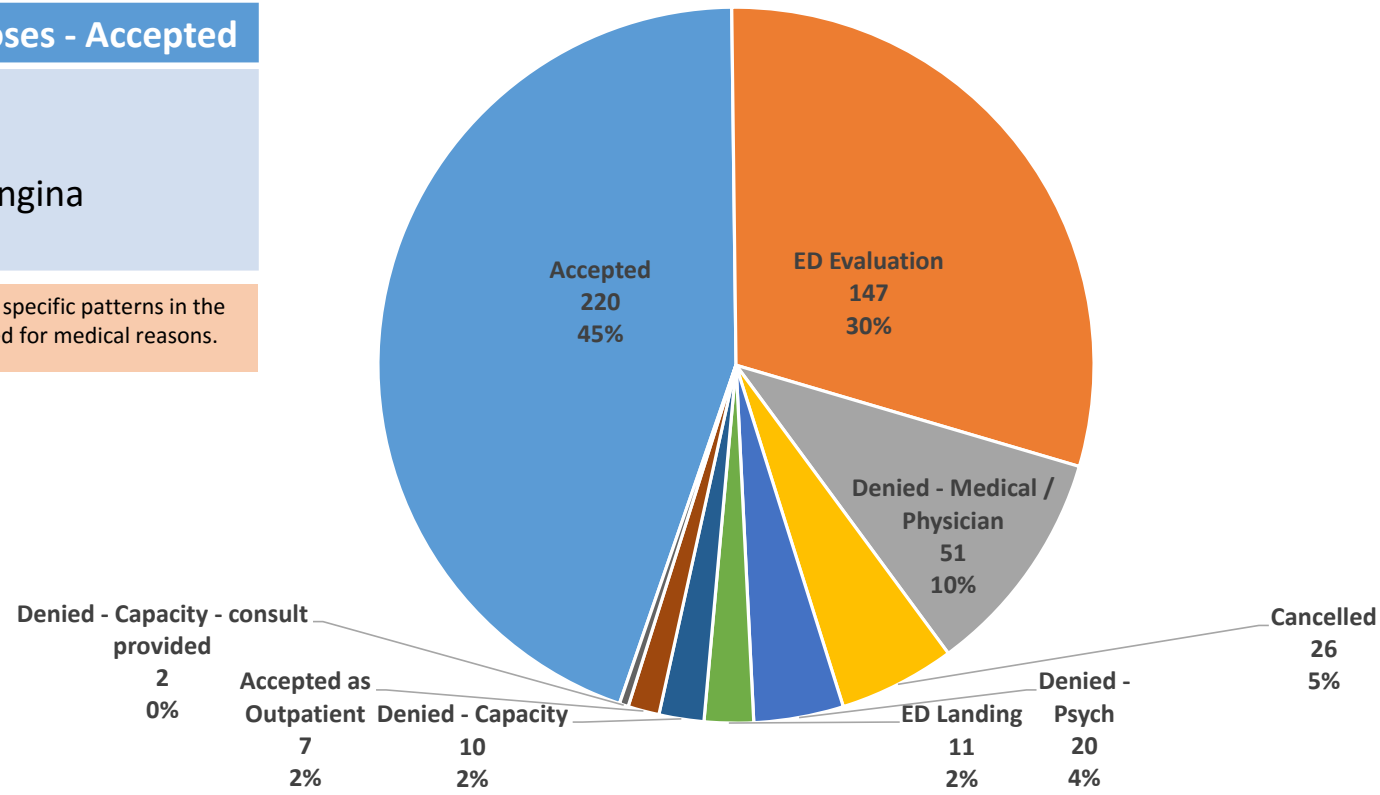
DHMC Transfer Center Volume 2016 YTD – Lancaster HSA

Total - 494

Top Diagnoses - Accepted

NSTEMI
Trauma
Unstable Angina
Chest Pain

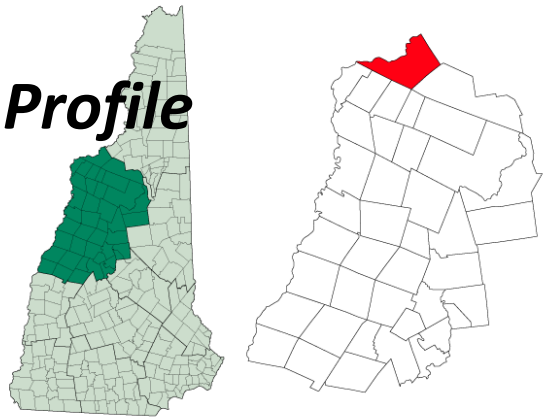
* There were no specific patterns in the diagnoses denied for medical reasons.



Source: D-H Connected Care Center - Forefront

Littleton, NH HSA Strategic Profile

December 2016 – DRAFT

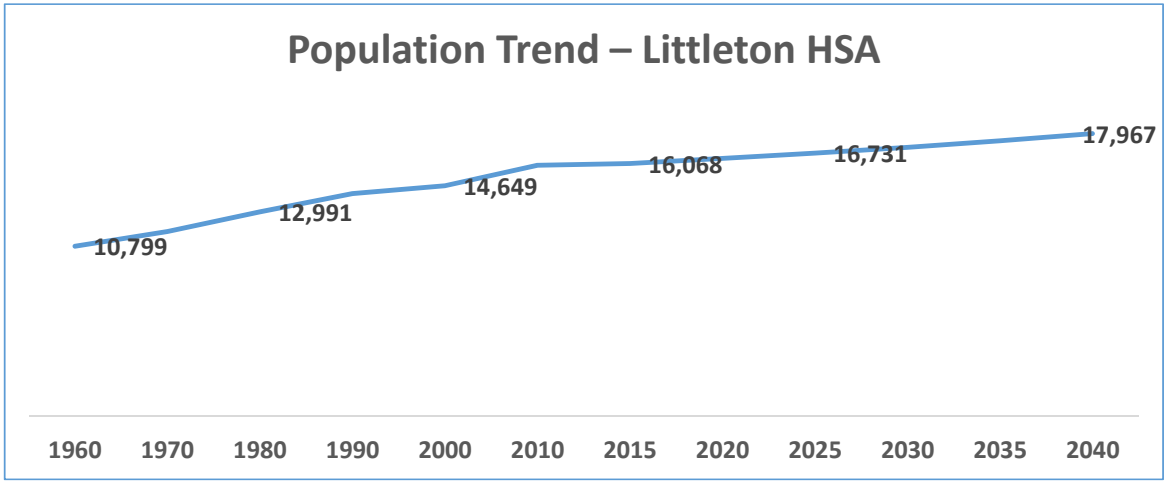


Dartmouth-Hitchcock

A CULTURE OF CARING

Demographic Overview

Littleton, NH HSA

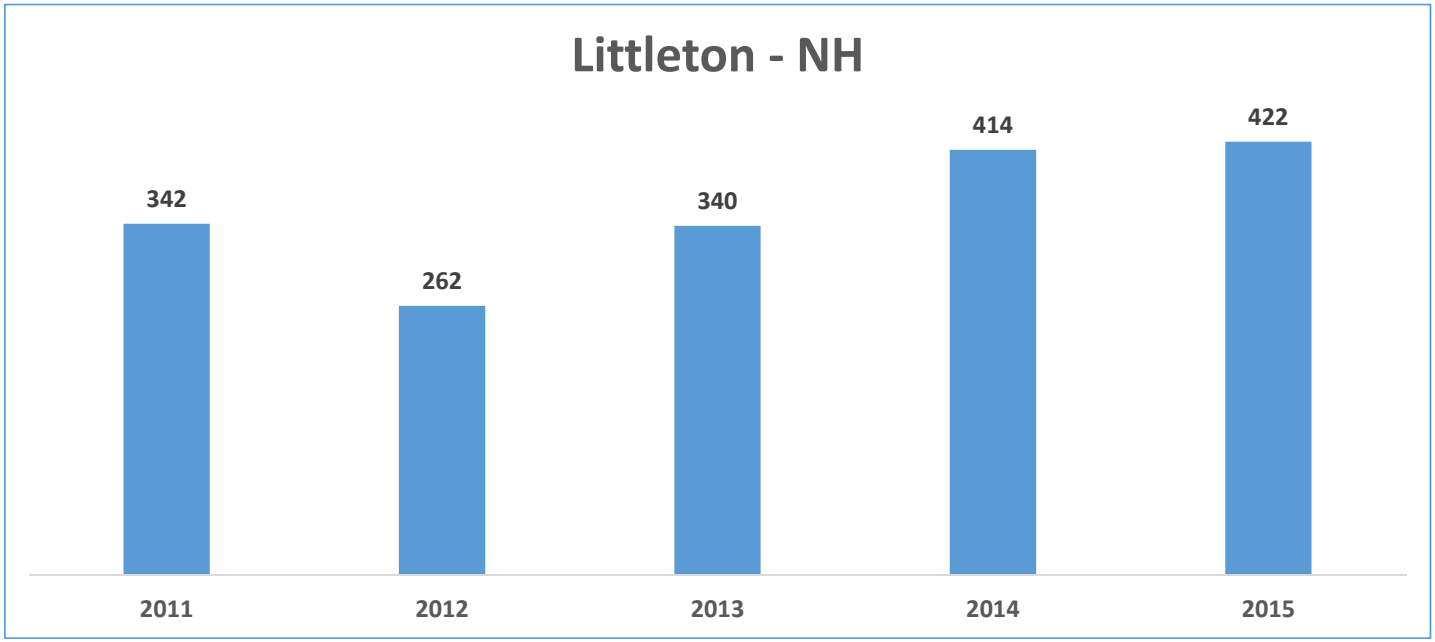


	2000	2010	2015	2020	2025	2030	2035	2040
Bethlehem	2,199	2,526	2,558	2,651	2,746	2,806	2,874	2,949
Easton	256	254	260	261	262	268	274	281
Franconia	924	1,104	1,118	1,169	1,221	1,248	1,278	1,312
Landaff	378	415	416	424	433	442	453	465
Lincoln	1,271	1,662	1,705	1,827	1,952	1,995	2,043	2,097
Lisbon	1,587	1,595	1,602	1,598	1,594	1,629	1,668	1,712
Littleton	5,845	5,928	5,925	5,911	5,894	6,022	6,169	6,330
Lyman	487	533	542	556	571	583	598	613
Sugar Hill	563	563	569	569	568	581	595	610
Woodstock	1,139	1,374	1,373	1,430	1,488	1,520	1,557	1,598
TOTALS	**14,649**	**15,954**	**16,068**	**16,396**	**16,731**	**17,094**	**17,511**	**17,967**

Sources: NHOEP, Census.gov, American Community Survey, D-H Regional & System Integration

KEY DEMOGRAPHIC MEASURES		
Category	**Grafton County**	**NH**
Median HH Income	$55,045	$65,986
Unemployment	2.1%	2.3%
Poverty		
All People	11.6%	8.2%
Health Insurance		
With	86.9%	92.5%
Without	13.1%	7.5%
Educational Level		
High School or Higher	91.35	92.0%
Bachelor's Degree or Higher	37.5%	34.4%
Housing		
Owner Occupied	68.0%	71.0%
Renter Occupied	32.0%	29.0%

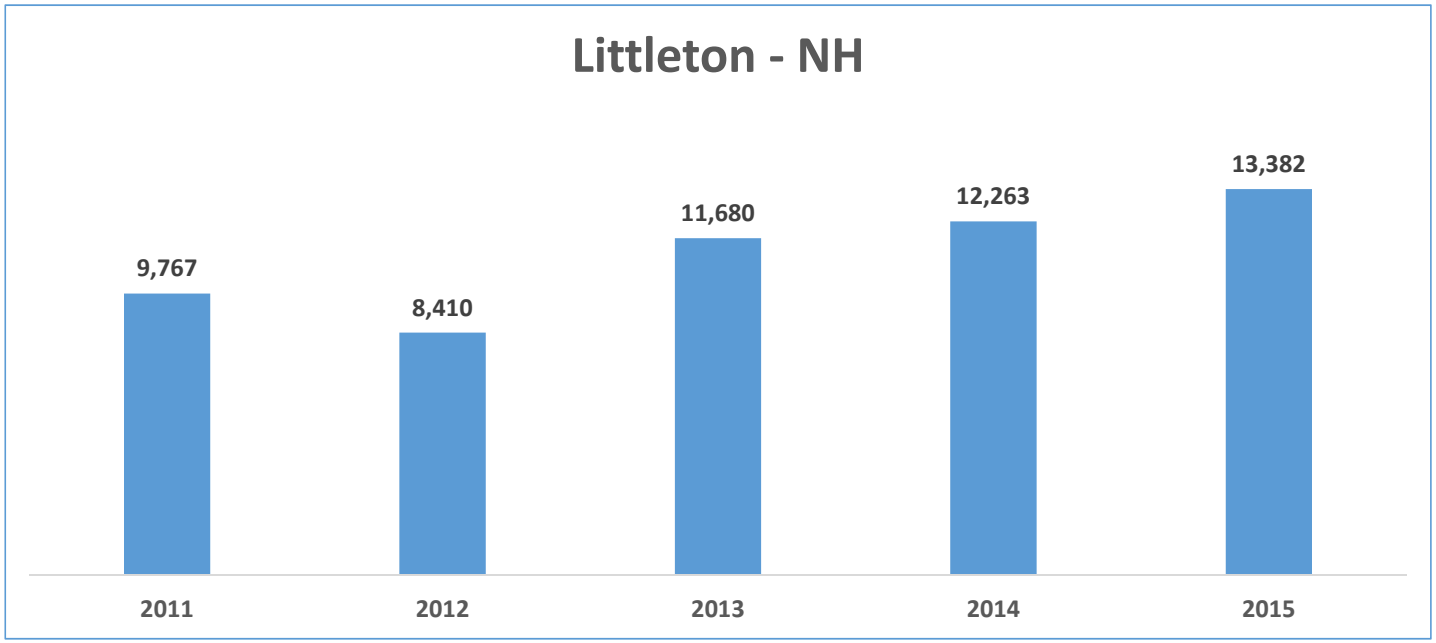
DHMC Inpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
1.9%	23.4%

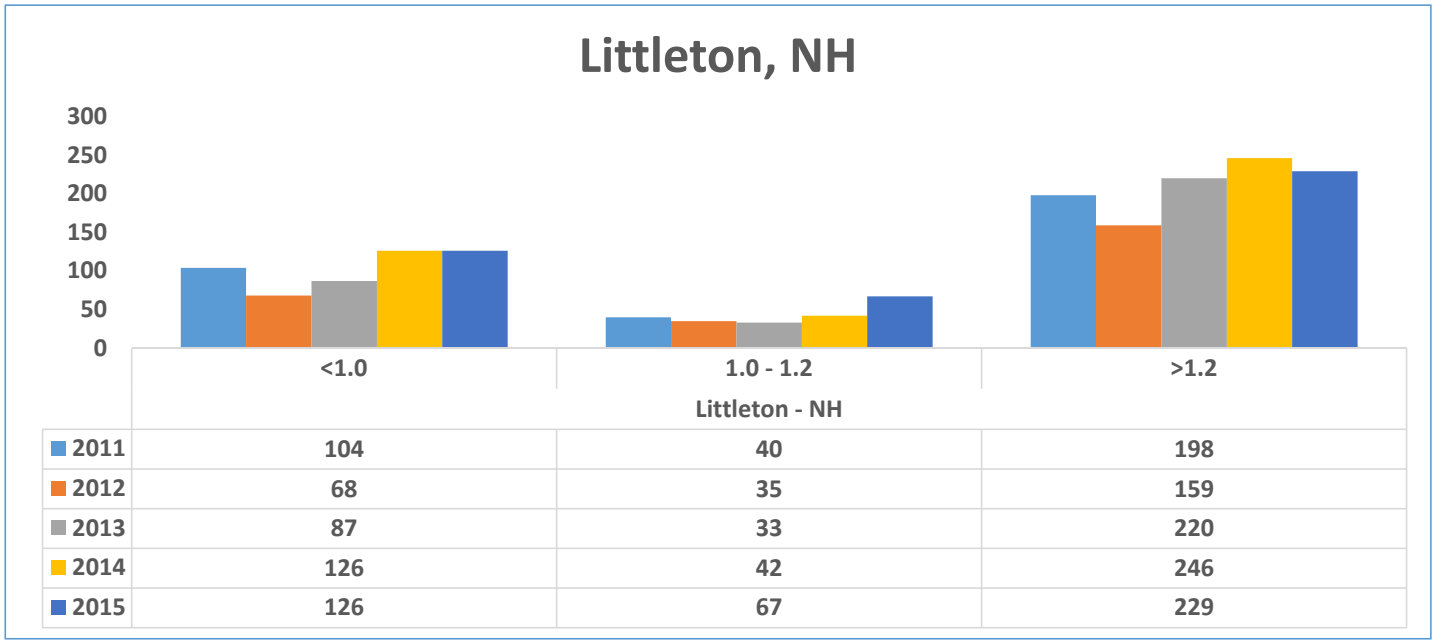
DHMC Outpatient Visit Trend 2011-2015



Source: D-HDRS

1-Year % Chg.	5-Year % Chg.
9.1%	37.0%

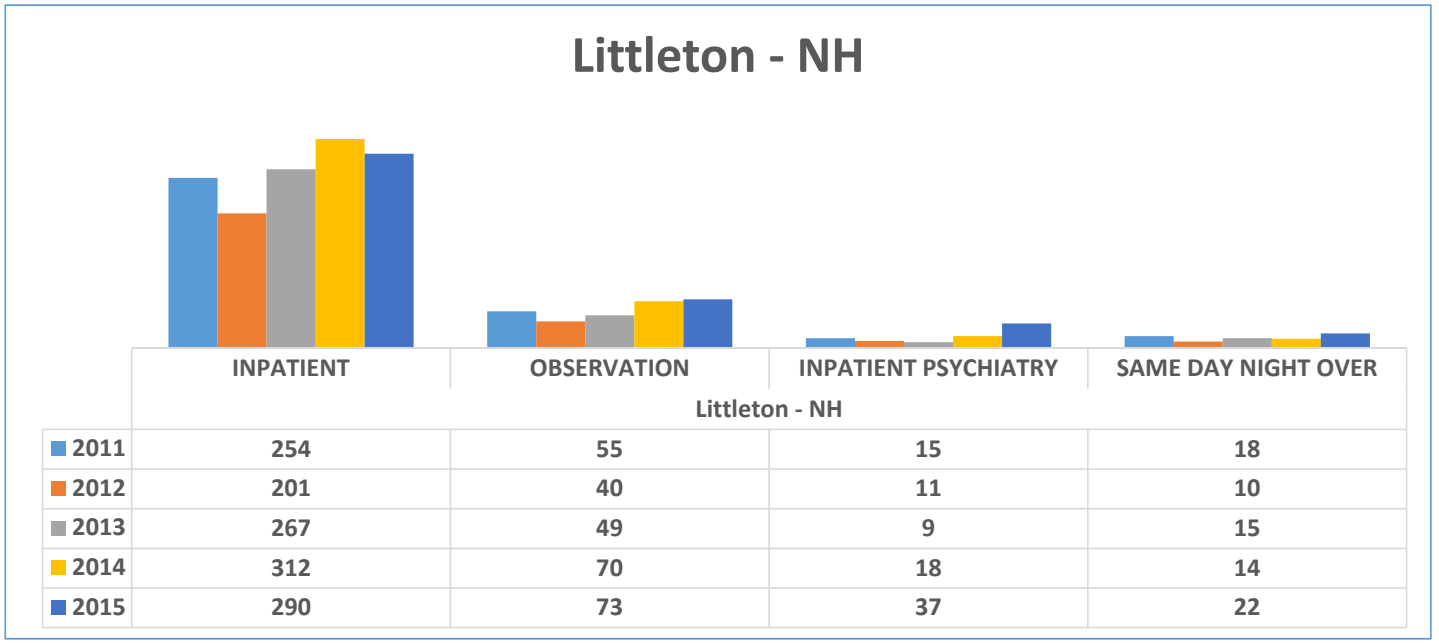
DHMC Inpatient Acuity Trend 2011-2015



Littleton - NH	<1.0	1.0 - 1.2	>1.2
2011	104	40	198
2012	68	35	159
2013	87	33	220
2014	126	42	246
2015	126	67	229

Source: D-HDRS

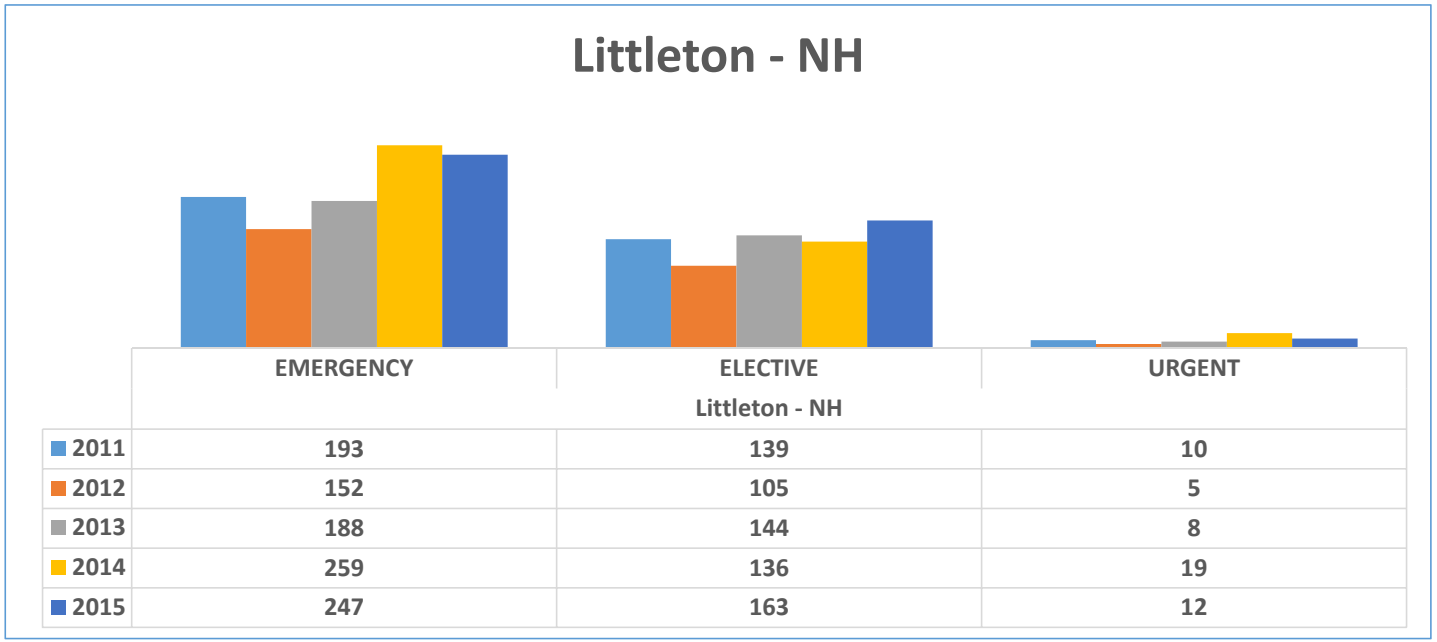
DHMC Patient Type Trend 2011-2015



	INPATIENT	OBSERVATION	INPATIENT PSYCHIATRY	SAME DAY NIGHT OVER
	Littleton - NH			
2011	254	55	15	18
2012	201	40	11	10
2013	267	49	9	15
2014	312	70	18	14
2015	290	73	37	22

Source: D-HDRS

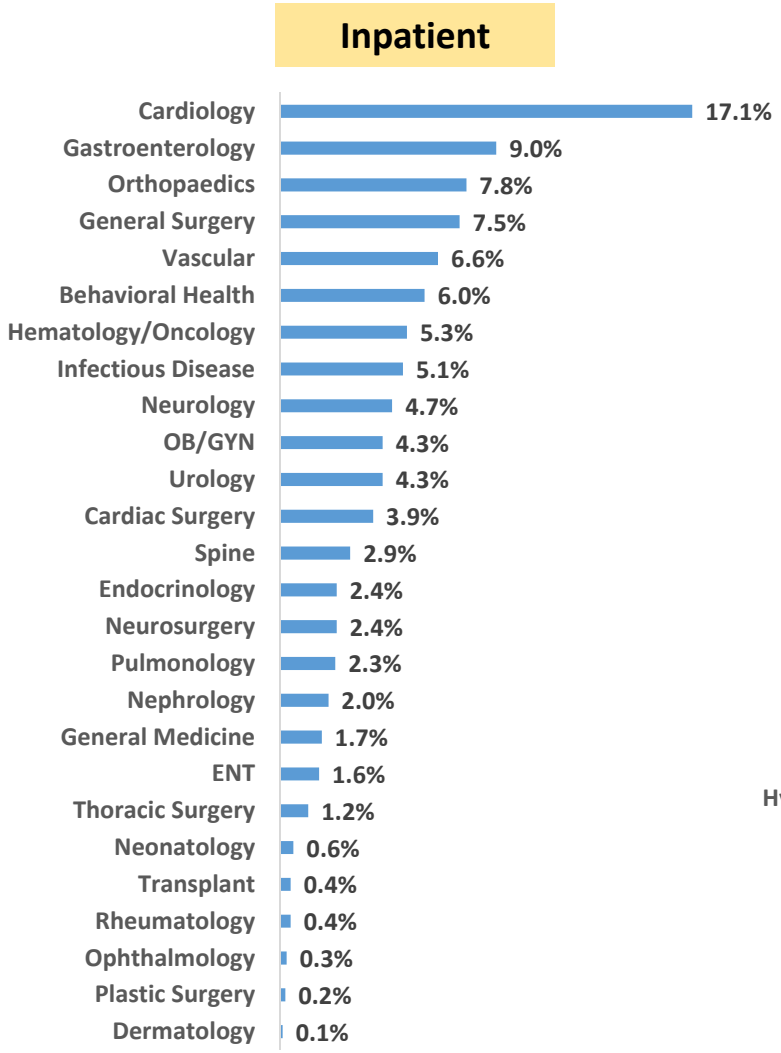
DHMC Admit Type Trend 2011-2015

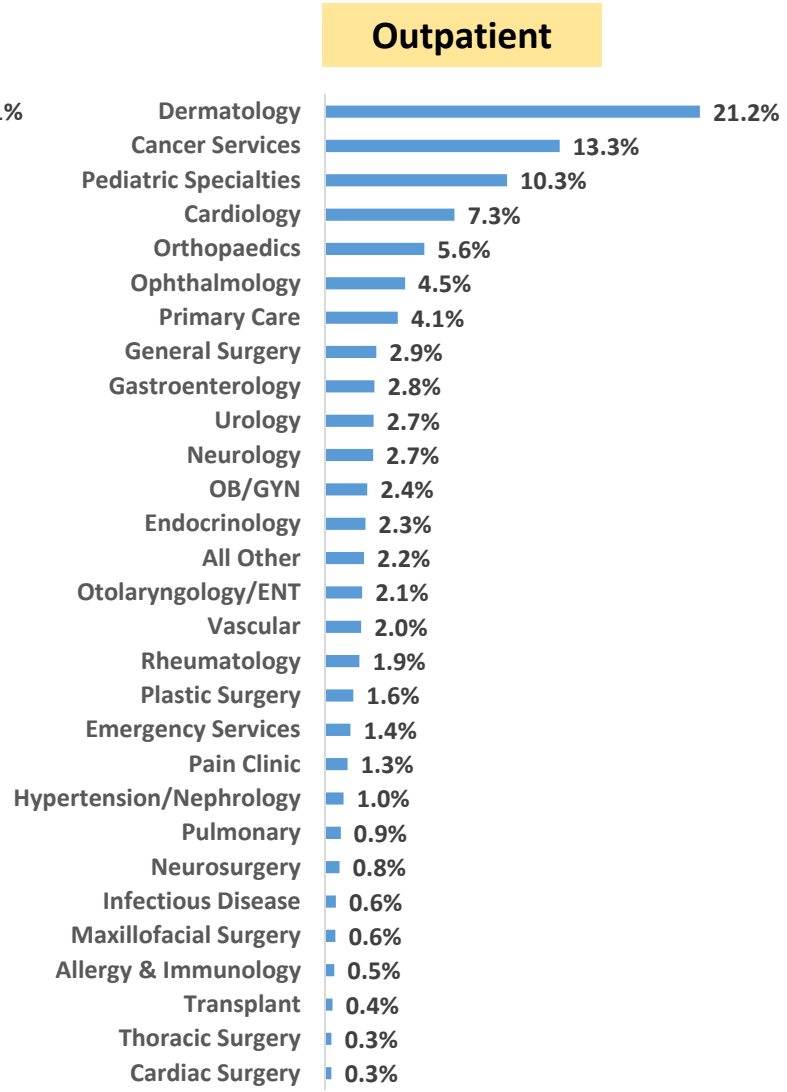


	EMERGENCY	ELECTIVE	URGENT
	Littleton - NH		
2011	193	139	10
2012	152	105	5
2013	188	144	8
2014	259	136	19
2015	247	163	12

Source: D-HDRS

Demand for Services By Specialty





Source: D-HDRS

Inpatient Visits By Clinical Section - Trend

LITTLETON - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Cardiology	52	50	51	90	62	-31.1%	19.2%
Behavioral Health	21	14	11	21	40	90.5%	90.5%
General Surgery	23	22	30	20	38	90.0%	65.2%
Gastroenterology	40	22	34	29	35	20.7%	-12.5%
Infectious Disease	14	10	18	20	29	45.0%	107.1%
Neurology	18	8	20	11	26	136.4%	44.4%
Orthopaedics	24	17	31	41	25	-39.0%	4.2%
OB/GYN	10	14	9	21	22	4.8%	120.0%
Endocrinology	7	4	6	7	18	157.1%	157.1%
Hematology/Oncology	27	9	10	31	17	-45.2%	-37.0%
Vascular	26	19	21	34	17	-50.0%	-34.6%
Urology	18	9	23	11	15	36.4%	-16.7%
Cardiac Surgery	10	14	14	17	14	-17.6%	40.0%
Spine	8	10	13	11	10	-9.1%	25.0%
Neurosurgery	7	9	10	7	9	28.6%	28.6%
ENT	6	5	6	4	8	100.0%	33.3%
General Medicine	4	4	5	10	8	-20.0%	100.0%
Pulmonology	10	6	7	11	7	-36.4%	-30.0%
Nephrology	9	8	7	6	6	0.0%	-33.3%
Neonatology		1	3	1	5	400.0%	
Plastic Surgery					4		
Thoracic Surgery	4	3	5	5	4	-20.0%	0.0%
Dermatology					2		
Transplant	2	1	3	1	1	0.0%	-50.0%
Ophthalmology	2	2	1				
Rheumatology		1	2	5			

Source: D-HDRS

Outpatient Visits By Clinical Section - Trend

LITTLETON - NH	2011	2012	2013	2014	2015	1-Yr. % Chg.	5-Yr. % Chg.
Dermatology	1,958	1,817	2,298	2,629	3,071	16.8%	56.8%
Cancer Services	1,077	1,180	1,676	1,797	1,634	-9.1%	51.7%
Pediatric Specialties	1,136	925	1,158	1,220	1,271	4.2%	11.9%
Cardiology	722	548	825	1,010	953	-5.6%	32.0%
Orthopaedics	467	451	693	718	781	8.8%	67.2%
Ophthalmology	408	369	468	564	698	23.8%	71.1%
Primary Care	493	347	487	475	476	0.2%	-3.4%
General Surgery	254	219	346	321	463	44.2%	82.3%
Gastroenterology	244	170	333	385	411	6.8%	68.4%
Urology	369	207	304	265	370	39.6%	0.3%
OB/GYN	216	209	245	278	369	32.7%	70.8%
Neurology	316	219	329	272	364	33.8%	15.2%
Endocrinology	271	224	246	230	287	24.8%	5.9%
All Other	262	179	268	229	278	21.4%	6.1%
Otolaryngology/ENT	228	164	270	223	271	21.5%	18.9%
Vascular	233	180	252	211	250	18.5%	7.3%
Pain Clinic	142	59	119	149	226	51.7%	59.2%
Emergency Services	127	92	163	195	211	8.2%	66.1%
Rheumatology	215	150	271	232	202	-12.9%	-6.0%
Plastic Surgery	128	158	250	147	197	34.0%	53.9%
Neurosurgery	77	83	90	66	132	100.0%	71.4%
Hypertension/Nephrology	100	71	134	146	118	-19.2%	18.0%
Pulmonary	73	101	107	111	93	-16.2%	27.4%
Infectious Disease	64	67	60	74	67	-9.5%	4.7%
Allergy & Immunology	69	51	43	59	59	0.0%	-14.5%
Maxillofacial Surgery	22	34	78	130	51	-60.8%	131.8%
Cardiac Surgery	34	38	40	39	38	-2.6%	11.8%
Thoracic Surgery	32	41	51	44	22	-50.0%	-31.3%
Transplant	30	57	76	44	19	-56.8%	-36.7%

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined)

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Allergy	• Allergic reactions • Other upper respiratory disease • Asthma • Other lower respiratory disease	**Dermatology**	• Other skin disorders • Other inflammatory condition of skin • Other and unspecified benign neoplasm • Allergic reactions	**General Surgery**	• Other gastrointestinal disorders • Other fractures • Abdominal hernia
Cancer Services	• Cancer of bronchus; lung • Cancer of head and neck • Secondary malignancies • Cancer of breast • Cancer of pancreas	**Emergency Services**	• Other nervous system disorders • Other injuries and conditions due to external causes • Abdominal pain • Other fractures	**High-Risk OB**	• Other complications of birth; puerperium affecting management of mother • Other complications of pregnancy • Normal pregnancy and/or delivery
Cardiac Surgery	• Coronary atherosclerosis and other heart disease • Heart valve disorders	**Endocrinology**	• Thyroid disorders • Diabetes mellitus with complications • Other endocrine disorders	**Infectious Disease**	• Bacterial infection; unspecified site • Immunizations and screening for infectious disease • Infective arthritis and osteomyelitis (except that caused by tuberculosis)
Cardiology	• Cardiac dysrhythmias • Coronary atherosclerosis and other heart disease • Conduction disorders • Heart valve disorders • Congestive heart failure; nonhypertensive	**Gastroenterology**	• Other gastrointestinal disorders • Other liver diseases • Esophageal disorders	**Maxillofacial Surgery**	• Disorders of teeth and jaw • Cancer of head and neck

Source: D-HDRS

Top Diagnoses By Clinical Section – 5-Year (Combined) – cont.

Section	Top Diagnoses	Section	Top Diagnoses	Section	Top Diagnoses
Neurology	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Hereditary and degenerative nervous system conditions • Epilepsy; convulsions • Acute cerebrovascular disease	**Orthopaedics**	• Fracture of lower limb • Fracture of upper limb • Connective tissue disease • Non-traumatic joint disorders • Spondylosis; intervertebral disc disorders; other back problems	**Thoracic Surgery**	• Cancer of bronchus; lung • (N/A) • Other lower respiratory disease • Cancer of esophagus
Neurosurgery	• Nervous system disorders • Spondylosis; intervertebral disc disorders; other back problems • Intracranial injury • Acute cerebrovascular disease	**Otolaryngology (ENT)**	• Ear and sense organ disorders • Otitis media and related conditions • Cancer of head and neck • Upper respiratory disease	**Urology**	• Genitourinary symptoms and ill-defined conditions • Diseases of bladder and urethra • Diseases of kidney and ureters • Calculus of urinary tract
OB/GYN	• Complications of birth; Other female genital disorders • Complications of pregnancy • Genitourinary symptoms and ill-defined conditions	**Pulmonary**	• Other lower respiratory disease • Chronic obstructive pulmonary disease and bronchiectasis • Cystic fibrosis	**Vascular Surgery**	• Peripheral and visceral atherosclerosis • Other circulatory disease • Aortic; peripheral; and visceral artery aneurysms • Phlebitis; thrombophlebitis and thromboembolism • Aortic and peripheral arterial embolism or thrombosis
Ophthalmology	• Retinal detachments; defects; vascular occlusion; and retinopathy • Blindness and vision defects • Glaucoma • Cataract	**Rheumatology**	• Connective tissue disease • Non-traumatic joint disorders • Osteoarthritis • Spondylosis; intervertebral disc disorders; other back problems • Systemic lupus erythematosus and connective tissue disorders		

Source: D-HDRS

Top Procedures (Min. 10 Procedures)

Procedure	2011	2012	2013	2014	2015
Diagnostic cardiac catheterization, coronary arteriography	119	114	115	110	71
Respiratory intubation and mechanical ventilation	36	26	43	35	42
Blood transfusion	54	39	28	59	38
Psychological and psychiatric evaluation and therapy	62	15	13	7	29
Other diagnostic procedures (interview, evaluation, consultation)	14	15	16	14	23
Other OR procedures on vessels other than head and neck	37	37	37	36	22
Other vascular catheterization, not heart	85	36	40	25	20
Diagnostic spinal tap	11	4	6	5	18
Enteral and parenteral nutrition	15	17	20	17	18
Abdominal paracentesis	34	6	16	15	18
Other therapeutic procedures, hemic and lymphatic system	25	20	29	16	16
Other OR lower GI therapeutic procedures	13	9	16	10	15
Other non-OR therapeutic cardiovascular procedures	14	10	15	22	14
Extracorporeal circulation auxiliary to open heart procedures	9	16	14	18	13
Hip replacement, total and partial	4	14	16	11	13
Laminectomy, excision intervertebral disc	6	11	3	5	13
Hemodialysis	8	8	5	14	12
Upper gastrointestinal endoscopy, biopsy	99	51	45	8	12
Debridement of wound, infection or burn	3	9	4	12	11
Diagnostic ultrasound of heart (echocardiogram)	13	12	12	24	11
Other therapeutic procedures	78	39	72	19	11
Excision, lysis peritoneal adhesions	6	1	6	2	11
Other OR heart procedures	15	8	2	10	11
Coronary artery bypass graft (CABG)	11	12	9	18	10
Other procedures to assist delivery	2	6	5	6	10
Other non-OR or closed therapeutic nervous system procedures	17	19	17	4	10

Source: D-HDRS

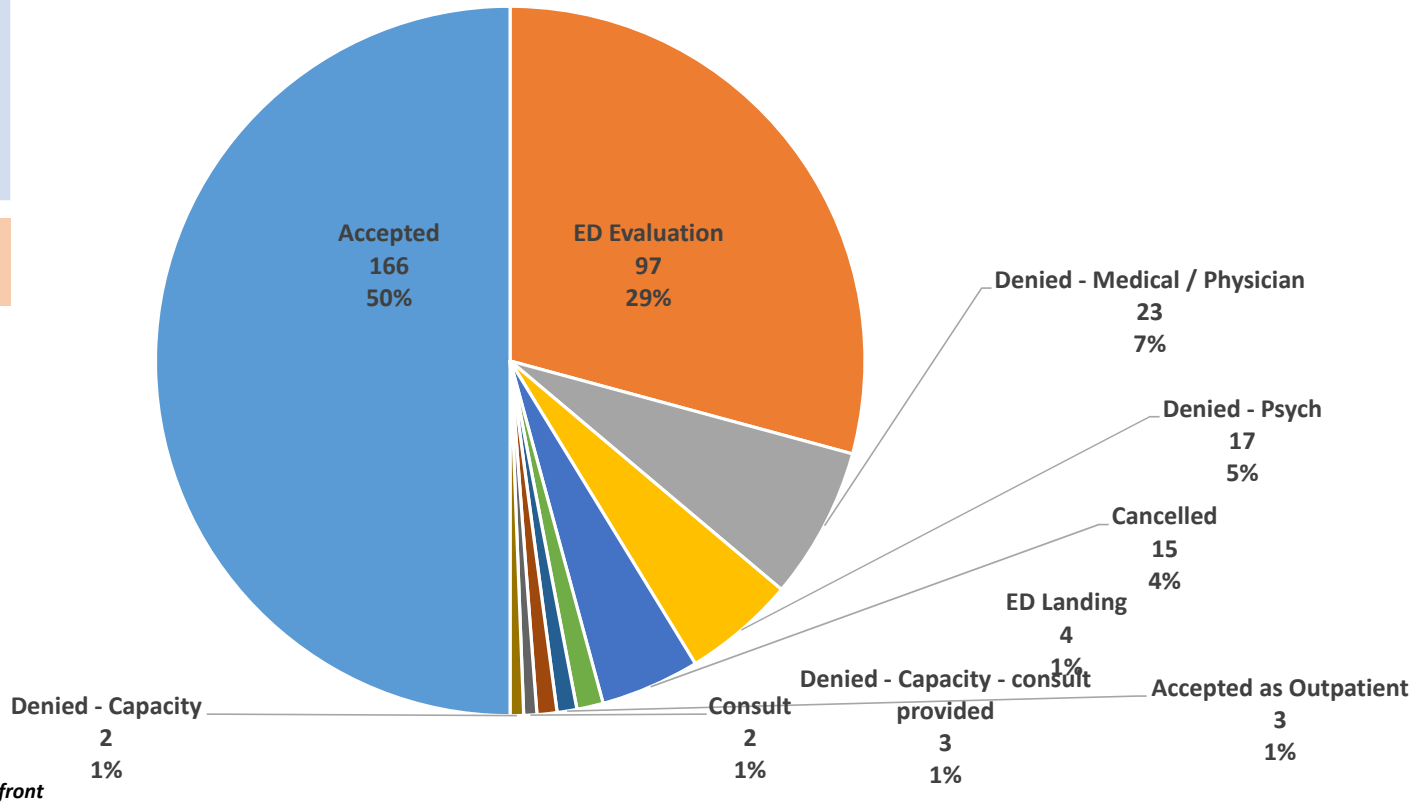
DHMC Transfer Center Volume 2016 YTD – Littleton HSA

Total - 332

Top Diagnoses - Accepted

NSTEMI
STEMI
Trauma
Unstable Angina

* There were no specific patterns in the diagnoses denied for medical reasons.



Source: D-H Connected Care Center - Forefront