

Health & Biosciences: Durham Region

Definition and Context

The health and biosciences sector encompasses a variety of businesses, including medical research, the development of pharmaceuticals, digital health, precision medicine, development and manufacturing of medical health devices with technological elements such as artificial intelligence, and the healthcare system itself (Government of Canada, 2018a). The health and biosciences industry generates significant economic growth annually, representing 11 percent of Canada's annual GDP in 2016 (Government of Canada, 2018a). In order to remain globally competitive and promote an innovation economy with better health outcomes, Canada must engage in health research and digital technologies to boost economic productivity, enable the commercialization of technologies and strengthen the national health system (Government of Canada, 2018a).

The health and biosciences sector also includes accompanying and supporting healthcare services such as residential care for medical and social reasons, social assistance in various forms such as community housing and counselling, and vocational rehabilitation services (Durham Workforce Authority, 2016). The proportion of seniors (65 years and over) is expected to be more than 26.2 percent of the overall population by 2038 (Bohnert, Chagnon & Dion, 2015). This means that 1 in 4 people in Canada will be considered senior citizens, increasing the demand for employment for health service providers, related support services and health research (Conference Board of Canada, 2018).

In addition, the recent legalisation of cannabis in October of 2018 presents new opportunities for growth in the health and biosciences sector. The Canada Institute for Health Research (2018b) has outlined several priorities for cannabis health research, including examining potential health benefits and developing a better understanding of health risks associated with consumption across different populations. In July 2018, the CIHR partnered with the Mental Health Commission of Canada and the Canadian Centre on Substance Use and Addiction to provide three million dollars in funding towards evidence-based cannabis research (Canada Institute for Health Research, 2018b). These research projects are slated to begin in spring of 2019 (Canada Institute for Health Research, 2018b).

Growth in health and biosciences is important to making Durham Region more competitive locally, provincially and globally. Federal support is available for health and biosciences projects in the Durham Region, who are seeking to grow and commercialize. The Canadian Institutes of Health Research (CIHR) provides numerous opportunities for funding research in healthcare. Several funding opportunities were available in early 2019 for research projects that focus on transitions in care, neurogeneration in aging and Indigenous healthy life trajectories (Researchnet, 2018). Additionally, CIHR is partnered with the Natural Sciences and Engineering Research Council of Canada (NSERC) to form the Collaborative Health Research Projects, providing grants to innovative health research that can better health services or generate economic development in healthcare, through partnership with a knowledge or technology user organization (Natural Sciences and Engineering Research Council of Canada, 2018). In addition, there are provincial funding programs that support the development of innovation in healthcare and biosciences, including the Advancing Health program which matches healthcare organizations and academia with innovations, and the

Health Technologies Fund, which sponsors projects that support aging at home (Ontario Centres of Excellence, 2018).

Highlights of Health & Bioscience Businesses in Durham Region

Durham Region is home to many healthcare service providers, including the Lakeridge Health hospital network, spanning five campuses including Ajax-Pickering, Bowmanville, Oshawa, Port Perry and Whitby (Lakeridge Health, 2018). These five hospitals offer essential emergency and medical care, in addition to diabetes education programs, palliative care, rehabilitation services, and dialysis and kidney care (Lakeridge Health, 2018). In addition, Oshawa is home to the Lakeridge Health Education and Research Network, which partners with post-secondary institutions and health care service providers to host research studies and clinical studies that are important to innovations and new medical developments (Lakeridge Health, 2019).

In addition, Durham Region is positioned to assist in significant advancements in healthcare research. There are three post-secondary institutions located within the region: Trent University Durham, Durham College and University of Ontario Institute of Technology (UOIT) in advancing healthcare and health-related research. In particular, UOIT has acquired substantial funding for healthcare research, receiving 27 successful funding decisions from the Canadian Institute for Health Research since 2009 (Canadian Institute for Health Research, 2018a). Several of these research projects launch in 2019, including a planning and dissemination grant for best practices in electronic health record collaboration and a Catalyst grant for improving heart failure outcomes through apps that support self-management and adherence (Canadian Institute for Health Research, 2018). Both these grants focus on healthcare and its relationship with technology, which is important for future success.

Ontario Shores is a public hospital focused on mental illness and is located within the Town of Whitby. This organization is a champion in its field, employing more than 1,200 staff and offering a myriad of training programs for healthcare professionals and mental health care specialists (Ontario Shores, 2019). In addition, Ontario Shores (2019) offers evidence-based patient care for clients who are affected by mental illness and need additional supports to fully participate in society.

Purdue Pharma represents pharmaceutical research and development in the Durham Region, and is located in the City of Pickering (Purdue Pharma, 2019). Purdue Pharma is a privately-held pharmaceutical company that is active in both research and development formulation and pharmaceutical manufacturing (Purdue Pharma, 2019). Three of the drugs this company manufactures can be found on the Innovative Drug Register from Health Canada (Health Canada, 2019). Innovative drugs have data protection for 6 years, due to their use of a medicinal ingredient or variation of a medicinal ingredient that has not been previously approved by the Minister (Food and Drug Regulations, CRC c870, C.08.004.1). These drugs include Netupitant (Drugbank, 2018) and Aloxi Solution (Drugbank, 2019a), which prevent and treat chemotherapy-induced nausea and vomiting, and Tafluprost, which are eye drops that control the progression of glaucoma (Drugbank, 2019b).

Health & Bioscience Employment by NOCS (2016)

The National Occupational Classification System (NOCS) is developed by the government of Canada, as the Canadian standardized taxonomy and framework for communicating about labour market information, and is sorted by skill levels and skill types (Government of Canada, 2018b). Occupations within this taxonomy are grouped by the type of work required for each job, including

the employment requirements, job description and responsibilities, tasks and duties (Government of Canada, 2018b). Other factors that impact the classification of occupations include the complexity of the work, the types of services that are provided or the goods that are being made, and the responsibility required in the work (Government of Canada, 2018b). There are several levels to these occupational categories, beginning with a single digit, described as a broad occupational category code (e.g. 0 Management occupations) (Government of Canada, 2018b). The occupational codes become more specific as the number of digits increase: two-digits are major group codes (e.g. 00 Senior management occupations), three-digits are minor group codes (e.g. 001 Legislators and senior management) and four-digits identify the above three groups including a unit group (e.g. 0011 Legislators) (Government of Canada, 2018b).

The following table outlines the occupations represented in the health and biosciences sector, along with the total employed persons in Durham Region in those occupations, and their respective median and average employment incomes. This table contains the most recent data from the Statistics Canada Census by Place of Work (POW), meaning that all these jobs are within the Durham Region.

Occupation (NOC)	Total Employed	Median Employment Income (\$)	Average Employment Income (\$)
0014 Senior managers - health, education, social and community services and membership organizations	215	88507	95463
0311 Managers in health care	385	91072	95475
0411 Government managers – health and social policy development and program administration	10		
2112 Chemists	125	61116	67231
2121 Biologists and related scientists	40	40192	50975
2211 Chemical technologists and technicians	295	61691	73191
3011 Nursing co-ordinators and supervisors	225	74261	67853
3012 Registered nurses and registered psychiatric nurses	3175	67985	65443
3111 Specialist physicians	310	140534	150620
3112 General practitioners and family physicians	595	129232	140470
3113 Dentists	340	99380	130545
3114 Veterinarians	170	76836	78018
3121 Optometrists	95	90008	89339

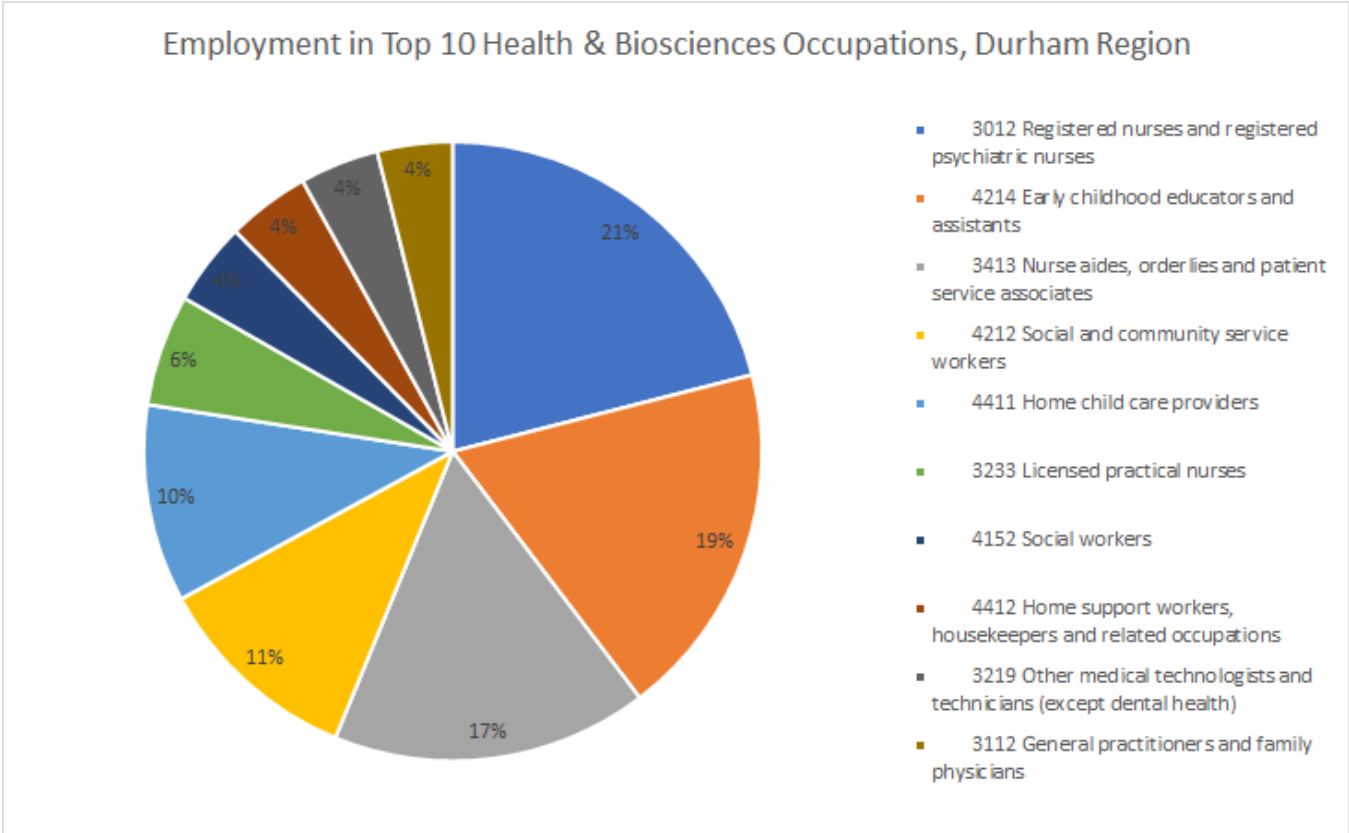
3122 Chiropractors	150	51905	64549
3124 Allied primary health practitioners	90	83966	87543
3125 Other professional occupations in health diagnosing and treating	50	48921	40562
3131 Pharmacists	445	87435	85626
3132 Dietitians and nutritionists	115	48205	43684
3141 Audiologists and speech-language pathologists	105	66872	64960
3142 Physiotherapists	260	60907	61148
3143 Occupational therapists	135	75276	62951
3144 Other professional occupations in therapy and assessment	135	32074	34367
3211 Medical laboratory technologists	130	67858	65381
3212 Medical laboratory technicians and pathologists' assistants	155	38197	38664
3213 Animal health technologists and veterinary technicians	260	28675	28176
3214 Respiratory therapists, clinical perfusionists and cardiopulmonary technologists	85	77174	82341
3215 Medical radiation technologists	320	79298	78792
3216 Medical sonographers	70	31540	39069
3217 Cardiology technologists and electrophysiological diagnostic technologists, n.e.c.	40	37593	34987
3219 Other medical technologists and technicians (except dental health)	625	32229	34275
3222 Dental hygienists and dental therapists	435	48123	46121

3223 Dental technologists, technicians and laboratory assistants	95	54640	47250
3231 Opticians	120	54291	55894
3232 Practitioners of natural healing	135	10009	20150
3233 Licensed practical nurses	880	51525	48106
3234 Paramedical occupations	240	99113	93189
3236 Massage therapists	480	17051	23261
3237 Other technical occupations in therapy and assessment	180	43089	38218
3411 Dental assistants	585	32532	32167
3413 Nurse aides, orderlies and patient service associates	2500	38301	37516
3414 Other assisting occupations in support of health services	445	30206	32579
4151 Psychologists	210	62111	59322
4152 Social workers	655	60822	60324
4153 Family, marriage and other related counsellors	280	58865	55672
4161 Natural and applied science policy researchers, consultants and program officers	200	65921	86792
4165 Health policy researchers, consultants and program officers	195	57253	59396
4212 Social and community service workers	1645	41462	44647
4214 Early childhood educators and assistants	2815	27574	27418
4411 Home child care providers	1560	10369	13317
4412 Home support workers, housekeepers and related occupations	655	26674	27530

Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

The largest proportion of health and bioscience sector jobs in the Durham Region belongs to registered nurses and registered psychiatric nurses, representing 3175 employed persons from the 2016 Census. The occupation with the second highest employment is nurse aides, orderlies and patient service associates, representing 2500 employed residents. Both these occupations are central to the administration of essential healthcare services, and will continue to be in demand due to an aging population and its demand for nursing and home care services (Garner et al., 2018). Many of these occupations pay above the median and average wages of overall employment in the Region, which are \$38,893 and \$50,161 respectively.

The following figure is a visual representation of the top 10 Health & Biosciences occupations in Durham Region, according to the 2016 Census. The subsectors are separated by four-digit NOCS.



Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

Health & Bioscience Employment by NAICS (2016)

The North American Industry Classification System (NAICS) is a hierarchical classification system for industries, developed by the national statistical agencies of Canada, United States and Mexico. (Statistics Canada, 2017). This classification system divides the economy into 20 major sectors grouped by production criterion, which are further divided into 102 sub-sectors and 324 industry groups (Statistics Canada, 2017). The reason for the development of this system is to classify business establishments, and to segregate the establishments by the types of activities businesses specialize in (Statistics Canada, 2017). However, it is important to keep in mind that some large companies and enterprises may fall under several sectors in NAICS and cannot wholly be represented by one sector code (Statistics Canada, 2017). NAICS codes are available from broad

categories of 2-digits (e.g. 31-33 Manufacturing) to more specific codes that are 6-digits (e.g. 335223 Major kitchen appliance manufacturing) (Statistics Canada, 2017). There are NAICS codes for 3-digits, 4-digits, and 5-digits (Statistics Canada, 2017).

The following table outlines the industries represented in the health and biosciences sector, along with the total employed persons in Durham Region in those industries, and their respective median and average employment incomes by 4-digit NAICS. This table contains the most recent data from the Statistics Canada Census by Place of Work (POW), meaning that all these persons are employed within the Durham Region.

Industry (NAICS)	Total Employed	Median Employment Income (\$)	Average Employment Income (\$)
3254 Pharmaceutical and medicine manufacturing	750	63071	78453
3391 Medical equipment and supplies manufacturing	130	37525	47491
4145 Pharmaceuticals, toiletries, cosmetics and sundries merchant wholesalers	195	76172	83006
4461 Health and personal care stores	2605	29373	38167
5416 Management, scientific and technical consulting services	1755	40154	53103
5417 Scientific research and development services	180	64180	78942
5419 Other professional, scientific and technical services	1155	27938	39595
6211 Offices of physicians	1985	42816	74771
6212 Offices of dentists	2000	39747	52648
6213 Offices of other health practitioners	2205	31444	41052
6214 Out-patient care centres	980	48417	48440
6215 Medical and diagnostic laboratories	370	42997	50001
6216 Home health care services	480	38649	47420
6219 Other ambulatory health care services	160	98820	88815

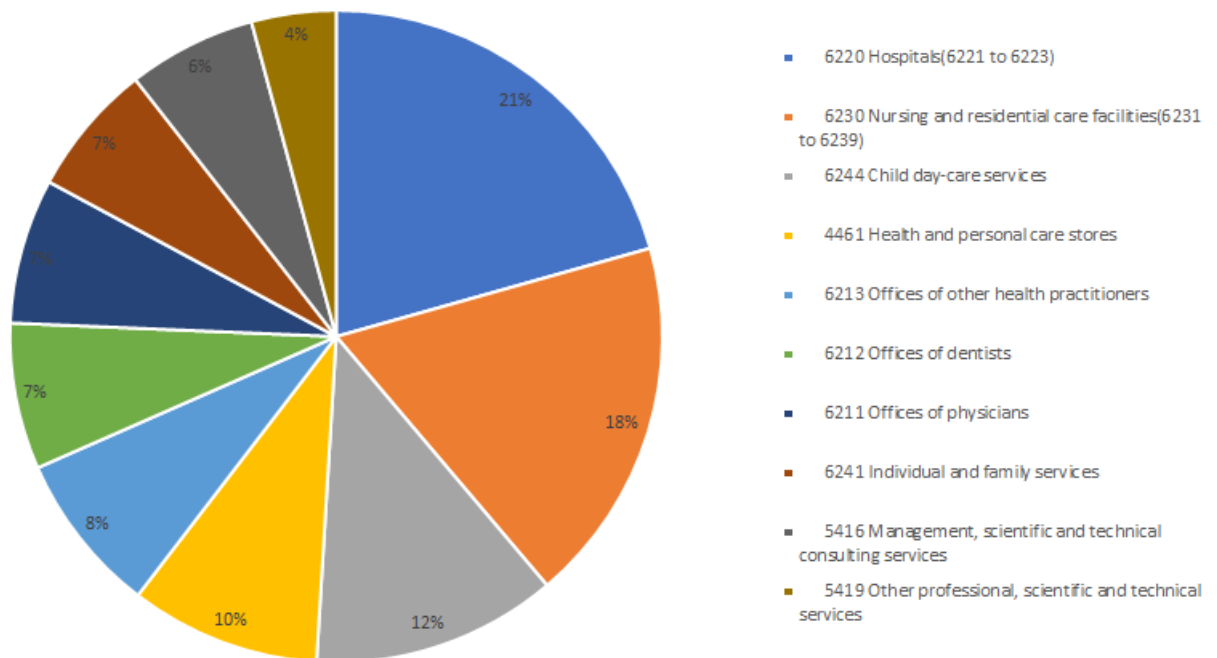
6220 Hospitals(6221 to 6223)	5690	60766	66035
6230 Nursing and residential care facilities(6231 to 6239)	5010	37567	39788
6241 Individual and family services	1815	43342	48436
6242 Community food and housing, and emergency and other relief services	110	39518	39313
6243 Vocational rehabilitation services	155	32800	34017
6244 Child day-care services	3350	19044	21329

Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

Most industries within the health and biosciences sector, are above the median (\$38,983) and average (\$50,161) employment incomes in Durham Region. The highest paying positions are from the industry 6219 Other ambulatory health care services, consisting of ambulance services and other services related to emergency medical care. The majority of employed workers in the Region in this sector are working in hospitals (n=5690).

The following figure is a visual representation of the top 10 Health & Biosciences industries in Durham Region, according to the 2016 Census. The subsectors are separated by four-digit NAICS, similarly to the chart above.

Employment in Top 10 Health & Biosciences Industries, Durham Region



Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

Canadian Business Counts (December 2018): Health and Biosciences

The Canadian Business Counts are published twice annually, and are available publicly available at the national and provincial levels (Statistics Canada, 2018). Canadian Business Counts by Census Subdivision (e.g. Durham Region) are purchased collectively by the Workforce Planning Boards of Ontario, including Durham Workforce Authority. These counts provide information about the number of businesses, as classified by three-digit industrial classification (NAICS) and employment-size categories (e.g. 1 to 4 employees), and are taken from the Statistics Canada Business Register (Statistics Canada, 2018). Each operating location is classified as a separate business, so if a company has more than one location (e.g. headquarters office, 2 branches), they will each be counted individually (Statistics Canada, 2018). Using the Canadian Business Counts is beneficial in understanding the composition of businesses in the Durham Region by industry, as well as the number of SMEs (small and medium enterprises) and their role in the local economy.

The following table outlines the number of businesses represented in the health and biosciences sector, categorized by 3-digit NAICS (North American Industrial Classification System) and number of employees. This table contains the most recent data from the Canadian Business Register in December 2018 by Place of Work (POW), meaning that all these businesses are located within the Durham Region.

Industry	Without Employees	1 - 4	5 - 9	10 - 19	20-49	50-99	100-199	200-499	500 +
325 - Chemical manufacturing	20	4	5	7	4	3	0	2	0
446 - Health and personal care stores	161	125	98	41	31	12	1	0	0
621 - Ambulatory health care services	1364	713	251	128	33	6	5	3	1
622 - Hospitals	3	0	1	0	0	0	0	3	3
623 - Nursing and residential care facilities	56	18	37	57	36	10	6	6	0
624 - Social assistance	463	44	38	60	61	7	2	1	0

Source: Canadian Business Counts, December 2018 (custom purchased by Durham Workforce Authority)

There are over 2000 businesses relevant to the health and biosciences sector in the Durham Region, with the majority having less than four employees. Most businesses in this sector are from ambulatory health care services, representing direct or indirect healthcare services to ambulatory patients, such as physicians, dentists and medical laboratories.

Educational Attainment (Census, 2016)

Educational attainment in the health and biosciences sector varies due to the varied skill requirements and tasks associated with the breadth of occupations. The following table outlines employment in the Health & Biosciences sector in Durham Region by highest level of educational attainment and 3-Digit NAICS (North American Industrial Classification System). Please refer above for the full context and definition of NAICS.

Industry (3-Digit NAICS)	No certificate, diploma or degree	Secondary (high) school diploma or equivalency certificate	Apprenticeship or trades certificate or diploma	College, CEGEP or other non-university certificate or diploma	Bachelor's Degree	Master's Degree	Earned Doctorate
325 Chemical	60	330	50	410	260	135	10

manuf ring							
446 Health and personal care stores	205	825	80	745	535	70	20
621 Ambulator y health care services	160	905	155	3555	1250	565	130
622 Hospitals	70	470	150	2725	1440	375	50
623 Nursing and residential care facilities	275	890	380	2550	565	125	
624 Social assistance	265	1180	120	2400	980	285	

Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

When examining the health and biosciences sector in Durham Region by industry, nearly 97 percent of employees have a certificate, diploma or degree. Nearly 44 percent of employees have a college diploma or equivalent, while nearly 33 percent of employees have a university certificate, degree or equivalent.

The following table outlines employment in the Health & Biosciences sector in Durham Region by highest level of educational attainment and 4-Digit NOCS. Please refer above for the full context and definition of NOC (National Occupational Classification).

Occupation (NOC)	No certificate , diploma or degree	Secondary (high) school diploma or equivalency certificate	Apprenticeship or trades certificate or diploma	College, CEGEP or other non- university certificate or diploma	Bachelor's degree	Master's degree	Earned doctorate
0014 Senior managers - health, education,		40		30	60	50	10

social and community services and membership organizations							
0311 Managers in health care		20	10	80	140	100	10
0411 Government managers – health and social policy development and program administration				10	10	10	
2112 Chemists		10		20	40	40	10
2121 Biologists and related scientists				10	20	10	
2211 Chemical technologists and technicians		60		140	50	40	
2221 Biological technologists and technicians				10			
3011 Nursing coordinators and supervisors				110	60	20	
3012 Registered nurses and registered psychiatric nurses		30	30	1610	1180	120	
3111 Specialist physicians						30	10

3112 General practitioner s and family physicians						40	10
3113 Dentists						60	
3114 Veterinarian s						20	
3121 Optometrist s							
3122 Chiropracto rs					20		30
3124 Allied primary health practitioner s			10		50	30	
3125 Other professional occupations in health diagnosing and treating				10	10	10	
3131 Pharmacist s				10	310	30	20
3132 Dietitians and nutritionists				20	70	30	
3141 Audiologists and speech- language pathologists						90	
3142 Physiothera pists				10	130	90	20
3143 Occupation al therapists					50	70	
3144 Other professional occupations		10		40	70		

in therapy and assessment							
3211 Medical laboratory technologists		10		60	60	10	
3212 Medical laboratory technicians and pathologists' assistants		20	20	70	40		
3214 Respiratory therapists, clinical perfusionists and cardiopulmonary technologists				40	40		
3215 Medical radiation technologists		30	10	170	90	10	
3216 Medical sonographers				10	40	10	10
3217 Cardiology technologists and electrophysiological diagnostic technologists, n.e.c.				30			
3219 Other medical technologists and technicians (except dental health)		150	20	300	110	20	

3221 Denturists				20			
3222 Dental hygienists and dental therapists				380	30		
3223 Dental technolog ists, technicians and laboratory assistants		40		50		10	
3231 Opticians		10	10	90	20		
3232 Practitioner s of natural healing				50	50		
3233 Licensed practical nurses		20		760	50	10	
3234 Paramedica l occupations		10		160	50		
3236 Massage therapists			20	370	50		
3237 Other technical occupations in therapy and assessment		10	10	110	50		
3411 Dental assistants		10	20	490	20	10	
3413 Nurse aides, orderlies and patient service associates	110	440	290	1360	190	40	
3414 Other assisting occupations	30	150	50	150	60		

in support of health services							
4151 Psychologists					60	80	60
4152 Social workers		10		140	200	260	
4153 Family, marriage and other related counsellors		10		90	70	100	
4161 Natural and applied science policy researchers, consultants and program officers		40	10	20	70	30	
4165 Health policy researchers, consultants and program officers		20		40	60	50	
4212 Social and community service workers	30	170	20	790	480	70	
4214 Early childhood educators and assistants	100	480	50	1740	350	40	
4411 Home child care providers	190	580	30	460	200	20	
4412 Home support	70	150	30	300	70		

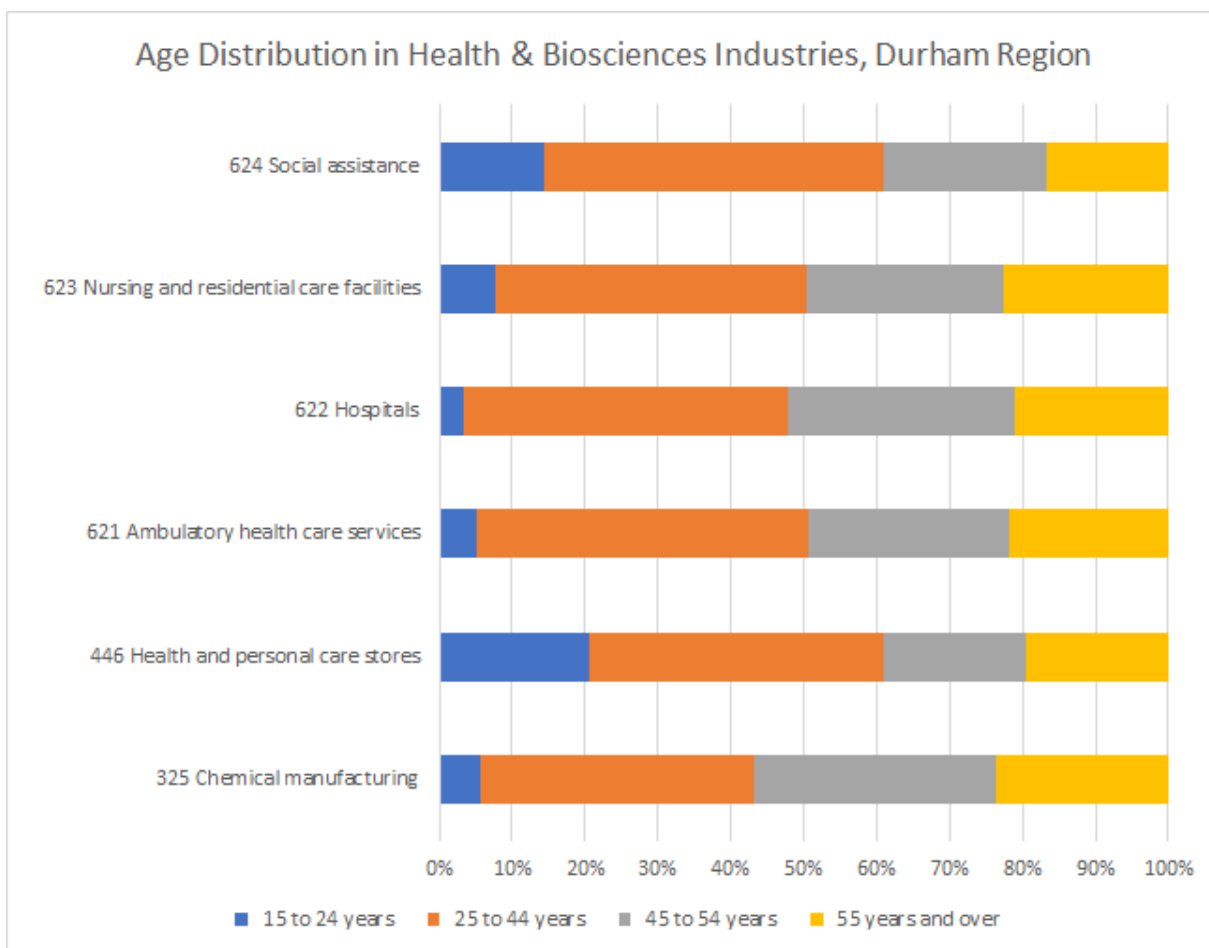
workers, housekeepers and related occupations							
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Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

Nearly all employees in health and biosciences occupations have a certificate, diploma or degree (97.7%). Approximately 45 percent of employees have a college diploma or equivalent, with nearly 40 percent of employees possessing a university degree or equivalent.

Workforce Age Breakdown by NAICS (Census, 2016)

The following table illustrates employment in the Health & Biosciences sector in Durham Region (POW) by age group and 3-Digit NAICS (North American Industrial Classification System). Specifically, for people who work in the health and biosciences industries within Durham Region, this chart shows approximately the age distribution by 3-Digit NAICS.



Source: Statistics Canada Census, 2016 (custom purchased by Durham Workforce Authority)

This visual depiction of the age distribution in health and biosciences industries shows that the majority of persons employed are in the core working age group (25 to 44 years of age). Employment for this age group ranges between 37 to 47 percent. The age group with least employment in health and biosciences industries are youth (15 to 24 years), which is likely due to the educational requirements and employment experiences necessary for employment within the sector.

Key Performance Indicators: Durham College

Each year, Durham College produces a Graduate Employment Report based on information compiled from the KPI survey. The information contained in the report profiles the employment status of Durham College graduates from post-secondary programs in 2016. Six months after graduation, graduates are contacted by an independent consulting firm (hired by the Ministry of Training, Colleges and Universities), regarding their employment status. The table below represents programs within the health and biosciences sector.

Program Name	Total Graduates	Percentage Working (Related)	Percentage Working
Activation Coordination in Gerontology (ACGR)	22	89	100
Addictions & Mental Health (ADMH)	67	68	88
Biomedical Engineering Technology (BMTY)	20	80	100
Biotechnology, Advanced (BITY)	16	33	83
Biotechnology, Fast-Track (BTYF)	14	67	100
Chemical Engineering Technology (CMHF)	6	0	67
Chemical Engineering Technology (CHEM)	20	38	75
Chemical Laboratory Technician (CLBT)	50	50	78
Child and Youth Worker (CYWK)	50	77	91
Community Services & Child Studies Foundations (CCSF)	22	0	33
Communicative Disorders Assistant (CDA)	34	53	87
Dental Assisting Levels I and II (DAII)	87	86	93
Dental Hygiene (DENT)	26	57	71
Dental Reception and Administration (DRA)	22	17	67

Developmental Services Worker (DWSK)	25	57	86
Early Childhood Education (ECE)	150	82	84
Emergency Services Fundamentals (EMSF)	15	0	0
Fitness and Health Promotion (FIT)	61	50	92
General Arts and Science- UOIT Nursing Preparation (GASN)	75	50	100
General Arts and Science- Health Preparation (GASH)	72	25	75
Occupational Therapist Assistant and Physiotherapist Assistant (OTPA)	43	50	92
Paramedic (PPC)	32	100	100
Paramedic- Advanced Care (PADV)	11	100	100
Personal Support Worker	57	79	93
Pharmaceutical and Food Science Technology, Fast-Track (PHMF)	51	40	70
Pharmaceutical and Food Service Technology (PHRM)	16	50	50
Practical Nursing (PNII)	148	68	84
Practical Nursing Bridging (PNBR)			
Registered Nurse- Critical Care Nursing (CCH)	114	93	100
Social Service Worker (SSWK)	94	61	89
Youth Justice & Interventions (YJI)	26	82	100

Source: Durham College, 2017, Graduate Employment Report

Key Performance Indicators: UOIT

UOIT is also responsible for publishing Key Performance Indicators for undergraduate programs, including employment rates 6 months and 2 years following graduation. Although there is less detail than the Durham College KPI data, the indicators still provide a basic understanding of what programs of study are related to higher employment. The table below represents programs within the health and biosciences sector, and is the most recent publicly available data, for graduates from the class of 2014.

Program	Bachelor's Conferred	Employment Rate (6 Months)	Employment Rate (2 Years)
Dentistry	0		
Nursing	175	88.3	100
Optometry	0		
Other Health Professions	36	79.73	93.33
Pharmacy	0		
Physical Science	28	100	100
Therapy & Rehabilitation	0		

Source: UOIT, 2016, Key Performance Indicators, Employment Rate of 2014 Graduates in Undergraduate Programs

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