

Developments in Certificate and Degree Completions in Health Care Fields of Study in Massachusetts, 2001 to 2012 and 2012 to 2015

Chapter 224 Workforce Impact Study

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Introduction

Each year the National Center for Education Statistics (NCES) of the U.S. Department of Education collects a wide range of data from every postsecondary educational institution in the nation that participates in any federal student financial aid programs. Data on college enrollment, completions, graduation rates, staffing, college costs, prices and finances are reported by colleges and universities across the nation. The Integrated Postsecondary Education Data System (IPEDS) data collection method used to measure this array of postsecondary access and outcomes measures is composed of a set of standardized reporting materials that include well-defined concepts and measures that are used by colleges to prepare their IPEDS submissions to NCES.

One of the major data elements collected by the IPEDS program is information on postsecondary degrees and certificates awarded by colleges and universities across the U.S. each year. In effect, IPEDS ‘completions’ serve as a census of all postsecondary awards granted in the nation each year. IPEDS not only counts the total number of degrees and awards granted by each college and university in the nation, but also captures information about the type (degree or certificate) and level (associate’s, bachelor’s, and so on) of the degree as well as major field of study of the degree award.

Among the most important features of IPEDS completion data from the perspective of understanding labor supply responses to changing labor demand conditions is that the data on completions is also reported by major field of study for each award type and level. College and university catalogues vary markedly in the way they label and characterize a major field or course of study. In order to better achieve comparability in reporting college completion awards by field of study, the IPEDS completion reporting system requires colleges to report completions using the Classification of Instructional Programs (CIP). The CIP system is a hierarchical taxonomy of major fields of instruction that includes specific descriptive definitions for hundreds of fields of study and serves as a standard by which data are both reported and analyzed. Moreover, completions data organized by the CIP structure can be connected to O*NET occupational data that describe the ability, knowledge, skill, and behavioral proficiency requirements of the range of occupations found in the American economy. Indeed, analysts have successfully used IPEDS along with payroll employment data (that represents demand for labor)

derived from the U.S. Bureau of Labor Statistics business establishment surveys (including the Current Employment Statistics Survey, the Quarterly Census of Employment and Wages and the Occupational Employment Statistics Survey programs) to measure institutional supply response to changing labor market demand conditions in specific industry-occupational/major field of study labor market segments.

This paper provides information on trends in postsecondary completions in health care-related fields of study in Massachusetts over the 2001 to 2012 period, representing the period before the passage of Chapter 224 or what we label as the “pre-Chapter 224 period” and over the period of three years following the enactment of Chapter 224, 2012 to 2015 which we have labeled the “post-Chapter 224 period.”¹ The state saw a rapid expansion in the demand for health care workers in Massachusetts between 2001 and 2012, when the Chapter 224 health care cost containment legislation was enacted. This paper describes overall developments in postsecondary completions in health care fields as well as developments in completions in specific health care fields of study. Analysis of the pre-Chapter 224 period provides a benchmark of postsecondary completions in health disciplines prior to the enactment of Chapter 224 that can be used to understand how institutional health labor supply may respond to the shifting structure of labor demand during the post health care reform era. The post-Chapter 224 period shows the beginnings of that shifting structure.

The Health Care Hierarchy

Perhaps more than any other industry in the American economy, the health care sector is characterized by a high degree of occupational credential and licensing requirements that are very closely tied to some kind of formal postsecondary educational activity. Employment in most health professions requires a postsecondary degree (the level of degree depending on the occupational specialty) and a certification from a third party organization that together frequently lead to the award of a license to practice in the field by a state agency that has legislative authority to award licenses to practice in the state in that health specialty.

¹ All certificate and degree awards presented in this paper measure completions during a school year. Completions in 2001, 2012, and 2015 measure degree and certificate awards in the following school years: 2001: 2000-2001 school year, 2012: 2011-2012 school year, and 2015: 2014-2015 school year.

A considerable proportion of health care industry employment in Massachusetts is concentrated in health care practitioner and technical occupations. These jobs include occupations ranging from various physician specialties, various registered nurse and advanced practitioner nurse specialties, therapeutic occupations, and technicians including dental hygienists, EMTs and surgical technologists. Employment in these occupations requires knowledge in specific medical fields that is generally developed at the postsecondary level. These occupations usually require certification and/or licensure that include a test of medical knowledge in the field as well as some clinical experience. In 2014-15, about 37 percent of employment in the Massachusetts health care sector is concentrated in medical diagnostic and/or treatment occupations.

Many non-professional health service workers are also required to earn a postsecondary certificate in order to practice in a health care setting. For example, health care support occupations which play an important role in the delivery of health care services in the Commonwealth do not require a postsecondary degree, but sometimes do require a certificate. Employment as a nursing assistant requires short-term training that leads to certification in that specialty and a license that allows these workers to engage in a very limited set of medical activities often related to measurement of basic vital signs. Other health care support occupations, including home health aides, do not require any certification or license. About 18 percent of staff employed in the state's health care sector work in health care support occupations, with a large and rapidly growing fraction employed as home health aides.

These degree and certificate requirements are in part a reflection of the health care hierarchy that places occupations with the most extensive educational requirements for practice at the top of the hierarchy while those with fewer formal schooling requirements are at lower levels of the hierarchy. For example, personal care aides and attendants while not classified as health care workers according to the standard occupational taxonomy (which classifies PCAs as part of personal service occupations), are engaged in providing home health care to a large number of chronically ill individuals and individuals with disabilities, as well as infirm elderly individuals. No education or training is required for entry into this occupation.

Massachusetts Postsecondary Education's Response to Health Care Employment Growth

Our examination of degree and certificate awards by postsecondary institutions in the state is conducted in the context of employment developments in the state's health care sector. For example, the strong growth between 2000 and 2008 in the demand for workers in the high wage/high medical knowledge sector of the health care delivery system in Massachusetts created a sharp increase in the need for a wide range of health practitioner professionals. This demand was led by employment growth in general medical/surgical hospitals and specialty hospitals, as well as physicians' offices and outpatient treatment centers. How did labor supply respond to this sudden and significant increase in demand for medical professionals? We explore this question by examining postsecondary completions or awards by certificate and degree level and major field of study by postsecondary institutions in Massachusetts.

It is important to note that the institutional labor supply response to a change in demand for workers with specific kinds of skills and knowledge often occurs with a considerable time lag between when an increase in demand occurs in a specific occupation and the time it takes to complete an educational program that prepares its graduates for employment in that occupation. Such time lags can cause substantial labor market imbalances as the demand for labor rises quickly, but the additional supply created to meet the demand may not become available for employment until 4 or 5 years following the increase in demand. This is due to the typically long education and training durations associated with developing most required proficiencies, certifications and licenses.

The result of these lags, also called the cobweb effect, can be sustained labor shortage conditions characterized by high job vacancy rates, substantial increases in real wages in specific occupations, as well as lost output and income for the firm.² Indeed, as hospital employment levels in Massachusetts rose very rapidly between 2000 and 2008, labor shortages across a wide variety of health care practitioner occupations began to emerge, especially in the registered nursing specialties where the shortages became very severe. Massachusetts hospitals adjusted by

² The reverse process can result in large labor surpluses as demand in a high level occupation falls, but completions in the related field of study continue to rise as students complete their course of study. For a discussion of this cobweb effect, please see: Paul Harrington and Laura Knoll, "*Labor Market Imbalances in the Computer Science Field of Study: The dot.com Boom and Bust in U.S. Computer Science Labor Markets*" Special Report, Office of the Provost, Drexel University, 2014.

raising wages and reducing educational requirements and hiring graduates with associate's degrees into nursing positions in general medical/surgical hospital RN positions.

As the number of degrees conferred by nursing programs in Massachusetts colleges and universities at both the two- and four-year levels rose sharply after 2008, labor shortage problems in the occupation were greatly diminished. The sharp reduction in the pace of hospital employment growth that occurred after 2008, combined with a rising number of newly graduated nurses each year, largely mitigated the RN supply problems confronting both hospitals and nursing homes in Massachusetts.

Today, little evidence of a registered nurse shortage exists in Massachusetts and the practice of regularly hiring RNs at the associate's degree level has greatly declined. Slower growth in hospital employment and substantial employment declines in the state's nursing homes mean substantially reduced levels of demand for registered nurses relative to the pre-2008 period. In response, many colleges are now offering ASN to BSN programs to help registered nurses with an associate's degree compete more effectively in a labor market now characterized by an ample nursing supply.

Developments in Health Care Education in Massachusetts by Academic Level and Broad Health Care Fields of Study

Postsecondary Awards in Health Fields of Study, 2001 to 2012

We begin our analysis of IPEDS completion data for the entire 2001 to 2012 period so that we can account for the long durations of education and training preparation required for entry into most health care professions. The findings in Table 1 examine trends in the total number of certificates and degrees awarded in health fields by Massachusetts colleges and universities over this period. The data reveal very large increases in the number of degrees conferred in health care fields. Over the 11-year period total health care degrees awarded by Massachusetts postsecondary institutions rose from 8,100 during 2001 to nearly 13,500 in 2012. This was a two-thirds increase in the number of health care degrees conferred, representing a 6 percent average annual growth rate.

Sharp increases in degree awards occurred across all degree levels. The rise in doctor's degrees³ was especially large as some therapeutic fields of study shifted their degree requirements from bachelor's to the doctoral level. It should be noted that this increase in health care degree awards represents a major investment by postsecondary educational institutions in expanding existing programs and in some instances creating new programs to respond to rising labor demand.

The number of health care certificates⁴ awarded by Massachusetts colleges and universities also increased sharply over the 2001 to 2012 period. Total certificate awards tripled

Table 1: Trends in Health Care Degree and Certificate Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

Award Level	2001	2012	Absolute Change	Relative Change
Degree Awards				
Associate's Degree	1,901	2,924	1,023	54%
Bachelor's Degree	2,576	4,483	1,907	74%
Master's Degree	2,256	3,377	1,121	50%
Doctor's Degree	1,365	2,666	1,301	95%
Degree Total	8,098	13,450	5,352	66%
Certificate Awards				
Less than One Year	1,027	2,208	1,181	115%
One to Less than Two Years	1,178	4,680	3,502	297%
Two to Four Years	32	111	79	247%
Post-Bachelor's	62	257	195	315%
Post-Master's	100	196	96	96%
Certificate Total	2,399	7,452	5,053	211%
Degree and Certificate Awards				
Degree and Certificate Total	10,497	20,902	10,405	99%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

³ Doctor's degrees in this paper include professional degrees e.g., M.D., research doctor's degrees, Ph.D., and other doctor's degrees including doctor's in pharmacy and therapeutic fields.

⁴ Certificate completions reported here is not a complete count of all industry-relevant certifications conferred in the Commonwealth. For example, CNA certifications from the Red Cross or some certificates supported by Commonwealth Corporation grant programs are not reported in IPEDS data. An IPEDS study in 2012, "Defining and Reporting Subbaccalaureate Certificates in IPEDS" found: (i) while institutions may have internal consistency in reporting certificates that consistency does not exist across institutions, (ii) institutions, particularly 4-year, maybe reporting certificates that are not necessarily subbaccalaureate certificates or that may not be earned as a result of an independent, formal program of study, and (iii) institutions are awarding a number of noncredit certificates that, under current definitions, are not reported to IPEDS.

from 2,400 to nearly 7,500 over the period, representing an annual average rate of increase of 19 percent. A large fraction of certificates awarded were of relatively short duration. In 2012, about 30 percent of all certificate awards were for programs lasting less than one year and nearly 63 percent of postsecondary certificate awards were in programs of one to two years duration—many of these awards were in the medical/dental assistance related fields of study. Therapy assistant certificate programs also accounted for a substantial share of one to two year certificate awards.

Degree and certificate awards were granted at several different levels. A distribution by level of degrees and certificates awarded in 2001 and 2012 presented in Table 2 reveals that in 2001, nearly one-third of all health care degrees awarded in the Commonwealth were bachelor's degrees and 28 percent were master's degrees. Associates degree awards comprised 23 percent of health field awards and the remaining degree awards were granted at the doctor's level. There was little change in the distribution of health field degree awards over the 11 years between 2001 and 2012. The only change was a small increase in the share of bachelor's and doctor's degrees and a small decline in the share of associate's and master's degrees.

Table 2: Distribution of Health Care Degree and Certificate Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2001 and 2012

Award Level	Number		Percentage Distribution	
	2001	2012	2001	2012
Degree Awards				
Associate's Degree	1,901	2,924	23%	22%
Bachelor's Degree	2,576	4,483	32%	33%
Master's Degree	2,256	3,377	28%	25%
Doctor's Degree	1,365	2,666	17%	20%
Degree Total	8,098	13,450	100%	100%
Certificate Awards				
Less than One Year	1,027	2,208	43%	30%
One to Less than Two Years	1,178	4,680	49%	63%
Two to Four Years	32	111	1%	1%
Post-Bachelor's	62	257	3%	3%
Post-Master's	100	196	4%	3%
Certificate Total	2,399	7,452	100%	100%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Almost all certificate awards in health fields of study in Massachusetts were concentrated at the less than one year and one to two year level. Certificates awarded for training duration of one to two years comprised nearly one-half of health care certificates awarded in 2001 and another 43 percent were awarded for less than one year of training. In 2012, certificate awards in health fields were also concentrated in programs with less than one year or one to two years of training. However, between 2001 and 2012, the share of all health certificate awards shifted from less than one year certificates to one to two year certificates. In 2012, the former accounted for 30 percent (down from 43% in 2001) and the latter for 63 percent (up from 49% in 2001) of all health certificate awards.

Much of the increase in awards at the postsecondary level came in the nursing fields with total number of nursing awards more than doubling between 2001 and 2012. Nursing awards accounted for one-third of the total increase in postsecondary awards in health care fields during this period of time. The number of allied health and medical assisting awards granted also skyrocketed over the period with the number of awards tripling from 1,000 to over 3,100 between 2001 and 2012. Awards in health and medical administrative services including medical coding, insurance specialist and medical office assistant also rose sharply, increasing by 1,100 awards between 2001 and 2012. This growth accounts for 11 percent of the total increase in postsecondary certificate and degree awards in health and medical fields granted by colleges and universities in Massachusetts over the 2001-2012 period. Many of the awards in health and medical administrative services were at the less than two year certificate level.

Table 3: Trends in Health Care Certificate and Degree Awards by Broad (Four Digit) CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

Major Field of Study	2001	2012	Absolute Change	Relative Change
Health Services/Allied Health/Health Sciences, Communication Disorders Sciences and Services	0	279	279	---
Dentistry (DDS, DMD)	363	460	97	27%
Advanced/Graduate Dentistry and Oral Sciences	319	401	82	26%
Dental Support Services and Allied Professions	96	194	98	102%
Health and Medical Administrative Services	293	583	290	99%
Allied Health and Medical Assisting Services	681	1,844	1,163	171%
Allied Health Diagnostic/Treatment Professions	1,027	3,118	2,091	204%
	560	1,172	612	109%

Major Field of Study	2001	2012	Absolute Change	Relative Change
Clinical/Medical Laboratory Science Professions	108	359	251	232%
Health/Medical Preparatory Programs	70	176	106	151%
Medicine (MD)	579	642	63	11%
Medical Clinical Sciences/Graduate Medical Study	13	9	-4	-31%
Mental/Social Health Services and Allied Prof	385	536	151	39%
Nursing	2,817	6,111	3,294	117%
Optometry (OD)	150	120	-30	-20%
Ophthalmic and Optometric Support Services	5	14	9	180%
Pharmacy, Pharmaceutical Sciences	462	1,461	999	216%
Public Health	556	943	387	70%
Rehabilitation and Therapeutic Professions	1,318	1,280	-38	-3%
Veterinary Medicine (DVM)	76	80	4	5%
Health Aides/Attendants/Orderlies	31	0	-31	-100%
Medical Illustration and Informatics	0	25	25	---
Dietetics and Clinical Nutrition Services	5	69	64	1280%
Alternative/Complementary Medicine	80	69	-11	-14%
Alternative Complementary Medical Support SVC	0	5	5	---
Somatic Bodywork and Related Therapeutic SVC	176	850	674	383%
Energy and Biologically Based Therapies	0	11	11	
Health Professions and Related Clinical Sciences	327	91	-236	-72%
Total	10,497	20,902	10,405	99%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Postsecondary Awards in Health Fields of Study, 2012 to 2015

The number of health related postsecondary degree and certificate awards granted by the state's colleges and universities in 2015 has remained essentially unchanged since 2012. A total of 21,000 certificate and degree awards in health care fields were granted during 2015, just over 100 more compared to the number of awards in health fields of study than were granted three years earlier in 2012 (20,900). The findings in Table 4 reveal that this flatness in overall postsecondary health awards over the last three years masks some very large changes in the composition of health awards granted by the state's institutions of higher learning. The number of certificates awarded at the below two-year level has plunged between 2012 and 2015, falling by 30 percent over that time period. Almost the entire decline was at the one to less than two

year certificate level. The number of degree awards in the health fields continued to rapidly rise from 13,400 during 2012 to 15,800 by 2015, representing an increase of 18 percent or an annual average rate of growth of 6 percent per year, similar to the growth rate of the previous 11 year period.

Table 4: Trends in Health Care Degree and Certificate Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

Award Level	2012	2015	Absolute Change	Relative Change
Degree Awards				
Associate's Degree	2,924	2,973	49	2%
Bachelor's Degree	4,483	6,075	1,592	36%
Master's Degree	3,377	3,839	462	14%
Doctor's Degree	2,666	2,947	281	11%
Degree Total	13,450	15,834	2,384	18%
Certificate Awards				
Less than One Year	2,208	1,886	-322	-15%
One to Less than Two Years	4,680	2,655	-2,025	-43%
Two to Four Years	111	79	-32	-29%
Post-Bachelor's	257	354	97	38%
Post-Master's	196	250	54	28%
Certificate Total	7,452	5,224	-2,228	-30%
Degree and Certificate Awards				
Degree and Certificate Total	20,902	21,058	156	1%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

The changing composition by level of health care degree and certificate awards in Massachusetts between 2012 and 2015 is presented in Table 5. In just three years between 2012 and 2015, the share of health care bachelor's degrees out of all health degrees awarded by Massachusetts postsecondary institutions increased from 33 percent in 2012 to 38 percent in 2015, while the share of associate's degrees decreased from 22 percent in 2012 to 19 percent in 2015. The distribution of health care certificates reverses some of the change that had occurred between 2001 and 2012; the share of less than one year certificates rose from 30 percent to 36 percent between 2012 and 2015, whereas certificates with a slightly longer training duration, one to two years, comprised a little over half of all health care certificates awarded in 2015, down from 63 percent in 2012.

Table 5: Distribution of Health Care Degree and Certificate Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2012 and 2015

Award Level	Number		Percentage Distribution	
	2012	2015	2012	2015
Degree Awards				
Associate's Degree	2,924	2,973	22%	19%
Bachelor's Degree	4,483	6,075	33%	38%
Master's Degree	3,377	3,839	25%	24%
Doctor's Degree	2,666	2,947	20%	19%
Degree Total	13,450	15,834	100%	100%
Certificate Awards				
Less than One Year	2,208	1,886	30%	36%
One to Less than Two Years	4,680	2,655	63%	51%
Two to Four Years	111	79	1%	2%
Post-Bachelor's	257	354	3%	7%
Post-Master's	196	250	3%	5%
Certificate Total	7,452	5,224	100%	100%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

The large decline in the number of less than two year certificate awards granted each year was heavily concentrated in the clinical and medical assistant field and the medical billing field where certificate completions declined dramatically. The gains in degrees conferred were heavily concentrated in the nursing fields at the bachelor's degree level. By 2015, the number of bachelor's degree awards in nursing by Massachusetts colleges and universities had increased to 3,100, in part as these institutions added ASN to BSN degree upgrading programs in response to the changing labor market conditions discussed earlier. The total number of nursing awards at the associate's degree level declined modestly since 2012, again in response to changing labor market conditions and rising educational attainment requirements.

Table 6: Trends in Health Care Certificate and Degree Awards by Broad (Four-Digit) CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

Major Field of Study	2012	2015	Absolute Change	Relative Change
Health Services/Allied Health/Health Sciences	279	354	75	27%
Communication Disorders Sciences and Services	460	564	104	23%
Dentistry (DDS, DMD)	401	450	49	12%
Advanced/Graduate Dentistry and Oral Sciences	194	237	43	22%

Major Field of Study	2012	2015	Absolute Change	Relative Change
Dental Support Services and Allied Professions	583	442	-141	-24%
Health and Medical Administrative Services	1,844	1,495	-349	-19%
Allied Health and Medical Assisting Services	3,118	1,929	-1,189	-38%
Allied Health Diagnostic/Treatment Professions	1,172	1,165	-7	-1%
Clinical/Medical Laboratory Science Professions	359	450	91	25%
Health/Medical Preparatory Programs	176	307	131	74%
Medicine (MD)	642	637	-5	-1%
Medical Clinical Sciences/Graduate Medical Study	9	30	21	233%
Mental/Social Health Services and Allied Prof	536	774	238	44%
Nursing	6,111	6,908	797	13%
Optometry (OD)	120	123	3	3%
Ophthalmic and Optometric Support Services	14	15	1	7%
Pharmacy, Pharmaceutical Sciences	1,461	1,630	169	12%
Public Health	943	1,041	98	10%
Rehabilitation and Therapeutic Professions	1,280	1,523	243	19%
Veterinary Medicine (DVM)	80	94	14	18%
Veterinary Biomedical and Clinical Sciences (Cert.)	-	6	6	-
Health Aides/Attendants/Orderlies	0	1	1	-
Medical Illustration and Informatics	25	65	40	160%
Dietetics and Clinical Nutrition Services	69	95	26	38%
Alternative/Complementary Medicine	69	53	-16	-23%
Alternative Complementary Medical Support SVC	5	1	-4	-80%
Somatic Bodywork and Related Therapeutic SVC	850	502	-348	-41%
Movement and Mind-Body Therapies and Education	-	0	0	-
Energy and Biologically Based Therapies	11	14	3	27%
Health Professions and Related Clinical Sciences	91	153	62	68%
Total	20,902	21,058	156	1%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Postsecondary Awards in Nursing

The CIP system defines the nursing field of study as a program that “... prepares individuals in the knowledge, techniques and procedures for promoting health, providing care for the sick, disabled, infirmed or other individuals or groups: Includes instruction in the administration of medication and treatments, assisting a physician during treatments and examinations, referring patients to physicians and other health care specialists, and planning

education for health maintenance.” During 2012, Massachusetts postsecondary institutions awarded over 1,200 certificates in nursing fields of study, most often in courses of study that lasted between one and two years. The overall number of nursing certificates awarded in the state rose very sharply over the last decade increasing from 470 certificate awards in 2001 to 1,242 by 2012, a 164 percent increase.

About 80 percent of all nursing awards granted in Massachusetts during 2012 were degree awards. About one-half of those degree awards were at the bachelor’s level while an additional one-third of these awards were at the associate’s level. The number of nursing degrees awarded by Massachusetts colleges and universities more than doubled between 2001 and 2012, with especially rapid growth in the number of nursing bachelor’s degree awards. Indeed, despite much attention paid in the popular press in the growth of ASN programs, BSN program awards grew at double the pace of ASN program awards over the eleven years between 2001 and 2012.

As has been the trend in a number of health-related fields, the number of advanced degree awards in nursing also increased quite sharply over the last decade. Master’s degree awards in nursing increased from 413 during 2001 to 759 by 2012, an increase of 84 percent. The number

Table 7: Trends in Nursing (CIP 51.16) Certificate and Degree Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

Award Level	2001	2012	Absolute Change	Relative Change
Degree Awards in Nursing				
Associate's Degree	945	1,608	663	70%
Bachelor's Degree	974	2,388	1,414	145%
Master's Degree	413	759	346	84%
Doctor's Degree	15	114	99	660%
Degree Total	2,347	4,869	2,522	107%
Certificate Awards in Nursing				
Less than One Year	40	104	64	160%
One to Less than Two Years	392	913	521	133%
Two to Four Years	12	95	83	692%
Post-Bachelor's	10	114	104	1040%
Post-Master's	16	16	0	0%
Certificate Total	470	1,242	772	164%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

of doctor's degree awards in nursing rose from 15 to 114 over the same period—a very sharp expansion in a field that traditionally did not utilize many workers at the doctor's level.

The acceleration of BSN program awards in nursing continued after 2012, albeit at a slightly slower rate. Between 2012 and 2015 the number of bachelor's degree awards in nursing increased by 725 awards or 30 percent representing an average annual increase of 10 percent; only slightly lower than the annual average increase of 13 percent in the eleven years prior to the enactment of Chapter 224 (2001 to 2012). The overall rate of growth of nursing degree awards in the Commonwealth has also declined from an annual average rate of 10 percent per year during 2001-2012 period to 6 percent per year during 2012-2015 period. Consequently the share of bachelor's degrees among all nursing degree awards has grown from 49 percent in 2012 to 54 percent in 2015. Bachelor's degrees in nursing comprised 41 percent of all nursing degree awards in the state in 2001.

Associate degree awards in nursing fell by 5 percent or 74 degrees over the three years between 2012 and 2015. Post baccalaureate degree awards in nursing also rose in the post-Chapter 224 period. The number of nursing master's degree awards in 2015 were one-fifth higher than the number awarded in 2012. In 2015, 901 master's degrees were awarded versus 759 in 2012, representing an increase of 142 master's degree awards over three years or 47 awards per year, much higher than the annual average increase of 31 awards per year between 2001 and 2012. Nursing doctorate degrees also rose sharply between 2012 and 2015. Although still small in number, there was a 55 percent increase in nursing doctor's degrees between 2012 and 2015. In 2015 the state's higher education institutions awarded 177 doctor's degrees in nursing, up from 114 awards in 2012, representing an increase of 63 awards over the three-year period or 21 nursing doctor's degrees per year over the three years after the enactment of Chapter 224.

Certificate awards in nursing declined by 5 percent between 2012 and 2015. The entire decline was concentrated at the pre-bachelor's level certificates of durations under one year, one to two years, and two to four years. There were small gains in post-bachelor's and post-master's certificate awards in nursing. The share of certificates among all nursing postsecondary awards declined from 20 percent in 2012 to 17 percent in 2015.

Table 8: Trends in Nursing (CIP 51.16) Certificate and Degree Awards by Level of Award among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

	2012	2015	Absolute Change	Relative Change
	Degree Awards in Nursing			
Associate's Degree	1,608	1,534	-74	-5%
Bachelor's Degree	2,388	3,113	725	30%
Master's Degree	759	901	142	19%
Doctor's Degree	114	177	63	55%
Degree Total	4,869	5,725	856	18%
	Certificate Awards in Nursing			
Less than One Year	104	91	-13	-13%
One to Two Years	913	877	-36	-4%
Two to Four Years	95	74	-21	-22%
Post-Bachelor's	114	117	3	3%
Post Master's	16	24	8	50%
Certificate Total	1,242	1,183	-59	-5%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

One way to better understand the growth in output of nursing programs and other major fields of study is to examine more detailed program classification available from the CIP program. For example, each of the 28 four-digit CIP health care fields of study listed in Table 3 are further disaggregated in the IPEDS database into more specific 6-digit field of study codes. In Massachusetts, post-secondary institutions award degrees and certificates in a total of 168 specific health care fields. An examination of trends in nursing field of study awards at this level of detail allows important insights into the number of degrees and certificates granted in each subspecialty within a health care field of study. In Tables 9 and 10 we have used nursing to illustrate the level of program detail available at the more disaggregated level of field of study classification.

The findings in Table 9 provide a detailed depiction of the areas of concentration where nursing certificates and degrees were awarded by postsecondary institutions in Massachusetts. A look at the table reveals that during 2012 seven out of ten nursing degrees and certificates were awarded by RN programs (up from 62 percent in 2001) and 14 percent by LPN programs (unchanged from 14% LPN share in 2001). Both RN and LPN programs have grown very rapidly over the last decade. The table suggests that over time a number of specialties have

emerged in the nursing fields such as nursing practice (or nurse practitioner), pediatric nursing and similar specialty fields that had zero degree or certificate awards in 2001 and 453 in 2012. Such conclusions should be treated with caution as some of these developments may be associated with institutional changes in the way they classified their programs.

A notable finding is the small number of completions in postsecondary nursing assistant programs. During 2012, postsecondary institutions granted just 54 nursing assistant awards; up from 40 awards in 2001. Our study of the employment growth in the state's health care industry and changes in the demand for workers in different health care occupations suggests that the nursing assistant occupation has grown at a very rapid pace. Growth in the number of nursing assistant awards based on IPEDS data seems to suggest that the supply response has been anemic. However, it is important to note that postsecondary institutions that participate in federal financial aid programs are not the sole or primary source of education and training to various health care occupations. Indeed, it is surprising that that any nursing assistant awards were granted by postsecondary educational institutions since nurse assistant preparation programs are generally found in secondary career and technical education institutions or provided by independent third party training programs, including those funded under the Workforce Innovation and Opportunity Act.

Table 9: Trends in Nursing Certificate and Degree Awards by Detailed CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

Detailed Nursing Field of Study	2001	2012	Absolute Change	Relative Change
Registered Nursing/Registered Nurse/Nursing Science	1,733	4,286	2,553	147%
Nursing Administration	5	62	57	1140%
Adult Health Nurse/Nursing	16	47	31	194%
Nurse Anesthetist	6	71	65	1083%
Family Practice Nurse/Nursing	14	145	131	936%
Nurse Midwife/Nursing Midwifery	8	-	-8	-100%
Pediatric Nurse/Nursing	0	42	42	-
Psychiatric/Mental Health Nurse/Nursing	8	30	22	275%
Public Health/Community Nurse/Nursing	0	5	5	-
Clinical Nurse Specialist	0	8	8	-
Critical Care Nursing	0	10	10	-
Nursing Education	0	10	10	-

Detailed Nursing Field of Study	2001	2012	Absolute Change	Relative Change
Nursing Practice	0	147	147	-
Palliative Care Nursing	0	6	6	-
Clinical Nurse Leader	0	11	11	-
Geriatric Nurse/Nursing	0	29	29	-
Women's Health Nurse/Nursing	0	26	26	-
Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	0	159	159	-
Licensed Practical/Vocational Nurse Training	389	829	440	113%
Nursing Assistant/Aide and Patient Care Assistant/Aide	40	54	14	35%
Practical Nursing, Vocational Nursing and Nursing Assistants, Other	-	134	134	-
Nursing, Other	598	-	-598	-100%
Total Nursing	2,817	6,111	3,294	117%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

In the post-Chapter 224 period, there was a slight shift in the nursing specialties awards. Registered Nurses still ranked the highest in additions per year though the pace did slow somewhat from an increase of 232 additional RN degree awards per year in the pre-Chapter 224 period compared to 221 additional RN awards per year during the 2012-2015 post-Chapter 224 period. The increase in RN awards in the post-Chapter 224 period was accompanied by a decrease in LPN awards; falling to 762 awards in 2015 from 829 LPN awards in 2012. Nursing assistant awards remained about the same, declining by 3 awards or 6 percent over the three years despite the sharp increase in nursing assistant employment. As noted above, the training of nursing assistants is mostly done outside the postsecondary education system, generally in secondary career and technical education institutions or by independent third party training programs. Postsecondary awards in nursing assistant fields do not capture the extent of nursing assistant training and certification in the state.

As noted in our paper on employment developments in the state's health care industry, the slowdown in hospital industry employment growth since 2008 and the decline in employment in nursing homes since 2012 have meant a slowdown in the growth of demand for

Table 10: Trends in Nursing Certificate and Degree Awards by Detailed CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

	2012	2015	Absolute Change	Relative Change
Registered Nursing/Registered Nurse/Nursing Science	4,286	4,949	663	15%
Nursing Administration	62	75	13	21%
Adult Health Nurse/Nursing	47	75	28	60%
Nurse Anesthetist	71	74	3	4%
Family Practice Nurse/Nursing	145	196	51	35%
Pediatric Nurse/Nursing	42	23	-19	-45%
Psychiatric/Mental Health Nurse/Nursing	30	28	-2	-7%
Public Health/Community Nurse/Nursing	5	0	-5	-100%
Perioperative/Operating Room and Surgical Nurse/Nursing	-	1	1	-
Clinical Nurse Specialist	8	20	12	150%
Critical Care Nursing	10	0	-10	-100%
Nursing Education	10	40	30	300%
Nursing Practice	147	245	98	67%
Palliative Care Nursing	6	0	-6	-100%
Clinical Nurse Leader	11	15	4	36%
Geriatric Nurse/Nursing	29	47	18	62%
Women's Health Nurse/Nursing	26	30	4	15%
Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	159	123	-36	-23%
Licensed Practical/Vocational Nurse Training	829	762	-67	-8%
Nursing Assistant/Aide and Patient Care Assistant/Aide	54	51	-3	-6%
Practical Nursing, Vocational Nursing and Nursing Assistants, Other	134	154	20	15%
Total Nursing	6,111	6,908	797	13%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

registered nurses at the bachelor's degree level and likely at the associate's degree level as well.⁵ Since 2012, there has been a slight slowdown in the rate of growth of postsecondary awards in

⁵ See "Health Care Employment, Structure, and Trends in Massachusetts," Chapter 224 Workforce Impact Study, Prepared for Office of State Auditor, Commonwealth of Massachusetts, by Commonwealth Corporation and the Center for Labor Markets and Policy, Drexel University, December 2016.

nursing. The number of associate's degree and certificate awards fell between 2012 and 2015 while degree awards at the bachelor's and higher level grew, albeit at slower average annual rates.

The long term outlook for nursing remains strong, in part due to anticipated replacement needs as older nurses retire, but sharp expansion of nursing programs may not be warranted since the structure of health care service provision has shifted from traditional inpatient care to care in outpatient settings and at home. Our analysis of health care employment trends reveals that the majority of new health care jobs created in Massachusetts in recent years have been concentrated among home health care agencies and providers of care to the elderly and disabled. The staffing structure among these providers is heavily concentrated in entry-level positions that require little formal schooling in health or medical fields or work experience in those fields.

Developments in Health Care Education in Massachusetts by Academic Level and Detailed Health Care Field of Study

Using the IPEDS completion data we have prepared a set of tables that combines both the course of study with the level of degree and certificate award at both the four-digit CIP and six-digit CIP level of aggregation for postsecondary health programs in Massachusetts. The highlights of this analysis are presented below.

Less than One Year Certificates

The findings provided in Tables 11 through 14 examine health care postsecondary awards conferred from courses of study of less than one year in duration during the pre-Chapter 224 period (2001 through 2012, Tables 11 and 12) and the post-Chapter 224 enactment period (2012 through 2015, Tables 13 and 14). During 2012, more than 2,200 such awards were granted by postsecondary institutions in the Commonwealth. During 2015, the number of such awards (less than one year) dropped to 1,900, representing a decline of 15 percent or 322 certificates. This is a reversal from the 2001 to 2012 period when the number of certificate awards of less than one year duration in health fields more than doubled. The findings in Tables 11 and 12 provide trends in the number of less than one year certificate awards in broader health fields of study (four-digit CIP codes), while the data in Tables 13 and 14 provide a measure of the more detailed types of

programs (six-digit CIP codes) that are producing these certificate awards. The following are highlights from our analysis of certificates at the less than one year level:

- Somatic bodywork and related therapeutic fields generated the largest absolute and relative increases in completion awards at the less than one year level during the pre-Chapter 224 period; an increase of 366 awards representing a growth rate of 227 percent. Table 13 reveals that most of this increase was in the field of message therapy/therapeutic massage. In the post-Chapter 224 period, Somatic bodywork and related therapeutic fields awarded 148 fewer awards in 2015 compared to 2012, representing a loss of about 49 completions annually; with all the loss in the therapeutic massage field (Table 14).
- Medical assisting was the second largest area of growth in less than one-year completions in the pre-Chapter 224 period (Table 11). This changed during the post-Chapter 224 period (Table 12) where completions dropped 25 percent; larger than the overall 15 percent decline of less than one year certificates awarded between 2012 and 2015.
- Health and administrative services had also been a large and rapidly growing field of study in the state in the pre-Chapter 224 period. A very large share of this increase was in the output of programs in which individuals receive training as medical insurance coding specialists and from medical insurance biller fields of study. Table 12 shows that health and administrative services completions reversed course in the post-Chapter 224 period, dropping by 11 percent. The Commonwealth awarded about 43 fewer certificates in this field in 2015 compared to 2012.
- Clinical and medical laboratory science programs had also sharply increased awards at the less than one year level during the pre-Chapter 224 period. During the 2012-2015 period, clinical and medical laboratory certificate awards continued to grow by 57 awards or 27 percent over three years between 2012 and 2015; a rate of growth of 9 percent per year.
- Mental and social health services and allied professions added only 5 certificates between 2001 and 2012, but grew by 70 percent in the post-Chapter 224 enactment period, from 67 certificates awarded in 2012 to 114 certificate awards in 2015.

Table 11: Trends in Health Care Certificate Awards of Less than One Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	0	-	-
51.02	Communication Disorders Sciences and Services	-	1	1	-
51.06	Dental Support Services and Allied Professions	33	17	-16	-48%
51.07	Health and Medical Administrative Services	188	397	209	111%
51.08	Allied Health and Medical Assisting Services	342	594	252	74%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	128	251	123	96%
51.1	Clinical/Medical Laboratory Science and Allied Professions	35	209	174	497%
51.11	Health/Medical Preparatory Programs	-	-	-	-
51.15	Mental and Social Health Services and Allied Professions	62	67	5	8%
51.16	Nursing	40	104	64	160%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	2	5	3	150%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	-	-	-
51.22	Public Health	-	5	5	-
51.23	Rehabilitation and Therapeutic Professions	-	-	-	-
51.26	Health Aides/Attendants/Orderlies	31	0	-31	-100%
51.31	Dietetics and Clinical Nutrition Services	-	-	-	-
51.33	Alternative and Complementary Medicine and Medical Systems	-	20	20	-
51.35	Somatic Bodywork and Related Therapeutic Services.	161	527	366	227%
51.37	Energy and Biologically Based Therapies.	-	11	11	-
51.99	Health Professions and Related Clinical Sciences, Other.	5	0	-5	-100%
	Total	1,027	2,208	1,181	115%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 12: Trends in Health Care Certificate Awards of Less than One Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	0	0	0	-
51.02	Communication Disorders Sciences and Services	1	1	0	0%
51.06	Dental Support Services and Allied Professions	17	-	-17	-100%
51.07	Health and Medical Administrative Services	397	354	-43	-11%
51.08	Allied Health and Medical Assisting Services	594	445	-149	-25%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	251	151	-100	-40%
51.1	Clinical/Medical Laboratory Science and Allied Professions	209	266	57	27%
51.11	Health/Medical Preparatory Programs	-	11	11	-
51.15	Mental and Social Health Services and Allied Professions	67	114	47	70%
51.16	Nursing	104	91	-13	-13%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	5	3	-2	-40%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	39	39	-
51.22	Public Health	5	6	1	20%
51.26	Health Aides/Attendants/Orderlies	0	1	1	-
51.31	Dietetics and Clinical Nutrition Services	-	2	2	-
51.33	Alternative and Complementary Medicine and Medical Systems	20	9	-11	-55%
51.35	Somatic Bodywork and Related Therapeutic Services	527	379	-148	-28%
51.37	Energy and Biologically Based Therapies	11	14	3	27%
51.99	Health Professions and Related Clinical Sciences, Other	0	0	0	-
	Total	2,208	1,886	-322	-15%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 13: Trends in Health Care Certificate Awards of Less than One Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	0	-	-
51.0201	Communication Disorders, General	-	-	-	-
51.0202	Audiology/Audiologist and Hearing Sciences	-	-	-	-
51.0299	Communication Disorders Sciences and Services, Other	-	1	1	-
51.0301	Community Health Liaison	8	0	-8	-100%
51.0601	Dental Assisting/Assistant	33	17	-16	-48%
51.0701	Health/Health Care Administration/Management	0	0	0	-
51.0702	Hospital and Health Care Facilities Administration/Management	2	-	-	-
51.0703	Health Unit Coordinator/Ward Clerk	-	0	-	-
51.0705	Medical Office Management/Administration	6	7	1	17%
51.0706	Health Information/Medical Records Administration/Administrator	2	0	-2	-100%
51.0707	Health Information/Medical Records Technology/Technician	79	20	-59	-75%
51.0708	Medical Transcription/Transcriptionist	20	1	-19	-95%
51.0709	Medical Office Computer Specialist/Assistant	-	4	4	-
51.071	Medical Office Assistant/Specialist	-	44	44	-
51.0711	Medical/Health Management and Clinical Assistant/Specialist	-	-	-	-
51.0712	Medical Reception/Receptionist	-	8	8	-
51.0713	Medical Insurance Coding Specialist/Coder	-	62	62	-
51.0714	Medical Insurance Specialist/Medical Biller	-	179	179	-
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	73	55	-18	-25%
51.0717	Medical Staff Services Technology/Technician	-	-	-	-
51.0799	Health and Medical Administrative Services, Other	6	17	11	183%
51.0801	Medical/Clinical Assistant	279	383	104	37%
51.0802	Clinical/Medical Laboratory Assistant	61	0	-61	-100%
51.0805	Pharmacy Technician/Assistant	-	111	111	-
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	1	2	1	100%
51.081	Emergency Care Attendant (EMT Ambulance)	-	1	1	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0899	Allied Health and Medical Assisting Services, Other	1	97	96	9600%
51.0901	Cardiovascular Technology/Technologist	-	-	-	-
51.0902	Electrocardiograph Technology/Technician	-	21	21	-
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	-	1	1	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	108	126	18	17%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	-	4	4	-
51.0909	Surgical Technology/Technologist	5	30	25	500%
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	6	9	3	50%
51.0911	Radiologic Technology/Science - Radiographer	-	21	21	-
51.0913	Athletic Training/Trainer	-	-	-	-
51.0917	Polysomnography	-	0	0	-
51.092	Magnetic Resonance Imaging (MRI)	-	-	-	-
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	9	39	30	333%
51.1001	Blood Bank Technology Specialist	-	-	-	-
51.1004	Clinical/Medical Laboratory Technician	16	0	-16	-100%
51.1009	Phlebotomy Technician/Phlebotomist	-	195	195	-
51.1012	Sterile Processing Technology/Technician	-	-	-	-
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	19	14	-5	-26%
51.1102	Pre-Medicine/Pre-Medical Studies	-	-	-	-
51.1501	Substance Abuse/Addiction Counseling	32	13	-19	-59%
51.1502	Psychiatric/Mental Health Services Technician	9	49	40	444%
51.1504	Community Health Services/Liaison/Counseling	0	3	3	-
51.1599	Mental and Social Health Services and Allied Professions, Other	13	2	-11	-85%
51.1801	Opticianry/Ophthalmic Dispensing Optician	2	-	-	-
51.1802	Optometric Technician/Assistant	-	-	-	-
51.1803	Ophthalmic Technician/Technologist	-	5	5	-
51.1899	Ophthalmic/Optometric Support Services and Allied Professions, Other	-	-	-	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	-	-
51.2206	Occupational Health & Industrial Hygiene	-	-	-	-
51.2211	Health Services Administration	-	5	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	-	-
51.2399	Rehabilitation and Therapeutic Professions, Other	-	-	-	-
51.2601	Health Aide	31	0	-31	-100%
51.2602	Home Health Aide/Home Attendant	-	-	-	-
51.2699	Health Aides/Attendants/Orderlies, Other	-	-	-	-
51.3101	Dietetics/Dietitian	-	-	-	-
51.3102	Clinical Nutrition/Nutritionist	-	-	-	-
51.3199	Dietetics and Clinical Nutrition Services, Other	-	-	-	-
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	-	20	20	-
51.3501	Massage Therapy/Therapeutic Massage	161	516	355	220%
51.3502	Asian Bodywork Therapy	-	11	11	-
51.3703	Polarity Therapy	-	9	9	-
51.3704	Reiki	-	2	2	-
51.3803	Adult Health Nurse/Nursing	-	-	-	-
51.3812	Perioperative/Operating Room and Surgical Nurse/Nursing	-	-	-	-
51.3814	Critical Care Nursing	-	0	-	-
51.3901	Licensed Practical/Vocational Nurse Training	-	50	50	-
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide	40	54	14	35%
	Nursing, Other	-	-	-	-
51.9999	Health Professions and Related Clinical Sciences, Other	5	0	-5	-100%
	Total	1,027	2,208	1181	115%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 14: Trends in Health Care Certificate Awards of Less than One Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	0	0	0	-
51.0201	Communication Disorders, General	-	0	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0202	Audiology/Audiologist and Hearing Sciences	-	-	0	-
51.0299	Communication Disorders Sciences and Services, Other	1	1	0	0%
51.0301	Community Health Liaison	-	-	0	-
51.0601	Dental Assisting/Assistant	17	-	-17	-100%
51.0701	Health/Health Care Administration/Management	0	-	0	-
51.0702	Hospital and Health Care Facilities Administration/Management	-	-	-2	-100%
51.0703	Health Unit Coordinator/Ward Clerk	0	-	0	-
51.0705	Medical Office Management/Administration	7	6	-1	-14%
51.0706	Health Information/Medical Records Administration/Administrator	0	0	0	-
51.0707	Health Information/Medical Records Technology/Technician	20	40	20	100%
51.0708	Medical Transcription/Transcriptionist	1	3	2	200%
51.0709	Medical Office Computer Specialist/Assistant	4	-	-4	-100%
51.071	Medical Office Assistant/Specialist	44	18	-26	-59%
51.0711	Medical/Health Management and Clinical Assistant/Specialist	-	-	0	-
51.0712	Medical Reception/Receptionist	8	24	16	200%
51.0713	Medical Insurance Coding Specialist/Coder	62	104	42	68%
51.0714	Medical Insurance Specialist/Medical Biller	179	62	-117	-65%
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	55	81	26	47%
51.0717	Medical Staff Services Technology/Technician	-	-	0	-
51.0799	Health and Medical Administrative Services, Other	17	16	-1	-6%
51.0801	Medical/Clinical Assistant	383	287	-96	-25%
51.0802	Clinical/Medical Laboratory Assistant	-	16	16	-
51.0805	Pharmacy Technician/Assistant	111	91	-20	-18%
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	2	5	3	150%
51.081	Emergency Care Attendant (EMT Ambulance)	1	21	20	2000%
51.0899	Allied Health and Medical Assisting Services, Other	97	25	-72	-74%
51.0901	Cardiovascular Technology/Technologist	-	-	0	-
51.0902	Electrocardiograph Technology/Technician	21	10	-21	-100%
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	1	-	-1	-100%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	126	77	-49	-39%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	4	20	16	400%
51.0909	Surgical Technology/Technologist	30	30	0	0%
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	9	0	-9	-100%
51.0911	Radiologic Technology/Science - Radiographer	21	2	-19	-90%
51.0913	Athletic Training/Trainer	-	-	0	-
51.0917	Polysomnography	0	0	0	-
51.092	Magnetic Resonance Imaging (MRI)	-	4	4	-
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	39	8	-31	-79%
51.1001	Blood Bank Technology Specialist	-	-	0	-
51.1004	Clinical/Medical Laboratory Technician	-	-	0	-
51.1009	Phlebotomy Technician/Phlebotomist	195	163	-32	-16%
51.1012	Sterile Processing Technology/Technician	-	31	31	-
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	14	72	58	414%
51.1102	Pre-Medicine/Pre-Medical Studies	-	11	11	-
51.1501	Substance Abuse/Addiction Counseling	13	29	16	123%
51.1502	Psychiatric/Mental Health Services Technician	49	54	5	10%
51.1504	Community Health Services/Liaison/Counseling	3	7	4	133%
51.1599	Mental and Social Health Services and Allied Professions, Other	2	24	22	1100%
51.1801	Opticianry/Ophthalmic Dispensing Optician	-	-	0	-
51.1802	Optometric Technician/Assistant	-	0	0	-
51.1803	Ophthalmic Technician/Technologist	5	0	-5	-100%
51.1899	Ophthalmic/Optometric Support Services and Allied Professions, Other	-	3	3	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	39	39	-
51.2206	Occupational Health & Industrial Hygiene	-	-	0	-
51.2211	Health Services Administration	5	6	1	20%
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	-	-	0	-
51.2601	Health Aide	0	1	1	-
51.2602	Home Health Aide/Home Attendant	-	0	0	-
51.2699	Health Aides/Attendants/Orderlies, Other	-	0	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.3101	Dietetics/Dietitian	-	-	0	-
51.3102	Clinical Nutrition/Nutritionist	-	-	0	-
51.3199	Dietetics and Clinical Nutrition Services, Other	-	2	2	-
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	20	9	-11	-55%
51.3501	Massage Therapy/Therapeutic Massage	516	379	-137	-27%
51.3502	Asian Bodywork Therapy	11	-	-11	-100%
51.3703	Polarity Therapy	9	6	-3	-33%
51.3704	Reiki	2	8	6	300%
51.3803	Adult Health Nurse/Nursing	-	-	0	-
51.3812	Perioperative/Operating Room and Surgical Nurse/Nursing	-	1	1	-
51.3814	Critical Care Nursing	0	0	0	-
51.3901	Licensed Practical/Vocational Nurse Training	50	39	-11	-22%
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide	54	51	-3	-6%
	Nursing, Other	-	0	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	0	0	0	-
	Total	2,208	1,886	-322	-15%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

One to Two Year Certificates

Earlier we observed a near tripling of the number of certificate awards granted at the one to two year level between 2001 and 2012. A look at findings in Table 15 reveals that most of the increase occurred in the fields of health administrative services and in medical/clinical assisting during this time. In the post-Chapter 224 period certificate awards at the one to two year level declined. Table 16 shows a 43 percent decrease in the number of one to two year certificates awarded between 2012 and 2015. The decline was spread across all fields with large declines occurring in the two areas that saw a sharp growth in the pre-Chapter 224 period: health administrative services and medical assisting.

At a more detailed level, as shown by the findings provided in Table 17 and Table 18, we found that:

- Output of medical/clinical assistant programs accounted for more than half of the increase in one to two year postsecondary program output during the pre-Chapter 224 period (2001 to 2012). Between 2012 and 2015 postsecondary institutions in the Commonwealth awarded 1,126 fewer medical/clinical assistant certificates, representing a decline of 53 percent.
- In the nursing field, one to two year certificate programs saw very rapid expansion in the pre-Chapter 224 period. LPN programs doubled annual completions to 779 by 2012, up from 389 in 2001. The emergence of one to two year certificate programs in nursing assistant and vocational nursing resulted in 134 one to two year certificates awarded in these fields during 2012. By 2015, LPN programs at the one to two year level had slowed slightly, awarding 723 certificates in 2015, down from 779 certificates awarded in 2012.
- Massage therapy specialties at the one to two year level increased the number of awards from 15 in 2001 to 313 in 2012; but by 2015 massage therapy certificates in one to two year programs had dropped down to 121 awards.

Table 15: Trends in Health Care Certificate Awards of One to Two Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-		-	-
51.06	Dental Support Services and Allied Professions	54	363	309	572%
51.07	Health and Medical Administrative Services	140	831	691	494%
51.08	Allied Health and Medical Assisting Services	304	2122	1818	598%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	73	105	32	44%
51.1	Clinical/Medical Laboratory Science and Allied Professions	-	6	6	-
51.15	Mental and Social Health Services and Allied Professions	51	25	-26	-51%
51.39	Nursing	392	913	521	133%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	2	0	-2	-100%
51.22	Public Health		-	-	-
51.23	Rehabilitation and Therapeutic Professions	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.27	Medical Illustration and Informatics		-	-	-
51.31	Dietetics and Clinical Nutrition Services		-	-	-
51.33	Alternative and Complementary Medicine and Medical Systems		-	-	-
51.34	Alternative and Complementary Medical Support Services	-	2	2	-
51.35	Somatic Bodywork and Related Therapeutic Services	15	313	298	1987%
51.99	Health Professions and Related Clinical Sciences, Other	147	0	-147	-100%
	Total	1,178	4,680	3502	297%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 16: Trends in Health Care Certificate Awards of One to Two Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.06	Dental Support Services and Allied Professions	363	190	-173	-48%
51.07	Health and Medical Administrative Services	831	301	-530	-64%
51.08	Allied Health and Medical Assisting Services	2,122	1,015	-1,107	-52%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	105	94	-11	-10%
51.1	Clinical/Medical Laboratory Science and Allied Professions	6	5	-1	-17%
51.15	Mental and Social Health Services and Allied Professions	25	47	22	88%
51.39	Nursing	913	877	-36	-4%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	-	-	0	-
51.22	Public Health	-	1	1	-
51.23	Rehabilitation and Therapeutic Professions	-	-	-	-
51.27	Medical Illustration and Informatics	-	4	4	-
51.31	Dietetics and Clinical Nutrition Services	-	0	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.33	Alternative and Complementary Medicine and Medical Systems	-	0	0	-
51.34	Alternative and Complementary Medical Support Services	2	0	-2	-100%
51.35	Somatic Bodywork and Related Therapeutic Services	313	121	-192	-61%
51.99	Health Professions and Related Clinical Sciences, Other	-	-	0	-
	Total	4,680	2,655	-2,025	-43%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 17: Trends in Health Care Certificate Awards of One to Two Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	-	-	-
51.0601	Dental Assisting/Assistant	54	363	309	572%
51.0699	Dental Services and Allied Professions, Other	-	-	-	-
51.0705	Medical Office Management/Administration	6	36	30	500%
51.0706	Health Information/Medical Records Administration/Administrator	0	-	-	-
51.0707	Health Information/Medical Records Technology/Technician	93	0	-93	-100%
51.071	Medical Office Assistant/Specialist	-	65	65	-
51.0713	Medical Insurance Coding Specialist/Coder	-	171	171	-
51.0714	Medical Insurance Specialist/Medical Biller	-	357	357	-
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	29	202	173	597%
51.0799	Health and Medical Administrative Services, Other	12	0	-12	-100%
51.0801	Medical/Clinical Assistant	297	2,122	1,825	614%
51.0802	Clinical/Medical Laboratory Assistant	-	-	-	-
51.0803	Occupational Therapist Assistant	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0805	Pharmacy Technician/Assistant	2	0	-2	-100%
51.0899	Health & Medical Assistants, Other	5	-	-	-
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	-	7	7	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	41	41	-
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	-	0	0	-
51.0908	Respiratory Care Therapy/Therapist	5	0	-5	-100%
51.0909	Surgical Technology/Technologist	68	57	-11	-16%
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	-	6	6	-
51.1199	Health/Medical Preparatory Programs, Other	-	-	-	-
51.1501	Substance Abuse/Addiction Counseling	7	17	10	143%
51.1502	Psychiatric/Mental Health Services Technician	44	8	-36	-82%
51.1599	Mental and Social Health Services and Allied Professions, Other	-	-	-	-
51.1801	Opticianry/Ophthalmic Dispensing Optician	2	0	-2	-100%
51.2211	Health Services Administration	-	-	-	-
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	-	-
51.2799	Medical Illustration and Informatics, Other	-	-	-	-
51.3103	Dietetic Technician	-	-	-	-
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	-	-	-	-
51.3499	Alternative and Complementary Medical Support Services, Other	-	2	2	-
51.3501	Massage Therapy/Therapeutic Massage	15	313	298	1987%
51.3801	Nursing (RN Training)	-	-	-	-
51.3901	Licensed Practical/Vocational Nurse Training	389	779	390	100%
51.3999	Practical Nursing, Vocational Nursing and Nursing Assistants, Other	-	134	134	-
	Nursing, Other	3	0	-3	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	147	-	-	-
	Total	1,178	4,680	3,502	297%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 18: Trends in Health Care Certificate Awards of One to Two Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0601	Dental Assisting/Assistant	363	190	-173	-48%
51.0699	Dental Services and Allied Professions, Other	-	-	0	-
51.0705	Medical Office Management/Administration	36	34	-2	-6%
51.0706	Health Information/Medical Records Administration/Administrator	-	-	0	-
51.0707	Health Information/Medical Records Technology/Technician	-	-	0	-
51.071	Medical Office Assistant/Specialist	65	71	6	9%
51.0713	Medical Insurance Coding Specialist/Coder	171	175	4	2%
51.0714	Medical Insurance Specialist/Medical Biller	357	-	-357	-100%
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	202	21	-181	-90%
51.0799	Health and Medical Administrative Services, Other	-	-	0	-
51.0801	Medical/Clinical Assistant	2122	996	-1126	-53%
51.0802	Clinical/Medical Laboratory Assistant	-	-	0	-
51.0803	Occupational Therapist Assistant	-	-	0	-
51.0805	Pharmacy Technician/Assistant	-	19	19	-
51.0899	Health & Medical Assistants, Other	-	-	0	-
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	7	22	15	214%
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	41	1	-40	-98%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	0	0	0	-
51.0908	Respiratory Care Therapy/Therapist	0	0	0	-
51.0909	Surgical Technology/Technologist	57	71	14	25%
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	6	5	-1	-17%
51.1199	Health/Medical Preparatory Programs, Other	-	-	0	-
51.1501	Substance Abuse/Addiction Counseling	17	19	2	12%
51.1502	Psychiatric/Mental Health Services Technician	8	28	20	250%
51.1599	Mental and Social Health Services and Allied Professions, Other	-	0	0	-
51.1801	Opticianry/Ophthalmic Dispensing Optician	-	-	0	-
51.2211	Health Services Administration	-	1	1	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	0	-
51.2799	Medical Illustration and Informatics, Other	-	4	4	-
51.3103	Dietetic Technician	-	0	0	-
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	-	0	0	-
51.3499	Alternative and Complementary Medical Support Services, Other	2	0	-2	-100%
51.3501	Massage Therapy/Therapeutic Massage	313	121	-192	-61%
51.3801	Nursing (RN Training)	-	-	0	-
51.3901	Licensed Practical/Vocational Nurse Training	779	723	-56	-7%
51.3999	Practical Nursing, Vocational Nursing and Nursing Assistants, Other	134	154	20	15%
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	-	-	0	-
	Total	4,680	2,655	-2,025	-43%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Associate's Degrees

Most of the increase (about 60 percent) in health care associate's degree awards among Massachusetts colleges and universities that occurred over the 2001 to 2012 period were in the nursing field, with the bulk of the remaining increase originating in allied health professions (Table 19). As mentioned earlier in this paper, during the post-Chapter 224 period associate's degree awards slowed significantly, increasing by only 2 percent over the three-year period (Table 20). On a more detailed basis (Table 21 and Table 22) we found:

- Essentially all of the gain in nursing degree awards came from ASN programs with little or no completions in other nursing specialties during the 2001 to 2012 period. In the post-Chapter 224 period, ASN program awards declined by 74 degrees or 5 percent.
- Between 2001 and 2012 there were substantial increases in awards in health technology and allied health professions, including respiratory care therapy programs, sonography, and ultrasound specialty programs as well as radiologic technology and radiation therapy

programs. In the post-Chapter 224 period, associate's degree awards declined in allied health professions.

- Associate's degree awards in allied health and medical assisting services increased between 2012 and 2015 by 67 awards or 19 percent; a reversal from a small decline in the 2001 to 2012 period. Most of the increase occurred in the physical and occupational therapy assistant fields.

Table 19: Trends in Health Care Associate's Degree Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	71	71	-
51.02	Communication Disorders Sciences and Services	-	15	15	-
51.06	Dental Support Services and Allied Professions	169	155	-14	-8%
51.07	Health and Medical Administrative Services	86	161	75	87%
51.08	Allied Health and Medical Assisting Services	362	357	-5	-1%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	170	379	209	123%
51.1	Clinical/Medical Laboratory Science and Allied Professions	15	44	29	193%
51.11	Health/Medical Preparatory Programs	2	19	17	850%
51.15	Mental and Social Health Services and Allied Professions	104	47	-57	-55%
51.16	Nursing	945	1,608	663	70%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	1	8	7	700%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	-	-	-
51.22	Public Health	-	11	11	-
51.23	Rehabilitation and Therapeutic Professions	35	16	-19	-54%
51.31	Dietetics and Clinical Nutrition Services	5	5	0	0%
51.33	Alternative and Complementary Medicine and Medical Systems	-	1	1	-
51.34	Alternative and Complementary Medical Support Services	-	3	3	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.35	Somatic Bodywork and Related Therapeutic Services	-	10	10	-
51.99	Health Professions and Related Clinical Sciences, Other	7	14	7	100%
	Total	1,901	2,924	1,023	54%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 20: Trends in Health Care Associate's Degree Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	71	97	26	37%
51.02	Communication Disorders Sciences and Services	15	20	5	33%
51.06	Dental Support Services and Allied Professions	155	159	4	3%
51.07	Health and Medical Administrative Services	161	186	25	16%
51.08	Allied Health and Medical Assisting Services	357	424	67	19%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	379	333	-46	-12%
51.1	Clinical/Medical Laboratory Science and Allied Professions	44	60	16	36%
51.11	Health/Medical Preparatory Programs	19	17	-2	-11%
51.15	Mental and Social Health Services and Allied Professions	47	78	31	66%
51.16	Nursing	1,608	1,534	-74	-5%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	8	10	2	25%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	-	0	-
51.22	Public Health	11	21	10	91%
51.23	Rehabilitation and Therapeutic Professions	16	-	-16	-100%
51.31	Dietetics and Clinical Nutrition Services	5	12	7	140%
51.33	Alternative and Complementary Medicine and Medical Systems	1	0	-1	-100%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.34	Alternative and Complementary Medical Support Services	3	1	-2	-67%
51.35	Somatic Bodywork and Related Therapeutic Services	10	2	-8	-80%
51.99	Health Professions and Related Clinical Sciences, Other	14	19	5	36%
	Total	2,924	2,973	49	2%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 21: Trends in Health Care Associate's Degree Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	57	57	-
51.0001	Health and Wellness, General	-	14	14	-
51.0203	Speech-Language Pathology/Pathologist	-	15	15	-
51.0299	Communication Disorders Sciences and Services, Other	-	-	-	-
51.0301	Community Health Liaison	0	-	-	-
51.0601	Dental Assisting/Assistant	4	8	4	100%
51.0602	Dental Hygiene/Hygienist	161	138	-23	-14%
51.0603	Dental Laboratory Technology/Technician	3	9	6	200%
51.0699	Dental Services and Allied Professions, Other	1	-	-	-
51.0701	Health/Health Care Administration/Management	-	-	-	-
51.0705	Medical Office Management/Administration	-	-	-	-
51.0706	Health Information/Medical Records Administration/Administrator	2	0	-2	-100%
51.0707	Health Information/Medical Records Technology/Technician	23	30	7	30%
51.071	Medical Office Assistant/Specialist	-	-	-	-
51.0712	Medical Reception/Receptionist	-	-	-	-
51.0713	Medical Insurance Coding Specialist/Coder	-	17	17	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	49	76	27	55%
51.0799	Health and Medical Administrative Services, Other	12	38	26	217%
51.0801	Medical/Clinical Assistant	109	122	13	12%
51.0803	Occupational Therapist Assistant	106	62	-44	-42%
51.0805	Pharmacy Technician/Assistant	2	0	-2	-100%
51.0806	Physical Therapy Technician/Assistant	102	68	-34	-33%
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	43	79	36	84%
51.0812	Respiratory Therapy Technician/Assistant	-	16	16	-
51.0899	Allied Health and Medical Assisting Services, Other	-	10	10	-
51.0901	Cardiovascular Technology/Technologist	-	10	10	-
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	2	0	-2	-100%
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	3	6	3	100%
51.0905	Nuclear Medical Technology/Technologist	7	8	1	14%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	100	122	22	22%
51.0908	Respiratory Care Therapy/Therapist	44	92	48	109%
51.0909	Surgical Technology/Technologist	0	12	12	-
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	13	30	17	131%
51.0911	Radiologic Technology/Science - Radiographer	-	99	99	-
51.0913	Athletic Training/Trainer	-	0	-	-
51.0999	Health & Medical Diagnostic & Treatment Services, Other	1	-	-	-
51.1002	Cytotechnology/Cytotechnologist	-	-	-	-
51.1004	Clinical/Medical Laboratory Technician	15	44	29	193%
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	0	-	-	-
51.1102	Pre-Medicine/Pre-Medical Studies	2	2	0	0%
51.1103	Pre-Pharmacy Studies	-	-	-	-
51.1105	Pre-Nursing Studies	-	17	17	-
51.1199	Health and Medical Preparatory Programs,	0	-	-	-
51.1501	Substance Abuse/Addiction Counseling	9	12	3	33%

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.1502	Psychiatric/Mental Health Services Technician	89	35	-54	-61%
51.1504	Community Health Services/Liaison/Counseling	-	-	-	-
51.1599	Mental and Social Health Services and Allied Professions, Other	6	0	-6	-100%
51.1801	Opticianry/Ophthalmic Dispensing Optician	1	8	7	700%
51.1803	Optometric/Ophthalmic Laboratory Tech.	-	-	-	-
51.2202	Environmental Health	-	-	-	-
51.2208	Community Health and Preventive Medicine	-	2	2	-
51.2211	Health Services Administration	-	9	9	-
51.2306	Occupational Therapy/Therapist	20	16	-4	-20%
51.2309	Therapeutic Recreation/Recreational Therapy	0	-	-	-
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	-	-
51.2399	Rehabilitation and Therapeutic Professions, Other	15	-	-	-
51.3103	Dietetic Technician	-	5	5	-
51.3104	Dietitian Assistant	5	0	-5	-100%
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	-	1	1	-
51.3499	Alternative and Complementary Medical Support Services, Other	-	3	3	-
51.3501	Massage Therapy/Therapeutic Massage	-	10	10	-
51.3801	Registered Nursing/Registered Nurse	910	1,608	698	77%
51.3803	Adult Health Nurse/Nursing	-	-	-	-
31.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other	-	-	-	-
51.3901	Licensed Practical/Vocational Nurse Training	-	-	-	-
	Nursing, Other	35	0	-35	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	7	14	7	100%
	Total	1,901	2,924	1,023	54%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 22: Trends in Health Care Associate's Degree Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	57	85	28	49%
51.0001	Health and Wellness, General	14	12	-2	-14%
51.0203	Speech-Language Pathology/Pathologist	15	20	5	33%
51.0299	Communication Disorders Sciences and Services, Other	-	-	0	-
51.0301	Community Health Liaison	-	-	0	-
51.0601	Dental Assisting/Assistant	8	9	1	13%
51.0602	Dental Hygiene/Hygienist	138	137	-1	-1%
51.0603	Dental Laboratory Technology/Technician	9	13	4	44%
51.0699	Dental Services and Allied Professions, Other	-	0	0	-
51.0701	Health/Health Care Administration/Management	-	-	0	-
51.0705	Medical Office Management/Administration	-	-	0	-
51.0706	Health Information/Medical Records Administration/Administrator	-	0	0	-
51.0707	Health Information/Medical Records Technology/Technician	30	54	24	80%
51.071	Medical Office Assistant/Specialist	-	-	0	-
51.0712	Medical Reception/Receptionist	-	0	0	-
51.0713	Medical Insurance Coding Specialist/Coder	17	20	3	18%
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	76	66	-10	-13%
51.0799	Health and Medical Administrative Services, Other	38	46	8	21%
51.0801	Medical/Clinical Assistant	122	109	-13	-11%
51.0803	Occupational Therapist Assistant	62	88	26	42%
51.0805	Pharmacy Technician/Assistant	-	-	0	-
51.0806	Physical Therapy Technician/Assistant	68	105	37	54%
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	79	86	7	9%
51.0812	Respiratory Therapy Technician/Assistant	16	0	-16	-100%
51.0899	Allied Health and Medical Assisting Services, Other	10	36	26	260%
51.0901	Cardiovascular Technology/Technologist	10	9	-1	-10%
51.0903	Electroneurodiagnostic/Electroencephalographic Technology/Technologist	0	0	0	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	6	6	0	0%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0905	Nuclear Medical Technology/Technologist	8	6	-2	-25%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	122	113	-9	-7%
51.0908	Respiratory Care Therapy/Therapist	92	72	-20	-22%
51.0909	Surgical Technology/Technologist	12	11	-1	-8%
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	30	30	0	0%
51.0911	Radiologic Technology/Science - Radiographer	99	84	-15	-15%
51.0913	Athletic Training/Trainer	0	-	0	-
51.0999	Health & Medical Diagnostic & Treatment Services, Other	-	2	2	-
51.1002	Cytotechnology/Cytotechnologist	-	-	0	-
51.1004	Clinical/Medical Laboratory Technician	44	60	16	36%
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	-	-	0	-
51.1102	Pre-Medicine/Pre-Medical Studies	2	3	1	50%
51.1103	Pre-Pharmacy Studies	-	14	14	-
51.1105	Pre-Nursing Studies	17	-	-17	-100%
51.1199	Health and Medical Preparatory Programs,	-	-	0	-
51.1501	Substance Abuse/Addiction Counseling	12	19	7	58%
51.1502	Psychiatric/Mental Health Services Technician	35	59	24	69%
51.1504	Community Health Services/Liaison/Counseling	-	-	0	-
51.1599	Mental and Social Health Services and Allied Professions, Other	0	0	0	-
51.1801	Opticianry/Ophthalmic Dispensing Optician	8	10	2	25%
51.1803	Optometric/Ophthalmic Laboratory Tech.	-	-	0	-
51.2202	Environmental Health	-	1	1	-
51.2208	Community Health and Preventive Medicine	2	0	-2	-100%
51.2211	Health Services Administration	9	20	11	122%
51.2306	Occupational Therapy/Therapist	16	-	-16	-100%
51.2309	Therapeutic Recreation/Recreational Therapy	-	-	0	-
51.2311	Kinesiotherapy/Kinesiotherapist	-	-	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	-	-	0	-
51.3103	Dietetic Technician	5	12	7	140%
51.3104	Dietitian Assistant	-	-	0	-
51.3399	Alternative and Complementary Medicine and Medical Systems, Other	1	0	-1	-100%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.3499	Alternative and Complementary Medical Support Services, Other	3	1	-2	-67%
51.3501	Massage Therapy/Therapeutic Massage	10	2	-8	-80%
51.3801	Registered Nursing/Registered Nurse	1,608	1,534	-74	-5%
51.3803	Adult Health Nurse/Nursing	-	-	0	-
31.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other	-	-	0	-
51.3901	Licensed Practical/Vocational Nurse Training	-	-	0	-
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	14	19	5	36%
	Total	2,924	2,973	49	2%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Two to Four Year Certificates

The number of certificate awards from health care programs of two to four years duration during the pre-Chapter 224 period was quite small, with most of these certificates concentrated in non-degree Registered Nurse programs. Post-Chapter 224, two to four certificate awards in the nursing field declined from 95 awards in 2012 to 74 awards in 2015, representing a decline of 21 awards, or 22 percent.

Table 23: Trends in Awards of Health Care Certificates of Two to Four Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.07	Health and Medical Administrative Services	-	0	-	-
51.08	Allied Health and Medical Assisting Services	-	-	-	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	20	2	-18	-90%
51.11	Health/Medical Preparatory Programs	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.15	Mental and Social Health Services and Allied Professions	-	-	-	-
51.16	Nursing	12	95	83	692%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	12	12	-
51.23	Rehabilitation and Therapeutic Professions	-	-	-	-
51.31	Dietetics and Clinical Nutrition Services	-	2	2	-
51.35	Somatic Bodywork and Related Therapeutic Services	-	-	-	-
	Total	32	111	79	247%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 24: Trends in Awards of Health Care Certificates of Two to Four Year Duration by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.07	Health and Medical Administrative Services	0	-	0	-
51.08	Allied Health and Medical Assisting Services	-	-	0	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	2	0	-2	-100%
51.11	Health/Medical Preparatory Programs	-	1	1	-
51.15	Mental and Social Health Services and Allied Professions	-	4	4	-
51.16	Nursing	95	74	-21	-22%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	12	-	-12	-100%
51.23	Rehabilitation and Therapeutic Professions	-	-	0	-
51.31	Dietetics and Clinical Nutrition Services	2	-	-2	-100%
51.35	Somatic Bodywork and Related Therapeutic Services	-	-	0	-
	Total	111	79	-32	-29%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 25: Trends in Health Care Certificate Awards of Two to Four Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0706	Health Information/Medical Records Administration/Administrator	-	-	-	-
51.0707	Health Information/Medical Records Technology/Technician	-	0	-	-
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	-	-	-	-
51.0799	Health and Medical Administrative Services, Other	-	-	-	-
51.0801	Medical/Clinical Assistant	-	-	-	-
51.0901	Cardiovascular Technology/Technician	9	0	-9	-100%
51.0902	Electrocardiograph Technology/Technician	-	-	-	-
51.0903	Electroencephalograph Technology/Technician	1	0	-1	-100%
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	-	-
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	-	0	-	-
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	10	0	-10	-100%
51.092	Magnetic Resonance Imaging (MRI))	-	2	2	-
51.1199	Health/Medical Preparatory Programs, Other	-	-	-	-
51.1599	Mental and Social Health Services and Allied Professions, Other	-	-	-	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	12	12	-
51.2309	Therapeutic Recreation/Recreational Therapy	-	-	-	-
51.3103	Dietetic Technician	-	2	2	-
51.3501	Massage Therapy/Therapeutic Massage	-	-	-	-
51.3801	Registered Nursing/Registered Nurse	12	95	83	692%

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
	Total	32	111	79	247%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 26: Trends in Health Care Certificate Awards of Two to Four Year Duration by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0706	Health Information/Medical Records Administration/Administrator	-	-	0	-
51.0707	Health Information/Medical Records Technology/Technician	0	-	0	-
51.0716	Medical Administrative/Executive Assistant and Medical Secretary	-	-	0	-
51.0799	Health and Medical Administrative Services, Other	-	-	0	-
51.0801	Medical/Clinical Assistant	-	-	0	-
51.0901	Cardiovascular Technology/Technician	-	-	0	-
51.0902	Electrocardiograph Technology/Technician	-	-	0	-
51.0903	Electroencephalograph Technology/Technician	-	-	0	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	0	-
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	0	0	0	-
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	-	-	0	-
51.092	Magnetic Resonance Imaging (MRI)	2	-	-2	-
51.1199	Health/Medical Preparatory Programs, Other	-	1	1	-
51.1599	Mental and Social Health Services and Allied Professions, Other	-	4	4	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	12	-	-12	-
51.2309	Therapeutic Recreation/Recreational Therapy	-	-	0	-
51.3103	Dietetic Technician	2	-	-2	-
51.3501	Massage Therapy/Therapeutic Massage	-	-	0	-
51.3801	Registered Nursing/Registered Nurse	95	74	-21	-22%
	Total	111	79	-32	-29%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Bachelor's Degrees

The largest increase in health care bachelor's degree awards occurred in the nursing field with 1,414 more awards in 2012 compared to 2001, accounting for 74 percent of all growth in health care bachelor's degree awards in the pre-Chapter 224 period (Table 27). In the post-

Chapter 224 period nursing field awards accounted for 49 percent of the total increase in health care bachelor's degree awards (Table 28). The 2012 to 2015 period saw a doubling of bachelor's degree awards in public health and 3 percent increase in awards in rehabilitation and therapeutic fields.

Table 27: Trends in Health Care Bachelor's Degree Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	207	207	-
51.02	Communication Disorders Sciences and Services	158	182	24	15%
51.06	Dental Support Services and Allied Professions	37	47	10	27%
51.07	Health and Medical Administrative Services	58	125	67	116%
51.08	Allied Health and Medical Assisting Services	19	43	24	126%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	131	183	52	40%
51.1	Clinical/Medical Laboratory Science and Allied Professions	52	80	28	54%
51.11	Health/Medical Preparatory Programs	57	96	39	68%
51.15	Mental and Social Health Services and Allied Professions	15	48	33	220%
51.16	Nursing	974	2,388	1,414	145%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	-	1	1	-
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	326	482	156	48%
51.22	Public Health	-	109	109	-
51.23	Rehabilitation and Therapeutic Professions	677	427	-250	-37%
51.27	Medical Illustration and Informatics	-	-	-	-
51.31	Dietetics and Clinical Nutrition Services	-	10	10	-
51.36	Movement and Mind-Body Therapies and Education	-	0	-	-
51.99	Health Professions and Related Clinical Sciences, Other	72	55	-17	-24%
	Total	2,576	4,483	1,907	74%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

**Table 28: Trends in Health Care Bachelor's Degree Program Completions by Four-Digit CIP
Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015**

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	207	253	46	22%
51.02	Communication Disorders Sciences and Services	182	252	70	38%
51.06	Dental Support Services and Allied Professions	47	86	39	83%
51.07	Health and Medical Administrative Services	125	219	94	75%
51.08	Allied Health and Medical Assisting Services	43	45	2	5%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	183	224	41	22%
51.1	Clinical/Medical Laboratory Science and Allied Professions	80	101	21	26%
51.11	Health/Medical Preparatory Programs	96	178	82	85%
51.15	Mental and Social Health Services and Allied Professions	48	47	-1	-2%
51.16	Nursing	2,388	3,113	725	30%
51.18	Ophthalmic and Optometric Support Services and Allied Professions	1	2	1	100%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	482	511	29	6%
51.22	Public Health	109	332	223	205%
51.23	Rehabilitation and Therapeutic Professions	427	593	166	39%
51.27	Medical Illustration and Informatics	-	0	0	-
51.31	Dietetics and Clinical Nutrition Services	10	21	11	110%
51.36	Movement and Mind-Body Therapies and Education	0	0	0	-
51.99	Health Professions and Related Clinical Sciences, Other	55	98	43	78%
	Total	4,483	6,075	1,592	36%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 29: Trends in Health Care Bachelor's Degree Program Completions by Six-Digit CIP
Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	207	207	-
51.0001	Health and Wellness, General	-	-	-	-
51.0201	Communication Sciences and Disorders, General	119	131	12	10%
51.0203	Speech-Language Pathology/Pathologist	-	0	-	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	39	36	-3	-8%
51.0299	Communication Disorders Sciences and Services, Other	-	15	15	-
51.0301	Community Health Liaison	3	0	-3	-100%
51.0602	Dental Hygiene/Hygienist	37	47	10	27%
51.0603	Dental Laboratory Technology/Technician	-	0	-	-
51.0701	Health/Health Care Administration/Management	5	33	28	560%
51.0702	Hospital and Health Care Facilities Administration/Management	28	0	-28	-100%
51.0706	Health Information/Medical Records Administration/Administrator	7	0	-7	-100%
51.0707	Health Information/Medical Records Technology/Technician	-	-	-	-
51.0711	Medical/Health Management and Clinical Assistant/Specialist	-	2	2	-
51.0799	Health and Medical Administrative Services, Other	18	90	72	400%
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	19	43	24	126%
51.081	Emergency Care Attendant (EMT Ambulance)	-	-	-	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	9	17	8	89%
51.0905	Nuclear Medical Technology/Technologist	1	18	17	1700%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	-	9	9	-
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	-	-	-	-
51.0911	Radiologic Technology/Science - Radiographer	-	8	8	-
51.0912	Physician Assistant	16	0	-16	-100%
51.0913	Athletic Training/Trainer	66	122	56	85%
51.0915	Cardiopulmonary Technology/Technologist	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.092	Magnetic Resonance Imaging (MRI)	-	9	9	-
51.0999	Allied Health Diagnostic/Intervention/Treatment Professions, Other	39	0	-39	-100%
51.1002	Cytotechnology/Cytotechnologist	-	0	-	-
51.1003	Hematology Technology/Technician	-	-	-	-
51.1004	Clinical/Medical Laboratory Technician	7	32	25	357%
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	28	24	-4	-14%
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	17	24	7	41%
51.1101	Pre-Dentistry Studies	6	1	-5	-83%
51.1102	Pre-Medicine/Pre-Medical Studies	44	50	6	14%
51.1103	Pre-Pharmacy Studies	-	-	-	-
51.1104	Pre-Veterinary Studies	7	36	29	414%
51.1108	Pre-Optometry Studies	-	1	1	-
51.1109	Pre-Physical Therapy Studies	-	1	1	-
51.1199	Health/Medical Preparatory Programs, Other	-	7	7	-
51.1504	Community Health Services/Liaison/Counseling	-	45	45	-
51.1508	Mental Health Counseling/Counselor	-	1	1	-
51.1599	Mental and Social Health Services and Allied Professions, Other	12	2	-10	-83%
51.1899	Ophthalmic and Optometric Support Services and Allied Professions, Other	-	1	1	-
51.2001	Pharmacy	313	279	-34	-11%
51.2004	Medicinal and Pharmaceutical Chemistry	-	1	1	-
51.201	Pharmaceutical Sciences	-	42	42	-
51.2011	Pharmaceutical Marketing and Management	-	25	25	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	13	135	122	938%
51.2201	Public Health, General	-	90	90	-
51.2202	Environmental Health	-	1	1	-
51.2207	Public Health Education and Promotion	-	12	12	-
51.2208	Community Health and Preventive Medicine	-	0	0	-
51.221	International Public Health/International Health	-	-	-	-
51.2211	Health Services Administration	-	-	-	-
51.2212	Behavioral Aspects of Health	-	1	1	-
51.2299	Public Health, Other	-	5	5	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.2301	Art Therapy/Therapist	21	45	24	114%
51.2305	Music Therapy/Therapist	2	26	24	1200%
51.2306	Occupational Therapy/Therapist	119	41	-78	-66%
51.2308	Physical Therapy/Therapist	181	3	-178	-98%
51.2309	Therapeutic Recreation/Recreational Therapy	10	2	-8	-80%
51.2311	Kinesiotherapy/Kinesiotherapist	-	5	-	-
51.2314	Rehabilitation Science	-	-	-	-
51.2399	Rehabilitation and Therapeutic Professions, Other	344	305	-39	-11%
51.2703	Medical Illustration/Medical Illustrator	-	-	-	-
51.2706	Medical Informatics	-	-	-	-
51.3101	Dietetics/Dietitian	-	10	10	-
51.3601	Movement Therapy and Movement Education	-	0	0	-
51.3801	Registered Nursing/Registered Nurse	651	2,146	1,495	230%
51.3803	Adult Health Nurse/Nursing	16	24	8	50%
51.3808	Nursing Science	33	0	-33	-100%
51.381	Psychiatric/Mental Health Nurse/Nursing	-	-	-	-
51.3818	Nursing Practice	-	95	95	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	-	123	123	-
	Nursing, Other	274	0	-274	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	72	55	-17	-24%
	Total	2,576	4,483	1,907	74%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 30: Trends in Health Care Bachelor's Degree Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	207	253	46	22%
51.0001	Health and Wellness, General	-	0	0	-
51.0201	Communication Sciences and Disorders, General	131	191	60	46%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0203	Speech-Language Pathology/Pathologist	0	0	0	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	36	40	4	11%
51.0299	Communication Disorders Sciences and Services, Other	15	21	6	40%
51.0301	Community Health Liaison	-	-	0	-
51.0602	Dental Hygiene/Hygienist	47	86	39	83%
51.0603	Dental Laboratory Technology/Technician	0	0	0	-
51.0701	Health/Health Care Administration/Management	33	62	29	88%
51.0702	Hospital and Health Care Facilities Administration/Management	-	6	6	-
51.0706	Health Information/Medical Records Administration/Administrator	0	2	2	-
51.0707	Health Information/Medical Records Technology/Technician	-	8	8	-
51.0711	Medical/Health Management and Clinical Assistant/Specialist	2	18	16	800%
51.0799	Health and Medical Administrative Services, Other	90	123	33	37%
51.0808	Veterinary/Animal Health Technology/Technician and Veterinary Assistant	43	44	1	2%
51.081	Emergency Care Attendant (EMT Ambulance)	-	1	1	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	17	17	0	0%
51.0905	Nuclear Medical Technology/Technologist	18	9	-9	-50%
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	9	26	17	189%
51.091	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician	-	20	20	-
51.0911	Radiologic Technology/Science - Radiographer	8	8	0	0%
51.0912	Physician Assistant	-	25	25	-
51.0913	Athletic Training/Trainer	122	108	-14	-11%
51.0915	Cardiopulmonary Technology/Technologist	-	-	0	-
51.092	Magnetic Resonance Imaging (MRI)	9	11	2	22%
51.0999	Allied Health Diagnostic/Intervention/Treatment Professions, Other	-	-	0	-
51.1002	Cytotechnology/Cytotechnologist	0	4	4	-
51.1003	Hematology Technology/Technician	-	-	0	-
51.1004	Clinical/Medical Laboratory Technician	32	23	-9	-28%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	24	41	17	71%
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	24	33	9	38%
51.1101	Pre-Dentistry Studies	1	0	-1	-100%
51.1102	Pre-Medicine/Pre-Medical Studies	50	115	65	130%
51.1103	Pre-Pharmacy Studies	-	0	0	-
51.1104	Pre-Veterinary Studies	36	37	1	3%
51.1108	Pre-Optometry Studies	1	4	3	300%
51.1109	Pre-Physical Therapy Studies	1	5	4	400%
51.1199	Health/Medical Preparatory Programs, Other	7	17	10	143%
51.1504	Community Health Services/Liaison/Counseling	45	46	1	2%
51.1508	Mental Health Counseling/Counselor	1	0	-1	-100%
51.1599	Mental and Social Health Services and Allied Professions, Other	2	1	-1	-50%
51.1899	Ophthalmic and Optometric Support Services and Allied Professions, Other	1	2	1	100%
51.2001	Pharmacy	279	276	-3	-1%
51.2004	Medicinal and Pharmaceutical Chemistry	1	6	5	500%
51.201	Pharmaceutical Sciences	42	61	19	45%
51.2011	Pharmaceutical Marketing and Management	25	38	13	52%
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	135	130	-5	-4%
51.2201	Public Health, General	90	237	147	163%
51.2202	Environmental Health	1	5	4	400%
51.2207	Public Health Education and Promotion	12	19	7	58%
51.2208	Community Health and Preventive Medicine	0	67	67	-
51.221	International Public Health/International Health	-	-	0	-
51.2211	Health Services Administration	-	0	0	-
51.2212	Behavioral Aspects of Health	1	0	-1	-100%
51.2299	Public Health, Other	5	4	-1	-20%
51.2301	Art Therapy/Therapist	45	56	11	24%
51.2305	Music Therapy/Therapist	26	32	6	23%
51.2306	Occupational Therapy/Therapist	41	66	25	61%
51.2308	Physical Therapy/Therapist	3	41	38	1267%
51.2309	Therapeutic Recreation/Recreational Therapy	2	-	-2	-100%
51.2311	Kinesiotherapy/Kinesiotherapist	5	13	8	160%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.2314	Rehabilitation Science	-	15	15	-
51.2399	Rehabilitation and Therapeutic Professions, Other	305	370	65	21%
51.2703	Medical Illustration/Medical Illustrator	-	-	0	-
51.2706	Medical Informatics	-	0	0	-
51.3101	Dietetics/Dietitian	10	21	11	110%
51.3601	Movement Therapy and Movement Education	0	0	0	-
51.3801	Registered Nursing/Registered Nurse	2146	2546	400	19%
51.3803	Adult Health Nurse/Nursing	24	36	12	50%
51.3808	Nursing Science	-	244	244	-
51.381	Psychiatric/Mental Health Nurse/Nursing	-	-	0	-
51.3818	Nursing Practice	95	172	77	81%
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	123	115	-8	-7%
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	55	98	43	78%
	Total	4483	6075	1592	36%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Post-Bachelor's Certificates

Although small in number, awards from post-bachelor's certificate programs expanded rapidly over the pre-Chapter 224 period with strong growth in pre-medical preparation programs as well as in nursing. Post-bachelor's certificate awards also increased in the post-Chapter 22 period, albeit at a slower pace; 12 percent per year versus 28 percent per year in the preceding 11 year period before the enactment of Chapter 224. Findings from Tables 31 through 34 show:

- Post-bachelor's certificate programs aimed at providing coursework to help prepare for medical school entry has been a key source of increase in post-bachelor's courses of study.
- Family practice, nutrition and geriatric certificates for nurses at the post-bachelor's level have grown since 2001. In the post-Chapter 224 period, these nursing certificates grew slowly, adding only a few more certificates in 2015.

Table 31: Trends in Health Care Post-Bachelor's Certificate Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	1	1	-
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	-	0	0	-
51.06	Dental Support Services and Allied Professions	-	-	-	-
51.07	Health and Medical Administrative Services	-	13	13	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	4	22	18	450%
51.1	Clinical/Medical Laboratory Science and Allied Professions	-	6	6	-
51.11	Health/Medical Preparatory Programs	11	61	50	455%
51.14	Medical Clinical Sciences/Graduate Medical Studies	-	-	-	-
51.15	Mental and Social Health Services and Allied Professions	-	-	-	-
51.16	Nursing	10	114	104	1040%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	0	-	-
51.22	Public Health	13	3	-10	-77%
51.23	Rehabilitation and Therapeutic Professions	-	0	-	-
51.27	Medical Illustration and Informatics	-	-	-	-
51.31	Dietetics and Clinical Nutrition Services	-	34	34	-
51.33	Alternative and Complementary Medicine and Medical Systems	24	0	-24	-100%
51.99	Health Professions and Related Clinical Sciences, Other	-	3	3	-
	Total	62	257	195	315%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 32: Trends in Health Care Post-Bachelor's Certificate Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	1	4	3	300%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	0	0	0	-
51.06	Dental Support Services and Allied Professions	-	-	0	-
51.07	Health and Medical Administrative Services	13	44	31	238%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	22	5	-17	-77%
51.1	Clinical/Medical Laboratory Science and Allied Professions	6	7	1	17%
51.11	Health/Medical Preparatory Programs	61	81	20	33%
51.14	Medical Clinical Sciences/Graduate Medical Studies	-	4	4	-
51.15	Mental and Social Health Services and Allied Professions	-	11	11	-
51.16	Nursing	114	117	3	3%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	0	9	9	-
51.22	Public Health	3	23	20	667%
51.23	Rehabilitation and Therapeutic Professions	0	-	0	-
51.27	Medical Illustration and Informatics	-	-	0	-
51.31	Dietetics and Clinical Nutrition Services	34	44	10	29%
51.33	Alternative and Complementary Medicine and Medical Systems	-	-	0	-
51.99	Health Professions and Related Clinical Sciences, Other	3	5	2	67%
	Total	257	354	97	38%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 33: Trends in Health Care Post-Bachelor's Certificate Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	1	1	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	-	-	-	-
51.0502	Advanced General Dentistry (Cert, MS, PhD)	-	-	-	-
51.0503	Oral Biology and Oral and Maxillofacial Pathology	-	0	0	-
51.0504	Dental Public Health and Education	-	-	-	-
51.0507	Oral/Maxillofacial Surgery	-	-	-	-
51.0508	Orthodontics/Orthodontology	-	-	-	-
51.0509	Pediatric Dentistry/Pedodontics	-	-	-	-
51.051	Periodontics/Periodontology	-	-	-	-
51.0511	Prosthodontics/Prosthodontology	-	-	-	-
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	-	-	-	-
51.0602	Dental Hygiene/Hygienist	-	-	-	-
51.0701	Health/Health Care Administration/Management	-	13	13	-
51.0706	Health Information/Medical Records Administration/Administrator	-	-	-	-
51.0719	Clinical Research Coordinator	-	-	-	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	-	-
51.0906	Perfusion Technology/Perfusionist	-	-	-	-
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	-	1	1	-
51.0908	Respiratory Care Therapy/Therapist	0	-	-	-
51.0911	Radiologic Technology/Science - Radiographer	-	21	21	-
51.0912	Physician Assistant	4	0	-4	-100%
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	-	-	-	-
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	-	6	6	-
51.1102	Pre-Medicine/Pre-Medical Studies	-	61	61	-
51.1107	Pre-Occupational Therapy Studies	-	-	-	-
51.1199	Health/Medical Preparatory Programs, Other	11	0	-11	-100%
51.1401	Medical Scientist	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.1501	Substance Abuse/Addiction Counseling	-	-	-	-
51.1508	Mental Health Counseling/Counselor	-	-	-	-
51.1599	Mental and Social Health Services and Allied Professions, Other	-	-	-	-
51.2002	Pharmacy Administration and Pharmacy Policy and Regulatory Affairs	-	0	-	-
51.2005	Natural Products Chemistry and Pharmacognosy	-	0	-	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	-	-
51.2201	Public Health, General	13	0	-13	-100%
51.2205	Health/Medical Physics	-	-	-	-
51.2206	Occupational Health and Industrial Hygiene	-	2	2	-
51.2207	Public Health Education and Promotion	-	-	-	-
51.2299	Public Health, Other	-	1	1	-
51.231	Vocational Rehabilitation Counseling/Counselor	-	0	0	-
51.2706	Medical Informatics	-	-	-	-
51.3101	Dietetics/Dietitian	-	34	34	-
51.3103	Dietetic Technician	-	-	-	-
51.3301	Acupuncture & Oriental Medicine	24	0	-24	-100%
51.3801	Registered Nursing/Registered Nurse	-	1	1	-
51.3803	Adult Health Nurse/Nursing	-	-	-	-
51.3805	Family Practice Nurse/Nursing	-	76	76	-
51.3807	Nurse Midwife/Nursing Midwifery	8	0	-8	-100%
51.3808	Nursing Science	-	-	-	-
51.3813	Clinical Nurse Specialist	-	1	1	-
51.3817	Nursing Education	-	-	-	-
51.3818	Nursing Practice	-	8	8	-
51.3821	Geriatric Nurse/Nursing	-	20	20	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	-	8	8	-
	Nursing, Other	2	0	-2	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	-	3	3	-
	Total	62	257	195	315%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 34: Trends in Health Care Post-Bachelor's Certificate Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	1	4	3	300%
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	-	-	0	-
51.0502	Advanced General Dentistry (Cert, MS, PhD)	-	0	0	-
51.0503	Oral Biology and Oral and Maxillofacial Pathology	0	-	0	-
51.0504	Dental Public Health and Education	-	-	0	-
51.0507	Oral/Maxillofacial Surgery	-	-	0	-
51.0508	Orthodontics/Orthodontology	-	-	0	-
51.0509	Pediatric Dentistry/Pedodontics	-	0	0	-
51.051	Periodontics/Periodontology	-	-	0	-
51.0511	Prosthodontics/Prosthodontology	-	-	0	-
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	-	-	0	-
51.0602	Dental Hygiene/Hygienist	-	-	0	-
51.0701	Health/Health Care Administration/Management	13	26	13	100%
51.0706	Health Information/Medical Records Administration/Administrator	-	1	1	-
51.0719	Clinical Research Coordinator	-	17	17	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	0	-
51.0906	Perfusion Technology/Perfusionist	-	0	0	-
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	1	5	4	400%
51.0908	Respiratory Care Therapy/Therapist	-	-	0	-
51.0911	Radiologic Technology/Science - Radiographer	21	-	-21	-100%
51.0912	Physician Assistant	-	-	0	-
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	-	-	0	-
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	6	7	1	17%
51.1102	Pre-Medicine/Pre-Medical Studies	61	64	3	5%
51.1107	Pre-Occupational Therapy Studies	-	17	17	-
51.1199	Health/Medical Preparatory Programs, Other	-	-	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.1401	Medical Scientist	-	4	4	-
51.1501	Substance Abuse/Addiction Counseling	-	5	5	-
51.1508	Mental Health Counseling/Counselor	-	1	1	-
51.1599	Mental and Social Health Services and Allied Professions, Other	-	5	5	-
51.2002	Pharmacy Administration and Pharmacy Policy and Regulatory Affairs	0	8	8	-
51.2005	Natural Products Chemistry and Pharmacognosy	0	-	0	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	1	1	-
51.2201	Public Health, General	-	5	5	-
51.2205	Health/Medical Physics	-	0	0	-
51.2206	Occupational Health and Industrial Hygiene	2	0	-2	-100%
51.2207	Public Health Education and Promotion	-	18	18	-
51.2299	Public Health, Other	1	0	-1	-100%
51.231	Vocational Rehabilitation Counseling/Counselor	0	-	0	-
51.2706	Medical Informatics	-	0	0	-
51.3101	Dietetics/Dietitian	34	44	10	29%
51.3103	Dietetic Technician	-	0	0	-
51.3301	Acupuncture & Oriental Medicine	-	-	0	-
51.3801	Registered Nursing/Registered Nurse	1	0	-1	-100%
51.3803	Adult Health Nurse/Nursing	-	-	0	-
51.3805	Family Practice Nurse/Nursing	76	82	6	8%
51.3807	Nurse Midwife/Nursing Midwifery	-	-	0	-
51.3808	Nursing Science	-	2	2	-
51.3813	Clinical Nurse Specialist	1	1	0	0%
51.3817	Nursing Education	-	2	2	-
51.3818	Nursing Practice	8	1	-7	-88%
51.3821	Geriatric Nurse/Nursing	20	29	9	45%
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	8	0	-8	-100%
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	3	5	2	67%
	Total	257	354	97	38%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Master's Degrees

Master's degrees in the health care field increased by more than 1,100 awards, a relative gain of 50 percent over the 11 years before the enactment of Chapter 224. Public health, allied health professions, nursing, and health administration had been key sources of expansion in health care awards at the master's degree level between 2001 and 2012. Post-Chapter 224 held steady in nursing and allied health professions, but public health awarded 37 fewer master's degrees annually over the three year period.

- Physician assistant programs have expanded rapidly increasing from 30 graduates in 2001 to 200 awards by 2012. By 2015, the Commonwealth awarded 321 physician assistant degrees.
- Master's degree awards in pharmacy administration had increased over the pre-Chapter 224 period. This is a program that provides education in management, economics, and social sciences for application in the pharmacy arena as well as regulatory policy. By 2015, pharmacy administration awards fell by 20 percent.
- Mental health counselor programs have also been key sources of new master's degree awards in the 2001 to 2012 period and continued to grow over the post-Chapter 224 period between 2012 and 2015.
- Master's awards in nursing practice, including nurse administration, nurse anesthetist, family practice nursing, pediatric nursing, and psychiatric/mental health nursing had all increased sharply between 2001 and 2012. In 2015, nursing specialties fluctuated slightly, but overall, nursing master's awards grew by 19 percent.
- Master's degree awards in physical therapy declined dramatically as physical therapy was re-credentialed to require a doctor's degree. Post-Chapter 224 awards show only 3 fewer master's degrees in physical therapy as the re-credential related decline leveled off.

Table 35: Trends in Health Care Master's Degree Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	-	-	-
51.02	Communication Disorders Sciences and Services	202	214	12	6%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	21	53	32	152%
51.06	Dental Support Services and Allied Professions	-	1	1	-
51.07	Health and Medical Administrative Services	209	311	102	49%
51.08	Allied Health and Medical Assisting Services	-	2	2	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	34	230	196	576%
51.1	Clinical/Medical Laboratory Science and Allied Professions	6	14	8	133%
51.11	Health/Medical Preparatory Programs	-	-	-	-
51.14	Medical Clinical Sciences/Graduate Medical Studies	13	9	-4	-31%
51.15	Mental and Social Health Services and Allied Professions	138	312	174	126%
51.16	Nursing	413	759	346	84%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	18	264	246	1367%
51.22	Public Health	467	734	267	57%
51.23	Rehabilitation and Therapeutic Professions	599	364	-235	-39%
51.25	Veterinary Biomedical and Clinical Sciences (Cert.)	-	-	-	-
51.27	Medical Illustration and Informatics	-	25	25	-
51.31	Dietetics and Clinical Nutrition Services	-	18	18	-
51.33	Alternative and Complementary Medicine and Medical Systems	56	48	-8	-14%
51.99	Health Professions and Related Clinical Sciences, Other	80	19	-61	-76%
	Total	2,256	3,377	1,121	50%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 36: Trends in Health Care Master's Degree Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	-	-	0	-
51.02	Communication Disorders Sciences and Services	214	248	34	16%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	53	56	3	6%
51.06	Dental Support Services and Allied Professions	1	7	6	600%
51.07	Health and Medical Administrative Services	311	386	75	24%
51.08	Allied Health and Medical Assisting Services	2	0	-2	-100%
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	230	358	128	56%
51.1	Clinical/Medical Laboratory Science and Allied Professions	14	11	-3	-21%
51.11	Health/Medical Preparatory Programs	-	19	19	-
51.14	Medical Clinical Sciences/Graduate Medical Studies	9	23	14	156%
51.15	Mental and Social Health Services and Allied Professions	312	431	119	38%
51.16	Nursing	759	901	142	19%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	264	240	-24	-9%
51.22	Public Health	734	621	-113	-15%
51.23	Rehabilitation and Therapeutic Professions	364	382	18	5%
51.25	Veterinary Biomedical and Clinical Sciences (Cert.)	-	6	6	-
51.27	Medical Illustration and Informatics	25	61	36	144%
51.31	Dietetics and Clinical Nutrition Services	18	16	-2	-11%
51.33	Alternative and Complementary Medicine and Medical Systems	48	44	-4	-8%
51.99	Health Professions and Related Clinical Sciences, Other	19	29	10	53%
	Total	3,377	3,839	462	14%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 37: Trends in Health Care Master's Degree Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	-	-	-
51.0201	Communication Sciences and Disorders, General	62	81	19	31%
51.0202	Audiology/Audiologist	9	0	-9	-100%
51.0203	Speech-Language Pathology/Pathologist	57	70	13	23%
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	74	63	-11	-15%
51.0299	Communication Disorders Sciences and Services, Other	-	-	-	-
51.0501	Dental Clinical Sciences, General	21	6	-15	-71%
51.0502	Advanced General Dentistry	-	0	0	-
51.0503	Oral Biology and Oral and Maxillofacial Pathology	-	8	8	-
51.0504	Dental Public Health and Education	-	2	2	-
51.0506	Endodontics/Endodontology	-	5	5	-
51.0507	Oral/Maxillofacial Surgery	-	0	0	-
51.0508	Orthodontics/Orthodontology	-	8	8	-
51.0509	Pediatric Dentistry/Pedodontics	-	2	2	-
51.051	Periodontics/Periodontology	-	7	7	-
51.0511	Prosthodontics/Prosthodontology	-	8	8	-
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	-	7	7	-
51.0602	Dental Hygiene/Hygienist	-	1	1	-
51.0701	Health/Health Care Administration/Management	209	311	102	49%
51.0719	Clinical Research Coordinator	-	-	-	-
51.0799	Health and Medical Administrative Services, Other	-	-	-	-
51.0814	Radiologist Assistant	-	2	2	-
51.0906	Perfusion Technology/Perfusionist	4	0	-4	-100%
51.0908	Respiratory Care Therapy/Therapist	-	7	7	-
51.0911	Radiologic Technology/Science - Radiographer	-	12	12	-
51.0912	Physician Assistant	30	201	201	-
51.0913	Athletic Training/Trainer	-	10	10	-
51.0915	Cardiopulmonary Technology/Technologist	-	-	-	-
51.0999	Allied Health Diagnostic/Intervention/Treatment Professions, Other	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	6	0	-6	-100%
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	-	14	14	-
51.1199	Health/Medical Preparatory Programs, Other	-	-	-	-
51.1401	Medical Scientist	13	9	-4	-31%
51.1501	Substance Abuse/Addiction Counseling	-	-	-	-
51.1504	Community Health Services/Liaison/Counseling	-	8	8	-
51.1505	Marriage and Family Therapy/Counseling	-	21	21	-
51.1506	Clinical Pastoral Counseling/Patient Counseling	-	-	-	-
51.1507	Psychoanalysis and Psychotherapy	18	16	-2	-11%
51.1508	Mental Health Counseling/Counselor	-	241	241	-
51.1509	Genetic Counseling/Counselor	-	17	17	-
51.1599	Mental and Social Health Services and Allied Professions, Other	120	9	-111	-93%
51.2002	Pharmacy Administration and Pharmacy Policy and Regulatory Affairs	-	234	234	-
51.2003	Pharmaceutics and Drug Design	-	2	2	-
51.2004	Medicinal and Pharmaceutical Chemistry	3	0	-3	-100%
51.2005	Natural Products Chemistry and Pharmacognosy	-	3	3	-
51.2006	Clinical and Industrial Drug Development	-	-	-	-
51.2007	Pharmacoeconomics/Pharmaceutical Economics	-	-	-	-
51.2008	Clinical, Hospital, and Managed Care Pharmacy	-	-	-	-
51.2009	Industrial and Physical Pharmacy and Cosmetic Sciences	-	-	-	-
51.201	Pharmaceutical Sciences	15	25	10	67%
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	-	-
51.2201	Public Health, General	266	373	107	40%
51.2202	Environmental Health	-	-	-	-
51.2205	Health/Medical Physics	-	12	12	-
51.2206	Occupational Health and Industrial Hygiene	12	16	4	33%
51.2207	Public Health Education and Promotion	7	0	-7	-100%
51.2209	Maternal and Child Health	-	34	34	-
51.221	International Public Health/International Health	-	0	0	-
51.2211	Health Services Administration	-	1	1	-
51.2212	Behavioral Aspects of Health	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.2299	Public Health, Other	182	298	116	64%
51.2301	Art Therapy/Therapist	8	39	31	388%
51.2302	Dance Therapy/Therapist	-	14	14	-
51.2305	Music Therapy/Therapist	-	13	13	-
51.2306	Occupational Therapy/Therapist	170	209	39	23%
51.2308	Physical Therapy/Therapist	341	23	-318	-93%
51.231	Vocational Rehabilitation Counseling/Counselor	11	0	-11	-100%
51.2311	Kinesiotherapy/Kinesiotherapist	-	0	-	-
51.2399	Rehabilitation and Therapeutic Professions, Other	69	66	-3	-4%
51.2509	Comparative and Laboratory Animal Medicine	-	-	-	-
51.2706	Medical Informatics	-	25	25	-
51.3101	Dietetics/Dietitian	-	18	18	-
51.3301	Acupuncture and Oriental Medicine	56	20	-36	-64%
51.3302	Traditional Chinese Medicine and Chinese Herbology	-	28	-	-
51.3801	Registered Nursing/Registered Nurse	64	297	233	364%
51.3802	Nursing Administration	5	56	51	1020%
51.3803	Adult Health Nurse/Nursing	-	23	23	-
51.3804	Nurse Anesthetist	6	71	65	1083%
51.3805	Family Practice Nurse/Nursing	14	69	55	393%
51.3808	Nursing Science	52	66	14	27%
51.3809	Pediatric Nurse/Nursing	-	42	42	-
51.381	Psychiatric/Mental Health Nurse/Nursing	8	30	22	275%
51.3811	Public Health/Community Nurse/Nursing	-	5	5	-
51.3813	Clinical Nurse Specialist	-	7	7	-
51.3814	Critical Care Nursing	-	10	10	-
51.3817	Nursing Education	-	4	4	-
51.3818	Nursing Practice	-	5	5	-
51.3819	Palliative Care Nursing	-	6	6	-
51.382	Clinical Nurse Leader	-	11	11	-
51.3821	Geriatric Nurse/Nursing	-	9	9	-
51.3822	Women's Health Nurse/Nursing	-	26	26	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	-	22	22	-
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide	-	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
	Nursing, Other	264	0	-264	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	80	19	-61	-76%
	Total	2,256	3,377	1,121	50%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 38: Trends in Health Care Master's Degree Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	-	-	0	-
51.0201	Communication Sciences and Disorders, General	81	85	4	5%
51.0202	Audiology/Audiologist	0	0	0	-
51.0203	Speech-Language Pathology/Pathologist	70	74	4	6%
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	63	80	17	27%
51.0299	Communication Disorders Sciences and Services, Other	-	9	9	-
51.0501	Dental Clinical Sciences, General	6	8	2	33%
51.0502	Advanced General Dentistry	0	0	0	-
51.0503	Oral Biology and Oral and Maxillofacial Pathology	8	25	17	213%
51.0504	Dental Public Health and Education	2	1	-1	-50%
51.0506	Endodontics/Endodontology	5	2	-3	-60%
51.0507	Oral/Maxillofacial Surgery	0	0	0	-
51.0508	Orthodontics/Orthodontology	8	6	-2	-25%
51.0509	Pediatric Dentistry/Pedodontics	2	0	-2	-100%
51.051	Periodontics/Periodontology	7	1	-6	-86%
51.0511	Prosthodontics/Prosthodontology	8	1	-7	-88%
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	7	12	5	71%
51.0602	Dental Hygiene/Hygienist	1	7	6	600%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0701	Health/Health Care Administration/Management	311	380	69	22%
51.0719	Clinical Research Coordinator	-	6	6	-
51.0799	Health and Medical Administrative Services, Other	-	-	0	-
51.0814	Radiologist Assistant	2	0	-2	-100%
51.0906	Perfusion Technology/Perfusionist	-	-	0	-
51.0908	Respiratory Care Therapy/Therapist	7	15	8	114%
51.0911	Radiologic Technology/Science - Radiographer	12	14	2	17%
51.0912	Physician Assistant	201	321	120	60%
51.0913	Athletic Training/Trainer	10	8	-2	-20%
51.0915	Cardiopulmonary Technology/Technologist	-	-	0	-
51.0999	Allied Health Diagnostic/Intervention/Treatment Professions, Other	-	-	0	-
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	-	11	11	-
51.1099	Clinical/Medical Laboratory Science and Allied Professions, Other	14	0	-14	-100%
51.1199	Health/Medical Preparatory Programs, Other	-	19	19	-
51.1401	Medical Scientist	9	23	14	156%
51.1501	Substance Abuse/Addiction Counseling	-	0	0	-
51.1504	Community Health Services/Liaison/Counseling	8	12	4	50%
51.1505	Marriage and Family Therapy/Counseling	21	26	5	24%
51.1506	Clinical Pastoral Counseling/Patient Counseling	-	57	57	-
51.1507	Psychoanalysis and Psychotherapy	16	11	-5	-31%
51.1508	Mental Health Counseling/Counselor	241	314	73	30%
51.1509	Genetic Counseling/Counselor	17	7	-10	-59%
51.1599	Mental and Social Health Services and Allied Professions, Other	9	4	-5	-56%
51.2002	Pharmacy Administration and Pharmacy Policy and Regulatory Affairs	234	188	-46	-20%
51.2003	Pharmaceutics and Drug Design	2	8	6	300%
51.2004	Medicinal and Pharmaceutical Chemistry	0	5	5	-
51.2005	Natural Products Chemistry and Pharmacognosy	3	-	-3	-100%
51.2006	Clinical and Industrial Drug Development	-	-	0	-
51.2007	Pharmacoeconomics/Pharmaceutical Economics	-	6	6	-
51.2008	Clinical, Hospital, and Managed Care Pharmacy	-	-	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.2009	Industrial and Physical Pharmacy and Cosmetic Sciences	-	-	0	-
51.201	Pharmaceutical Sciences	25	33	8	32%
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	0	-
51.2201	Public Health, General	373	359	-14	-4%
51.2202	Environmental Health	-	41	41	-
51.2205	Health/Medical Physics	12	0	-12	-100%
51.2206	Occupational Health and Industrial Hygiene	16	0	-16	-100%
51.2207	Public Health Education and Promotion	-	29	29	-
51.2209	Maternal and Child Health	34	62	28	82%
51.221	International Public Health/International Health	0	31	31	-
51.2211	Health Services Administration	1	26	25	2500%
51.2212	Behavioral Aspects of Health	-	22	22	-
51.2299	Public Health, Other	298	51	-247	-83%
51.2301	Art Therapy/Therapist	39	14	-25	-64%
51.2302	Dance Therapy/Therapist	14	2	-12	-86%
51.2305	Music Therapy/Therapist	13	5	-8	-62%
51.2306	Occupational Therapy/Therapist	209	287	78	37%
51.2308	Physical Therapy/Therapist	23	20	-3	-13%
51.231	Vocational Rehabilitation Counseling/Counselor	0	-	0	-
51.2311	Kinesiotherapy/Kinesiotherapist	0	0	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	66	54	-12	-18%
51.2509	Comparative and Laboratory Animal Medicine	-	6	6	-
51.2706	Medical Informatics	25	61	36	144%
51.3101	Dietetics/Dietitian	18	16	-2	-11%
51.3301	Acupuncture and Oriental Medicine	20	44	24	120%
51.3302	Traditional Chinese Medicine and Chinese Herbology	28	0	-28	-100%
51.3801	Registered Nursing/Registered Nurse	297	402	105	35%
51.3802	Nursing Administration	56	65	9	16%
51.3803	Adult Health Nurse/Nursing	23	36	13	57%
51.3804	Nurse Anesthetist	71	32	-39	-55%
51.3805	Family Practice Nurse/Nursing	69	113	44	64%
51.3808	Nursing Science	66	78	12	18%
51.3809	Pediatric Nurse/Nursing	42	23	-19	-45%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.381	Psychiatric/Mental Health Nurse/Nursing	30	28	-2	-7%
51.3811	Public Health/Community Nurse/Nursing	5	0	-5	-100%
51.3813	Clinical Nurse Specialist	7	19	12	171%
51.3814	Critical Care Nursing	10	-	-10	-100%
51.3817	Nursing Education	4	34	30	750%
51.3818	Nursing Practice	5	4	-1	-20%
51.3819	Palliative Care Nursing	6	0	-6	-100%
51.382	Clinical Nurse Leader	11	15	4	36%
51.3821	Geriatric Nurse/Nursing	9	18	9	100%
51.3822	Women's Health Nurse/Nursing	26	30	4	15%
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	22	4	-18	-82%
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide	-	-	0	-
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	19	29	10	53%
	Total	3,377	3,839	462	14%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Post-Master's Certificates

Substantial growth occurred in the number of post-master's certificate awards granted by colleges and universities in the Commonwealth in the pre-Chapter 224 period of 2001 to 2012. Much of this increase had been in dental specialty areas and in the communication disorders field. A number of specific dental specialty programs operated by dental schools for persons with dental degrees have emerged in Massachusetts over the past several years including pediatric dentistry, endodontics, and periodontics.

Post-master's certificate awards increased between 2012 and 2015 by 54 certificates or 28 percent yielding an annual rate of growth of 9 percent, about the same as the annual rate of growth over 2001 to 2012. Most awards were in dental specialty areas, mental health and nursing.

Table 39: Trends in Health Care Post-Master's Certificate Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	-	-	-
51.02	Communication Disorders Sciences and Services	0	31	31	-
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	63	122	59	94%
51.07	Health and Medical Administrative Services	-	-	-	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	-	-	-	-
51.14	Medical Clinical Sciences/Graduate Medical Studies	-	0	-	-
51.15	Mental and Social Health Services and Allied Professions	15	15	0	0%
51.16	Nursing	16	16	0	0%
51.17	Optometry (OD)	-	-	-	-
51.18	Ophthalmic and Optometric Support Services and Allied Professions	-	0	-	-
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	-	-	-
51.22	Public Health	-	-	-	-
51.23	Rehabilitation and Therapeutic Professions	5	12	7	140%
51.31	Dietetics and Clinical Nutrition Services	-	-	-	-
51.99	Health Professions and Related Clinical Sciences, Other	1	0	-1	-100%
	Total	100	196	96	96%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 40: Trends in Health Care Post-Master's Certificate Program Completions by Four-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.02	Communication Disorders Sciences and Services	31	33	2	6%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	122	158	36	30%
51.07	Health and Medical Administrative Services	-	0	0	-
51.09	Allied Health Diagnostic, Intervention, and Treatment Professions	-	-	0	-
51.14	Medical Clinical Sciences/Graduate Medical Studies	0	0	0	-
51.15	Mental and Social Health Services and Allied Professions	15	30	15	100%
51.16	Nursing	16	24	8	50%
51.17	Optometry (OD)	-	-	0	-
51.18	Ophthalmic and Optometric Support Services and Allied Professions	0	0	0	-
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	-	-	0	-
51.22	Public Health	-	-	0	-
51.23	Rehabilitation and Therapeutic Professions	12	3	-9	-75%
51.31	Dietetics and Clinical Nutrition Services		0	0	-
51.99	Health Professions and Related Clinical Sciences, Other	0	2	2	-
	Total	196	250	54	28%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 41: Trends in Health Care Post-Master's Certificate Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51	Health Services/Allied Health/Health Sciences, General	-	-	0	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	0	0	0	-
51.0299	Communication Disorders Sciences and Services, Other	-	31	31	-
51.0501	Dental Clinical Sciences, General	63	0	-63	-100%
51.0502	Advanced General Dentistry	-	27	27	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0503	Oral Biology and Oral and Maxillofacial Pathology	-	0	0	-
51.0504	Dental Public Health and Education	-	0	0	-
51.0506	Endodontics/Endodontology	-	19	19	-
51.0507	Oral/Maxillofacial Surgery	-	5	5	-
51.0508	Orthodontics/Orthodontology	-	15	15	-
51.0509	Pediatric Dentistry/Pedodontics	-	20	20	-
51.051	Periodontics/Periodontology	-	16	16	-
51.0511	Prosthodontics/Prosthodontology	-	12	12	-
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	-	8	8	-
51.0701	Health/Health Care Administration/Management	-	-	0	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	0	-
51.0912	Physician Assistant	-	-	0	-
51.1101	Pre-Dentistry Studies	-	-	0	-
51.1401	Medical Scientist	-	0	0	-
51.1504	Community Health Services/Liaison/Counseling	-	1	1	-
51.1507	Psychoanalysis and Psychotherapy	15	0	-15	-100%
51.1508	Mental Health Counseling/Counselor	-	14	14	-
51.1599	Mental and Social Health Services and Allied Professions, Other	-	-	0	-
51.1701	Optometry	-	-	0	-
51.1899	Ophthalmic and Optometric Support Services and Allied Professions, Other	-	0	0	-
51.2006	Clinical and Industrial Drug Development	-	-	0	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	0	-
51.2211	Health Services Administration	-	-	0	-
51.2301	Art Therapy/Therapist	0	-	0	-
51.2306	Occupational Therapy/Therapist	-	0	0	-
51.2308	Physical Therapy/Therapist	2	7	5	250%
51.231	Vocational Rehabilitation Counseling/Counselor	0	0	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	3	5	2	67%
51.3801	Registered Nursing/Registered Nurse	7	10	3	43%
51.3802	Nursing Administration	-	-	0	-
51.3803	Adult Health Nurse/Nursing	-	0	0	-
51.3804	Nurse Anesthetist	-	0	0	-
51.3805	Family Practice Nurse/Nursing	-	0	0	-
51.3807	Nurse Midwife/Nursing Midwifery	0	-	0	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.3808	Nursing Science	4	-	-4	-100%
51.3809	Pediatric Nurse/Nursing	-	0	0	-
51.381	Psychiatric/Mental Health Nurse/Nursing	-	0	0	-
51.3811	Public Health/Community Nurse/Nursing	-	-	0	-
51.3814	Critical Care Nursing	-	0	0	-
51.3817	Nursing Education	-	6	6	-
51.3818	Nursing Practice	-	0	0	-
51.3821	Geriatric Nurse/Nursing	-	0	0	-
51.3822	Women's Health Nurse/Nursing	-	0	0	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	-	0	0	-
	Nursing, Other	5	-	-5	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	1	0	-1	-100%
	Total	100	196	96	96%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 42: Trends in Health Care Post-Master's Certificate Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51	Health Services/Allied Health/Health Sciences, General	-	-	0	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	0	0	0	-
51.0299	Communication Disorders Sciences and Services, Other	31	33	2	6%
51.0501	Dental Clinical Sciences, General	0	1	1	-
51.0502	Advanced General Dentistry	27	23	-4	-15%
51.0503	Oral Biology and Oral and Maxillofacial Pathology	0	4	4	-
51.0504	Dental Public Health and Education	0	4	4	-
51.0506	Endodontics/Endodontology	19	20	1	5%
51.0507	Oral/Maxillofacial Surgery	5	4	-1	-20%
51.0508	Orthodontics/Orthodontology	15	19	4	27%
51.0509	Pediatric Dentistry/Pedodontics	20	19	-1	-5%
51.051	Periodontics/Periodontology	16	25	9	56%

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0511	Prosthodontics/Prosthodontology	12	19	7	58%
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	8	20	12	150%
51.0701	Health/Health Care Administration/Management	-	-	0	-
51.0706	Health Information/Medical Records Administration/Administrator	-	-	0	-
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	-	-	0	-
51.0912	Physician Assistant	-	-	0	-
51.1101	Pre-Dentistry Studies	-	-	0	-
51.1401	Medical Scientist	0	0	0	-
51.1501	Substance Abuse/Addiction Counseling	-	1	1	-
51.1504	Community Health Services/Liaison/Counseling	1	4	3	300%
51.1507	Psychoanalysis and Psychotherapy	0	2	2	-
51.1508	Mental Health Counseling/Counselor	14	23	9	64%
51.1599	Mental and Social Health Services and Allied Professions, Other	-	-	0	-
51.1701	Optometry	-	-	0	-
51.1899	Ophthalmic and Optometric Support Services and Allied Professions, Other	0	0	0	-
51.2006	Clinical and Industrial Drug Development	-	-	0	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	-	-	0	-
51.2211	Health Services Administration	-	-	0	-
51.2301	Art Therapy/Therapist	-	-	0	-
51.2306	Occupational Therapy/Therapist	0	0	0	-
51.2308	Physical Therapy/Therapist	7	2	-5	-71%
51.231	Vocational Rehabilitation Counseling/Counselor	0	-	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	5	1	-4	-80%
51.3101	Dietetics/Dietitian	-	0	0	-
51.3801	Registered Nursing/Registered Nurse	10	16	6	60%
51.3802	Nursing Administration	-	-	0	-
51.3803	Adult Health Nurse/Nursing	0	2	2	-
51.3804	Nurse Anesthetist	0	2	2	-
51.3805	Family Practice Nurse/Nursing	0	0	0	-
51.3807	Nurse Midwife/Nursing Midwifery	-	-	0	-
51.3808	Nursing Science	-	-	0	-
51.3809	Pediatric Nurse/Nursing	0	0	0	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.381	Psychiatric/Mental Health Nurse/Nursing	0	0	0	-
51.3811	Public Health/Community Nurse/Nursing	-	-	0	-
51.3814	Critical Care Nursing	0	-	0	-
51.3817	Nursing Education	6	4	-2	-33%
51.3818	Nursing Practice	0	0	0	-
51.3821	Geriatric Nurse/Nursing	0	0	0	-
51.3822	Women's Health Nurse/Nursing	0	0	0	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	0	-	0	-
	Nursing, Other	-	-	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	0	2	2	-
	Total	196	250	54	28%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Doctor's Degrees

Colleges and universities dramatically increased the number of doctor's degree awards in health care fields over the pre-Chapter 224 decade. The number of health care doctor's awards almost doubled between 2001 and 2012, increasing by 1,300 degrees or about 118 additional awards per year. This increase is largely the product of a re-credentialing of pharmacy and physical therapy programs from bachelor's and master's degree levels to the doctor's level, even though these programs are considered undergraduate programs with enrollment targeted at first-time full-time college students. However, new doctor's degree programs have emerged, especially in nursing fields, which have also served to sharply increase the number of health care doctor's degrees awarded in Massachusetts. In the post-Chapter 224 period, doctor's degrees overall grew by 11 percent or about 94 additional awards each year between 2012 and 2015.

- The number of traditional medical doctor (MD) degrees awarded in Massachusetts has increased at a modest pace compared to most other medical and health related areas. Between 2001 and 2012, Massachusetts medical schools have increased the number of

degree awards by just 62, a modest 11 percent increase over the 11-year period. By 2015, five fewer degrees were awarded for a 1 percent loss relative to MD awards in 2012.

- The overwhelming source of increase in doctor's degree awards came from up-credentialing of pharmacy and physical therapy first time awards from the bachelor's and master's level to a doctoral requirement as is seen in the pre-Chapter 224 period. In the post-Chapter 224 period, pharmacy and physical therapy doctoral awards continued to grow and contributed to nearly all doctoral degree growth over the three years.
- The number of doctor's degree awards in the nursing arena had increased sharply from 15 awards during 2001 to 114 awards by 2012. The increase included gains in nursing practice and nursing science degrees. Doctoral nursing degrees continued to grow in the post-Chapter 224 period where there was a 55 percent increase in awards between 2012 and 2015 yielding an average of 21 additional awards per year; much higher than the 9 additional awards per year rate of growth in nursing doctorate degree awards between 2001 and 2012.

Table 43: Trends in Health Care Doctor's Degree Completions by Four -Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.02	Communication Disorders Sciences and Services	3	17	14	467%
51.04	Dentistry (DDS, DMD)	319	401	82	26%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	12	19	7	58%
51.07	Health and Medical Administrative Services.	0	6	6	-
51.12	Medicine (MD)	579	642	63	11%
51.14	Medical Clinical Sciences/Graduate Medical Studies	0	0	0	-
51.15	Mental and Social Health Services and Allied Professions	0	22	22	-
51.16	Nursing	15	114	99	660%
51.17	Optometry (OD)	150	120	-30	-20%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	118	703	585	496%
51.22	Public Health	76	81	5	7%

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.23	Rehabilitation and Therapeutic Professions	2	461	459	22950%
51.24	Veterinary Medicine (DVM)	76	80	4	5%
51.27	Medical Illustration and Informatics	-	-	-	-
51.99	Health Professions and Related Clinical Sciences, Other	15	0	-15	-100%
	Total	1,365	2,666	1301	95%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 44: Trends in Health Care Doctor's Degree Completions by Four -Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.02	Communication Disorders Sciences and Services	17	10	-7	-41%
51.04	Dentistry (DDS, DMD)	401	450	49	12%
51.05	Advanced/Graduate Dentistry and Oral Sciences (Cert.)	19	23	4	21%
51.07	Health and Medical Administrative Services	6	5	-1	-17%
51.12	Medicine (MD)	642	637	-5	-1%
51.14	Medical Clinical Sciences/Graduate Medical Studies	0	3	3	-
51.15	Mental and Social Health Services and Allied Professions	22	12	-10	-45%
51.16	Nursing	114	177	63	55%
51.17	Optometry (OD)	120	123	3	3%
51.2	Pharmacy, Pharmaceutical Sciences, and Administration	703	831	128	18%
51.22	Public Health	81	37	-44	-54%
51.23	Rehabilitation and Therapeutic Professions	461	545	84	18%
51.24	Veterinary Medicine (DVM)	80	94	14	18%
51.27	Medical Illustration and Informatics	-	0	0	-
51.99	Health Professions and Related Clinical Sciences, Other.	-	-	0	-
	Total	2,666	2,947	281	11%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 45: Trends in Health Care Doctor's Degree Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2001 to 2012

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.0201	Communication Sciences and Disorders, General	2	2	0	0%
51.0202	Audiology/Audiologist	0	15	15	-
51.0203	Speech-Language Pathology/Pathologist	1	0	-1	-100%
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	0	0	0	-
51.0401	Dentistry	319	401	82	26%
51.0501	Dental Clinical Sciences, General	12	0	-12	-100%
51.0502	Advanced General Dentistry	0	1	1	-
51.0503	Oral Biology and Oral and Maxillofacial Pathology	0	5	5	-
51.0504	Dental Public Health and Education	0	3	3	-
51.0506	Endodontics/Endodontology	0	0	0	-
51.0507	Oral/Maxillofacial Surgery	0	1	1	-
51.0508	Orthodontics/Orthodontology	0	4	4	-
51.0509	Pediatric Dentistry/Pedodontics	0	0	0	-
51.051	Periodontics/Periodontology	0	2	2	-
51.0511	Prosthodontics/Prosthodontology	0	2	2	-
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	0	1	1	-
51.0701	Health/Health Care Administration/Management	0	6	6	-
51.1201	Medicine	579	642	63	11%
51.1401	Medical Scientist	0	0	0	-
51.1504	Community Health Services/Liaison/Counseling	-	-	-	-
51.1507	Psychoanalysis and Psychotherapy	0	11	11	-
51.1508	Mental Health Counseling/Counselor	0	11	11	-
51.1599	Mental and Social Health Services and Allied Professions, Other	0	0	0	-
51.1701	Optometry	150	120	-30	-20%
51.2001	Pharmacy	114	691	577	506%
51.2002	Pharmacy Administration/Policy/Regulatory Affairs	0	-	-	-

CIP Code	Major Name	2001	2012	Absolute Change 2001-2012	Relative Change 2001-2012
51.2003	Pharmaceutics and Drug Design	3	3	0	0%
51.2004	Medicinal and Pharmaceutical Chemistry	1	1	0	0%
51.2007	Pharmacoeconomics/Pharmaceutical Economics	-	-	-	-
51.2009	Industrial and Physical Pharmacy and Cosmetic Sciences	0	-	-	-
51.201	Pharmaceutical Sciences	0	8	8	-
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	0	0	0	-
51.2201	Public Health, General	8	7	-1	-13%
51.2202	Environmental Health	0	3	3	-
51.2206	Occupational Health and Industrial Hygiene	10	3	-7	-70%
51.2209	Maternal and Child Health	0	1	1	-
51.221	International Public Health/International Health	-	-	-	-
51.2212	Behavioral Aspects of Health	-	-	-	-
51.2299	Public Health, Other	58	67	9	16%
51.2306	Occupational Therapy/Therapist	0	6	6	-
51.2308	Physical Therapy/Therapist	0	450	450	-
51.231	Vocational Rehabilitation Counseling/Counselor	0	0	0	-
51.2311	Kinesiotherapy/Kinesiotherapist	0	0	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	2	5	3	150%
51.2401	Veterinary Medicine	76	80	4	5%
51.3801	Registered Nursing/Registered Nurse	0	40	40	-
51.3802	Nursing Administration	0	6	6	-
51.3803	Adult Health Nurse/Nursing	-	-	-	-
51.3804	Nurse Anesthetist	-	-	-	-
51.3805	Family Practice Nurse/Nursing	-	-	-	-
51.3808	Nursing Science	0	23	23	-
51.3814	Critical Care Nursing	-	-	-	-
51.3818	Nursing Practice	0	39	39	-
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	0	6	6	-
	Nursing, Other	15	0	-15	-100%
51.9999	Health Professions and Related Clinical Sciences, Other	15	0	-15	-100%
	Total	1,365	2,666	1,301	95%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.

Table 46: Trends in Health Care Doctor's Degree Program Completions by Six-Digit CIP Field of Study among Massachusetts Postsecondary Educational Institutions, 2012 to 2015

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.0201	Communication Sciences and Disorders, General	2	1	-1	-50%
51.0202	Audiology/Audiologist	15	9	-6	-40%
51.0203	Speech-Language Pathology/Pathologist	0	0	0	-
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	0	0	0	-
51.0401	Dentistry	401	450	49	12%
51.0501	Dental Clinical Sciences, General	0	10	10	-
51.0502	Advanced General Dentistry	1	0	-1	-100%
51.0503	Oral Biology and Oral and Maxillofacial Pathology	5	3	-2	-40%
51.0504	Dental Public Health and Education	3	1	-2	-67%
51.0506	Endodontics/Endodontology	0	1	1	-
51.0507	Oral/Maxillofacial Surgery	1	0	-1	-100%
51.0508	Orthodontics/Orthodontology	4	2	-2	-50%
51.0509	Pediatric Dentistry/Pedodontics	0	2	2	-
51.051	Periodontics/Periodontology	2	0	-2	-100%
51.0511	Prosthodontics/Prosthodontology	2	3	1	50%
51.0599	Advanced/Graduate Dentistry and Oral Sciences, Other	1	1	0	0%
51.0701	Health/Health Care Administration/Management	6	5	-1	-17%
51.1201	Medicine	642	637	-5	-1%
51.1401	Medical Scientist	0	3	3	-
51.1504	Community Health Services/Liaison/Counseling	-	1	1	-
51.1507	Psychoanalysis and Psychotherapy	11	2	-9	-82%
51.1508	Mental Health Counseling/Counselor	11	9	-2	-18%
51.1599	Mental and Social Health Services and Allied Professions, Other	0	3	3	-
51.1701	Optometry	120	123	3	3%
51.2001	Pharmacy	691	822	131	19%
51.2002	Pharmacy Administration/Policy/Regulatory Affairs	-	-	0	-
51.2003	Pharmaceutics and Drug Design	3	0	-3	-100%
51.2004	Medicinal and Pharmaceutical Chemistry	1	0	-1	-100%
51.2007	Pharmacoeconomics/Pharmaceutical Economics	-	1	1	-

CIP Code	Major Name	2012	2015	Absolute Change 2012-2015	Relative Change 2012-2015
51.2009	Industrial and Physical Pharmacy and Cosmetic Sciences	-	-	0	-
51.201	Pharmaceutical Sciences	8	5	-3	-38%
51.2099	Pharmacy, Pharmaceutical Sciences, and Administration, Other	0	0	0	-
51.2201	Public Health, General	7	1	-6	-86%
51.2202	Environmental Health	3	17	14	467%
51.2206	Occupational Health and Industrial Hygiene	3	3	0	0%
51.2209	Maternal and Child Health	1	1	0	0%
51.221	International Public Health/International Health	-	8	8	-
51.2212	Behavioral Aspects of Health	-	4	4	-
51.2299	Public Health, Other	67	6	-61	-91%
51.2306	Occupational Therapy/Therapist	6	1	-5	-83%
51.2308	Physical Therapy/Therapist	450	540	90	20%
51.231	Vocational Rehabilitation Counseling/Counselor	0	0	0	-
51.2311	Kinesiotherapy/Kinesiotherapist	0	0	0	-
51.2399	Rehabilitation and Therapeutic Professions, Other	5	1	-4	-80%
51.2401	Veterinary Medicine	80	94	14	18%
51.3801	Registered Nursing/Registered Nurse	40	34	-6	-15%
51.3802	Nursing Administration	6	10	4	67%
51.3803	Adult Health Nurse/Nursing	-	1	1	-
51.3804	Nurse Anesthetist	-	40	40	-
51.3805	Family Practice Nurse/Nursing	-	1	1	-
51.3808	Nursing Science	23	19	-4	-17%
51.3814	Critical Care Nursing	-	0	0	-
51.3818	Nursing Practice	39	68	29	74%
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing	6	4	-2	-33%
	Nursing, Other	0	0	0	-
51.9999	Health Professions and Related Clinical Sciences, Other	0	0	0	-
	Total	2,666	2,947	281	11%

Source: National Center for Education Statistics, Integrated Postsecondary Education Data System Public Use Files, tabulations by Center for Labor Markets and Policy, Drexel University.