

The Health Informatics Assessment Project

A report prepared for Growing Portland

April 2015



This report was prepared for the Growing Portland collaborative by John Spritz, Manager of Growing Portland. Technical and research assistance was provided by the Survey Research Center at the University of Southern Maine’s Muskie School of Public Service, and by Peter Marks. Principal funding support was provided by the Maine Technology Institute’s Cluster Initiative Program, with matching support provided by InterMed, MaineHealth, Maine Medical Center, the Portland Regional Chamber of Commerce, and Winxnet.

Table of Contents

Executive Summary: The Five Chief Takeaways..... 2

1. Background and methodology 3

2. HI at the national scale: “About to get red hot” 5

3. HI in Maine: The basic numbers..... 8

4. HI in Maine: Diverse talents, national reach 11

5. HI in Maine: Additional data 12

6. HI in Maine: The potential..... 15

7. HI in Maine: Growth inhibitors 17

8. What sort of talent do we need?..... 19

9. Creating a center 22

10. What kind of center makes sense in Maine?..... 27

11. What makes a center a “center of excellence”? 29

12. Is HI a cluster in Maine? 30

13. Recommendations 32

Appendix A: Online survey questions 34

Appendix B: Participation organizations 40

Appendix C: Higher education programs 42

Appendix D: Growing Portland partners 46

Appendix E: Selected resources 47

Executive Summary: The Five Chief Takeaways

For the purposes of this report, the Health Informatics Assessment Project will hereafter be referred to as “HIAP,” and health informatics will hereafter be referred to as “HI.” The definition of HI will be:

“The use of data to inform and improve healthcare quality, cost, and risk decisions.”

Research conducted on behalf of this report, the HIAP, has uncovered five key themes:

1) The HI community in Maine is diverse and deep.

Although the HIAP was not designed to include every potential health informatics employer in Maine, we feel confident in estimating a minimum of 3,000 individuals statewide who work in collecting, analyzing, and applying healthcare data. The majority of this community is centered in Greater Portland, primarily working in healthcare, insurance, and technology.

2) The demand for talent is significant.

The rapidly expanding skill and competency needs among employers have outstripped the available human resources. Most of the current academic offerings in Maine focus on health information management, not HI. Many organizations hire employees back and forth from one another, and there is a paucity of HI talent entering the state.

3) A center makes sense.

While Maine contains several HI hubs, typically based where large employers are located, there is relatively little cohesion across the community. This project uncovered a strong interest in developing some form of network for sharing ideas and resources, and for building and attracting talent, with Greater Portland the logical base for such a center.

4) Identifying value is critical.

For any collaborative effort to succeed in attracting talent, Maine’s HI community will need to demonstrate specialness. HI is a growing sector all across the country. Either through unique, problem-solving projects or through the very nature of our collaboration, Maine will have to demonstrate the intellectual and organizational advantages of working in this field, in this state.

5) Continue the process with two efforts.

We recommend maintaining and expanding the larger HI community through an online presence and regular convenings. We also recommend that a smaller work group be formed to address issues of funding, administration and the viability/value of a center.

The balance of this report examines various aspects of these themes.

Throughout its work, the Growing Portland collaborative remains cognizant of its role as an economic development initiative of the Greater Portland region. Our goal is to foster HI’s potential here and, by extension, throughout Maine.

1. Background and methodology

The Growing Portland collaborative (hereafter referred to as GP) is an economic development collaborative based in Portland, Maine. We represent 20 partner organizations in business, higher education, and research/development. GP identifies and implements projects that:

- Create sustainable jobs in innovative industries;
- Generate investments to support key sectors; and
- Attract young people to the region.

In 2013, GP's partners agreed to focus on three primary initiatives:

1. Building a center of excellence in healthcare informatics;
2. Optimizing the marine economy through science and education; and
3. Coordinating workforce opportunities for marginalized populations.

The HIAP aligns with the first of these initiatives. The Maine Technology Institute (MTI) provided primary funding for this project through its Cluster Initiative Program, with matching funding provided by InterMed, MaineHealth, Maine Medical Center, the Portland Regional Chamber of Commerce, and Winxnet. Technical assistance was provided by the Survey Research Center at the University of Southern Maine's Muskie School of Public Service, and additional research was provided by Peter Marks.

As the MTI application noted: *“Healthcare informatics has a strong and growing presence in Maine, with numerous organizations and individuals competing on a national basis. There is interest in developing a coalition or center in this cross-sector discipline. First, however, we need a clearer picture...this project proposes to undertake that assessment and its subsequent reporting.”*

The HIAP drew upon four primary sources:

- 1) Research, meetings, and surveys conducted prior to the HIAP
- 2) An online survey conducted in late 2014
- 3) Interviews conducted in 2014/2015
- 4) Additional research into health informatics

1) Research, meetings, and surveys conducted prior to the HIAP

- In late 2013, a GP work group in healthcare identified HI as a possible opportunity for workforce growth in Greater Portland.
- At a March 4, 2014, summit coordinated by GP, 24 industry leaders representing 18 local employers met to discuss HI's potential and the need for greater collaboration and focus.
- Concurrent with that summit, 14 meeting attendees had responded to an online survey, indicating strong mutual interest in establishing a center of excellence in HI.

Based on that summit and the information and opinions generated therein, GP applied to the MTI for a planning grant within the Cluster Initiative Program. Awarded a grant on September 11, 2014, GP conducted a series of programs to reach out to individuals and organizations with a stake in HI in Maine:

2) An online survey conducted in late 2014

- Conducted with the assistance of the Survey Research Center at the University of Southern Maine's Muskie School of Public Service, a 32-question online survey was developed and sent to individuals at 81 organizations throughout Maine. (*A complete list of the survey questions asked is included in Appendix A to this report.*) The survey was sent October 23, 2014 through January 11, 2015, in various waves.
- Of the 81 organizations contacted, 39 fully completed the 32-question survey, a 48% response rate. An additional 23 organizations partially completed the 32-question survey, an additional 28% response rate.
- The organizations contacted were in the fields of consulting, government, healthcare, higher education, insurance, nonprofit, and technology.
- This survey was not intended to be comprehensive of every Maine organization that potentially has a stake in, or employs individuals in, HI. Rather, it was sent to a majority of relevant organizations across the state, with the understanding that their responses could be viewed as representative of the whole.

3) Interviews conducted in 2014/2015

- GP's principal investigator for the HIAP, John Spritz, conducted live and telephone interviews with 55 individuals representing 43 organizations.
- Of the 43 interviews, 35 were with organizations completing the online survey; 8 were with organizations not involved with the online survey.

(A complete list of participating organizations is included in Appendix B to this report.)

4) Additional research into health informatics

- On its own and with the assistance of others, GP explored topics such as the increasing growth and significance of HI, different models for HI centers, which HI programs are available in local academic institutions, and how other cluster associations are constructed.

2. HI at the national scale: “About to get red hot”

“Using analytics to gain better insights can help demonstrate value and achieve better outcomes, such as new treatments and technologies. Information leading to insight can help informed and educated consumers become more accountable for their own health. Analytics can improve effectiveness and efficiency...Perhaps most important, it can expand access to healthcare, align pay with performance and help hold down growth in healthcare costs.”
(*IBM Institute for Business Value*, “The value of analytics in healthcare,” 2012)

The demands of the Affordable Care Act, the increasingly sophisticated technology available to health providers as well as patients, the pressures exerted by insurance companies to reduce costs – these are only a few of the reasons for the dramatic surge in HI. At the intersection of healthcare and technology, HI has opened up opportunities for hospitals and other healthcare providers, insurance companies, technology companies, and higher education programs.

However, assessing how many individuals actually work in HI, nationally or in Maine, is challenging. As of today, no NAICS (North American Industry Classification System) or SOC (Standard Occupational Classification) codes target this field. Lacking these codes and classifications, HI as a distinct sector and set of occupations is simply “not counted.” There *are* relevant O*NET codes, 15-1121.01 for “Informatics Nurse Specialist” and 29-2071.00 for “Medical Records and Health Information Technicians.”

[This situation may change soon. A consortium of HI associations, noting that “The Standard Occupational Classifications (SOC) for healthcare and related industries currently lacks codes associated with the health informatics occupation,” is proposing just such a category, “Health Informatics Practitioner.” If the new SOC is accepted, it would begin implementation in 2018.]

As a result, it can be bewildering deciding how to count the number of individuals working in health informatics nationwide. For example:

- CSC, in a 2012 report, “U.S. Healthcare Workforce Shortages: HIT Staff,” estimated the size of the HIT workforce to be 108,000, with an additional 50,000-worker deficit nationwide in open and unfilled jobs.
- Also in 2012, the U.S. Bureau of Labor Statistics counted 186,300 “Medical Records and Health Information Technicians” – primarily, these are electronic health record coders.
- In 2013, the Office of the National Coordinator for Health IT, looking at online job postings from 2007-2011, found 434,282 in health IT.
- O*NET reported that 512,000 informatics nurse specialists were employed nationwide in 2012, with another 209,000 expected to fill that category by 2022.
- The website of the American Medical Informatics Association claims “Over 5,000 informatics professionals and students” comprise its community.

Whatever statistics or definitions one chooses, the health informatics market is clearly growing:

“There is one job category that has seen significant growth, yet has gone largely unnoticed in national job reports: health care informatics. As measured by online job postings, hiring demand in 2012 experienced a modest recovery, with total job listings up 6% and health care postings overall up 5% compared to 2007. In contrast, postings for health care informatics jobs took off, jumping 53% in that five-year period.” (*Burning Glass*, “A Growing Jobs Sector: Health Informatics,” 2013)

“The healthcare analytics market has exploded. Healthcare organizations of all sizes are now seeking solutions that will help them better understand the population that they will be responsible for, and the incumbent risk therein as reimbursement models shift. This has created a hyper-driven market....” (*Chilmark Research*, “2013 Clinical Analytics Market Trends Report”)

“The clinical data analytics market is about to get red hot. With the shift towards new payment models and the sheer amount of clinical data contained in electronic health records, more and more healthcare groups are looking to analytic solutions for population health management.” (*Healthcare IT News*, “Clinical data analytics next big thing,” August 27, 2013)

“Employment of health information technicians is projected to grow 22 percent from 2012 to 2022, much faster than the average for all occupations...An aging population will need more medical tests, treatments, and procedures. This will mean more claims for reimbursement from insurance companies.” (*US Bureau of Labor Statistics*)

“Computer Systems Analyst was the most advertised IT job by healthcare companies, accounting for 27% of tech demand in this sector. Informatics Nurse Specialists were also listed among the tech jobs that were most needed.” (*WANTED Analytics* “Healthcare Is in Need of Tech Talent”)

“This field is exploding,’ says Charles Friedman, director of the health informatics program at the University of Michigan-Ann Arbor, which enrolled its first master’s class in the fall of 2012. ‘Access to health information on the Web is taking off at a meteoric pace. It’s creating enormous employment opportunities.’” (*U.S. News & World Report*, “Consider Pursuing a Career in Health Informatics,” March 26, 2014)

Those working in the field of informatics – using data “...to inform and improve healthcare quality, cost, and risk decisions” – have a range of job titles, positions and salaries. Just a few job-title samples (and their average or starting salaries) include:

- Health information technician (\$32K national average, according to Salary.com)
- Insurance analyst (\$53K national average, at Glassdoor.com)
- Informatics nurse specialist (\$56K-\$84K, according to Recruiter.com – Portland, ME is listed as \$57K-\$92K at Nursinginformatics.net)
- Data analyst (National average of \$61K at Indeed.com, \$64K and up at Glassdoor.com)
- Biostatistician (National average of \$75K, according to Salary.com)
- Healthcare informatics (\$94K national average, according to a 2014 survey by HealthITJobs.com)
- Chief medical information officer (\$150K-\$250K, according to Salarybystate.org)

As the HI field grows, one of its more attractive aspects is the opportunity for career advancement.

“Not only do these new informatics jobs pay better than their older counterparts, but they are also opening up a whole new set of opportunities for career advancement. Workers starting out as Health Information Clerks or Medical Coders can take advantage of clearly defined pathways that will let them move into more senior roles that pay more. These workers will have to continue to improve their skills and qualifications, of course, but there is an upward trajectory. These are likely to be good careers that can support a decent, middle-class lifestyle—no small thing given the difficult economic trends facing the nation overall and middle-skill job seekers in particular.” (*Burning Glass*, “Missed Opportunities? The Labor Market in Health Informatics,” 2014)

This potential for an upward or lateral trajectory augurs well for academic programs that accommodate certification and/or second careers.

3. HI in Maine: The basic numbers

Whatever workforce data is available nationally is more than we have in Maine. The state collects data about many healthcare subsets – but so far, not informatics.

Last year, the Maine Department of Labor’s Center for Workforce Research & Information (CWRI) issued its *2014 Health Occupations Report*; the closest occupation they noted was “Medical Records and Health Information Technicians”. The report indicates 1,120 employed in this sub-sector as of 2012, expected to rise to 1,273 (a 17% gain) by 2020. [After presenting the report in April 2014, its primary author, Paul Leparulo, confirmed that informatics has not yet shown up in the CWRI’s work. Similarly, in November 2014, Merrill Huhtala, program manager for Occupational Employment Statistics at the CWRI, told the author of this HIAP report that CWRI does not (yet) track HI. “The work you’re doing could break some ground.”]

Therefore, to estimate the number of HI workers in Maine, GP was faced with conducting something of a hand-count, adhering to three principles:

1. We would follow our definition of HI: *“The use of data to inform and improve healthcare quality, cost, and risk decisions.”* We would *not* try to count, for instance, every person working in a hospital. Or every employee at a technology company selling products and services in the HI space. Rather, we would count only those employees who genuinely were engaged in capturing, interpreting, and/or applying data.
2. We would trust our contacts within institutions – typically chief executives or senior managers – to distinguish who the relevant staff were, and what needs their institution might have.
3. We would reach out to sectors beyond healthcare, especially insurance and technology. If we contemplate building a program that aggregates people working in HI across Maine, then we cannot limit ourselves to one sector.

So, in 2014-15, how many people employed in Maine work in HI? The HIAP examined seven sectors, identifying organizations in each where some form of HI activity was occurring. Through the online survey and follow-up interviews, GP then contacted executives within those organizations to ask about the extent of an HI presence. In some situations, we were face-to-face with an executive or manager who could speak with certainty; in other situations, we were given estimates, or ranges. In still other situations, we were not able to contact reliable sources within an organization, but made intelligent estimates based on comparable data.

We estimate a minimum of approximately 3,000 individuals working in Maine in some form of HI, with 2,000-2,500 of these individuals located in Greater Portland. These numbers are defensible estimates, categorized as following for each sector:

Sector	# of HI staff	Sector	# of HI staff
Insurance	1,400	Consulting	50
Healthcare	1,000	Government	50
Technology	400	Higher education	25
Nonprofit	75		

What does a professional community employing 3,000 people mean? For comparison’s sake:

- **Disability insurance**, which features 20 or so companies in Greater Portland, is estimated to employ close to 5,000 people. (*Portland Press Herald*, “Large Canadian insurer picks Maine to expand, start hiring,” Feb 9, 2015)
- **Biotechnology**, which features 60 or so companies in Cumberland County, employs about 2,000 people there (from Mobilize Maine’s 2012 cluster analysis, based on NAICS codes identified by Charles Colgan for MTI in 2008).
- **Information technology**, which features about 270 companies in Cumberland County, employs about 4,500 people there (from the Mobilize Maine analysis (*above*), as well as from the CWRI)

[These estimates have varying interpretations. For instance, the disability insurance figure includes the total head-count at companies such as Unum and Disability RMS, although 100% of the people in those organizations are not actively engaged in disability insurance. Therefore, we reiterate that when GP estimates Maine’s HI industry at approximately 3,000, we are not including total head-count within relevant organizations: we are counting *only* those people engaged in HI work.]

In the online survey, HI companies were asked *where* these HI staff worked within their organization, using the following categories:

- Data acquisition
- Data analysis
- Data warehousing
- Electronic medical records
- Software/technology design
- Strategy and policy



As the chart to the right indicates, data analysis is the single largest category where HI employees work. Of course, this percentage alters from organization to organization, from sector to sector, but as will be seen in additional charts, it is a reliably consistent narrative.

We note that a significant additional population of HI and health information management workers in Maine consists of people who live/work here but are employed by out-of-state companies. Examples of those companies include:

- APS Healthcare
- BriovaRx
- In Record Time
- Lexicode
- Magellan Health Services
- Milliman
- Molina Healthcare
- Optum
- Scientific Technologies Corporation
- Truven
- Verisk

Developing and maintaining an HI community in Maine should include reaching out to the individuals working within these companies.

4. HI in Maine: Diverse talents, national reach

As shown in Appendix B, the list of organizations participating in the HIAP, Maine's HI community is diverse (and there are of course even more HI organizations in the state that did *not* participate). It is worthwhile to highlight just a few of the participating organizations.

Compass Health Analytics, a healthcare consulting firm with offices on Commercial Street, works 100% outside of Maine.

The **Franklin Community Health Network** is part of an effort looking for ways to connect patient data, claims data, and pharmacy data.

Goold Health Systems, based primarily in Augusta, works in Maine and nationwide. They envision "a big data institute" where information could be shared among companies.

HealthInfoNet, Maine's health information exchange, is a national model for how HIEs are supposed to operate, and how health systems are supposed to cooperate.

InterMed, a large healthcare provider, is particularly intrigued by how an HI center might prove to be a focal point for interns entering the healthcare field.

iVantage Health Analytics, based in Portland, works for hospital and healthcare systems across the country. They see an HI center as a place to "focus thought leadership."

Martin's Point Health Care, whose informatics department works with various sizes of vendors, thinks that an HI center could attract entrepreneurs and startups.

Mingle Analytics, with offices in South Paris and clients nationwide, envisions a center where HI people can come together to problem-solve on common issues.

RowdMap builds and implements business management platforms for healthcare providers. Virtually all of their work is out of state.

RxAnte uses analytics to improve medication use and therapy outcomes. They have offices in Portland and work nationwide.

The University of New England is developing programming that focuses on the adult learner. This accords well with another HIAP participant who noted that HI is a "a great second career."

The **University of New Hampshire** is developing a new Masters in Analytics degree. "There's a tremendous amount of job need"; UNH anticipates some of their graduates will work in Maine.

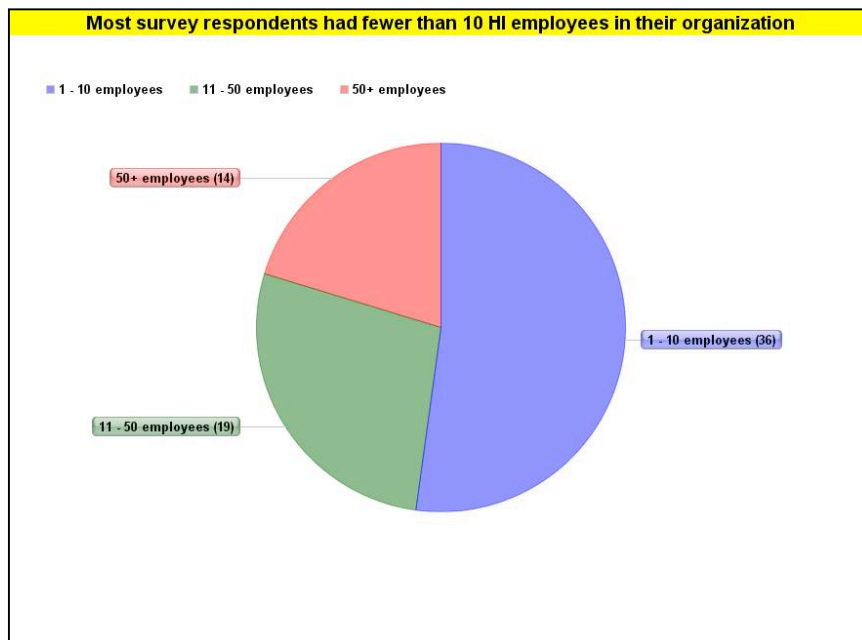
Winxnet, an IT outsourcing and consulting firm, specializes in working with healthcare providers. Winxnet is eager to connect academic programs with the needs of HI employers.

5. HI in Maine: Additional data

Beyond the raw numbers of how many people work in HI in Maine, and where they work within organizations, the HIAP survey and follow-up interviews gathered additional data regarding this population.

How many HI staff work within HI organizations?

As the chart to the right indicates, slightly more than half of survey respondents indicated that their organization employed fewer than 10 HI employees. Even in healthcare, which one would think would be the primary employer, many of the smaller hospitals in Maine currently employ very few people in HI. The interest is there but not (yet) the financial resources or human capital. As one would expect, the larger HI employers (50+) are the larger hospital systems, insurance companies, and technology firms.



How much do HI employees make in Maine?

Half of the respondents to the online survey indicated that HI staff made under \$75,000, while half indicated that HI staff made \$75,000-\$150,000. This compares well to annual mean wages in Maine for the following selected professions that relate to HI, as estimated in 2013 by the U.S. Department of Labor Bureau of Labor Statistics:

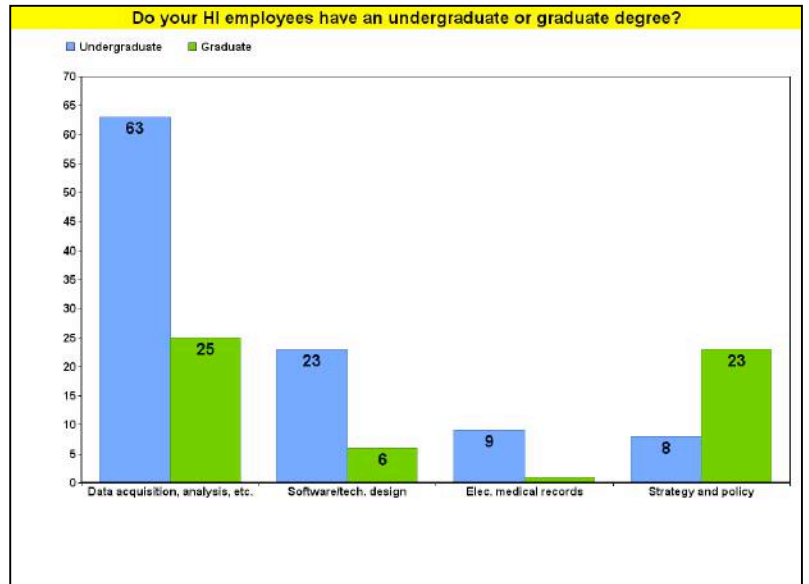
Salaries are one area where it is difficult to draw conclusions across sectors within HI, or even within a sector. The variables, such as organization size, location and employee skill level, are highly specific to each employer.

- \$98,260, Computer and Information Systems Managers
- \$80,220, Statisticians
- \$74,580, Computer Systems Analysts
- \$68,740, Computer Programmers
- \$62,640, Registered Nurses

However, our follow-up interviews with HI leaders clearly indicated that the majority of this workforce sits at the upper-end of salaries in Maine.

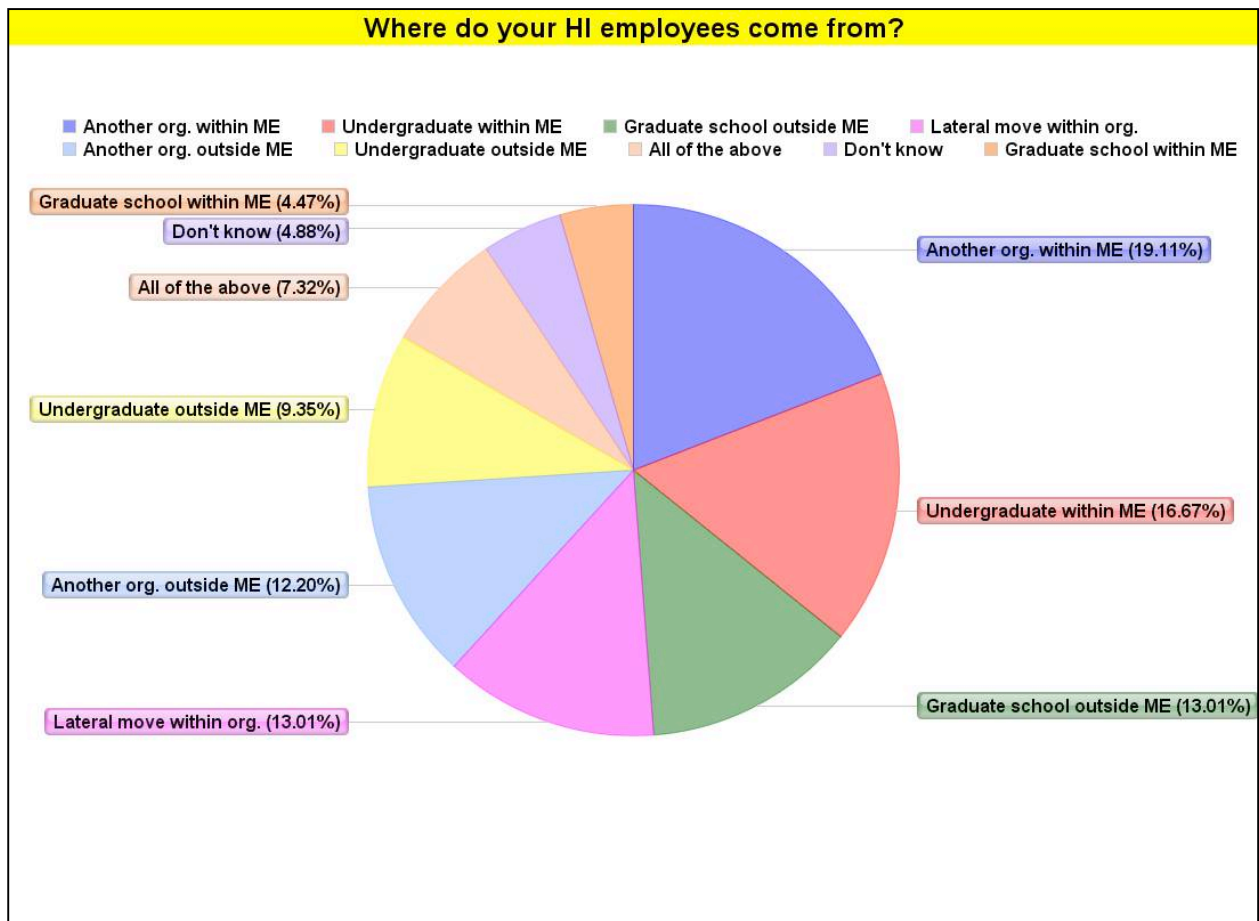
What sort of education does current HI staff possess?

As the chart indicates, in general, if you intend to work in HI in Maine, you'll need an undergraduate degree. The exception is "Strategy and policy," where senior management (and advanced degrees) are typically engaged. This chart aligns closely with the chart on page 19, where the survey asked what level of academic degree would be required of *future* HI staff (overwhelmingly, the answer was: undergraduate degree). [Blue bars on this chart indicate undergraduate degree; green bars indicate graduate degree. Numbers are raw indicators that each respondent ticked for various categories.]



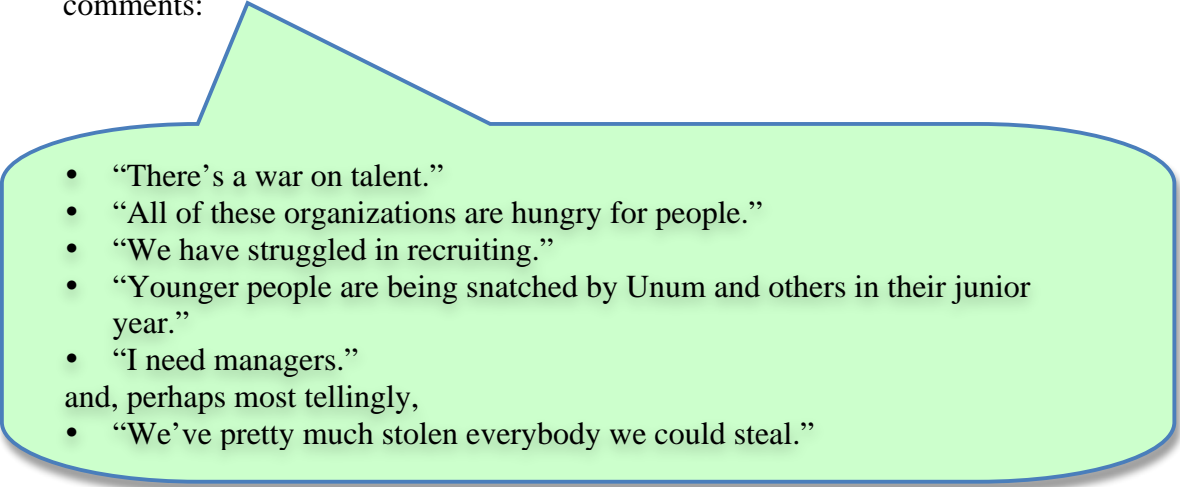
Where do your HI employees come from?

Where do Maine employers find their HI staff? As this chart indicates, the answers are various.



Among the conclusions that can be drawn from this data:

- There is not (yet) a reliable higher education pipeline for HI talent within the state of Maine. But the need is there.
- Higher-level talent, requiring graduate degrees, is typically found outside of Maine.
- The largest category for finding talent is “Another organization within Maine” – in other words, organizations (for-profit and non-profit) taking HI staff from one another. This state of affairs was confirmed in our follow-up interviews with HI leaders, as per these comments:

- 
- “There’s a war on talent.”
 - “All of these organizations are hungry for people.”
 - “We have struggled in recruiting.”
 - “Younger people are being snatched by Unum and others in their junior year.”
 - “I need managers.”
- and, perhaps most tellingly,
- “We’ve pretty much stolen everybody we could steal.”

Aggregate observations about the current status of HI staff in Maine

From the online survey and from the follow-up interviews, we observe that, for Maine:

- The HI population is larger than might be supposed – a minimum of 3,000 individuals – spread across various sectors.
- Data analysis makes up the single largest discipline within HI.
- HI jobs tend to pay well.
- Most positions (currently) require an undergraduate degree. No single “pipeline” dominates how talent is acquired.

These are some of the observable characteristics of HI today in Maine. What about the future?

6. HI in Maine: The potential

What is HI's potential in Maine? State leaders have spoken out: in 2013, the report of the *Governor's Broadband Capacity Building Task Force* called for, among other recommendations, that Maine "Develop a talent pool of health informatics specialists to expand Maine's competitive advantage in health information systems" at both the K-12 and university levels.

The growth potential in Maine is dramatic:

- **Looking at job growth from 2013-2022**, EMSI (Economic Modeling Specialists Intl), projects, for the Portland-South Portland-Biddeford Metropolitan Statistical Area:
 - A 19% rise in "Computer and mathematical occupations," with an average of 214 annual job openings
 - A 19% rise in "Health technologists and technicians," with an average of 233 annual job openings
- **Looking at job growth from 2010-2010** in their *2014 Health Occupations Report*, the CWRI projected 16% overall growth for healthcare, including 30% growth for hospitals. That growth will preferentially occur in Cumberland County, which already has 70 health workers per 1,000 residents (by far the highest in Maine).
- **The CWRI has also projected**, for the same timeframe, 2010-2020, 14-to-17% gains for professions such as Medical and Clinical Laboratory Technologists, Pharmacy Technicians, and Health Technologists and Technicians.
- **In their 2012-2022 Job Outlook report**, the CWRI noted these growth rates for High-Growth, High-Wage Jobs in Maine, many of which are HI-related:
 - Actuaries, 18% growth rate
 - Computer Systems Analysts, 17% growth rate
 - Healthcare Practitioners and Technical Workers, 11% growth rate
 - Medical and Clinical Laboratory Technologists, 7% growth rate
 - Software Developers, Applications, 15% growth rate

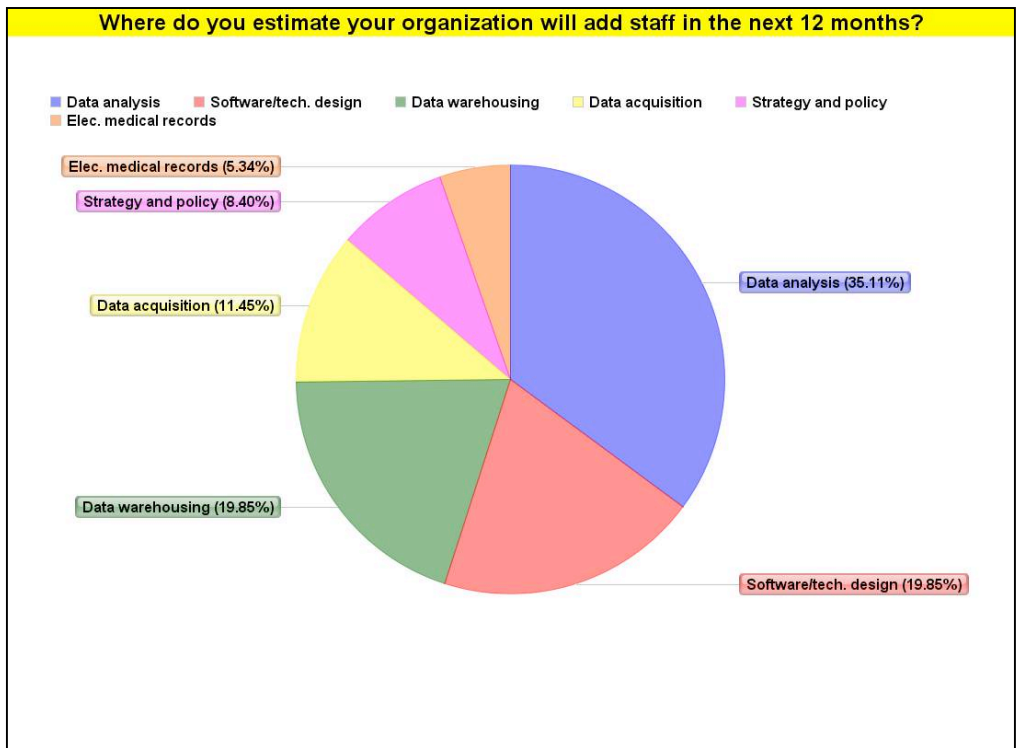
The HIAP online survey polled respondents as to their degree of optimism regarding HI growth. When asked "How would you describe the growth potential of health informatics within your organization?":

- 60% said "Growing steadily, incrementally"
- 27.5% said "Growing significantly"
- 12.5% said "Steady state – not much growth envisioned"

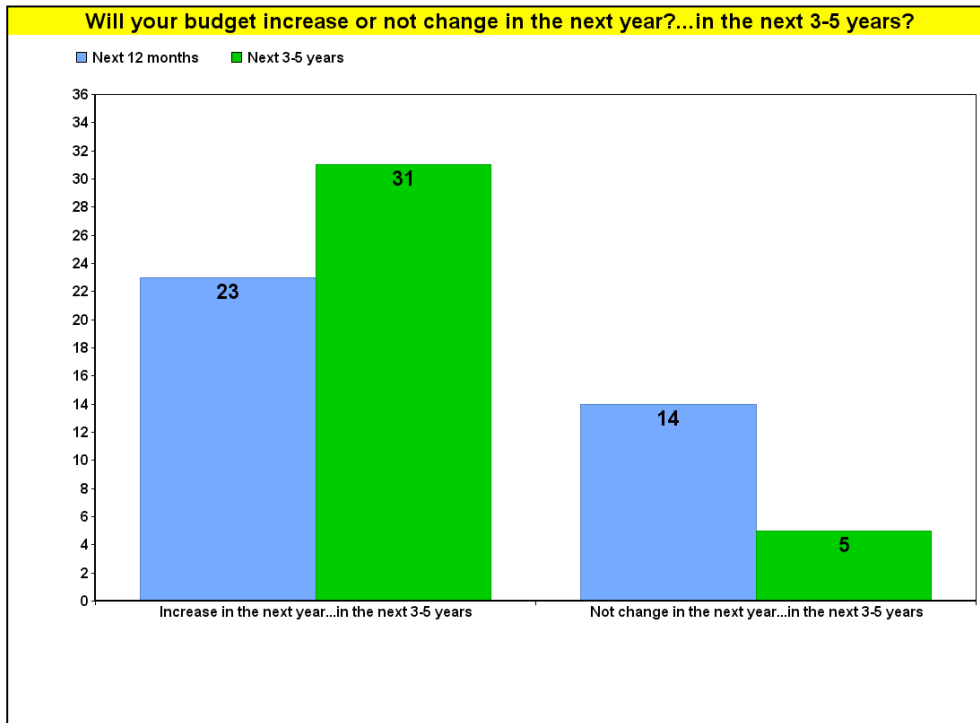
Where will growth occur? Survey respondents were asked where in their organizations they would be adding HI staff within the next 12 months:

- Data acquisition
- Data analysis
- Data warehousing
- Electronic medical records
- Software/technology design
- Strategy and policy

This chart closely matches the chart on page 9, “Where do HI employees work within your organization?” This consistency argues for focusing on data analysis as a linchpin for HI growth programs. (The survey asked the same question for “...the next 3-5 years?”, and the results were essentially the same.) Among survey respondents, raw numbers for expected staff increases were 153 in the next 12 months and 475 in the next 3-5 years.



And will organizations have the necessary budgets to grow their HI capabilities? The survey asked that, too, for the next 12 months and for the next 3-5 years.



As the chart indicates, there is general optimism that HI budgets will be increasing vs. not changing in the next year (23 vs. 14 respondents) and in the next 3-5 years (31 vs. 5 respondents).

Overall, then, there is careful optimism about the growth potential for HI in Maine. So, given this optimism, and the concurrent need, what is holding us back?

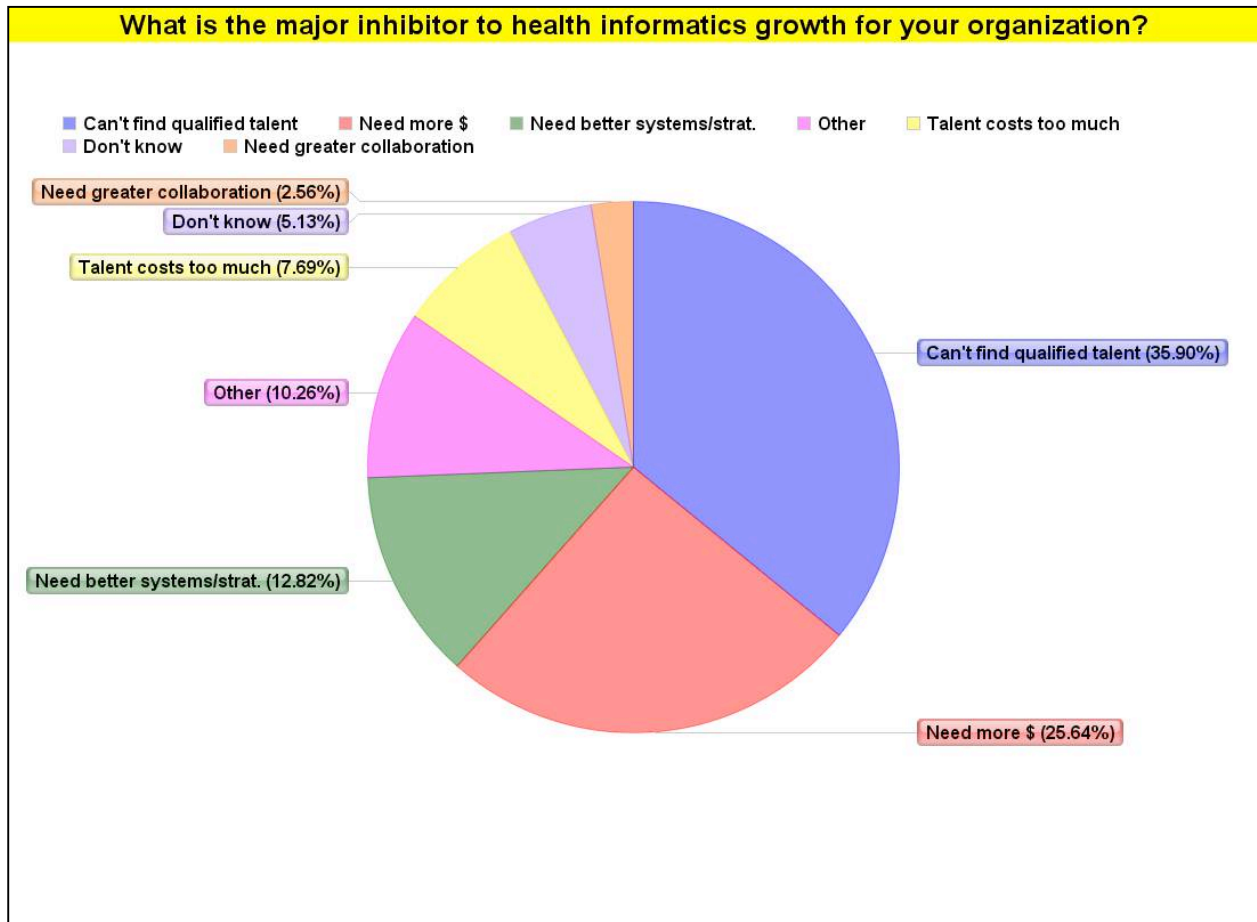
7. HI in Maine: Growth inhibitors

What is the major inhibitor to health informatics growth for your organization?

The HIAP survey asked respondents this question directly, giving them seven options:

1. We can't find qualified talent
2. We can find qualified talent – but they want too much money and/or don't want to come to/stay in Maine
3. Need greater collaboration/coordination among organizations
4. Need greater financial resources dedicated to health informatics within our organization
5. Need better systems and/or strategy within our organization
6. Other
7. Don't know

The results are below:



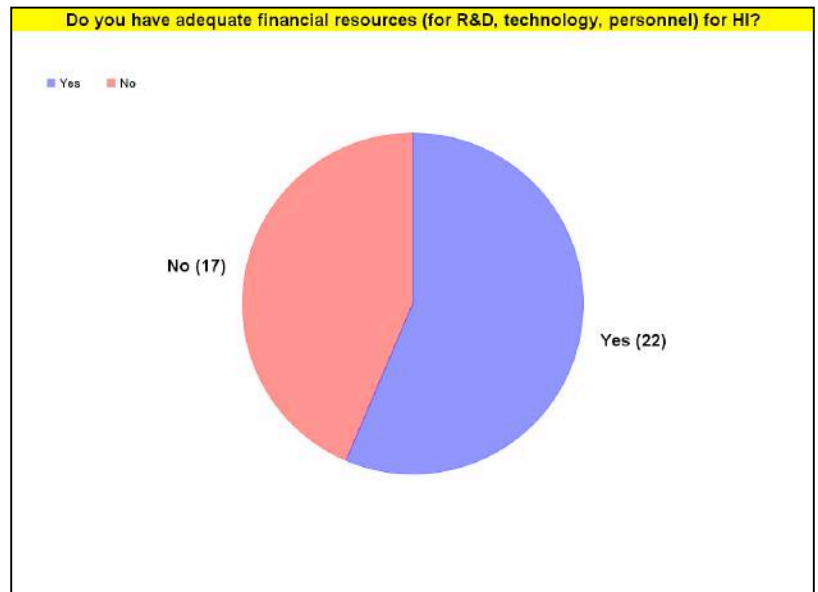
The dominance of the “Can't find qualified talent” category (35.90%) increases when one adds to it the similar “Talent costs too much” category (another 7.69%). In addition, several of the comments given by respondents who chose the “Other” category address the same concern:

- “It is hard to find qualified talent and when we do they usually want too much money for our area”
- “People qualified to manage technical work/workers”
- “State salaries, hiring quotas and process” (*from a state agency*)
- “Sometimes we cannot find talent, in that case we train up people already in the company”

In other words, close to half of all respondents identified the talent gap as the single biggest inhibitor to growth.

The next highest growth inhibitor relates to “Need greater financial resources dedicated to health informatics within our organization.” Pursuant to that issue, we asked survey respondents if they had adequate financial resources (for R&D, technology, personnel) for HI.

As this chart indicates, a majority of respondents answered in the positive, although the differential is slight. [This chart is slightly in contrast with the information on page 15, indicating a more optimistic opinion of growth and budgetary needs.]



But follow-up conversations with survey respondents confirmed that the hunt for qualified talent remains the #1 issue. This is, of course, a nationwide issue, not unique to Maine.

“The availability of qualified workers...emerged as the most significant challenge for vendor and provider respondents, a challenge which seemed to worsen between 2013 and 2014. Healthcare provider organizations in particular face challenges completing IT initiatives because of staff shortages...In order to satisfy the demand for desired workers, healthcare employers typically attempt to recruit workers away from other healthcare organizations using a multiplicity of approaches...The longer term solution for the healthcare industry though, is to increase the supply of IT professionals. One of the positive findings from this study in this regard is the increased willingness of healthcare providers to consider training from within as well as hiring new IT graduates.” (*HIMSS 2014 Workforce Study*)

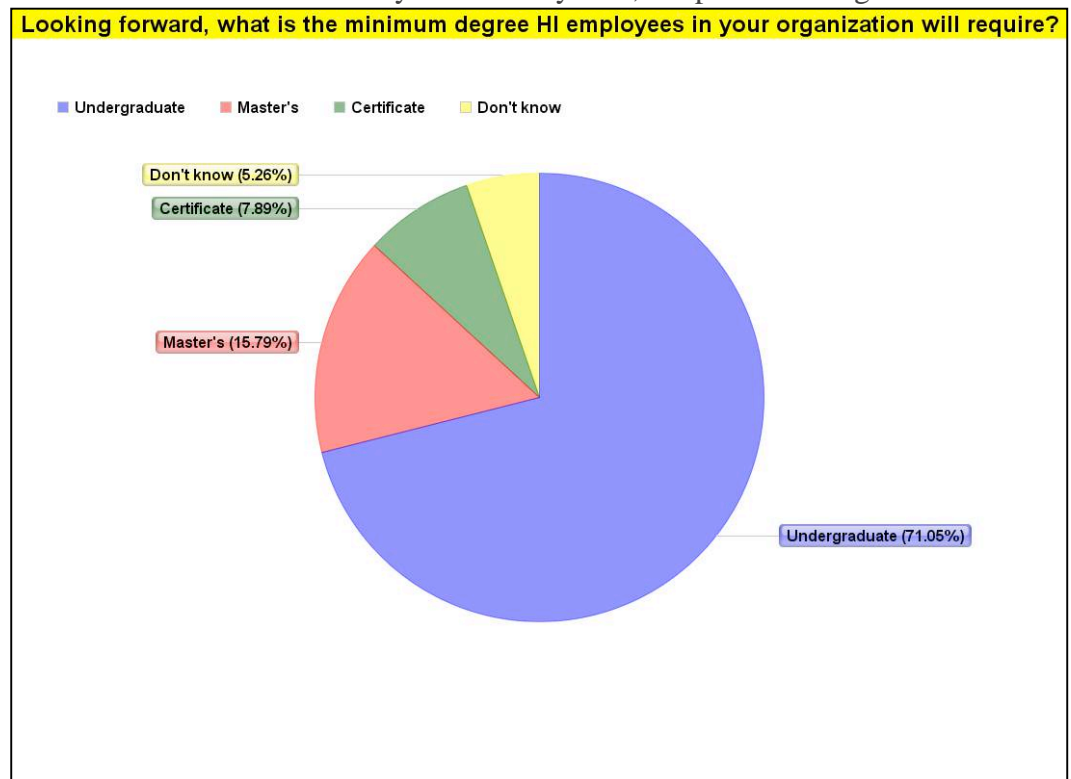
8. What sort of talent do we need?

Not surprisingly, the survey reiterated what people working within HI in Maine already knew or suspected: the number one issue is finding quality talent. Considering future potential, the survey also asked what characteristics that talent should have. For instance...

Looking forward, what is the minimum degree level you think that health informatics employees in your organization will require?

As this chart indicates, an undergraduate degree is the *de facto* minimum to work in HI in Maine. Interestingly, our follow-up interviews revealed that those organizations currently accessing talent from Maine colleges and universities do *not* limit themselves to computer science majors, or health majors. Maine students with undergraduate degrees who come to work in HI for Maine organizations come from all locations – the University of Maine system, the private colleges – with all sorts of majors. A familiarity with tech is helpful, but not essential.

As one interviewee expressed it, successful HI workers are ultimately conversant in technology, in healthcare, and in critical thinking skills. The last cannot be taught, but either of the first two can be introduced to fresh-out-of-school undergraduates. In the interviewee’s words: “Undergraduate degrees in (data) warehousing or analysis are not common. Most (new hires) are self-taught through experience.”



While hiring a philosophy or French major and introducing him/her to HI is do-able, it isn’t always preferable. Unfortunately, by and large, Maine has few true HI programs (rather than health information technology/management programs). An appendix to this report lists programs in more detail, but here are the basic facts for most programs that relate to HI or health information technology/management:

- Certificate programs (generally qualifying one for coding, billing tech, etc.) are available at Kaplan University (online) and University of Maine at Augusta

- Associate degree programs (also generally focused on coding, billing tech, etc.) are available at Beal College, Kaplan University (online), Kennebec Valley Community College, and York County Community College.
- Undergraduate degree programs or classes are available at
 - Bates College (one class in biostatistics, bioinformatics tutorial)
 - Bowdoin College (one class in biostatistics)
 - Kaplan University (online)
 - Saint Joseph’s College of Maine (a new program)
 - Southern New Hampshire University (online)
 - University of Maine at Farmington
 - University of New England (commencing this fall).
- Graduate degree programs or classes are available at:
 - Husson University (one informatics class within the PharmD degree)
 - Kaplan University (online)
 - Southern New Hampshire University (online)
 - University of New England (online, commencing this fall)
 - University of Southern Maine (a research cluster and one informatics class within the nursing school)
 - University of New Hampshire (Masters in Analytics commencing this fall)

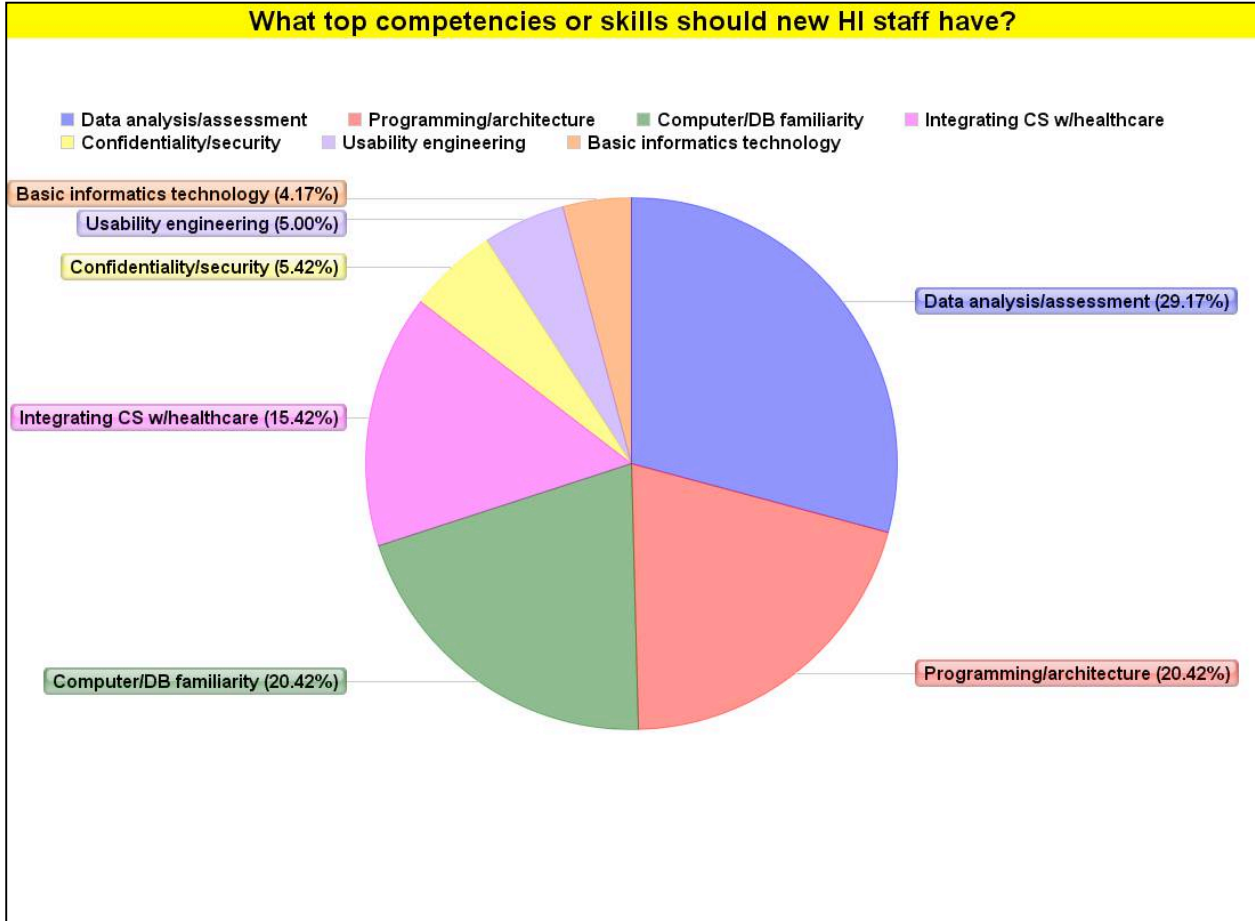
Is there potential? Yes. But this is a patchwork of programs, not yet sufficient to generate a steady supply of undergraduates who can start to fill HI jobs in Maine. So if *new* academic programs are devised, what competencies should we aim for? What skill-sets do we need to emphasize and develop among our future HI students? The survey asked this question, too:

Looking forward, please rank the top three core competencies/skills for the majority of your anticipated hires in health informatics. Enter 1 for the most important competency/skill, 2 for the second most important, and 3 for the third most important.

Results were weighted and scored accordingly. The list of competencies was generated from an amalgam of professional sources:

- Basic informatics terminology
- Ability to use and manipulate computers and database management systems
- Applying informatics/computer science, including programming, software engineering, architecture, etc.
- Integrating computer science with healthcare standards and needs
- Data analysis and assessment
- Usability engineering, human-computer interaction
- Confidentiality and security applications

Once again, as seen in the chart below, “data analysis” ranks as the primary concern. The next two highest-ranking categories each relate to HI’s computer science/technology side, not its healthcare side. However, as has been noted before, the HI workforce is increasingly required to be conversant in technology *and* healthcare.



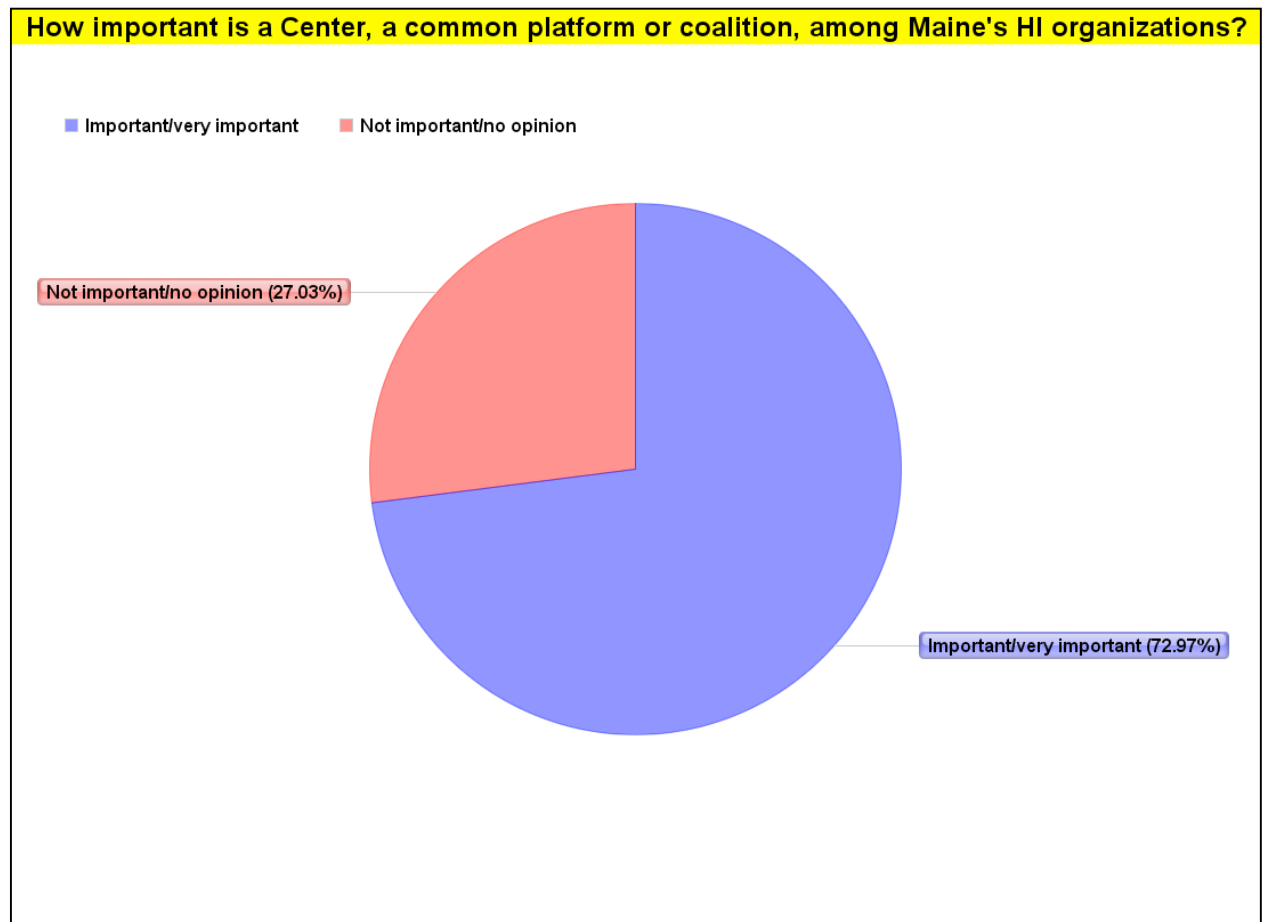
The *blend* of healthcare and technology competency has an advantage. It means that people can enter the HI field from a number of directions and professions. But this blending is also a challenge:

“Our research finds that many of these new jobs are hybrids, requiring skill sets from different disciplines and which therefore are not typically trained together...One example is the role of Clinical Analyst, which assists clinical staff with IT systems, interprets data, and manages patient records. That requires some of the skills both of a registered nurse and of an IT technician—at present, an uncommon combination. As a result, Clinical Analyst positions stay open 15% longer than the national average, a symptom of a shortage that could hamper the industry.” (*Burning Glass*, “Missed Opportunities? The Labor Market in Health Informatics,” 2014)

9. Creating a center

The HIAP originated with the hypothesis that some form of aggregating among Maine’s HI players might lead to greater efficiencies in attracting talent, spurring investments, and strengthening collaborations. The final part of the survey focused on this concept.

If a sufficient number of health informatics professionals and organizations in Maine are interested in developing a common platform or coalition that could serve multiple interests, how important would it be to you to have such a “Center”?



As seen in the chart above, survey respondents endorsed this idea. Follow-up interviews only further emphasized this position, from a number of perspectives:

- (*HI in Maine*) “can only succeed if you have a hub, a critical mass.”
- “It would be great to have a peer group to talk to about how *they* do it.”
- “It would be incredibly powerful to focus on thought leadership, white papers, presentations, that sort of thing”
- “If someone were starting out (*in HI*) they’d know where to go”
- (*Could be*) “a trolling ground for interns”

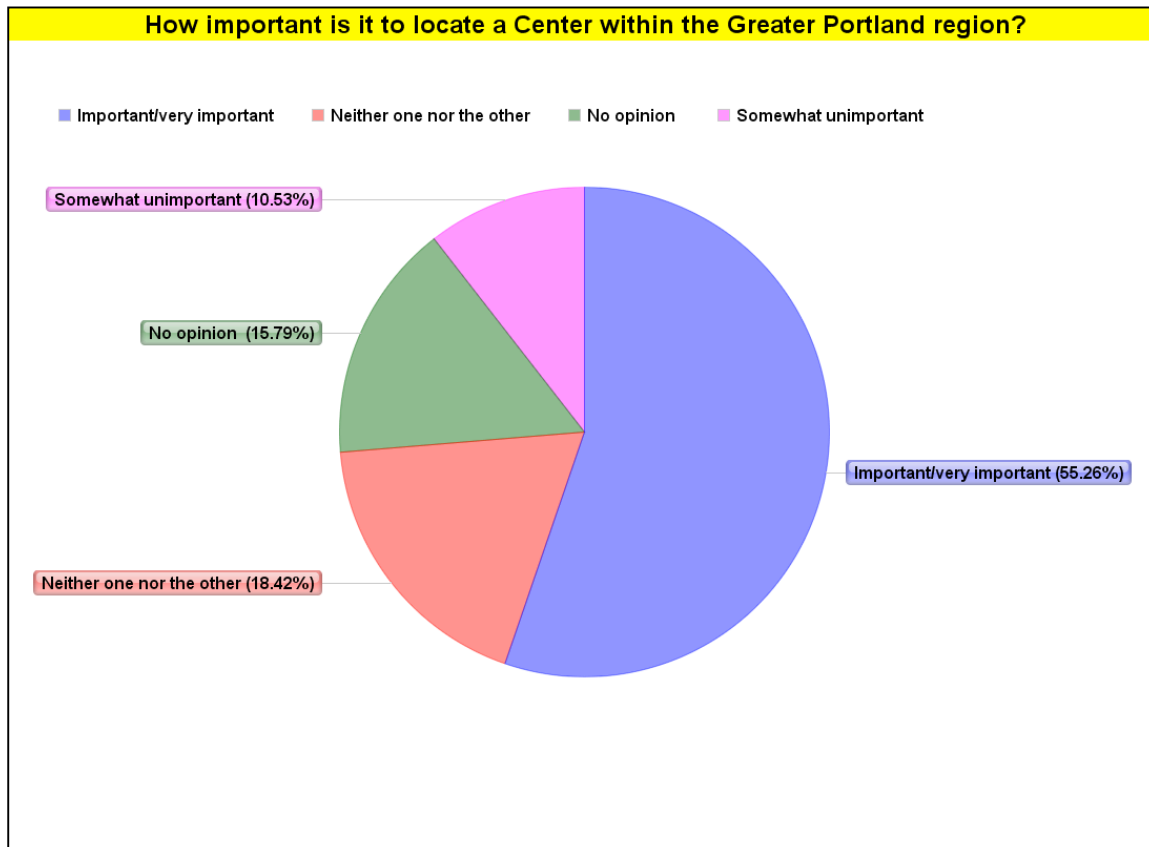
- “A hotbed of new ideas and creativity, a think-tank and a sharing of ideas”
- “An idea center, an education center, but also a resource for employment”
- “We simply don’t know what other people are doing...just getting people together has value”
- “I’d like to problem-solve” (*at a center*)
- “To allow people beyond leadership roles to connect. Quarterly chitchats with guys who do similar work at other companies.”
- “Start projects, coordinate efforts, find talent, a clearinghouse.”
- “Produce things that get public attention and national attention.”
- “Courses for doctors, RNs, and new (*HI*) hires.”

The survey also asked how important it would be to house a Center within an actual, brick-and-mortar facility. The responses were not definitive: 13 respondents said it was important or very important, 15 respondents said it was neither important nor unimportant, and 7 respondents said it was unimportant.

Another survey question asked about a center’s geographical location:

If there were such a Center, if it were primarily an actual, bricks-and-mortar facility (with an online component), how important would it be to locate the facility within the Greater Portland region?

As the chart indicates, the preference for the Greater Portland region is dramatic, especially considering that two of the three other categories (“No opinion” and “Neither one nor the other”) do not actually oppose the concept.



A center located in the Greater Portland area would benefit from its proximity to the state's business, employment, academic, and cultural hubs. Another advantage would be a close relationship with the new Maine Cyber Security Cluster, located on the University of Southern Maine's Portland campus. (The program, directed by USM professors Glenn Wilson and Charles Largay, received Cluster Initiative support from the Maine Technology Institute.)

The Maine Cyber Security Cluster works in training personnel and conducting research and development related to cyber risks. Increasingly, the vulnerability of health data is seen as a primary focus of those risks. On April 14, 2014, [as reported in the Portland Press Herald and elsewhere](#), an analysis published in JAMA pointed to breaches in health data affecting 29.1 million records between 2010-2013.

Breaches of those sort, and the general insecurity felt by the public when digital health data is held by others, points to a key concern for the HI community: how to balance an increasing need for data sharing with the public's demand for data security. As was noted in the *Top ten health industry issues of 2015*, published by pwc Health Research Institute, when US consumers were asked which was more important to them – data security or ease of access/convenience – the majority chose “data security”:

- ...71% to 29%, for medical tests and imaging results
- ...73% to 27% for doctor's notes and diagnoses
- ...65% to 35% for drug prescription information

A Greater Portland-based center for HI can partner with the (local) Maine Cyber Security Cluster to help to address these concerns.

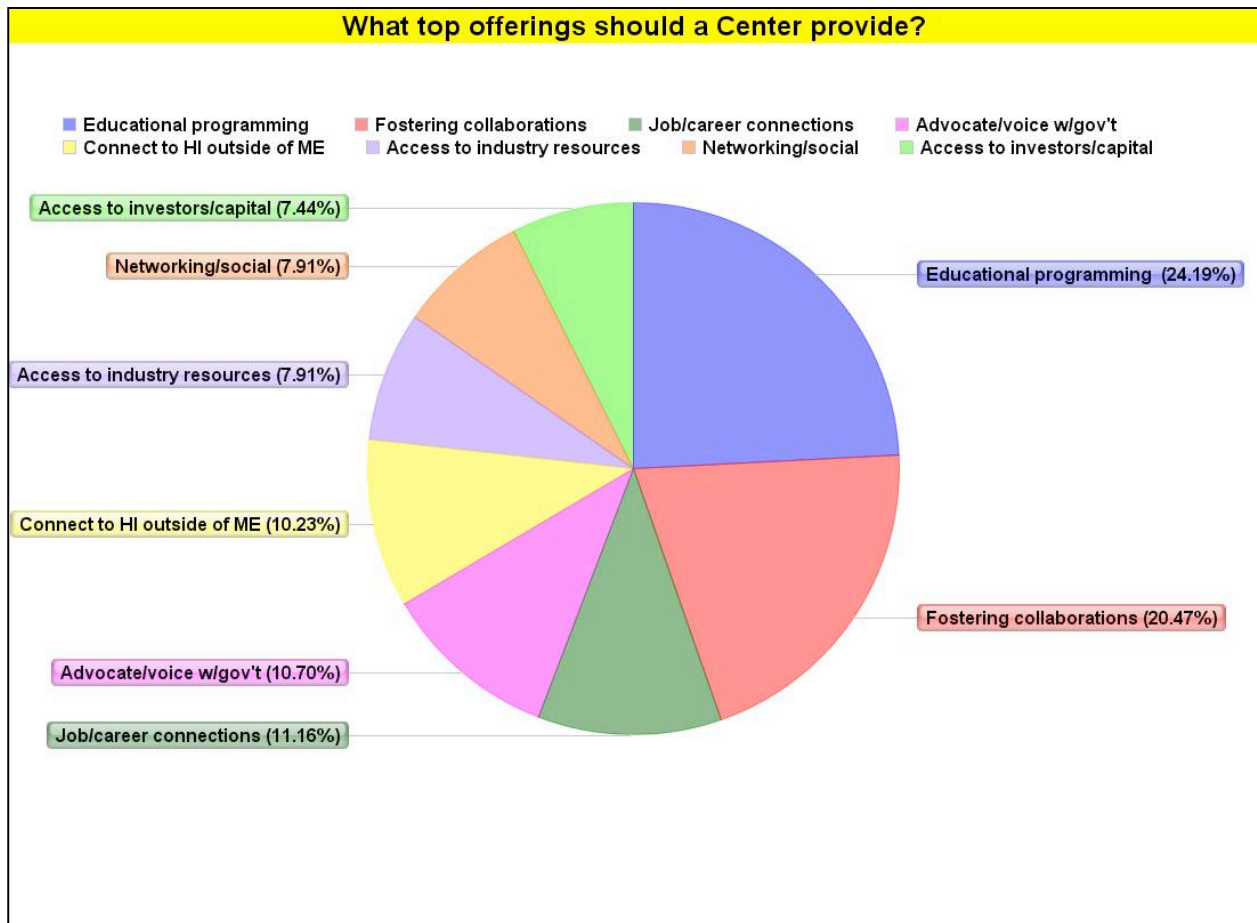
Another advantage to locating a center in Greater Portland is the number of nonprofits in the region addressing healthcare issues. Two of the most prominent and nonpartisan are:

- HealthInfoNet, the state's health information exchange, which links medical records throughout the state for virtually all Mainers; and the
- Daniel Hanley Center for Health Leadership, a “training ground” for health care leaders and a neutral party for tackling complex topics.

The survey also asked: assuming such a center were to be created, what would happen there?

If there were such a Center, rank the top three of the following potential offerings. Please enter 1 for the most important offering, 2 for the second most important, and 3 for the third most important. Results were weighted and scored accordingly. The offerings were:

- Access to investor/capital resources
- Advocate/voice for governmental and foundation resources
- Connector to health informatics and investment activities outside of Maine
- Educational programming (classes, training, etc.)
- Fostering collaborations
- Job/career/academic connections
- Networking/social gathering opportunities
- Resource access (industry information, white papers, etc.)
- Other offering



“Educational programming” and “Fostering collaborations” are the two clear preferences. But the relatively equal apportionment among the remaining categories indicates that a successful center may need to provide a variety of services. At the very least, those creating a center should be mindful that there are multiple interests and preferences at hand.

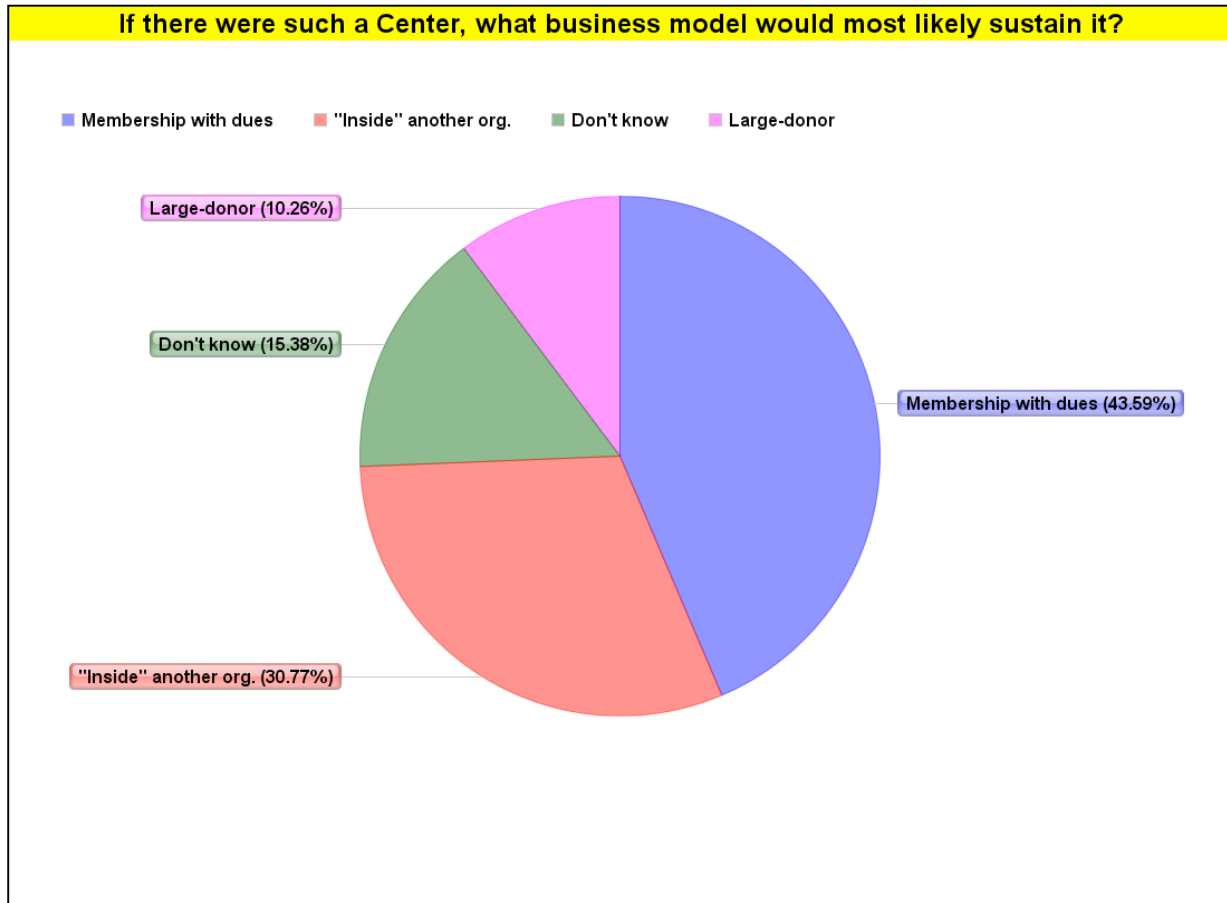
As for “Educational programming,” the varied professions represented by the survey respondents augurs for more research into what they were thinking of when they indicated this preference. It may be that such programming would come via a local (or online) higher education institution, or it may be programming offered more directly from local organizations.

“Fostering collaborations” is clearly significant, as the comments on pages 22-23 attest. In fact, perhaps the greatest value of a center (as indicated on page 29, “What makes a center a “center of excellence”?) is its ability to coalesce different individuals and strengths to produce important research and applications. Remembering that the ability to attract talent is the chief inhibitor to growth among HI organizations, a center that fosters collaborations can be a magnet for students, interns, and professionals seeking to enter the field.

The survey also asked...

If there were such a Center, what business model would most likely sustain it?

- Primarily a membership structure (organizations with health informatics interests would pay dues, perhaps pro-rated by organization size)
- Primarily a large-donor structure, with some combination of governmental, business and foundation support)
- Primarily an “adoption” by a for-profit, nonprofit or academic institution which would house the center
- Don’t know



As shown in this chart, there is strong support for a dues-paying, membership-based organization. There has been varying success in Maine in recent years in maintaining such associations for clusters. Also, compared to other questions asked on the survey, there is a good number of “Don’t know” responses to this question. The topic deserves further research.

10. What kind of center makes sense in Maine?

There are primarily three different models for HI centers across the United States:

1. Academic-affiliate models
2. Public health-affiliate models
3. Healthcare system-affiliate models

Examples of each include:

ACADEMIC: “The mission of the New York University (NYU) Center for Health Informatics and BioInformatics (CHIBI) is “to catalyze transformative changes in bio-medicine through breakthrough computational methodological research, best practices services, state of the art infrastructure, and cutting-edge education.” The CHIBI is led by a Director who reports to the Vice Dean of Science of NYU. The CHIBI works closely with the IT Department, the Clinical and Translational Science Institute and the Cancer Center. It has corporate partnerships, affiliations or collaborations with Pfizer, Merck, New York City Health and Hospitals Corporation, Geisinger Health System. The CHIBI offers doctoral level training in Medical Informatics and Bioinformatics through NYU's Sackler Institute.”

And

PUBLIC HEALTH: “The Minnesota Department of Health has a Center for Health Informatics. Its purpose is to:

- Support Strategic Health Informatics Initiatives;
- Increase Health Informatics Projects such as the Minnesota Public Health Information Network;
- Provide Health Informatics Consultation; and
- Develop Health Informatics Workforce Capacity by Increasing Informatics Education and Training.”

And

HEALTHCARE SYSTEM: “The Children's Hospital Informatics Program (CHIP) is a multidisciplinary applied research and education program at Boston Children's Hospital. CHIP investigators work at the intersection of information science, healthcare and biomedical discovery, advancing the state-of-the-art in functional genomics, personalized medicine, biomedical research collaboration and public health.”

A sampling of HI centers (and their affiliates) around the country include:

Academic centers	
Center for Health Informatics	University of Cincinnati
Center for Healthcare Informatics and Policy	Cornell University
Center for Research on Healthcare	University of Pittsburgh
Duke Center for Health Informatics	Duke University
Informatics Discovery Lab	Oregon Health & Science University
Institute for Health Informatics	University of Minnesota
Institute for Healthcare Informatics	Drexel University
Institute for Healthcare Informatics	University of Buffalo
Kansas University Center for Health Informatics	Kansas University
Louisiana Center for Health Informatics	University of Louisiana
NYU Center for Health Informatics and Bioinformatics	New York University
Public Health Informatics Institute	Emory University
Stanford Center for Clinical Informatics	Stanford University
Public health centers	
Center for Health Informatics	Minnesota Department of Health
Office of Health Informatics	Wisconsin Department of Public Services, Division of Public Health
Rocky Mountain Center for Translational Research in Public Health Informatics	University of Utah
Regenstrief Institute	Indiana University School of Medicine, Health and Hospital Corporation of Marion County, Wishard-Eskenazi Health
Healthcare affiliates	
Center for Biomedical Research Informatics	NorthShore University Health System
Children's Hospital Informatics Program	Boston Children's Hospital, Harvard Medical School
Homer Warner Center for Informatics Research	Intermountain Healthcare
IMS Institute for Healthcare Informatics	IMS Health

What is possible in Maine? We do not have an applied medical research university of the scope and caliber in the list above. But we *do* have academicians, healthcare researchers, government officials, nonprofit administrators, and technologists who are interested in coordinating efforts on a center that can fulfill a number of mutual interests, including talent attraction, education, and joint collaboration on projects.

A center combining elements of each of the above could be effective. However it is structured in Maine, the primacy of *talent attraction* must be maintained: the center's features should serve to connect would-be and current students and workers (both within and outside of Maine) with HI organizations.

11. What makes a center a “center of excellence”?

An HI center in Maine could draw together staff from disparate organizations, allow them to co-work in a common facility, create a space for classes and training, do all of this and more – and yet still not be a “center of excellence.” As was expressed to GP repeatedly during personal interviews, what will make a center special is what makes Maine special: our ability to collaborate on projects.

- “Maine is unusually collaborative compared to other states.”
- “The collaboration that comes from solving problems together”
- “Even though we’re competitors, we’re very collegial.”
- “Aggregating data *across silos* is what makes us unique.”

But what will make a true center of *excellence* is producing work – research, discovery, application – that makes a difference, that draws attention because it is uniquely productive and applicable in the real world.

- “A center works when there are projects to work on, things to do.”
- “We need to conduct high-quality research.”
- “Can we find a data analysis project that brings people together?”
- (*The center*) “needs a substantial, meaty problem to work on together, something to organize around.”
- “Do research here, so that people could say, ‘Hey, that’s happening in Portland, Maine.’”
- “The center needs to *produce* things that get public and national attention.”

And one of Maine’s strengths is that we have been aggregating and collating data consistently.

- “The *data* is the value proposition.”
- “One of the assets this group (*Maine’s HI community*) possesses is our collective IP.”
- “The common grist is *data*.”
- “Focus on how to *do* something with the data – more than is being done today.”
- “How do you make data invaluable?”
- “How do we bring analytic capacity together, focus it? Use it to support healthcare reform and payment reform?”

We are not necessarily proposing a “skunkworks,” a center where HI personnel from different organizations collaborate exclusively on a single project. But we *do* believe that the success of any center, and its estimation as a center of excellence, will rest in its ability to organize time and resources to reach beyond traditional tasks and accomplish something of significance. We do not yet know what that initiative may be; there could be several operating concurrently.

12. Is HI a cluster in Maine?

There is some interest in whether or not the HIAP has resulted in defining HI as a “cluster.” The Maine Technology Institute (MTI), a primary funder for the HIAP, defines a cluster as:

“...a grouping of industries that typically share common supply chains, markets and technology competencies or knowledge. Clusters are grouped around technology-related industry drivers and provide a state with its unique competitive advantages. Clusters are important drivers of business growth and economic development leading to creation and retention of high wage jobs.”

By this definition, then, yes, we believe that health informatics in Maine is a cluster.

We also note that in 2013, MTI commissioned Battelle to assess 13 technology clusters that might drive economic growth within Maine – and HI does not show up in this list.

- Agriculture, Aquaculture, Fisheries and Food Production
- Alternative Energy and Turbines
- Biopharmaceuticals
- Boatbuilding and Related Industries
- Defense
- Electronics and Semiconductors
- Engineering and Other Scientific/Technical Services
- Environmental Services
- Finance and Business Support Services
- Forestry-related Products
- Information Technology Services
- Materials for Textiles, Apparel, Leather and Footwear
- Medical Devices

Aspects of HI appear in Biopharmaceuticals, and in Information Technology Services, but in general it is a cluster currently defined as much by the competencies and skills of its practitioners, as by their job titles. The mix of sectors engaged in HI work – healthcare, insurance, government, nonprofit, technology, higher education – speaks to HI’s diversity and relative opacity.

Are there places where HI *has* been identified as a specific cluster, one with the potential to contribute significantly to a region’s economic vitality? (At least on the East Coast), there has been, and that place is Atlanta, Georgia. A June 2013 article in *Georgia Health News* says it all in its title: “Health IT: Why Ga. is at the center of data revolution.”

“‘Revolutionary changes in how health care payments are made and clinical information is exchanged — partly sparked by incentives in the Affordable Care Act — have created an industry boom,’ says Greg Fulton, a Greenway spokesman. ‘All of this [change] is going to be built on data,’” Fulton says. ‘That’s where health care wants to go.’ A cluster of health IT companies has mushroomed in Georgia, and especially the Atlanta area. Industry officials credit the Metro Atlanta Chamber of Commerce, the state Department of Economic Development and the Georgia Research Alliance, among other organizations, with helping the industry blossom here.”

The Public Health Informatics Institute at Emory University is only one of many institutions that help to sustain this HI cluster in Atlanta. Other contributors include a proliferation of programs at local universities, the Public Health Informatics Conference (which took place in April 2014 in Atlanta), the National Center for Public Health Informatics (based at the Centers for Disease Control in Atlanta), and the Georgia Research Alliance, an independent 501(c)(3) nonprofit that partners with local universities and the state’s department of economic development to expand R&D capacity.

In many ways, Maine is not the equal of Georgia, nor is Portland the equal of Atlanta: in population, VC investment, university size, technology infrastructure – in critical mass. But as is often noted, influencing change in Maine can mean targeted growth in hundreds of jobs, sometimes even dozens, rather than thousands. Similarly, as has been noted above, Maine has a tradition of working together on projects, which may allow us to move quickly. Finally, HI is a field that is creating excitement in the professions, in government, and in higher education, all of which is a net positive. We have a cluster whose diversity is its strength.

However, while many organizations and individuals in Maine are engaged in HI, there is relatively little connection or networking among them, for reasons including:

- They work in different sectors (healthcare, insurance, technology, government);
- They work for competing organizations within a sector;
- Their client base is exclusively in Maine or exclusively outside of Maine;
- They operate within different subsets of HI; and/or
- There is no central, organizing mechanism to network them.

This is why we think some form of a center, a network, makes sense. Without it, HI organizations in Maine will continue on straight, parallel paths. With it, they can selectively join forces to increase the critical mass and the attractiveness of the cluster for potential staff, entrepreneurs, and investors. Additionally, there can be opportunities to collaborate on projects that lead to greater efficiencies and quality breakthroughs.

13. Recommendations

Based on the HIAP'S findings, and on continuing conversations throughout the HI community, GP makes the following recommendations. (Some of these projects may end up occurring concurrently.)

Short term

1. Establish two groups to continue this process and community-building
 - A larger group consisting of HIAP participants, to be expanded to accommodate other relevant companies and organizations
 - i. Build a program for communicating online among the group
 - ii. Continue expanding group through HI MeetUps, LinkedIn pages, etc.
 - iii. Disseminate HIAP report to those unable to attend 4/22/15 meeting and those new to the community
 - iv. Determine funding/administration to run this larger group
 - b. A smaller working group to articulate and administer immediate growth opportunities
 - i. Define goals, short-term administration of group, and methods to communicate to larger group
 - ii. Establish budget and funding opportunities as needed to achieve goals
 1. Local contributions from HI participants
 2. Grant opportunities (MTI, etc.)
 3. Out-of-state contributions
 - iii. Continue developing the idea of a center that can facilitate talent attraction, education, and mutual collaboration among HI community members.
2. Determine if an MTI cluster-implementation grant is going to be applied for
 - a. Next award deadline is October, for up to \$500,000, with a 1-to-1 match
 - b. These grants are designed to build out a cluster's potential "*...by improving the effectiveness of their infrastructure, as well as resources and connections among firms, service providers, research laboratories and educational institutions. These awards support collaborative efforts that help spread knowledge and skills, build connections among businesses, connect businesses to research and service partners, and address common opportunities and challenges....*"
 - c. An MTI grant could help to
 - i. Build a network and programming to support that network
 - ii. Develop new services among cluster participants
 - iii. Connect HI activities in Maine to Hi activities nationwide
 - iv. Create an internship program
 - v. Establish a space where HI organizations could meet, learn from another, and work on common projects
 - d. Determine who would be the primary partners in applying for this grant (or others)

Longer term

1. Develop a plan to how to “land” the HI community organization at a location in Greater Portland that can accommodate some form of co-working space, education, intern programming, show-and-tell opportunities among participants, large-project work, etc.
2. Determine which activities are specific to a physical center, which are virtual, and which are both
3. Establish a long-term funding and administration model
4. Flesh out how local higher education institutions can collaborate with the HI industry through the center
5. Create a working group to look at common problems/projects that might galvanize the center
6. Plan metrics for success in attracting talent

The Growing Portland collaborative has to this point been the primary instigator and investigator of the potential for HI in Maine. We have developed connections with, and the beginnings of a network among, many of the HI organizations that would continue to grow this cluster and attract jobs, investment, and young people to the region. We are eager to continue and expand upon our role, and have initiated conversations within the HI community to determine how to take successful and meaningful next steps.

Appendix A: Online survey questions

The following 32 questions formed the content of the HIAP online survey.

BASIC INFORMATION

1. What is the name of your organization?
2. What is the name of your department?
3. What is your name?
4. What is your title within your organization?
5. What is the approximate total number of employees within your organization?
 - a. 1-5
 - b. 6-10
 - c. 11-20
 - d. 21-50
 - e. 51-100
 - f. 100+
6. What is the approximate total number of health informatics employees within your organization?
 - a. 1-5
 - b. 6-10
 - c. 11-20
 - d. 21-50
 - e. 51-100
 - f. 100+

STATUS OF CURRENT HEALTH INFORMATICS STAFF

7. For health informatics employees in your organization, where do they typically originate? Please rank the top three of the following categories, with 1 being highest, 2 being second-highest, and 3 being third-highest.
 - a. Undergraduate within Maine
 - b. Undergraduate outside of Maine
 - c. Graduate school within Maine
 - d. Graduate school outside of Maine
 - e. Lateral move within the organization
 - f. Acquisition from another organization within Maine
 - g. Acquisition from another organization outside of Maine
 - h. All of the above
 - i. Don't know
8. What is the approximate salary range for typical health informatics employees within your organization?
 - a. Under \$35,000
 - b. \$35,000-\$50,000
 - c. \$50,000-\$75,000
 - d. \$75,000-\$100,000
 - e. \$100,000-\$150,000
 - f. Above \$150,000

- g. Many/all of the above
 - h. Don't know
9. Approximately how many individuals are currently employed within each of the following health informatics categories within your organization?
- a. Data acquisition
 - b. Data analysis
 - c. Data warehousing
 - d. Electronic medical records
 - e. Software/technology design
 - f. Strategy and policy
 - g. Other
10. What is the typical level of education attained by health informatics staff within your organization for each of the following categories?

	Certificate	Undergraduate degree	Master's degree	Doctorate degree	Don't know	Not applicable
Data acquisition						
Data analysis						
Data warehousing						
Electronic medical records						
Software/technology design						
Strategy and policy						
Other						

11. To what degree do you fulfill informatics work inside your organization vs. outsourcing it? Please select the one item that best describes your organization.
- a. We handle of our informatics work in-house
 - b. We outsource some of our informatics work to Maine companies
 - c. We outsource some of our informatics work to companies outside of Maine
 - d. We outsource most of our informatics work to Maine companies
 - e. We outsource most of our informatics work to companies outside of Maine
 - f. We outsource all of our informatics work to Maine companies
 - g. We outsource all of our informatics work to companies outside of Maine
 - h. Don't know
12. Looking forward, approximately how many individuals within each health informatics category will be added to your organization within the next twelve months?
- a. Data acquisition
 - b. Data analysis
 - c. Data warehousing
 - d. Electronic medical records
 - e. Software/technology design
 - f. Strategy and policy
 - g. Other category (ies)

13. Looking forward, approximately how many individuals within each health informatics category will be added to your organization within the next three-to-five years?
 - a. Data acquisition
 - b. Data analysis
 - c. Data warehousing
 - d. Electronic medical records
 - e. Software/technology design
 - f. Strategy and policy
 - g. Other category (ies)
14. Looking forward, what is the minimum degree level you think that health informatics employees in your organization will require?
 - a. Undergraduate degree
 - b. Appropriate Master's degree
 - c. Appropriate Doctorate degree
 - d. Other professional certification
 - e. Don't know
15. Looking forward, how would you describe the growth potential of health informatics within your organization?
 - a. Steady state – not much growth envisioned
 - b. Growing steadily, incrementally
 - c. Growing significantly
 - d. Don't know
16. Please comment on that answer

CHALLENGES

17. What is the major inhibitor to health informatics growth for your organization?
 - a. We can't find qualified talent
 - b. We can find qualified talent – but they want too much money and/or don't want to come/stay in Maine
 - c. Need greater collaboration/coordination among organizations
 - d. Need greater financial resources dedicated to health informatics within our organization
 - e. Need better systems and/or strategy within our organization
 - f. Other
 - g. Don't know
18. How important is it for health informatics executives and/or staff to interact with colleagues from other organizations?
 - a. Very important
 - b. Somewhat important
 - c. Not a factor
 - d. Very unimportant
 - e. No opinion
19. How would you describe the financial resources/access to capital for health informatics needs – research, technology, personnel – within your organization?
 - a. We do not have the financial resources or access to capital we require.
 - b. We have adequate financial resources or access to capital.

- c. We have more than enough financial resources or access to capital.

OPPORTUNITIES

20. Looking forward, how important is it to you that your health informatics hires come from local schools or businesses, here in Maine?
- a. Very important
 - b. Somewhat important
 - c. Not a factor
 - d. Very unimportant
 - e. No opinion
21. Looking forward, over the next twelve months, do you see the budget for health informatics in your organization...
- a. Increasing significantly
 - b. Increasing a bit
 - c. Not changing
 - d. Decreasing a bit
 - e. Decreasing significantly
 - f. Don't know
22. Looking forward, over the next three-to-five years, do you see the budget for health informatics in your organization...
- a. Increasing significantly
 - b. Increasing a bit
 - c. Not changing
 - d. Decreasing a bit
 - e. Decreasing significantly
 - f. Don't know
23. Looking forward, please rank the top three core competencies/skills for the majority of your anticipated hires in health informatics. Enter 1 for the most important competency/skill, 2 for the second most important, and 3 for the third most important.
- a. Basic informatics technology
 - b. Ability to use and manipulate computers and database management systems
 - c. Applying informatics/computer science, including programming, software engineering, architecture, etc.
 - d. Integrating computer science with healthcare standards and needs
 - e. Data analysis and assessment
 - f. Usability engineering, human-computer interaction
 - g. Confidentiality and security applications

HEALTH INFORMATICS CENTER

24. If a sufficient number of health informatics professionals and organizations in Maine are interested in developing a common platform or coalition that could serve multiple interests, how important would it be for you to have such a "Center"?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Somewhat unimportant

- e. Not important at all
 - f. No opinion
25. If there were such a Center, how important is an actual, bricks-and-mortar facility (with an online component)?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Somewhat unimportant
 - e. Not important at all
 - f. No opinion
26. If there were such a Center, if it were primarily an actual, bricks-and-mortar facility (with an online component), how important would it be to locate the facility within the Greater Portland region?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Somewhat unimportant
 - e. Not important at all
 - f. No opinion
27. If there were such a Center, if it were not a bricks-and-mortar location, do you think it should be...
- a. A fully featured web site with resource sharing, etc.
 - b. A list-serv
 - c. Some other virtual online format (please describe in box below)
 - d. Don't know
28. If there were such a Center, rank the top three of the following potential offerings. Please enter 1 for the most important offering, 2 for the second most important, and 3 for the third most important.
- a. Access to investor/capital resources
 - b. Advocate/voice for governmental and foundation resources
 - c. Connector to health informatics and investment activities outside of Maine
 - d. Educational programming (classes, training, etc.)
 - e. Fostering collaborations
 - f. Job/career/academic connections
 - g. Networking/social/gathering opportunities
 - h. Resource access (industry information, white papers, etc.)
 - i. Other offering
29. If there were such a Center, what business model would most likely sustain it?
- a. Primarily a membership structure (organizations with health informatics interests would pay dues, perhaps pro-rated by organization size)
 - b. Primarily a large-donor structure, with some combination of governmental, business and foundation support
 - c. Primarily an "adoption" by a for-profit, non-profit, or academic institution which would house the Center
 - d. Other (please describe in the box below)
 - e. Other

30. If there were such a Center, without committing yourself or your organization to anything, what sort of support/resources do you think your organization might be able to provide?
 - a. Back-office
 - b. Connections
 - c. Financial
 - d. Leadership
 - e. People/manpower
 - f. Other (describe below)
 - g. Don't know
31. If there were such a Center, describe the administrative model you think would be most successful over time.
 - a. Independent nonprofit with Executive Director and staff, Board of Directors, etc.
 - b. Project or collaborative under the wing of an existing nonprofit
 - c. Unaffiliated collaborative
 - d. Other (describe below)
 - e. Don't know
32. What haven't we asked you that you would like to comment on?

Appendix B: Participating organizations

Through the online survey or through private interviews, individuals representing these organizations participated in the HIAP.

Academic

- Beal College
- Kaplan University
- Kennebec Valley Community College
- Southern Maine Community College
- St. Joseph's College of Maine
- University of Maine, Augusta
- University of Maine, Farmington
- University of New England
- University of New Hampshire, Institute for Health Policy and Practice
- University of Southern Maine
- University of Southern Maine, Muskie School of Public Service
- York County Community College

Consulting

- BerryDunn
- Betsy Biemann, Harvard Kennedy School of Government

Government

- City of Portland, Department of Health and Human Services
- State of Maine, Department of Health and Human Services, Office of Quality Improvement Services
- State of Maine, Department of Labor, Center for Workforce Research and Information
- U.S. Department of Veterans Affairs, VA Maine Healthcare System

Healthcare

- Acadia Hospital
- Apothecary By Design
- Central Maine Medical Center
- Eastern Maine Healthcare System
- Franklin Community Health Network
- InterMed
- MaineGeneral Medical Center
- MaineHealth
- Maine Medical Center
- Maine Medical Center Research Institute
- Martin's Point Health Care
- Mercy Hospital
- Northeast Delta Dental
- Spectrum Medical Group
- Spring Harbor Hospital

- St. Mary's Health System
- The Jackson Laboratory
- York Hospital

Insurance

- Aetna
- Anthem
- CIGNA
- Harvard Pilgrim Health Care
- Maine Community Health Options
- Unum

Nonprofit

- Daniel Hanley Center for Health Leadership
- E2Tech
- Foundation for Blood Research
- Maine Health Access Foundation
- Maine Health Management Coalition
- Maine Quality Counts
- Northern New England Accountable Care Collaborative

Technology

- Compass Health Analytics
- Goold Health Systems
- EngageHealthIQ
- HealthInfoNet
- HealthTech Maine
- iVantage Health Analytics
- Mingle Analytics
- OnPoint Health Data
- RxAnte
- RowdMap
- SironaHealth
- Stroudwater Associates
- Winxnet

Appendix C: Higher education programs

As noted on page 20 of this report, Maine now has relatively few programs, or classes, that target health informatics. The majority are in health information management of various sorts. The following list represents an attempt to inventory current and planned higher education programs relating to HI in or near Maine.

CERTIFICATE PROGRAMS

Kaplan University

- Medical Billing and Coding Certificate
- Only available online
- 24 Maine students currently enrolled in this program and other Healthcare Administration programs with significant informatics components
- <http://www.kaplanuniversity.edu/health-sciences/medical-billing-coding-certificate.aspx>

University of Maine at Augusta

- Certificate in Health Informatics, 31 credit hours, 10 courses, launched 2011-2012
- Designed for IT or healthcare students
- Instruction from Department of Nursing and Computer Information Systems
- Very few students have officially applied for the certificate but the CIS225 Introduction to Health Informatics Class (capped at 50) has full enrollment each semester
- <http://www.uma.edu/cischi.html>

ASSOCIATE DEGREES (2-YEAR PROGRAMS)

Beal College (Bangor)

- Associate Degree in Health Information Management (medical records, etc.)
- 3-year-old program, currently has 40 students, now residential, hope to go online, too.
- 85% job placement rate, mostly in local hospitals (coding, billing tech. etc.)
- Working with Saint Joseph's in 2+2 program for BS degree.
- <http://www.bealcollege.edu/page/2-765/health-information-management>

Kaplan University

- Associate in Applied Science in Health Information Technology
- Only available online
- 39 Maine students currently enrolled in this program and the 4-year undergraduate degree program (see below), including other Healthcare Administration programs with significant informatics components
- <http://www.kaplanuniversity.edu/health-sciences/health-information-technology-associate-degree.aspx>

Kennebec Valley Community College

- Associate Degree in Applied Science in Health Information Technology



- Students graduate as RHIT (Registered Health Information Technician) entering records, etc.
- 15 students/year, graduates find employment at local hospitals plus outsourcing companies such as Lexicode and In Record Time.
- <http://www.kvcc.me.edu/Pages/Health-Information-Tech/Health-Information-Tech-Home>

York County Community College

- Associate Degree in Health Information Management
- Program is 3 years old, started with Federal funding
- 42 students currently in the program, most from Maine, a few from New Hampshire
- Most students do not have healthcare backgrounds
- 1st class had 7 students, all got jobs: 6 at hospitals, one at a private practice
- Insurance companies weren't willing to take on students for practicums, "couldn't break into insurance"
- https://my.yccc.edu/ICS/Campus_Services/Career_and_Transfer_Services/Career_Services/Career_Information_by_Major/Health_Information_Management.jnz

UNDERGRADUATE DEGREES (4 YEAR OR 2+2 PROGRAMS)

Kaplan University

- Bachelor of Science in Health Information Management
- Only available online
- 39 Maine students currently enrolled in this program and the 2-year associate degree program (see above) plus other Healthcare Administration programs with significant informatics components
- <http://www.kaplanuniversity.edu/health-sciences/health-information-management-bachelor-degree.aspx>

Saint Joseph's College of Maine

- New degree in Health Information Management, 2+2 with community colleges and Beal College
- Onsite or online
- RHIT-level program, 15 students in it now, 8 from Maine
- Will expand next year after accreditation, anticipating growth
- Closest similar program (2+2) is in Cleveland, Ohio
- <http://online.sjcme.edu/bachelor-of-science-health-information-management.php>

Southern New Hampshire University (online)

- 120 credits, only available online
- Trains students for careers such as "health information managers" or "clinical data specialists"
- <http://www.snhu.edu/online-degrees/undergraduate-degrees/healthcare-informatics-BS-online.asp>

University of Maine at Farmington

- BA in Health Information Systems
- 3-year-old program
- Interdisciplinary, through Business Economics, Computer Science, and Community Health Education
- Program is geared towards traditional students
- There are @ 12 students in the program now. A few have graduated, working at Molina (Augusta), BC/BS in Florida, etc.
- <http://www.umf.maine.edu/majors-academics/health-information-systems/>

University of New England

- 2+2 undergraduate degree in Health Service and Information Management – Health Informatics
- Pilot program commences September 2015, small enrollment expected
- On-campus and online, workplace- and project-based; competency-based model
- Expected to take 12-18 months to complete degree
- <http://www.une.edu/news/2015/une-creating-program-study-health-informatics>

GRADUATE DEGREES

Husson University

- 4-year PharmD degree in the School of Pharmacy includes one course focusing on informatics, RX627: Pharmacy Informatics.
- M.S. in Nursing includes two courses focusing on informatics
 - NU 836: Informatics and Technology in Nursing Education.
 - NU 442: Health Informatics and Technology.

Kaplan University

- Master of Health Informatics
- 18-month program, only available online
- 10 Maine students currently enrolled in this program plus other Healthcare Administration programs with significant informatics components
- <http://www.kaplanuniversity.edu/health-sciences/health-informatics-master-degree.aspx>

Southern New Hampshire University

- Only available online
- MBA in Healthcare Informatics
- Graduation possible in 15 months
- 39 credits, combining (10) MBA and (3) HI courses
- <http://www.snhu.edu/online-degrees/graduate-degrees/MBA-online/healthcare-informatics.asp>

University of New England

- Masters degree in Health Informatics
- Exclusively online

- Commencing Fall 2015 (estimated)
- Enrollment and program duration TBD
- <http://vision.une.edu/take-survey-new-health-informatics-degree/>

University of New Hampshire (Durham)

- New Masters in Analytics program starting this fall, with business and health tracks
- One-year program, M-F 9-5, residential.
- Can handle 25-30 students/year, expect 10-15 first year
- Housed in the Graduate School, inter-disciplinary.
- Modeled on programs at Kennesaw State and NC State.
- Graduates could possibly work in Portland.
- Plus 8-week “Summer Boot Camp,” also residential, 8 weeks, M-F, for certificate
- <http://www.unh.edu/analytics/>

University of Southern Maine

- Interdisciplinary “Health Data Research Cluster”, with @ 10 graduate students and several professors, partnering with HealthInfoNet, Medical Care Development, and others to work on projects that demonstrate and test health data value.
<https://usm.maine.edu/research/health-analytis-cluster>
- USM’s School of Nursing (Certificates, BS degrees, MS degrees) includes a course in informatics: NUR 702, Informatics Technology

Appendix D: Growing Portland partners

The following is a list of current partners in the Growing Portland collaborative.

Bangor Savings Bank*
Biodiversity Research Institute
CIEE
City of Portland*
Creative Portland
Greater Portland Economic Development Corporation*
Gulf of Maine Research Institute
InterMed
John T. Gorman Foundation*
Kaplan University
Maine College of Art
Maine International Trade Center
Maine Medical Center
Maine Medical Center Research Institute
Portland Regional Chamber of Commerce
Saint Joseph's College of Maine
Southern Maine Community College
TD Charitable Foundation*
University of New England
University of Southern Maine

(* indicates sponsorship)

Appendix E: Selected resources

The following is a selected list of resources pertinent to the discussion of HI in Maine and nationally.

MAINE

- Camoin Associates, *Maine Comprehensive Research and Development Evaluation 2011*, <http://www.entreworks.net/Reports.php>
- Governor's Broadband Capacity Building Task Force, *Broadband – The Road to Maine's Future* <http://www.maine.gov/connectme/grants/ntia/capacity-building.shtml>
- Maine Department of Labor: *2014 Health Occupations Report*, <http://www.maine.gov/labor/cwri/publications/pdf/2014HealthOccupationsReport.pdf>
- Maine Department of Labor, Center for Workforce Research and Information, *Occupational Employment and Wages*, <http://www.maine.gov/labor/cwri/oes.html#tables>
- Maine Development Foundation: *Jobs in Maine: Online Job Postings by Industry, Occupation, Skills, and Education* <http://www.mdf.org/publications/Jobs-in-Maine-Online-Job-Postings-by-Industry-Occupation-Skills-and-Education/664/>
- Mobilize Maine: *Employment and Wages for Cumberland County Clusters (2010)*

NATIONAL

- American Health Information Management Association, Letter to the Standard Occupational Classification Policy Committee Chair, <http://journal.ahima.org/tag/standard-occupational-classification-principles/>
- Burning Glass Technologies, *A Growing Jobs Sector: Health Informatics*, <http://www.jff.org/publications/growing-jobs-sector-health-informatics>
- Burning Glass Technologies, *Missed Opportunities? The Labor Market in Health Informatics, 2014*, <http://www.burning-glass.com/research/health-informatics-2014/>
- Chilmark Research: *2013 Clinical Analytics Market Trends Report*, <https://www.chilmarkresearch.com/research/reports/>
- CSC, U.S. Healthcare Workforce Shortages: HIT Staff, http://www.csc.com/health_services/insights/50201-us-healthcare-workforce-shortages-hit
- HealthLeadersMedia, *The Promise of Healthcare Analytics*, <http://www.healthleadersmedia.com/breakthroughs/281331/The-Promise-of-Healthcare-Analytics>
- HIMSS Analytics: *2014 HIMSS Workforce Survey* <http://www.himssanalytics.org/research/AssetDetail.aspx?pubid=82173&tid=127>
- Informatics Professor, <http://informaticsprofessor.blogspot.com>
- Pwc Health Research Institute, *Top ten health industry issues of 2015*, <http://www.pwc.com/us/en/health-industries/top-health-industry-issues/privacy.jhtml>

For questions or comments regarding this report,
or for additional print or digital copies,
please contact:

John Spritz
Manager, Growing Portland
jspritz@maine.rr.com