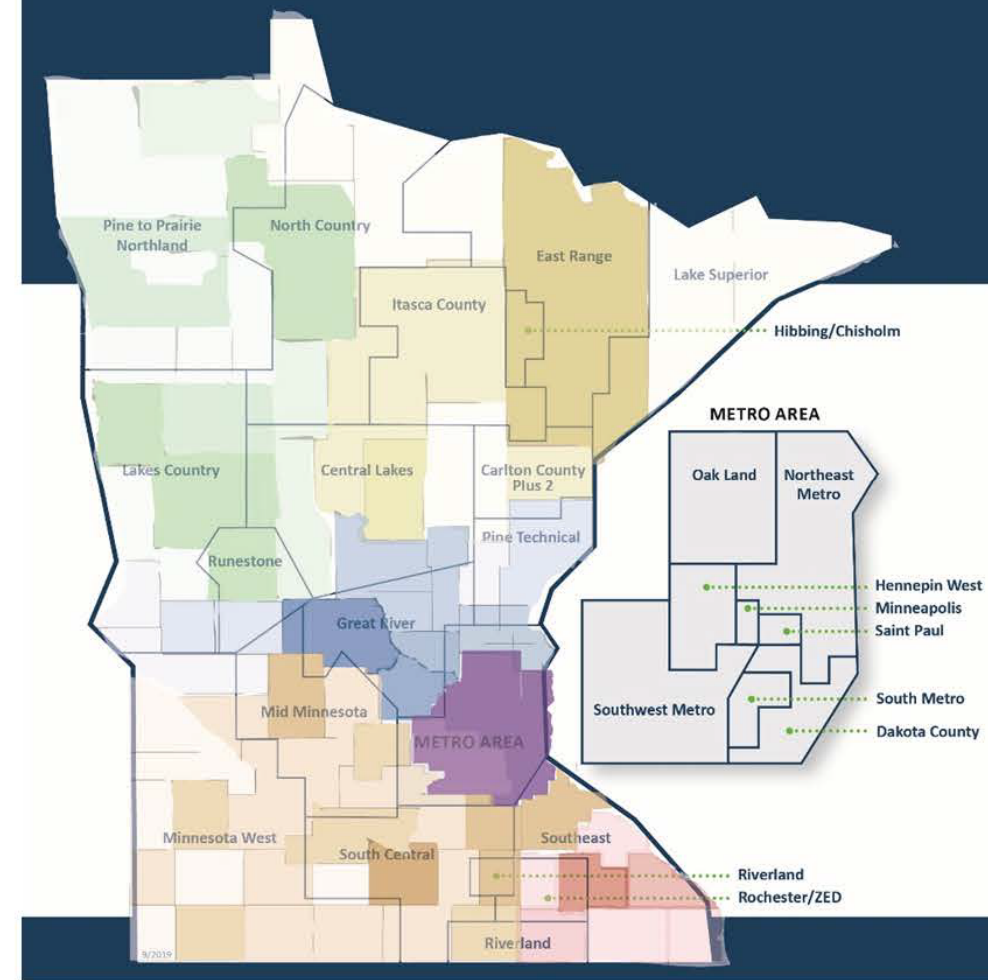


# 2024 Regional Career Trends

For Career and Technical Education

Erin Olson, Senior Director of Strategic Research  
Catherine Jett, Research Strategist  
Melinda Fierro, Research Strategist



The contents of this series were made possible through the Strengthening Career and Technical Education for the 21st Century Act (Perkins V) Federal grant from the United States Department of Education administered through Minnesota State Colleges and Universities.

# ABOUT US

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<https://www.menti.com/alyj495wj9fd>



**Catherine Jett, MPH**  
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# REALTIME TALENT'S APPROACH

To create more informed and efficient market-oriented decisions throughout the Minnesota workforce and education ecosystem by engaging a broad set of stakeholders

## Core Capabilities:

- Current labor market research, insights, forecasts
- Data Tool Support Services
- Talent Pipeline Management

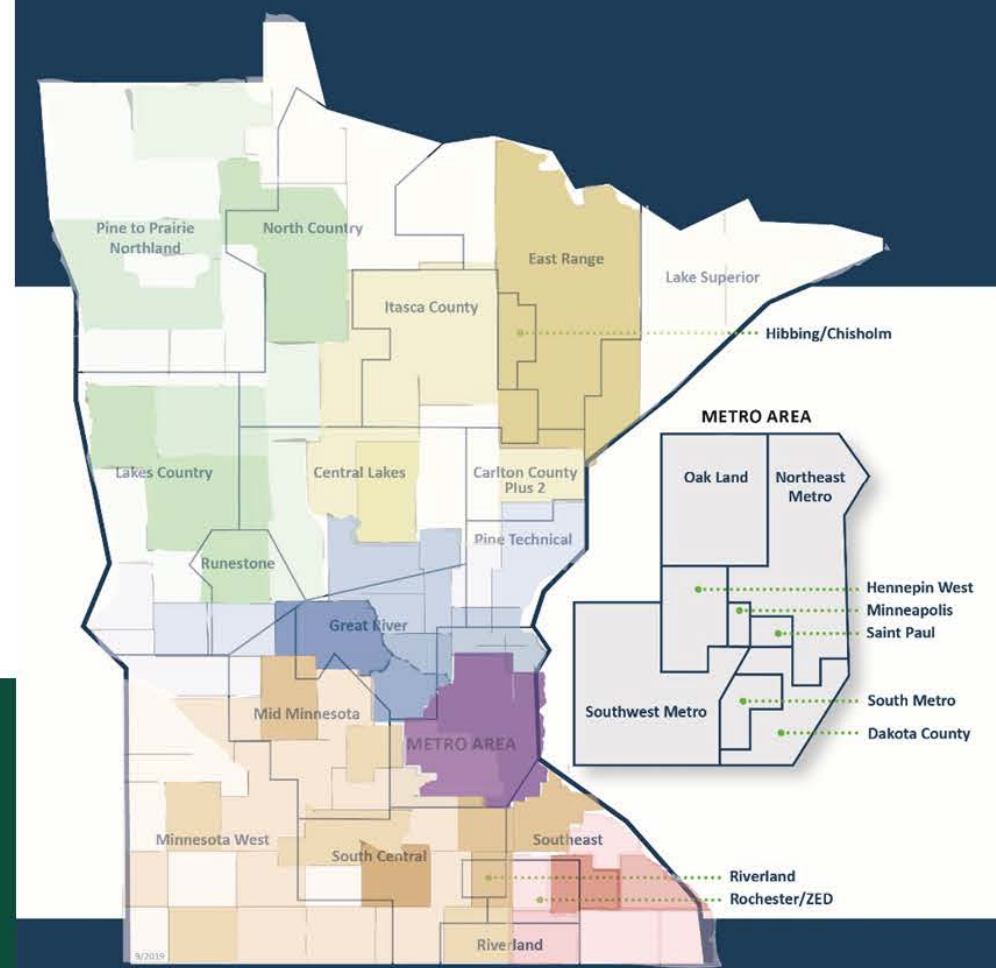




# 2024 Regional Career Trends

For Career and Technical Education

## Minnesota



December 10, 2024

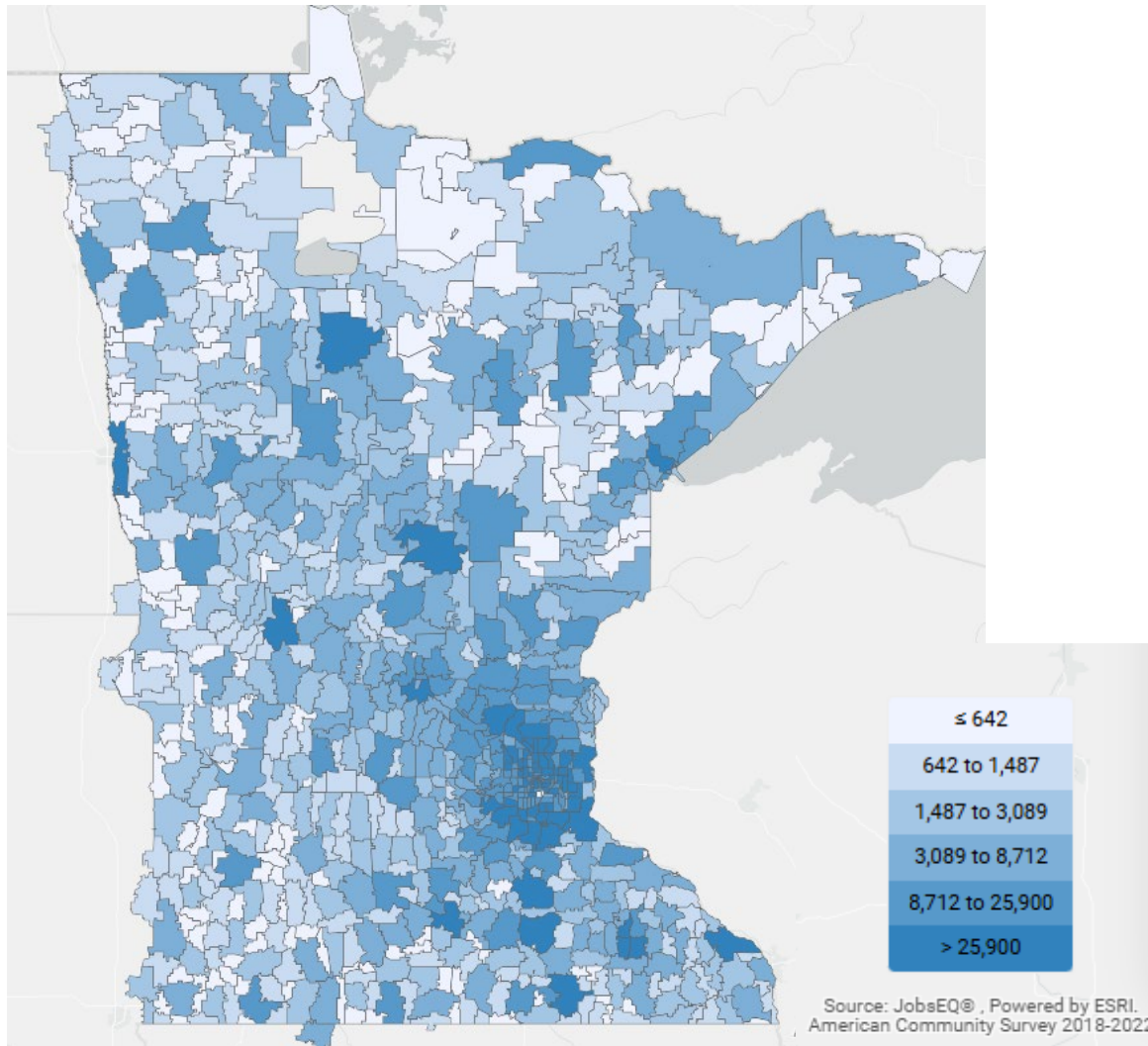


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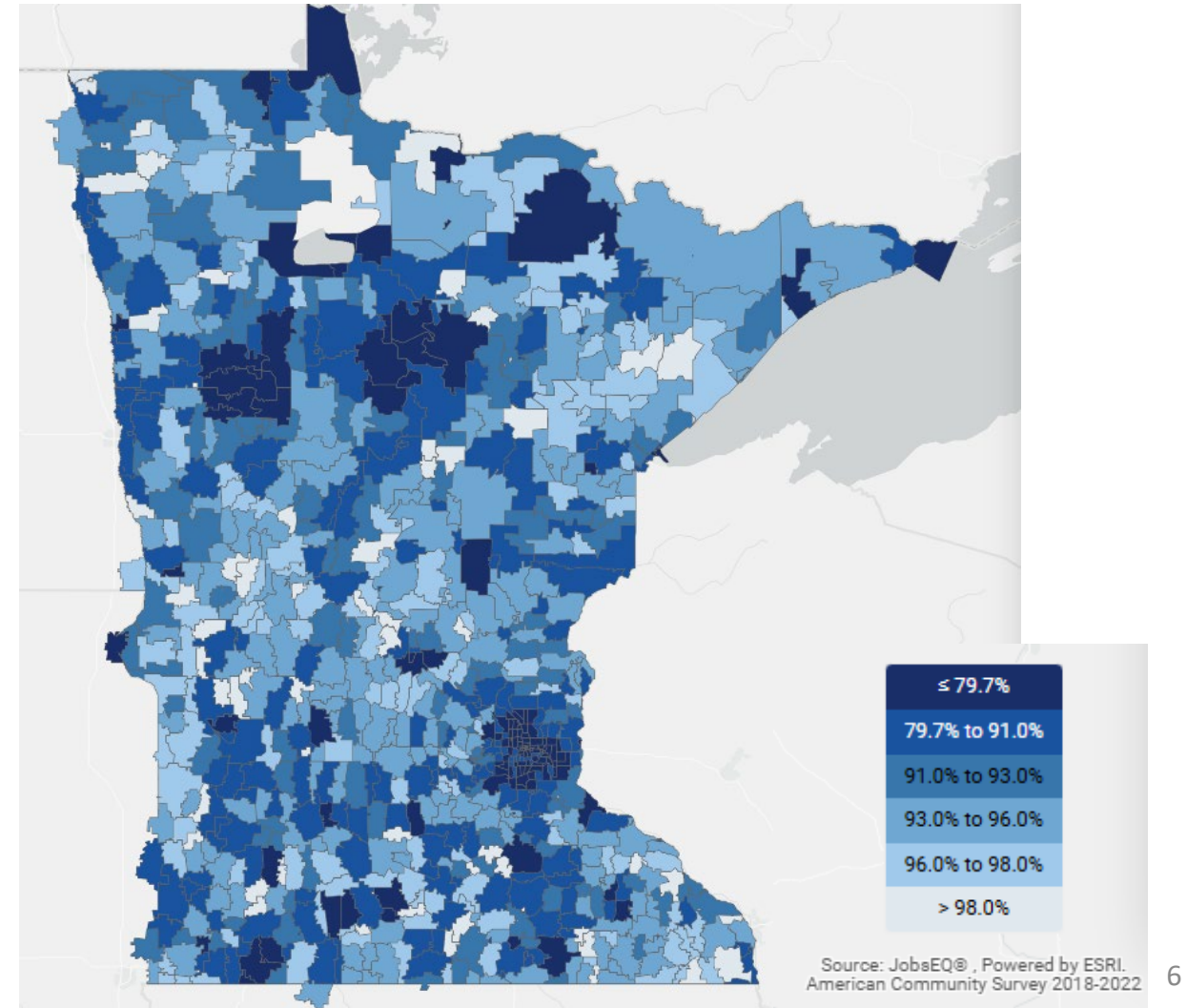
# Population Demographics

## Minnesota

### Resident Population of Minnesota



### Share of Population that is White by Race, Minnesota Zip Codes



# Population Demographics

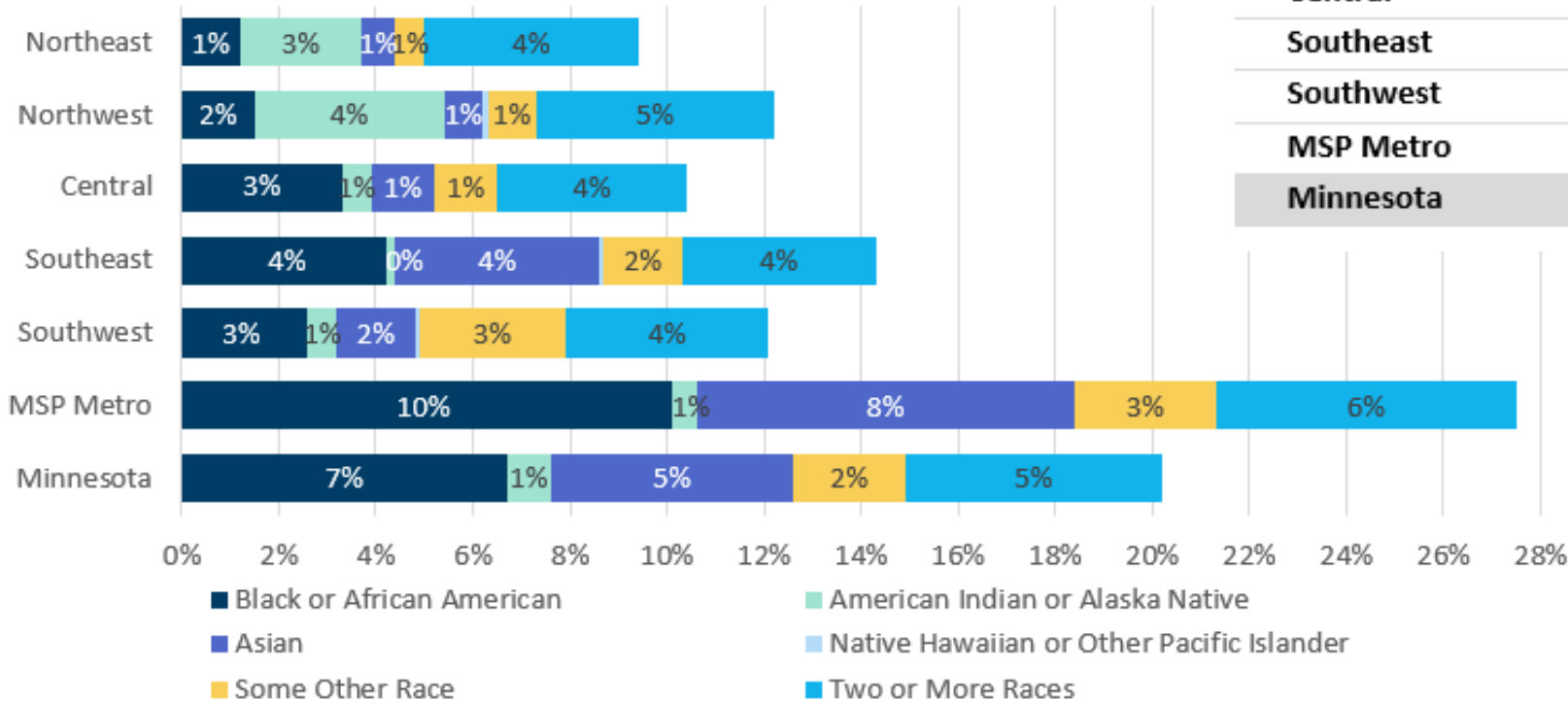
# Minnesota

## Race and Ethnicity Summary Info

Geography	% BIPOC by Race	% white by Race	% Hispanic/Latine Ethnicity
Northeast	9.3%	90.7%	1.8%
Northwest	12.2%	87.8%	3.8%
Central	10.4%	89.6%	3.2%
Southeast	14.3%	85.7%	5.3%
Southwest	12.1%	87.9%	7.9%
MSP Metro	27.5%	72.5%	6.7%
<b>Minnesota</b>	<b>20.3%</b>	<b>79.7%</b>	<b>5.7%</b>

American Community Survey 2018-2022

## Population Race of BIPOC Residents, All Ages

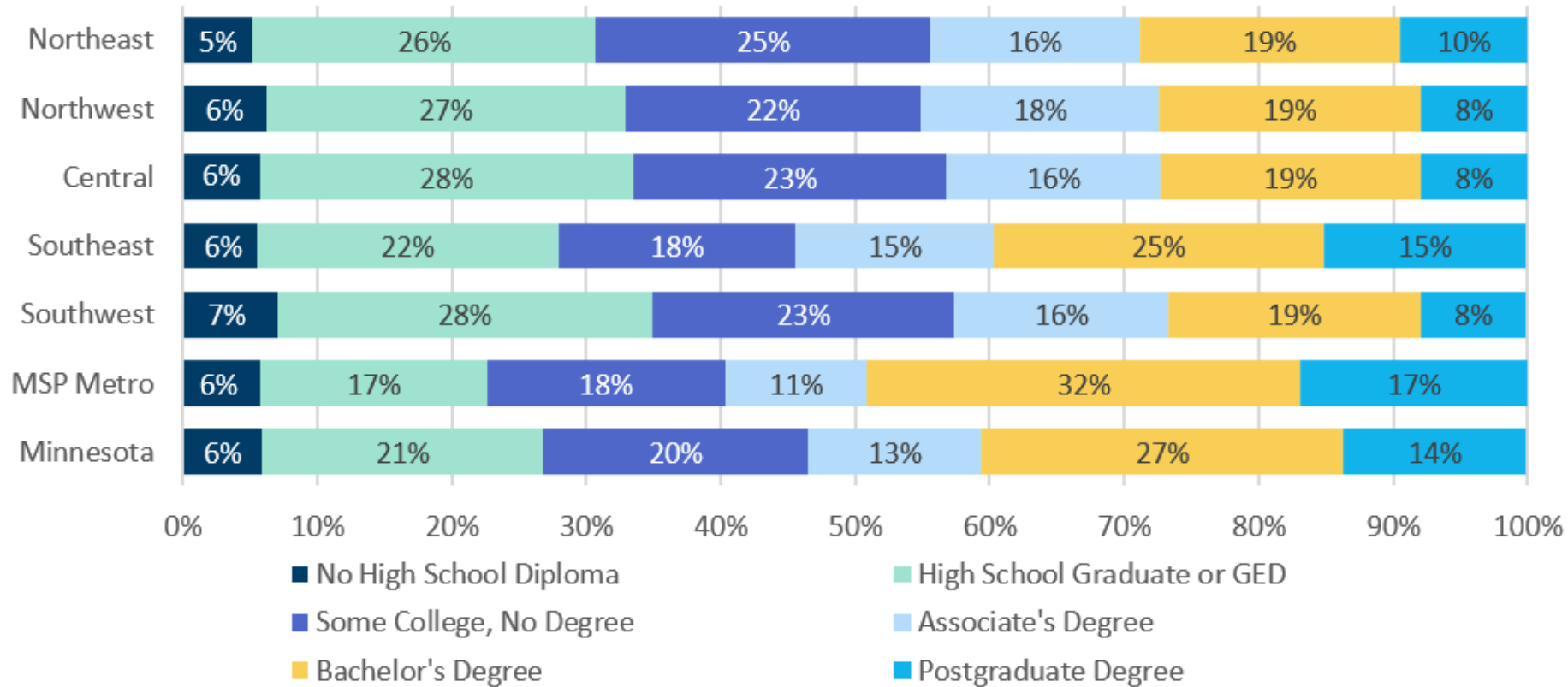


American Community Survey 2018-2022.



# Educational Attainment

**Educational Attainment, Age 25-64**



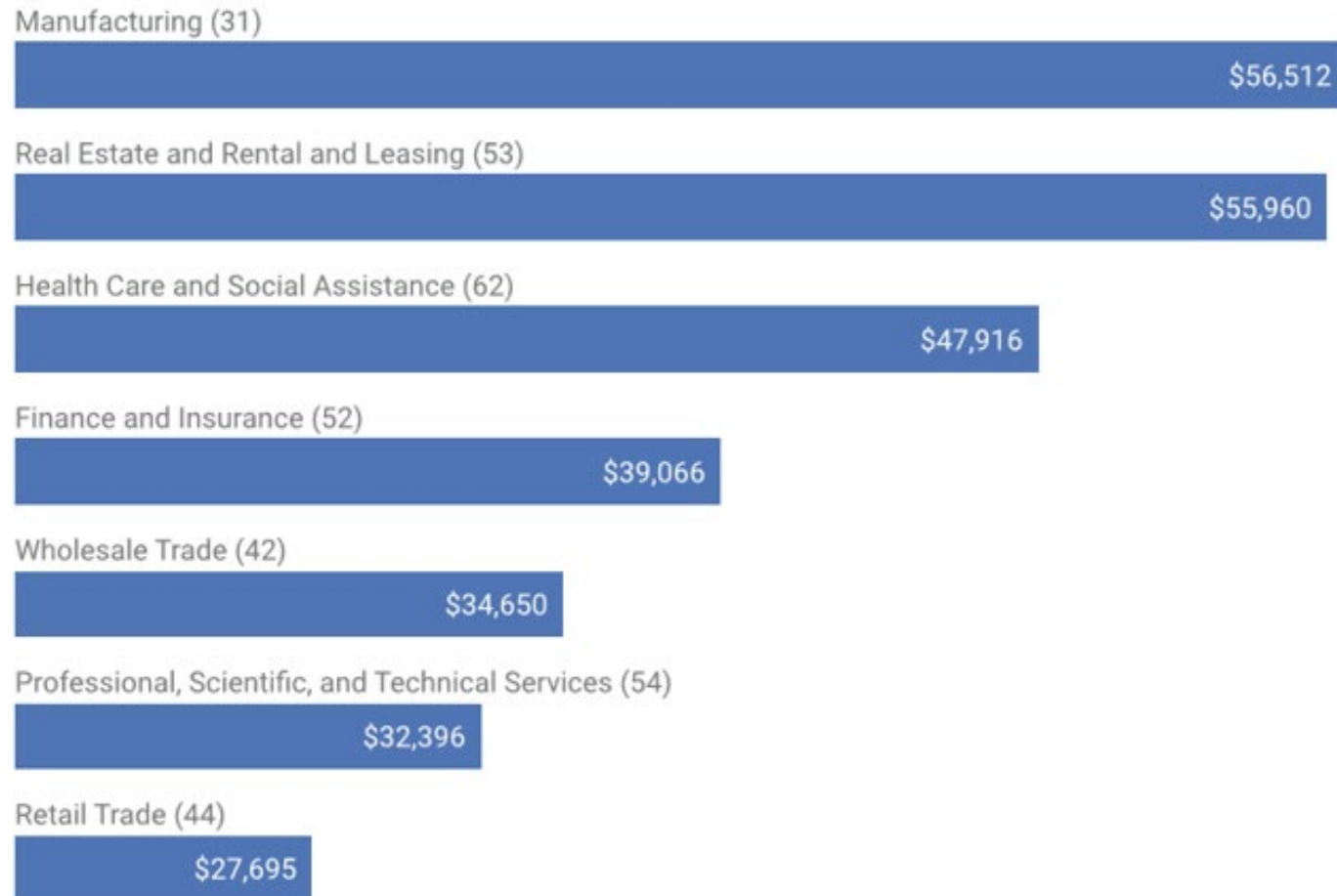
American Community Survey 2018-2022.

91 Postsecondary Institutions  
 105,176 postsecondary awards conferred (SY2022-23)

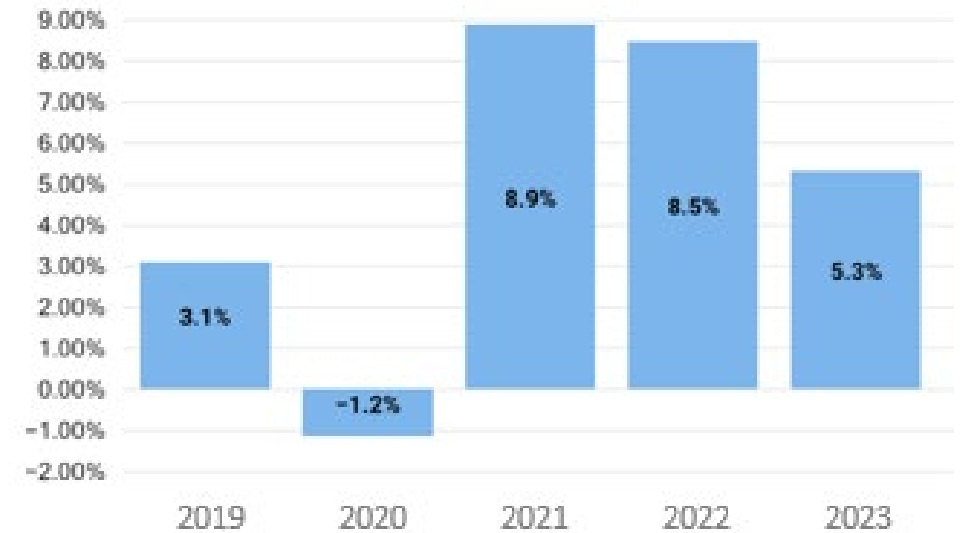


# Economic Growth

### Industry Contributions to GDP in Minnesota (in \$ Millions), 2023



### One-Year % Change in GDP, Minnesota



Gross Domestic Product data are provided by the Bureau of Economic Analysis, imputed by Chmura where necessary, updated through 2023.

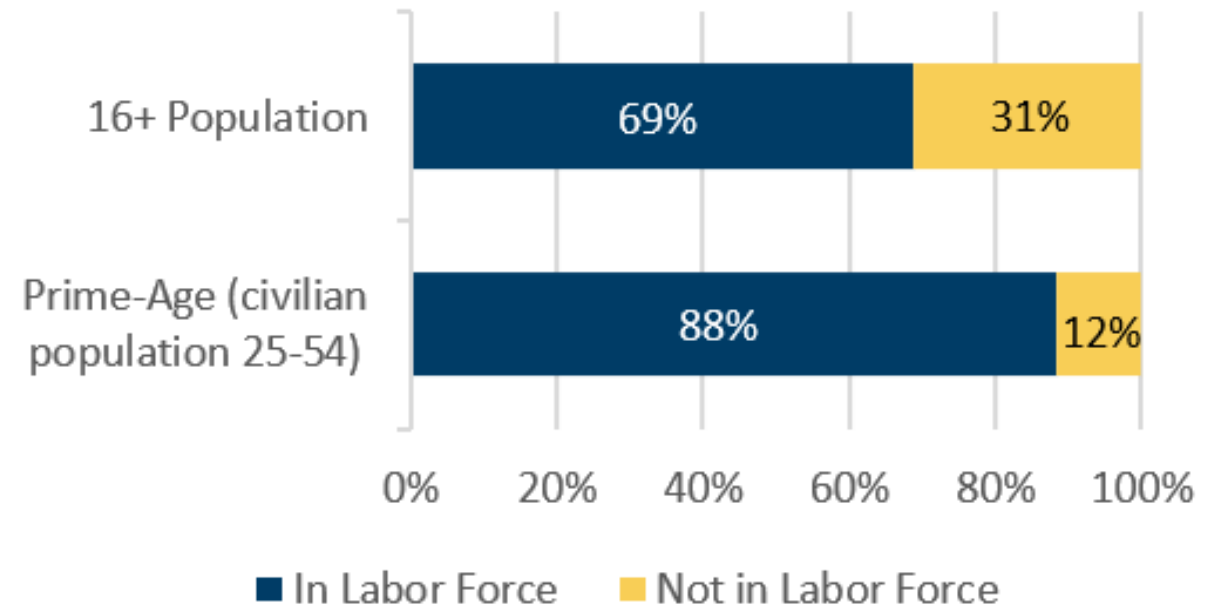


# Labor Force Participation

Minnesota

- Civilian labor force: 3,112,649 workers (an increase of 6,865 from the prior year)
- Labor force participation rate: 68.7%
  - This surpasses the national rate by over 5 percentage points
- Participation rate for the prime working-age population (ages 25 to 54): 88.4%.
  - This surpasses the national rate of 82.8%

## Labor Force Participation Rate

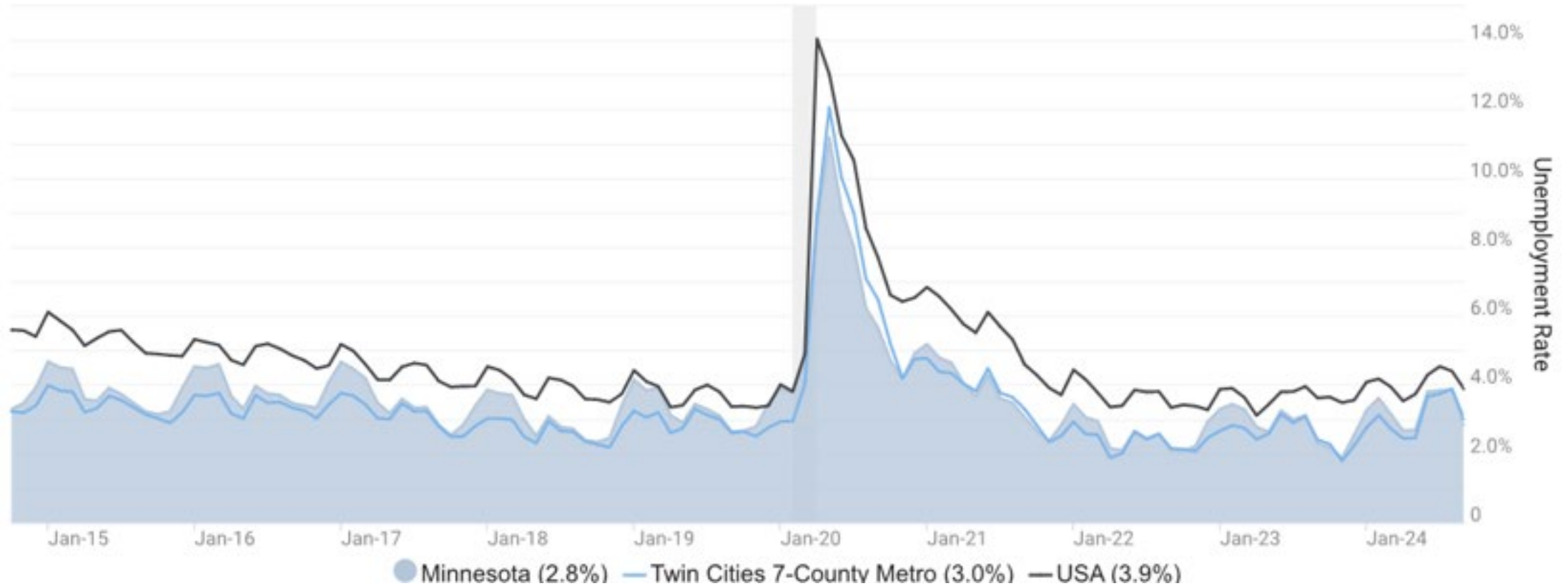


American Community Survey 2018-2022.

# Community Profile

Minnesota

### Unemployment for Minnesota

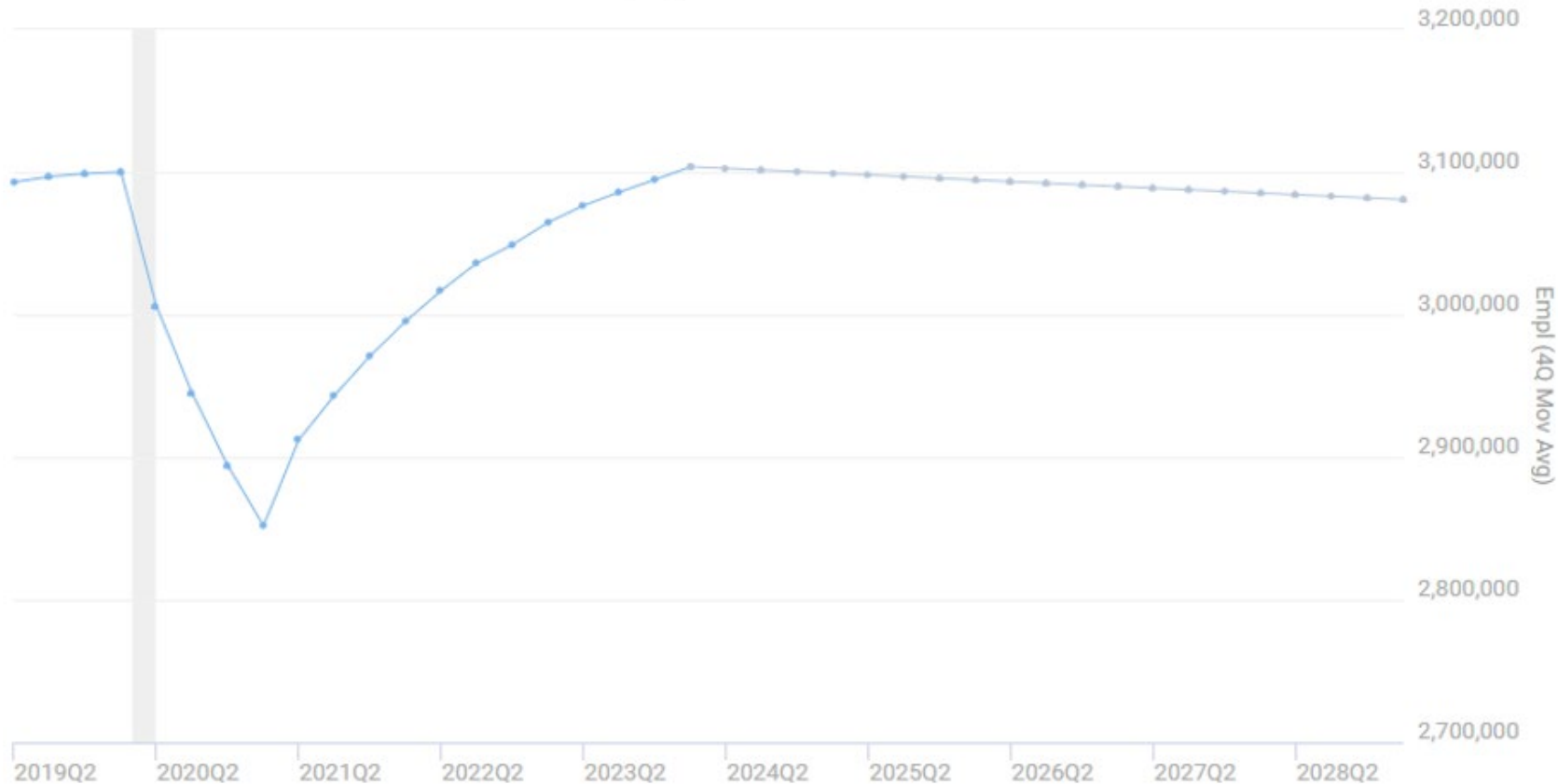


Unemployment rate data are from the Local Area Unemployment Statistics, provided by the Bureau of Labor Statistics and updated through September 2024.



# Labor Market *Forecast: Workforce*

5-Year Employment Forecast in Minnesota



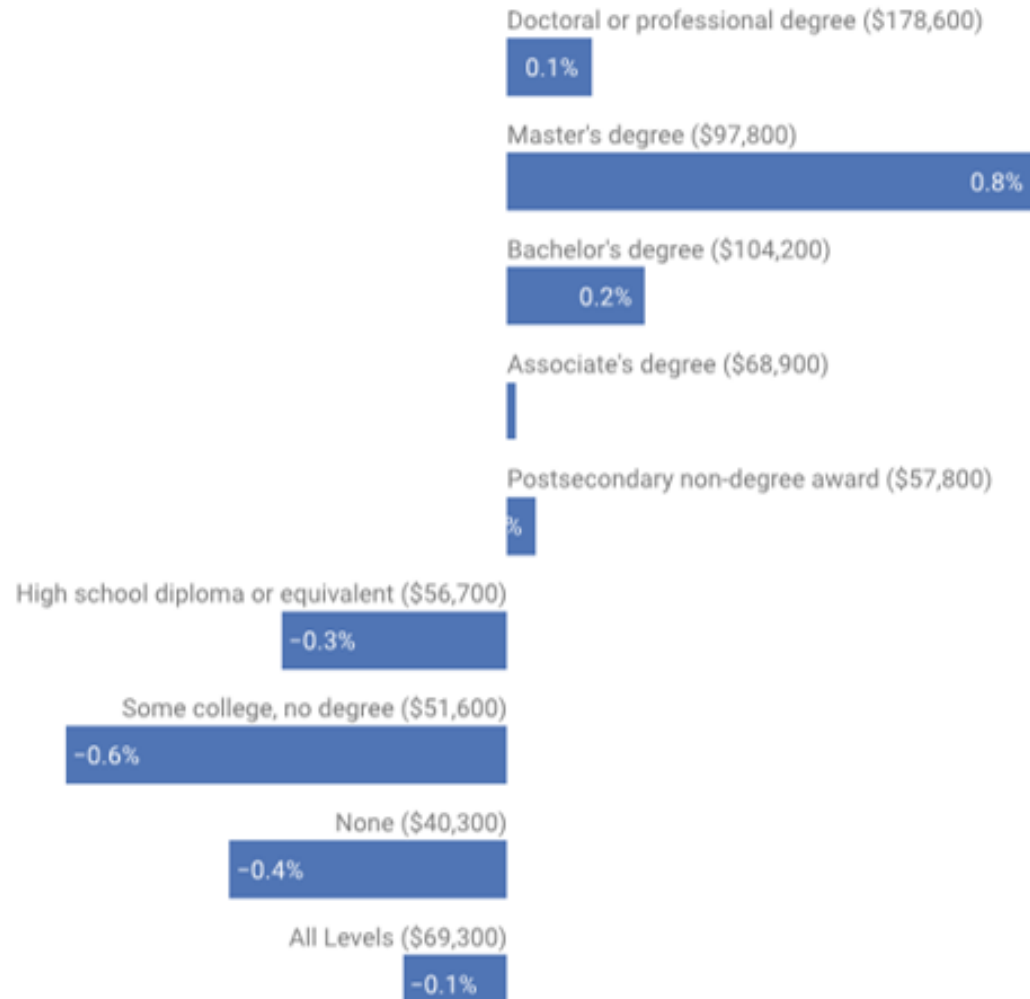
Average annual  
forecast of **-0.1%**  
change in  
employment cross all  
positions

# Quantifying Talent Shortages

## Forecast: *The Role of Education*

Minnesota

Annual Average Projected Job Growth by Education Required for Minnesota, 2024Q1



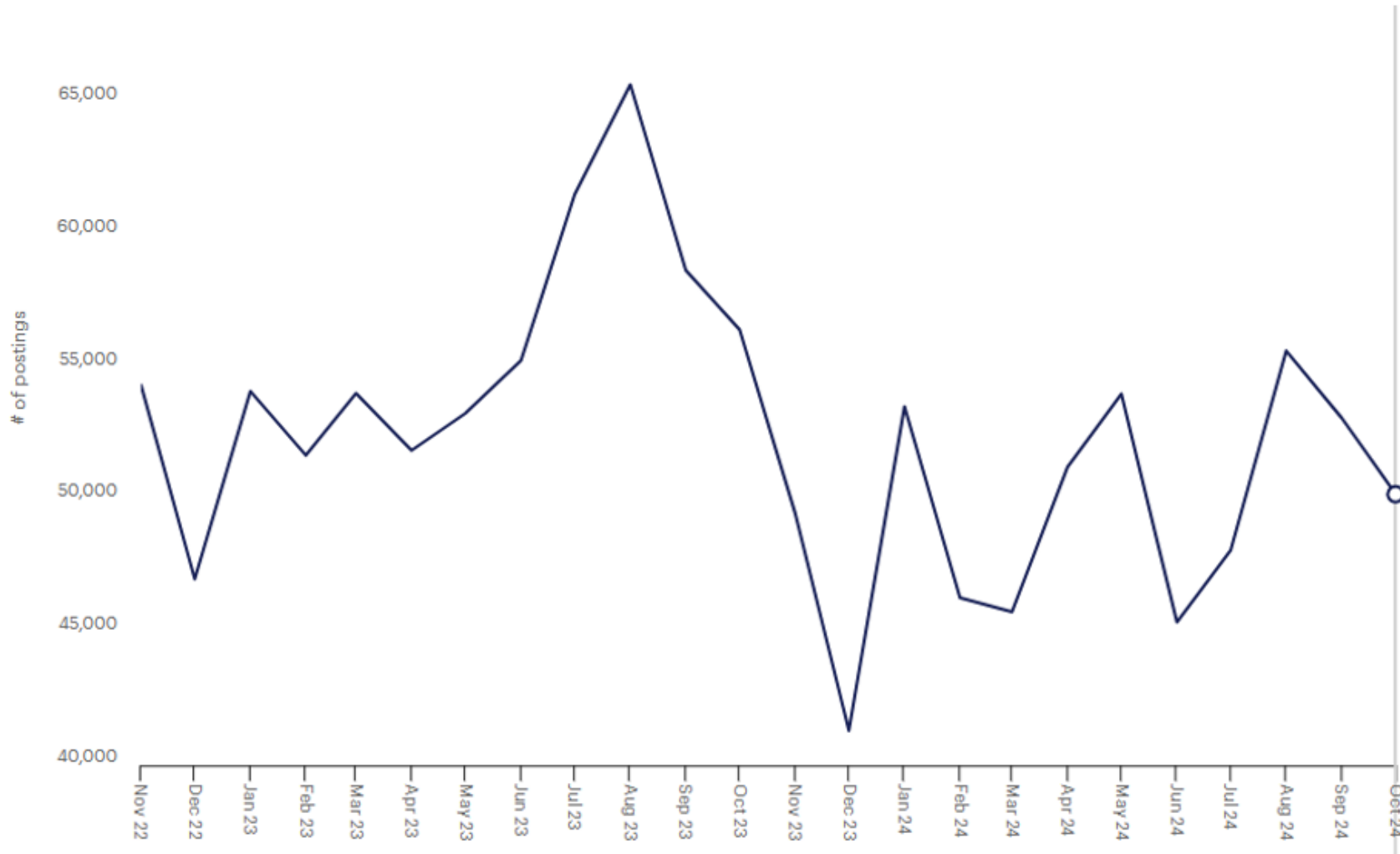
Average annual forecast of **-0.1%** change in employment cross all positions



# Job Posting Trends in Minnesota

## Minnesota

Total Jobs Advertised Monthly in Minnesota, October 2023-2024



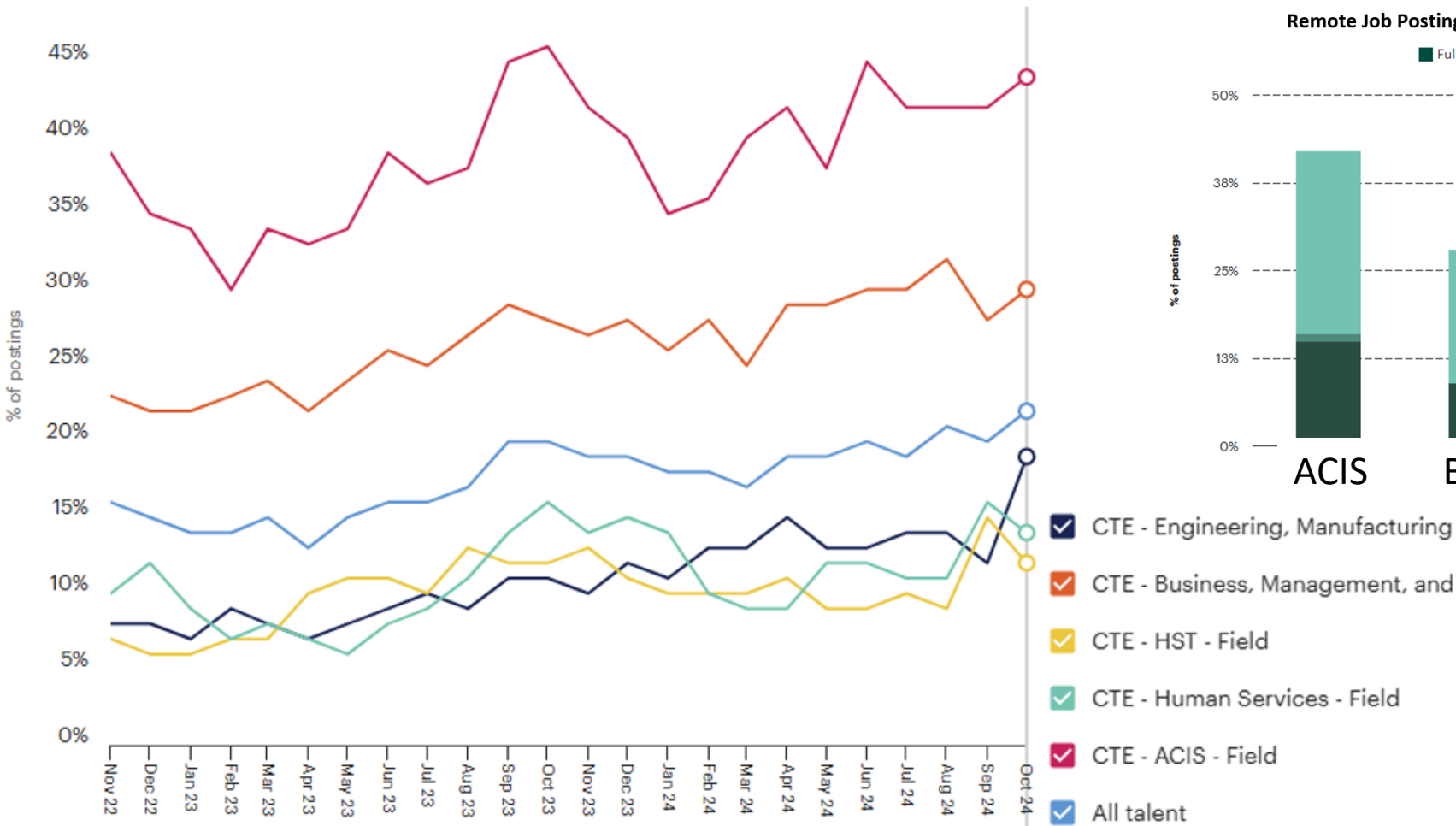
Peak posting Month:  
**August 2023**

SOURCE: TalentNeuron accessed 11/1/2024



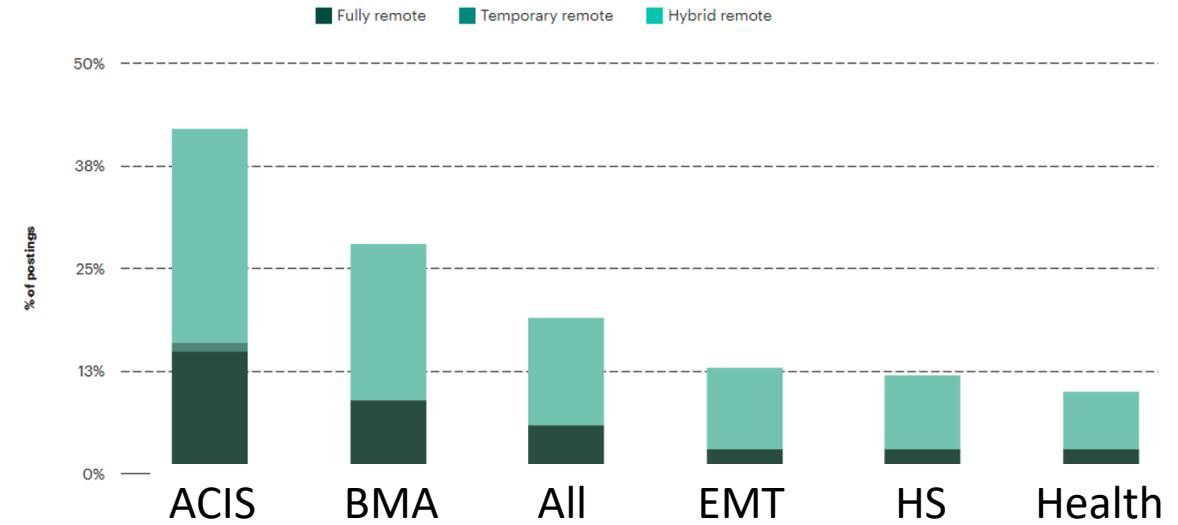
# Job Posting Trends in Minnesota

**Total Remote Job Postings Advertised Monthly in Minnesota, October 2023-2024**



SOURCE: TalentNeuron accessed 11/1/2024

**Remote Job Postings by Career Field Advertised in Minnesota, October 2023-2024**



# Respond in MentiMeter



# Career Field Summary

Minnesota

## Health Science Technology

- Highest employment concentration
- Second highest median wages

## Human Services

- Highest growth in the past five years
- Lowest median wages

## Business, Management, and Administration

- Largest total volume of employment
- Highest unemployment rate

## Arts, Communications, and Information Systems

- Smallest employment volume
- Second-highest unemployment rate

## Engineering, Manufacturing and Technology

- Second highest employment volume
- Highest unemployment rate

## Agriculture, Food, and Natural Resources

- Second smallest share of employment
- Second lowest entry-level wages



# Career Fields

# Minnesota

## CTE Field Employment and Wages in Minnesota, 2024Q1

CTE Field (occupation overlap exists, will not sum)	Current 2024Q1 Estimates							5-Year History	
	Empl	Avg Entry- Level Wages	Median Wages	LQ	Unempl	Unempl Rate	Online Job Ads <sup>3</sup>	Empl Change	Ann %
Health Science Technology	305,501	\$41,200	\$71,300	1.06	4,787	1.5%	45,098	2,831	0.2%
Human Services	494,381	\$44,000	\$59,200	1.01	11,034	2.2%	31,321	20,804	0.9%
Arts, Communications, and Information Systems	144,824	\$63,100	\$91,300	1.03	3,167	2.2%	10,638	-2,979	-0.4%
Business, Management, and Administration	1,343,061	\$43,500	\$61,700	0.98	42,634	3.1%	86,963	-14,967	-0.2%
Engineering, Manufacturing, and Technology	752,391	\$46,700	\$62,600	0.99	26,195	3.4%	40,370	10,341	0.3%
Agriculture, Food, and Natural Resources*	159,325	\$42,700	\$60,900	0.99	4,597	2.8%	7,955	1,545	0.2%
<b>Total - All Occupations</b>	<b>3,103,775</b>			<b>1.00</b>	<b>89,472</b>	<b>2.8%</b>	<b>217,197</b>	<b>15,052</b>	<b>0.1%</b>

Data as of 2024Q1 unless noted otherwise

Note: Figures may not sum due to rounding and overlap in occupations between career fields. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters. Employment by place of work.

1. Data based on a four-quarter moving average unless noted otherwise.

2. Wage data represent the average for all Covered Employment

3. Data represent found online ads active 10/1/2024-11/1/2024 in the selected region. Due to alternative county-assignment algorithms, ad counts in this analytic may not match that shown in RTI (nor in the popup window ad list). Ad counts for ZCTA-based regions are estimates.

# Career Fields

# Minnesota

**CTE Field Baseline Employment Forecast for Minnesota, 2029Q1**

CTE Field (occupation overlap exists, will not sum)	Current	5-Year Growth 2029Q1				
	Empl	Total Demand	Exits	Transfers	Empl Change	Ann % Change
Health Science Technology	305,501	128,674	60,240	62,406	6,027	0.4%
Human Services	494,381	260,750	122,863	134,039	3,847	0.2%
Arts, Communications, and Information Systems	144,824	55,065	20,501	31,600	2,965	0.4%
Business, Management, and Administration	1,343,061	785,428	356,873	458,044	-29,488	-0.4%
Engineering, Manufacturing, and Technology	752,391	362,167	151,871	216,945	-6,649	-0.2%
Agriculture, Food, and Natural Resources*	159,325	87,067	36,846	51,801	-1,580	-0.2%
<b>Total - All Occupations</b>	<b>3,103,775</b>	<b>1,629,916</b>	<b>729,502</b>	<b>923,342</b>	<b>-22,928</b>	<b>-0.1%</b>

Data as of 2024Q1 unless noted otherwise

Note: Figures may not sum due to rounding and overlap in occupations between career fields. All clusters are distinct occupations except for Agriculture, Food, and Natural Resources, which overlaps with other clusters. Employment by place of work.

1. Data based on a four-quarter moving average unless noted otherwise.
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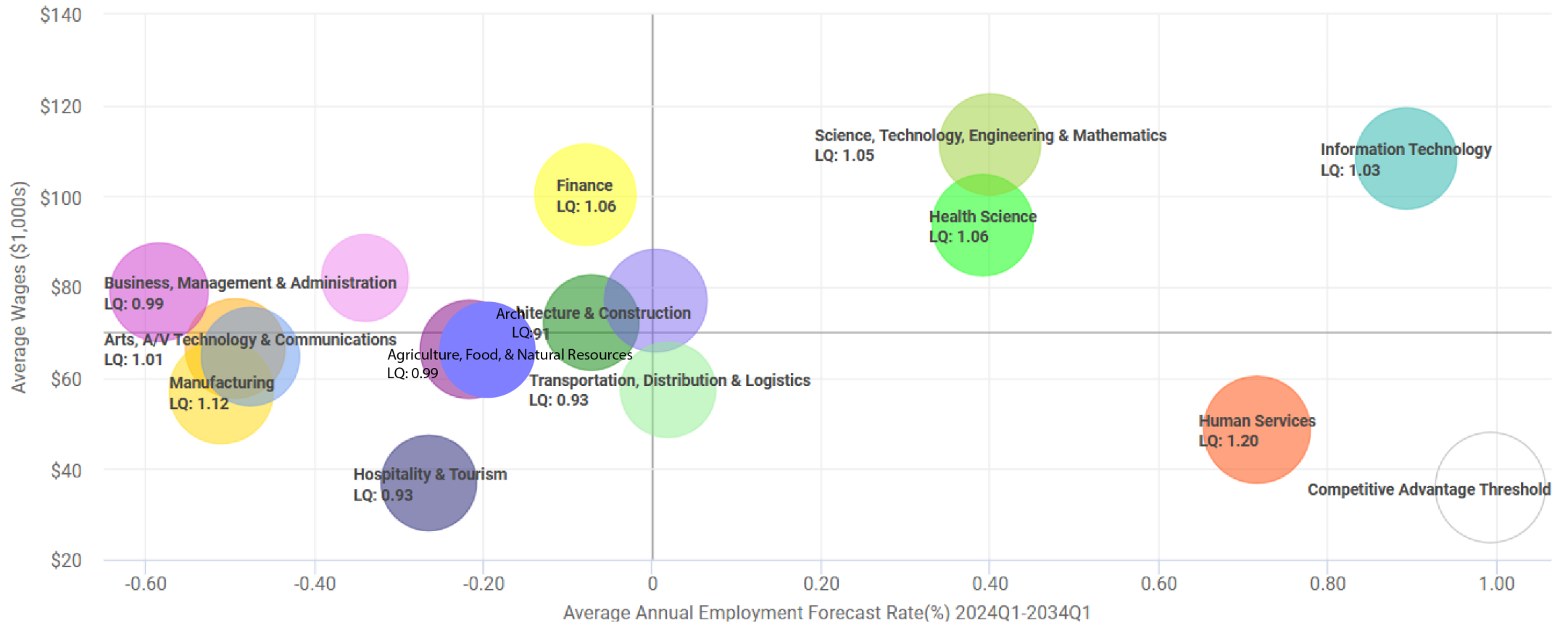


# Industries Workforce Forecast

## Industry Clusters for Minnesota as of 2024Q1



# Career Clusters Workforce Forecast



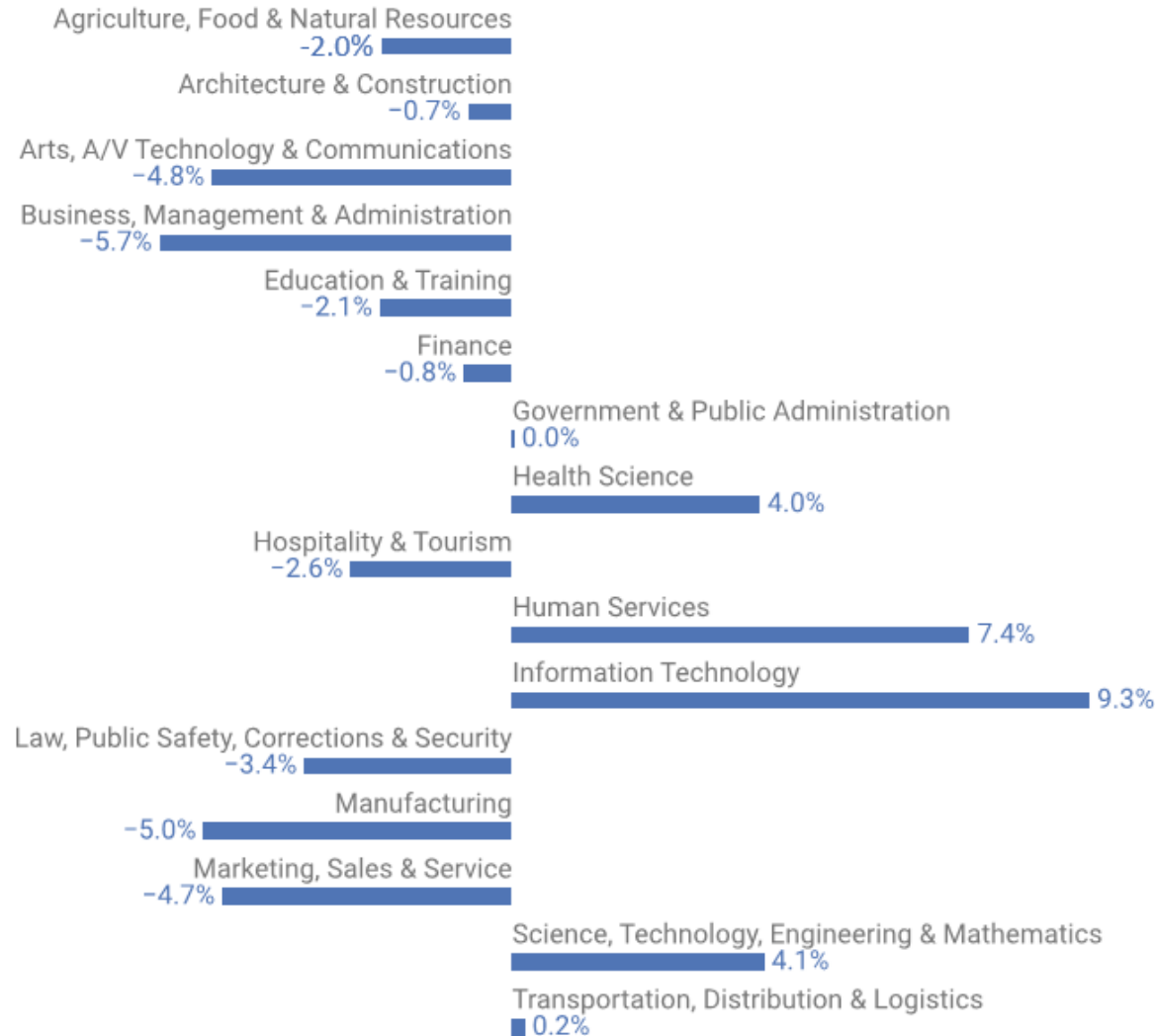
- Agriculture, Food & Natural Resources
- Business, Management & Administration
- Government & Public Administration
- Human Services
- Manufacturing
- Transportation, Distribution & Logistics
- Architecture & Construction
- Education & Training
- Health Science
- Information Technology
- Marketing, Sales & Service
- Competitive Advantage Threshold
- Arts, A/V Technology & Communications
- Finance
- Hospitality & Tourism
- Law, Public Safety, Corrections & Security
- Science, Technology, Engineering & Mathematics



# Career Cluster Detail

## Minnesota

### Baseline 10-Year Forecasts by Career Cluster, Minnesota, 2024Q1



### New in 2024

- Worsening employment outlooks for all clusters
- Only five clusters forecast average annual growth in employment volumes

# Career Cluster Detail

## Minnesota

Cluster Ten-Year Total Employment Change Forecasts by Region, 2024Q1

Career Cluster	Minnesota	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Agriculture, Food & Natural Resources*	-2.0%	-1.0%	-3.0% (+)	-4.0% (+)	1.0% (+)	-8.0% (+)	-5.0% (+)
Architecture & Construction	-0.7%	-2.0%	-1.8% (+)	0.0% (+)	4.7% (+)	-3.7% (+)	-2.2%
Arts, A/V Technology & Communications	-4.8%	-6.0%	-5.6% (+)	-5.1% (+)	-0.2% (+)	-10.5% (+)	-5.3%
Business, Management & Administration	-5.7%	-6.9%	-7.4%	-6.0% (+)	-1.8% (+)	-9.2% (+)	-6.7%
Education & Training	-2.1%	-3.2%	-1.5% (+)	-1.1% (+)	4.0% (+)	-4.8% (+)	-3.8%
Finance	-0.8%	-2.7%	-1.6% (+)	-0.1% (+)	3.5% (+)	-3.7% (+)	-0.6%
Government & Public Administration	0.0%	-1.6%	-0.7% (+)	-1.4%	5.4% (+)	-2.0% (+)	-0.6%
Health Science	4.0%	3.5%	2.2%	-4.4%	8.0% (+)	0.8% (+)	4.5%
Hospitality & Tourism	-2.6%	-3.5%	-3.3% (+)	-1.3% (+)	3.6% (+)	-5.0% (+)	-3.5%
Human Services	7.4%	7.4%	6.0% (+)	8.6% (+)	11.5% (+)	3.3% (+)	5.1%
Information Technology	9.3%	6.8%	3.5%	4.9% (+)	10.0%	1.8% (+)	4.2%
Law, Public Safety, Corrections & Security	-3.4%	-4.9%	-3.2% (+)	-1.2% (+)	2.6% (+)	-5.2% (+)	-2.5%
Manufacturing	-5.0%	-5.9%	-7.8% (+)	-6.1% (+)	0.3% (+)	-6.7% (+)	-6.1%
Marketing, Sales & Service	-4.7%	-5.5%	-7.3% (+)	-5.6% (+)	-1.2% (+)	-9.0% (+)	-7.3%
Science, Technology, Engineering & Mathematics	4.1%	2.8%	-0.3% (+)	2.7% (+)	9.2%	2.2% (+)	2.8% (+)
Transportation, Distribution & Logistics	-0.2%	-0.3%	-2.1% (+)	-0.7% (+)	4.1%	-3.7%	-1.9%
<b>Total - All Occupations</b>	<b>-1.0%</b>	<b>-2.0%</b>	<b>-2.0% (+)</b>	<b>-2.0% (+)</b>	<b>3.0% (+)</b>	<b>-5% (+)</b>	<b>-2.0%</b>

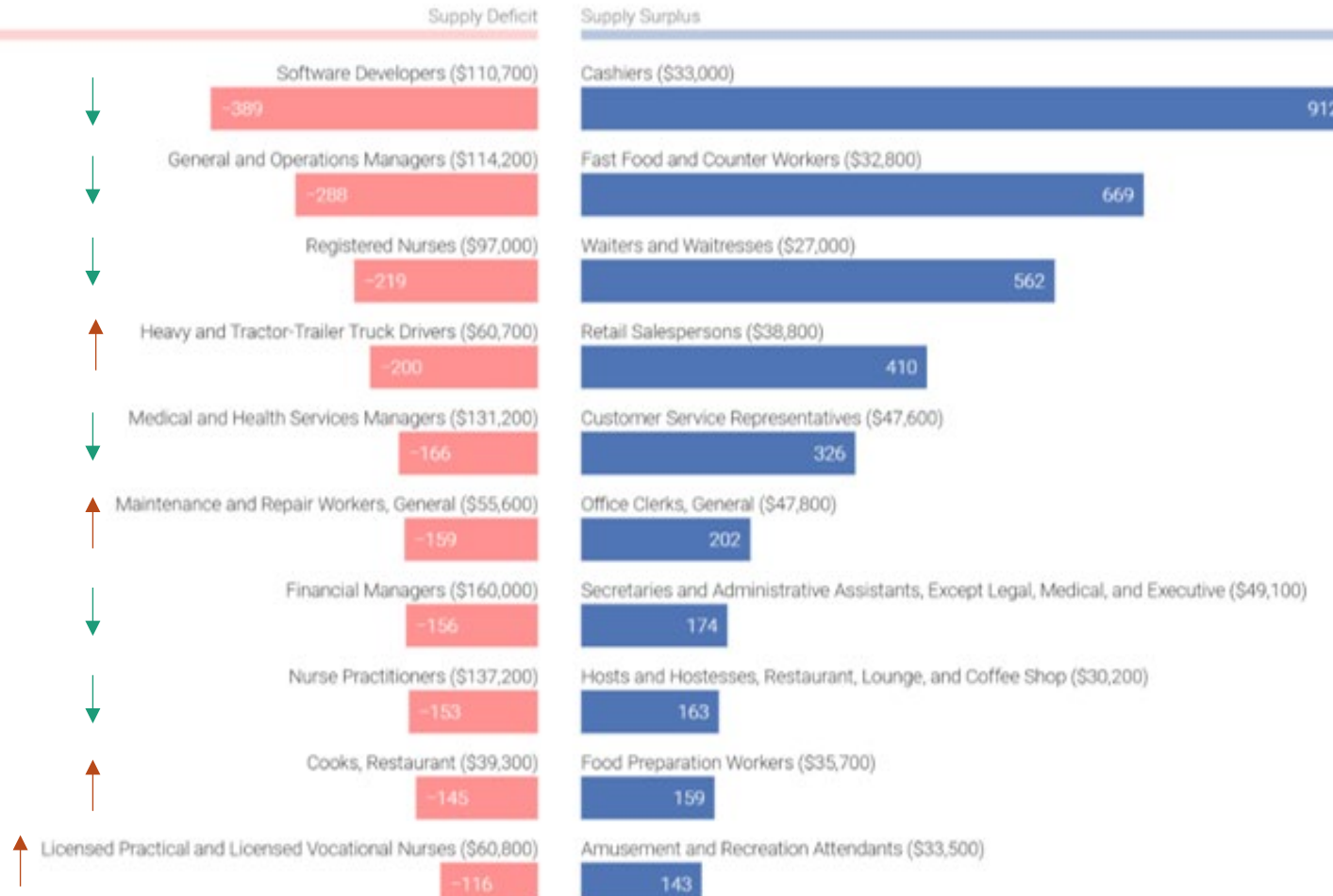
### New in 2024

- Worsening employment outlooks for all clusters in the MSP Metro and most in the Southeast
- Improved employment outlooks for most clusters in the Northeast, Northwest, Central, and Southwest regions

# Talent Shortage Occupation Gaps

Minnesota

Average Annual Occupation Gaps (i.e. Talent Shortage), 2024Q1 through 2034Q1



## New in 2024

- Reduction in talent surplus across many of the top occupations
- Top occupations forecasting shortages remain consistent, but with more reductions in severity than increases



# Zero Unemployment

# Minnesota

Occupations with No Unemployed Workforce and Employing over 75 Workers, Minnesota 2024Q1

SOC	Occupation	Current						5-Year History		5-Year Forecast				
		Empl	Median Ann Wages <sup>2</sup>	LQ	Unempl	Unempl Rate	30-Day Online Job Ads <sup>3</sup>	Empl Change	Ann %	Total Demand	Exits	Trans-fers	Empl Change	Ann % Change
33-9093	Transportation Security Screeners	644	\$60,700	0.68	0	n/a	32	54	1.8%	274	135	154	-15	-0.5%
27-2091	Disc Jockeys, Except Radio	469	\$42,000	0.99	0	n/a	7	-28	-1.2%	178	86	95	-4	-0.2%
49-2097	Audiovisual Equipment Installers and Repairers	379	\$54,100	0.76	0	n/a	72	-148	-6.4%	159	47	128	-16	-0.8%
11-9131	Postmasters and Mail Superintendents	310	\$89,300	1.21	0	n/a	80	-14	-0.9%	88	45	62	-19	-1.2%
51-8012	Power Distributors and Dispatchers	215	\$118,300	1.12	0	n/a	6	16	1.6%	70	29	54	-13	-1.3%
51-8011	Nuclear Power Reactor Operators	202	\$130,200	1.71	0	n/a	1	35	3.9%	84	29	54	0	0.0%
53-6099	Transportation Workers, All Other	198	\$43,300	0.81	0	n/a	n/a	-57	-4.9%	102	38	65	-1	-0.1%
29-9092	Genetic Counselors	157	\$97,600	2.23	0	n/a	9	17	2.3%	55	27	22	7	0.8%
19-2012	Physicists	115	\$119,500	0.29	0	n/a	20	13	2.4%	33	14	19	0	0.0%
11-9071	Gambling Managers	108	\$77,300	0.99	0	n/a	7	-57	-8.2%	58	22	35	0	0.1%
29-1029	Dentists, All Other Specialists	98	\$232,400	1.01	0	n/a	17	3	0.5%	14	11	3	0	0.0%
<b>Total - All Occupations</b>		<b>3,103,775</b>	<b>\$54,100</b>	<b>1.00</b>	<b>89,472</b>	<b>2.8%</b>	<b>248,532</b>	<b>15,052</b>	<b>0.1%</b>	<b>1,629,916</b>	<b>729,502</b>	<b>923,342</b>	<b>-22,928</b>	<b>-0.1%</b>





# Career Field Analysis

## Target Occupations

*High wage* (above regional median)

*High skill* (require some credential)

*High demand* (2/4 indicators: under 3% unempl, higher than average 5-year growth, total 5-year demand >50% of current empl, high job posting volume)

\*often also high occupation gap and award gap

## Gateway Occupations

*Mid wage* (\$45,000 – regional median)

*Low-middle skills* (HS diploma, some OJT)

Sufficient demand (3-5% unemployment and/or high volumes of current opportunities)

## Origin Occupations

*Low wage* (<\$45,000/year)

*Low skill* (no credential)

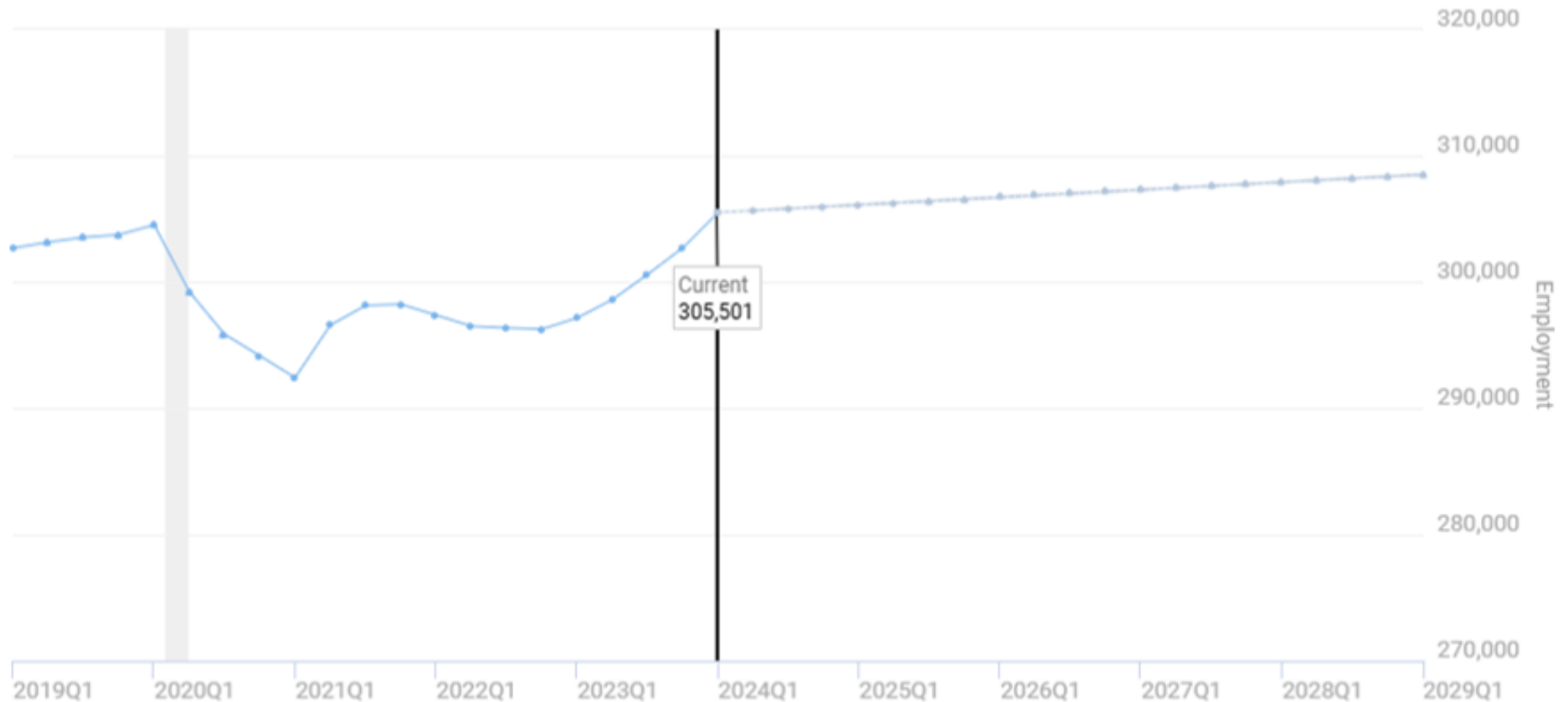
*Varied demand* (may have over 5% unemployment, low growth, low replacement demand, and/or low job postings)



# Health Science Technology

Minnesota

Baseline 5-Year Forecast for Health Science Technology Careers, Minnesota, 2024Q1



**2024Q1 Employment: 305,501 (9.8% of MN employment)**

**Median Wage: \$71,300**

**Location Quotient: 1.06**



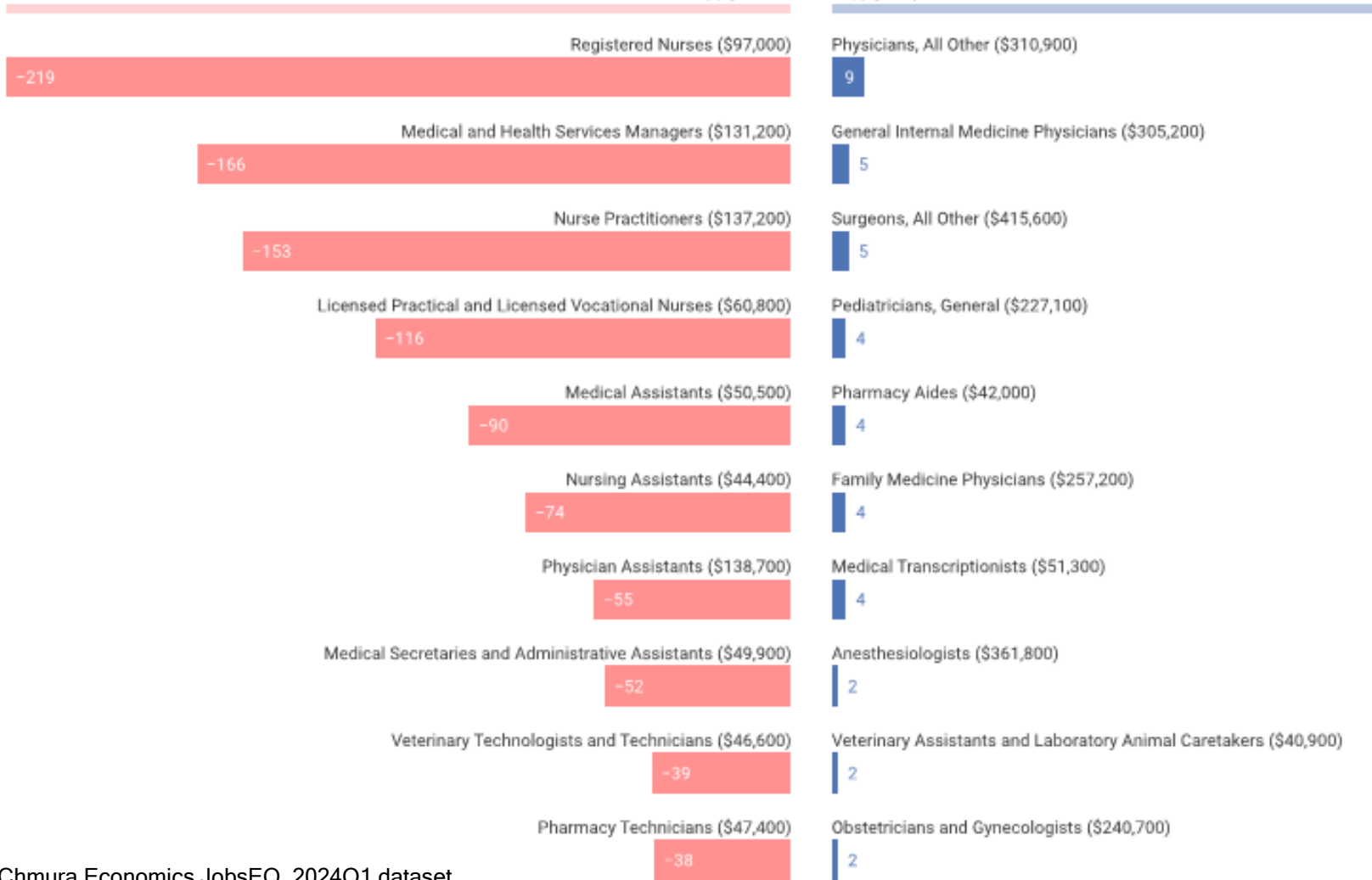
# Health Science Technology



Minnesota

## Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Health Science Technology, Minnesota, 2024Q1

Supply Deficit      Supply Surplus



### Demographic Highlight

24.2% Age 25-34

78.1% Female

80.0% White

3.5% Hispanic/Latinx

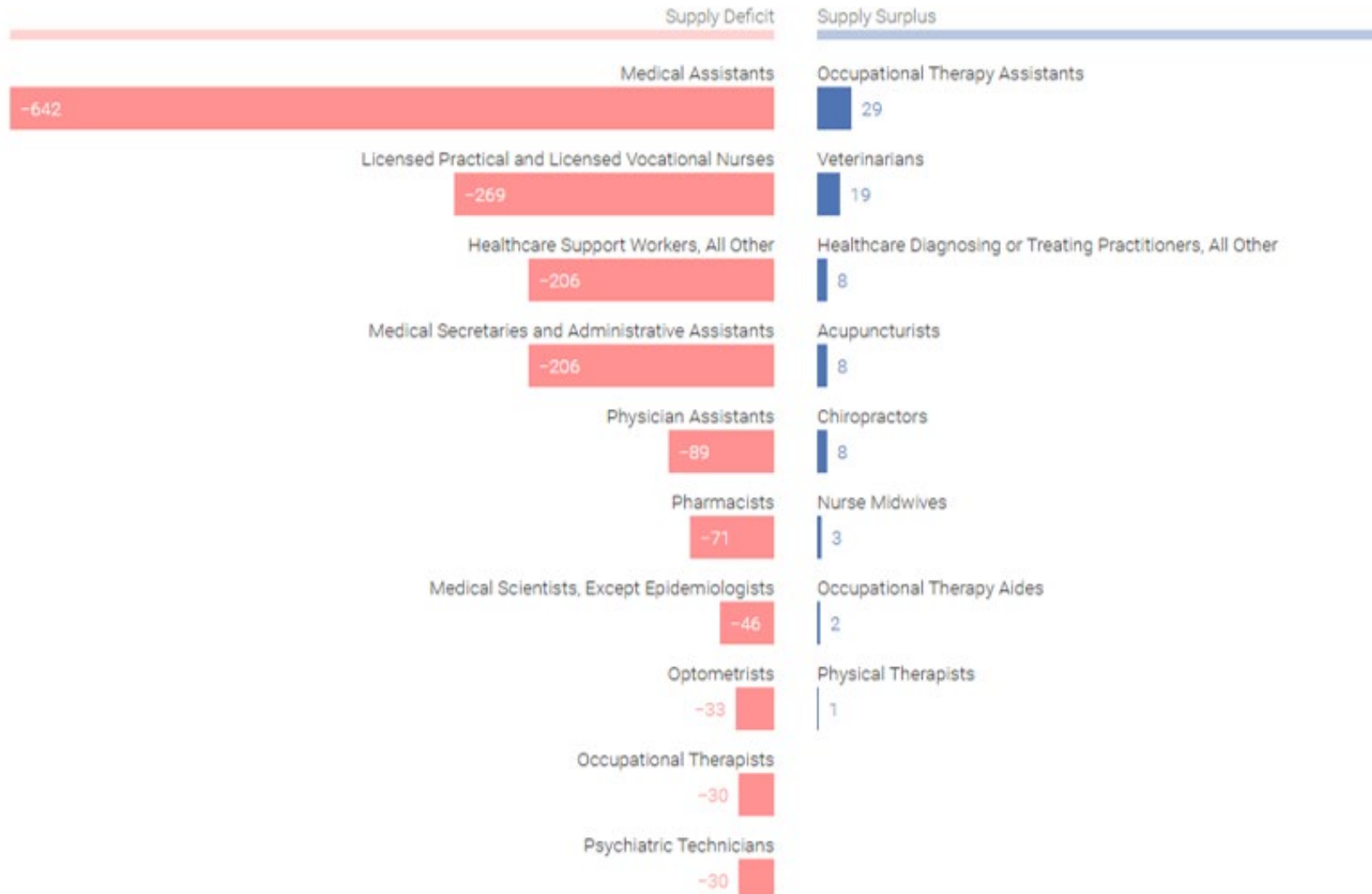


RealTime Talent

# Health Science Technology

## Minnesota

### Award Gaps in Health Science Technology, Minnesota, 2024Q1



### Educational Attainment

- Approximately 60% of workers in the Northwest, Central, and Southwest Minnesota have attained a high school diploma, some college, or a two-year degree
- Approximately 50% of workers in the MSP Metro and Southeast Minnesota hold a 4-year degree or higher



# Health Science Technology

Minnesota, 2024Q1

## Target Occupations (All HW, HD, HS, OG)

Registered Nurses  
 Licensed Practical & Licensed Vocational Nurses (AG)  
 Medical & Health Services Managers  
 Pharmacists (AG)  
 Dental Assistants

## Gateway Occupations

Medical Secretaries (HD, OG, AG)  
 Medical Assistants (HS, HD, OG, AG)  
 Pharmacy Technicians (HD, OG, AG)  
 Healthcare Support Workers, All Other (HD, AG)  
 Veterinary Technologists & Technicians (HS, HD, OG, AG)

## Origin Occupations

Nursing Assistants (HS, HD, OG)  
 Home Health Aides (HD, AG)  
 Psychiatric Technicians (HS, HD, OG, AG)  
 Phlebotomists (HS, HD, OG)  
 Veterinary Assistants & Laboratory Animal Caretakers (HD, AG)

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

## High Location Quotient (LQ) Occupations for Health Science Technology, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Bioengineers &amp; Biomedical Engineers</li> <li>Orthotists &amp; Prosthetists</li> <li>Medical Scientists, Except Epidemiologists</li> <li>Genetic Counselors</li> <li>Surgeons, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Genetic Counselors</li> <li>Healthcare Support Workers, All Other</li> <li>Surgeons, All Other</li> <li>Nurse Anesthetists</li> <li>Epidemiologists</li> </ul>	<ul style="list-style-type: none"> <li>Healthcare Support Workers, All Other</li> <li>Genetic Counselors</li> <li>Epidemiologists</li> <li>Nursing Assistants</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> </ul>	<ul style="list-style-type: none"> <li>Genetic Counselors</li> <li>Chiropractors</li> <li>Surgeons, All Other</li> <li>Nurse Anesthetists</li> <li>Healthcare Support Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Recreational Therapists</li> <li>Psychiatric Aides</li> <li>Chiropractors</li> <li>Healthcare Support Workers, All Other</li> <li>Veterinary Technologists &amp; Technicians</li> </ul>	<ul style="list-style-type: none"> <li>Dermatologists</li> <li>Surgeons, All Other</li> <li>Nurse Anesthetists</li> <li>Obstetricians &amp; Gynecologists</li> <li>Cardiologists</li> </ul>

# Health Science Technology

Minnesota

Origin-to-Gateway-to-Target Occupations for Health Science Technology, By Region 2024Q1

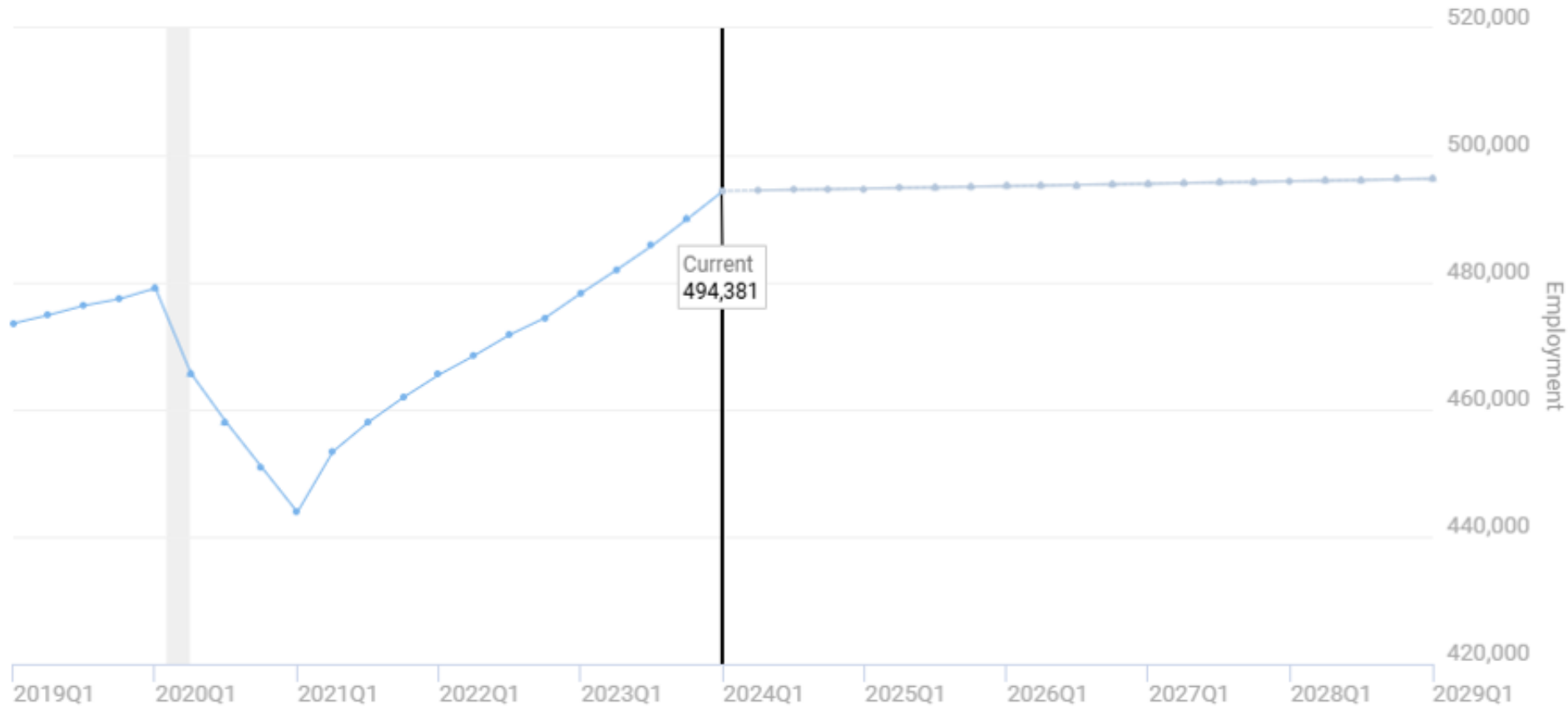
	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$73,800	Field: \$67,900	Field: \$65,200	Field: \$68,300	Field: \$62,400	Field: \$80,600
Unempl	Region: 2.6% Field: 1.5%	Region: 3.6% Field: 1.9%	Region: 3.2% Field: 1.8%	Region: 3.3% Field: 1.8%	Region: 2.8% Field: 1.6%	Region: 2.3% Field: 1.2%
Origin Occupations	<ul style="list-style-type: none"> <li>Home Health Aides</li> <li>Veterinary Assistants &amp; Laboratory Animal Caretakers</li> <li>Pharmacy Aides</li> <li>Physical Therapy Aides</li> </ul>	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Home Health Aides</li> <li>Pharmacy Technicians</li> <li>Healthcare Support Workers</li> <li>Veterinary Technologists &amp; Technicians</li> </ul>	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Home Health Aides</li> <li>Medical Secretaries &amp; Administrative Assistants</li> <li>Healthcare Support Workers</li> <li>Veterinary Technologists &amp; Technicians</li> </ul>	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Home Health Aides</li> <li>Medical Secretaries and Administrative Assistants</li> <li>Veterinary Technologists &amp; Technicians</li> <li>Healthcare Support Workers</li> </ul>	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Home Health Aides</li> <li>Pharmacy Technicians</li> <li>Veterinary Technologists &amp; Technicians</li> <li>Healthcare Support Workers</li> </ul>	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Home Health Aides</li> <li>Phlebotomists</li> <li>Veterinary Technologists &amp; Technicians</li> <li>Veterinary Assistants, &amp; Laboratory Animal Caretakers</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>Nursing Assistants</li> <li>Medical Secretaries &amp; Administrative Assistants</li> <li>Medical Assistants</li> <li>Pharmacy Technicians</li> <li>Healthcare Support Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Medical Secretaries</li> <li>Medical Assistants</li> <li>Psychiatric Technicians</li> <li>Medical Equipment Preparers</li> <li>Medical Transcriptionists</li> </ul>	<ul style="list-style-type: none"> <li>Pharmacy Technicians</li> <li>Medical Assistants</li> <li>Ophthalmic Medical Technicians</li> <li>Psychiatric Aides</li> <li>Medical Transcriptionists</li> </ul>	<ul style="list-style-type: none"> <li>Medical Assistants</li> <li>Pharmacy Technicians</li> </ul>	<ul style="list-style-type: none"> <li>Medical Secretaries &amp; Administrative Assistants</li> <li>Medical Assistants</li> <li>Psychiatric Aides</li> <li>Medical Equipment Preparers</li> <li>Medical Transcriptionists</li> </ul>	<ul style="list-style-type: none"> <li>Medical Assistants</li> <li>Medical Secretaries &amp; Administrative Assistants</li> <li>Pharmacy Technicians</li> <li>Healthcare Support Workers, All Other</li> <li>Opticians, Dispensing</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Medical &amp; Health Services Managers</li> <li>Dental Assistants</li> <li>Nurse Practitioners</li> </ul>	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Medical &amp; Health Services Managers</li> <li>Pharmacists</li> <li>Dental Assistants</li> </ul>	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Medical &amp; Health Services Managers</li> <li>Dental Assistants</li> <li>Dental Hygienists</li> </ul>	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Medical &amp; Health Services Managers</li> <li>Dental Assistants</li> <li>Pharmacists</li> </ul>	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Medical &amp; Health Services Managers</li> <li>Dental Assistants</li> <li>Dental Hygienists</li> </ul>	<ul style="list-style-type: none"> <li>Registered Nurses</li> <li>Licensed Practical &amp; Licensed Vocational Nurses</li> <li>Nurse Practitioners</li> <li>Medical &amp; Health Services Managers</li> <li>Physicians Assistants</li> </ul>





# Human Services

Baseline 5-Year Forecast for Human Services Careers, Minnesota, 2024Q1



**2024Q1 Employment: 494,381 (16% of MN employment)**  
**Median Wage: \$59,200**  
**Location Quotient: 1.01**



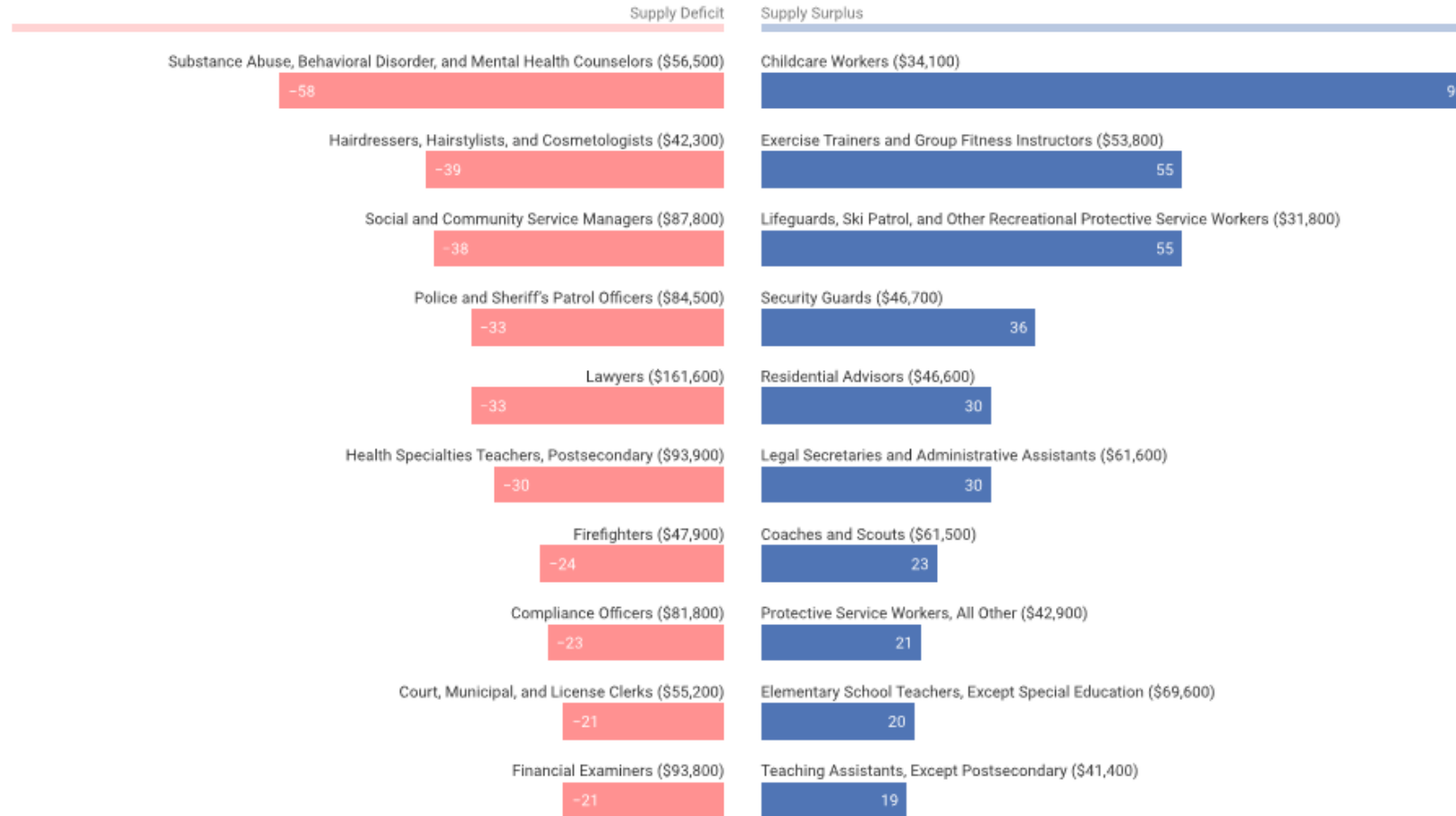
# Human Services



# Minnesota

## Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Human Services, Minnesota,

2024Q1



## Demographic Highlight

24.3% Age 55 or older

64.8% Female

82.2% White

4.2% Hispanic/Latinx

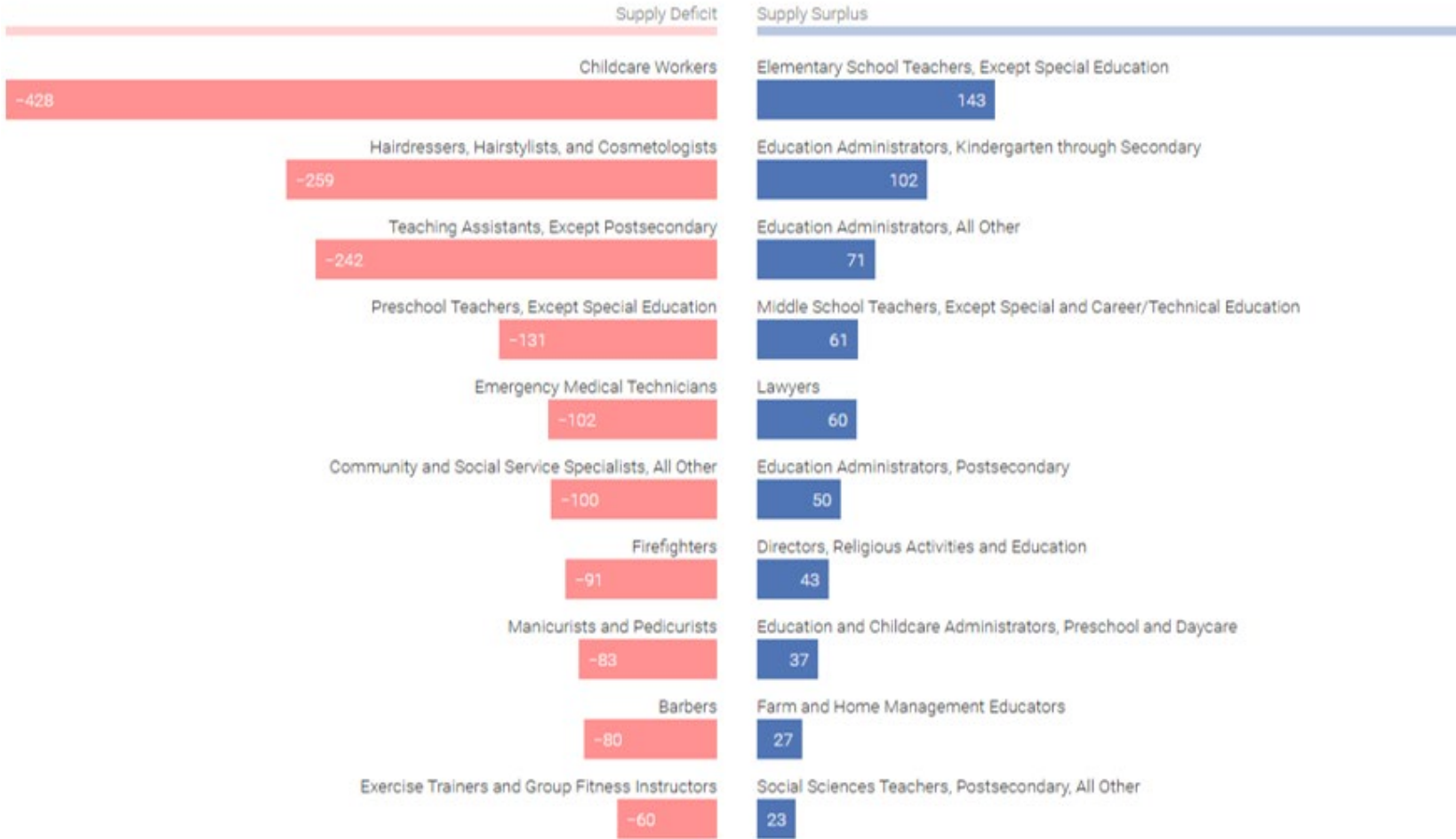


**RealTime Talent**

# Human Services

# Minnesota

**Award Gaps in Human Services, Minnesota, 2024Q1**



## Educational Attainment

- More than 50% of workers have attained a 4-year degree or higher
- Over 40% of the field's positions require less than a two-year degree or certificate
- At least 30% of roles require only short-term on the job training



# Human Services

Minnesota, 2024Q1

## Target Occupations (All HW, HS, HD)

- Elementary School Teachers
- Secondary School Teachers
- Lawyers (OG)
- Middle School Teachers
- Substance Abuse, Behavioral Disorder, & Mental Health Counselors (OG)

## Gateway Occupations

- Security Guards (HD)
- Social & Human Service Assistants (HD, AG)
- Self-Enrichment Teachers (HD)
- Exercise Trainers & Group Fitness Instructors (HD, AG)
- Court, Municipal, & License Clerks (OG)

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

## Origin Occupations (All HD, AG)

- Personal Care Aides
- Teaching Assistants (HS)
- Childcare Workers
- Preschool Teachers (HS)
- Hairdressers, Hairstylists, & Cosmetologists (HS, OG)

## High Location Quotient (LQ) Occupations for Human Services, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Social Workers, All Other</li> <li>Special Education Teachers, Preschool</li> <li>Marriage &amp; Family Therapists</li> <li>Geography Teachers, Postsec.</li> <li>Area, Ethnic, &amp; Cultural Studies Teachers, Postsec.</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Surveillance Officers &amp; Gambling Investigators</li> <li>Social Workers, All Other</li> <li>Court, Municipal, &amp; License Clerks</li> <li>Residential Advisors</li> <li>Special Education Teachers, Preschool</li> </ul>	<ul style="list-style-type: none"> <li>Funeral Home Managers</li> <li>Special Education Teachers, Preschool</li> <li>Social Workers, All Other</li> <li>Court, Municipal, &amp; License Clerks</li> <li>Morticians, Undertakers, &amp; Funeral Arrangers</li> </ul>	<ul style="list-style-type: none"> <li>Special Education Teachers, Preschool</li> <li>Funeral Home Managers</li> <li>Social Workers, All Other</li> <li>Court, Municipal, &amp; License Clerks</li> <li>Residential Advisors</li> </ul>	<ul style="list-style-type: none"> <li>Funeral Home Managers</li> <li>Special Education Teachers, Preschool</li> <li>Court, Municipal, &amp; License Clerks</li> <li>Gambling Surveillance Officers &amp; Gambling Investigators</li> <li>Social Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Emergency Medical Technicians</li> <li>Paramedics</li> <li>Special Education Teachers, Preschool</li> <li>Funeral Home Managers</li> <li>Social Workers, All Other</li> </ul>

# Human Services

# Minnesota

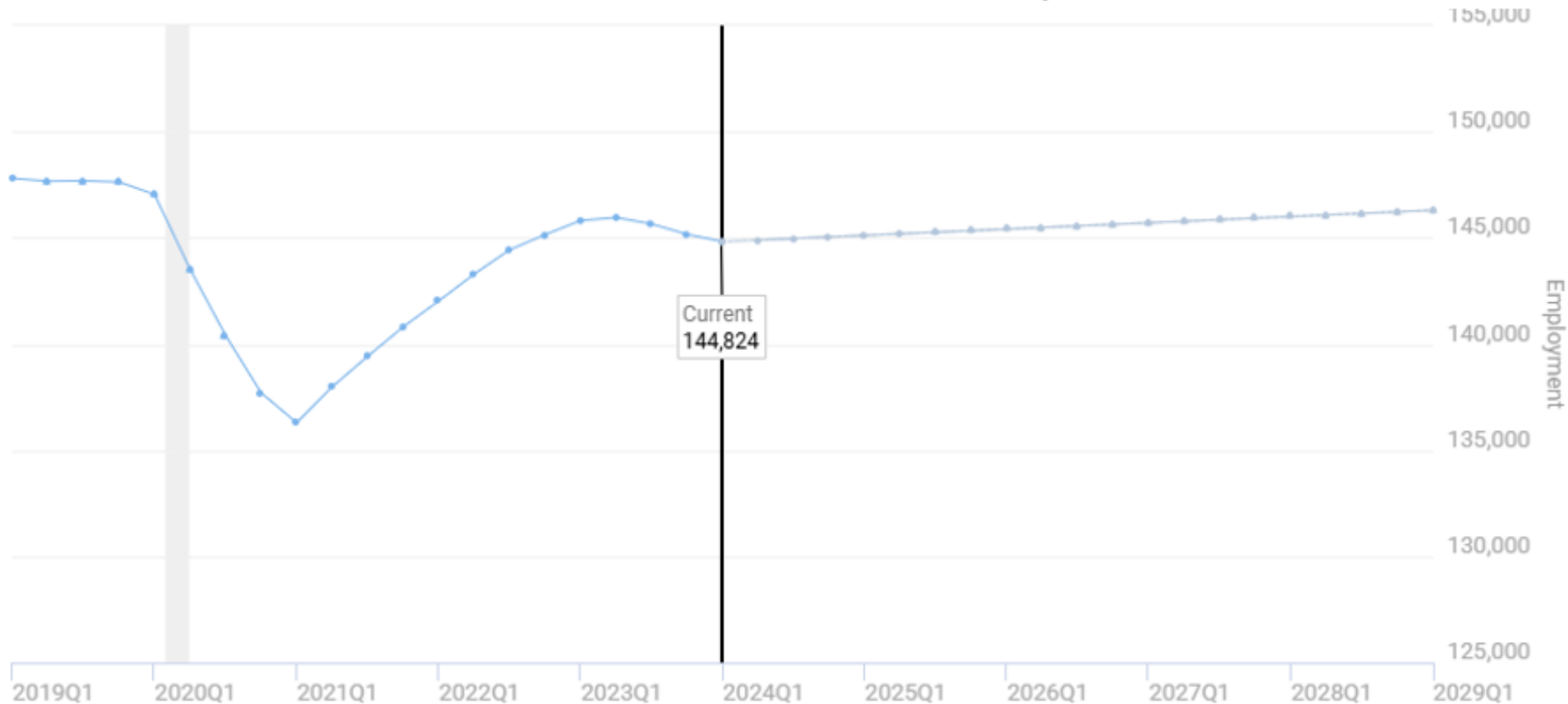
Origin-to-Gateway-to-Target Occupations for Human Services, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$61,600	Field: \$55,100	Field: \$55,400	Field: \$53,700	Field: \$56,400	Field: \$57,000
Unempl	Region: 2.6% Field: 2.1%	Region: 3.6% Field: 2.7%	Region: 3.2% Field: 2.4%	Region: 3.3% Field: 2.5%	Region: 2.8% Field: 2.1%	Region: 2.3% Field: 2.0%
Origin Occupations	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants, Except Postsecondary</li> <li>Childcare Workers</li> <li>Preschool Teachers, Except Special Education</li> <li>Hairdressers, Hairstylists, &amp; Cosmetologists</li> </ul>	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants</li> <li>Childcare Workers</li> <li>Social &amp; Human Service Assistants</li> <li>Preschool Teachers</li> </ul>	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants, Except Postsecondary</li> <li>Childcare Workers</li> <li>Preschool Teachers, Except Special Education</li> <li>Firefighters</li> </ul>	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants, Except Postsecondary</li> <li>Childcare Workers</li> <li>Preschool Teachers, Except Special Education</li> <li>Social &amp; Human Service Assistants</li> </ul>	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants, Except Postsecondary</li> <li>Childcare Workers</li> <li>Preschool Teachers, Except Special Education</li> <li>Firefighters</li> </ul>	<ul style="list-style-type: none"> <li>Personal Care Aides</li> <li>Teaching Assistants, except Postsecondary</li> <li>Preschool Teachers, except Special Education</li> <li>Hairdressers, Hair Stylists, &amp; Cosmetologists</li> <li>Laundry &amp; Dry-Cleaning Workers</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>Security Guards</li> <li>Social &amp; Human Service Assistants</li> <li>Self-Enrichment Teachers</li> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Exercise Trainers &amp; Group Fitness Instructors</li> </ul>	<ul style="list-style-type: none"> <li>Residential Advisors</li> <li>Supervisors of Entertainment &amp; Recreation Workers</li> <li>Community Health Workers</li> <li>Skincare Specialists</li> <li>Judicial Law Clerks</li> </ul>	<ul style="list-style-type: none"> <li>Social and Human Services Assistants</li> <li>Substitute Teachers, Short-Term</li> <li>Self-Enrichment Teachers</li> <li>Residential Advisors</li> <li>Rehabilitation Counselors</li> </ul>	<ul style="list-style-type: none"> <li>Exercise Trainers &amp; Groups</li> <li>Fitness Instructors</li> <li>Coaches &amp; Scouts</li> <li>Community &amp; Social Service Specialists</li> <li>Rehabilitation Counselors</li> <li>First-Line Supervisors of Entertainment &amp; Recreation Workers</li> </ul>	<ul style="list-style-type: none"> <li>Service Assistants</li> <li>Residential Advisors</li> <li>Community &amp; Social Service Specialists, All Other</li> <li>First-Line Supervisors of Personal Service Workers</li> <li>Tutors</li> </ul>	<ul style="list-style-type: none"> <li>Emergency Medical Technicians</li> <li>Social &amp; Human Service Assistants</li> <li>Exercise Trainers &amp; Group Fitness Instructors</li> <li>Security Guards</li> <li>Court, Municipal, &amp; License Clerks</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>Elementary School Teachers, Except Special Education</li> <li>Secondary School Teachers, Except Special &amp; CTE</li> <li>Lawyers</li> <li>Middle School Teachers, Except Special &amp; CTE</li> <li>Child, Family, &amp; School Social Workers</li> </ul>	<ul style="list-style-type: none"> <li>Elementary School Teachers</li> <li>Secondary School Teachers</li> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Child, Family, &amp; School Social Workers</li> <li>Middle School Teachers</li> </ul>	<ul style="list-style-type: none"> <li>Child, Family, &amp; School Social Workers</li> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Lawyers</li> <li>Social &amp; Community Service Manager</li> <li>Educational, Guidance, &amp; Career Counselors</li> </ul>	<ul style="list-style-type: none"> <li>Elementary School Teachers</li> <li>Secondary School Teachers, Except Special &amp; CTE</li> <li>Middle School Teachers, Except Special &amp; CTE</li> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Child, Family, &amp; School Social Workers</li> </ul>	<ul style="list-style-type: none"> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Child, Family, &amp; School Social Workers</li> <li>Substitute Teachers, Short-Term</li> <li>Social &amp; Community Service Managers</li> <li>Coaches &amp; Scouts</li> </ul>	<ul style="list-style-type: none"> <li>Substance Abuse, Behavioral Disorder, &amp; Mental Health Counselors</li> <li>Child, Family, &amp; School Social Workers</li> <li>Substitute Teachers, Short-Term</li> <li>Lawyers</li> <li>Paramedics</li> </ul>

# Arts, Communications, & Information Systems

Minnesota

Baseline 5-Year Forecast for Arts, Communications, and Information Systems Careers, Minnesota, 2024Q1



**2024Q1 Employment: 144,824 (4.7% of MN employment)**

**Median Wage: \$91,300**

**Location Quotient: 1.03**



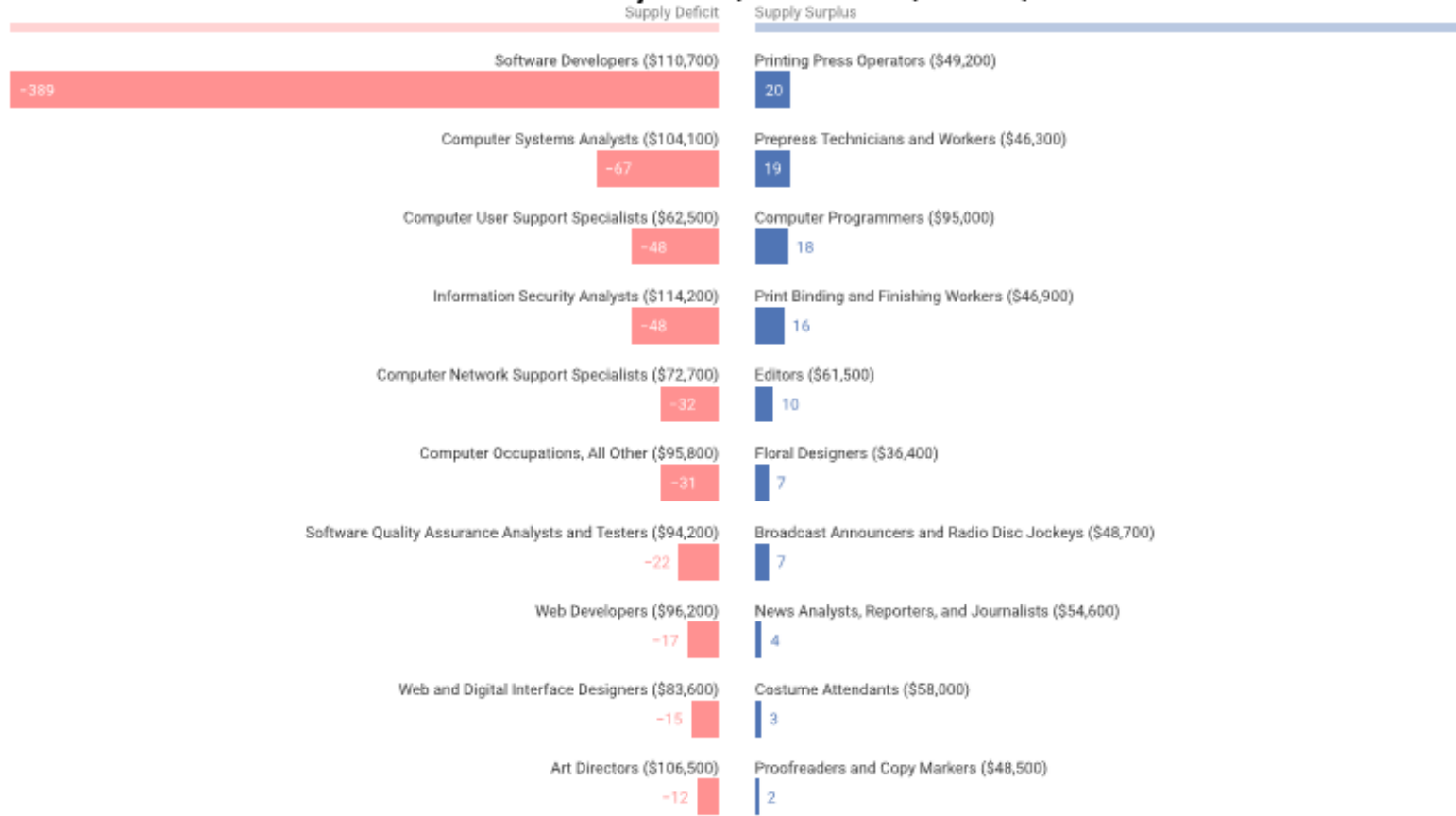


# Arts, Communications, & Information Systems



Minnesota

## Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Arts, Communications, and Information Systems, Minnesota, 2024Q1



### Demographic Highlight

19.6% Age 55 or older

72.6% Male

75.7% White

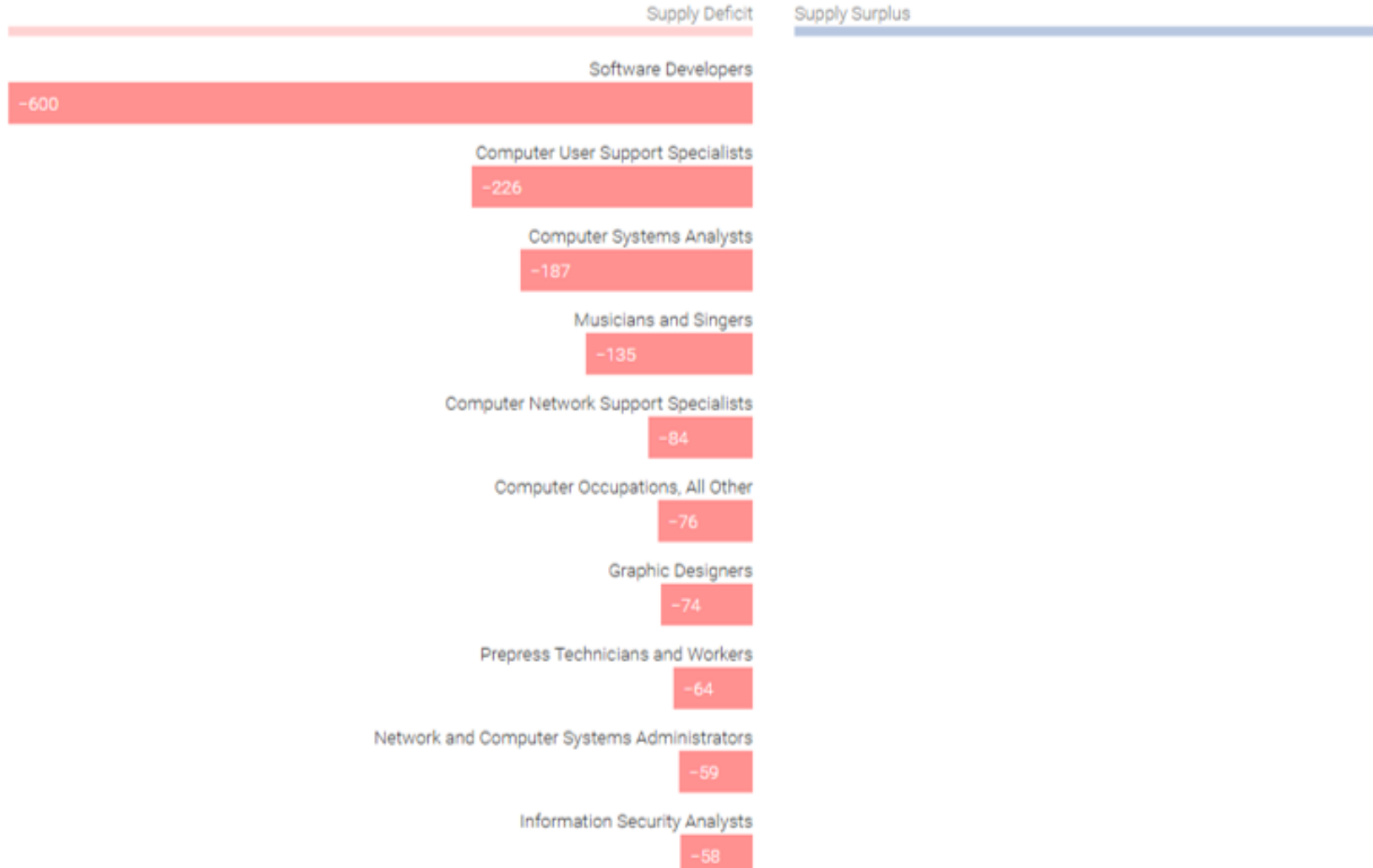
2.8% Hispanic/Latinx



# Arts, Communications, & Information Systems

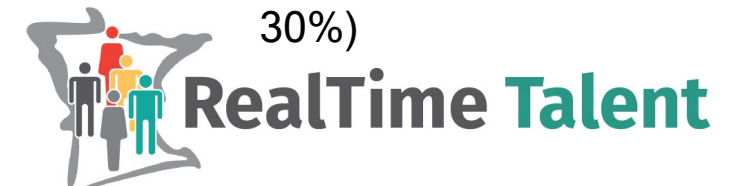
## Minnesota

Award Gaps in Arts, Communications, and Information Systems, Minnesota, 2024Q1



### Educational Attainment

- More than 80% of workers have attained a 2-year degree or higher
- Nearly 78% of the field's positions require a 2-year degree or higher
- Northwest and Southwest Minnesota have the largest percentages of workers in this field with a certificate or a two-year degree as their highest level of education (about 30%)



# Arts, Communications, & Information Systems

Minnesota, 2024Q1

**Target Occupations (All HW, HS, HD, AG)**  
 Software Developers (OG)  
 Computer User Support Specialists (OG)  
 Computer Systems Analysts (OG)  
 Computer Network Support Specialists (OG)  
 Graphic Designers

## Gateway Occupations

Printing Press Operators (AG)  
 Photographers (OG, AG)  
 Prepress Technicians & Workers (HS, AG)  
 Print Binding & Finishing Workers  
 Audio & Video Technicians (HS, OG, AG)

## Origin Occupations

Floral Designers (AG)  
 News Analysts, Reporters, & Journalists (HS)  
 Broadcast Announcers & Radio Disc Jockeys (HS, AG)  
 Disk Jockeys, Except Radio (AG)  
 Artists & Related Workers, All Other (OG, AG)

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

**High Location Quotient (LQ) Occupations for Arts, Communications, and Information Systems, By Region 2024Q1**

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Prepress Technicians and Workers</li> <li>Print Binding and Finishing Workers</li> <li>Desktop Publishers</li> <li>Computer Network Support Specialists</li> <li>Printing Press Operators</li> </ul>	<ul style="list-style-type: none"> <li>Broadcast Announcers and Radio Disc Jockeys</li> <li>Prepress Technicians and Workers</li> <li>Computer Network Support Specialists</li> <li>Dancers</li> <li>Artists and Related Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Prepress Technicians and Workers</li> <li>Broadcast Announcers and Radio Disc Jockeys</li> <li>Floral Designers</li> <li>Print Binding and Finishing Workers</li> <li>Commercial and Industrial Designers</li> </ul>	<ul style="list-style-type: none"> <li>Prepress Technicians and Workers</li> <li>Print Binding and Finishing Workers</li> <li>Printing Press Operators</li> <li>Commercial and Industrial Designers</li> <li>Broadcast Announcers and Radio Disc Jockeys</li> </ul>	<ul style="list-style-type: none"> <li>Prepress Technicians and Workers</li> <li>Print Binding and Finishing Workers</li> <li>Printing Press Operators</li> <li>Broadcast Announcers and Radio Disc Jockeys</li> <li>Desktop Publishers</li> </ul>	<ul style="list-style-type: none"> <li>Sound Engineering Technicians</li> <li>Prepress Technicians and Workers</li> <li>Computer Network Support Specialists</li> <li>Broadcast Announcers and Radio Disc Jockeys</li> </ul>

# Arts, Communications, & Information Systems

Minnesota

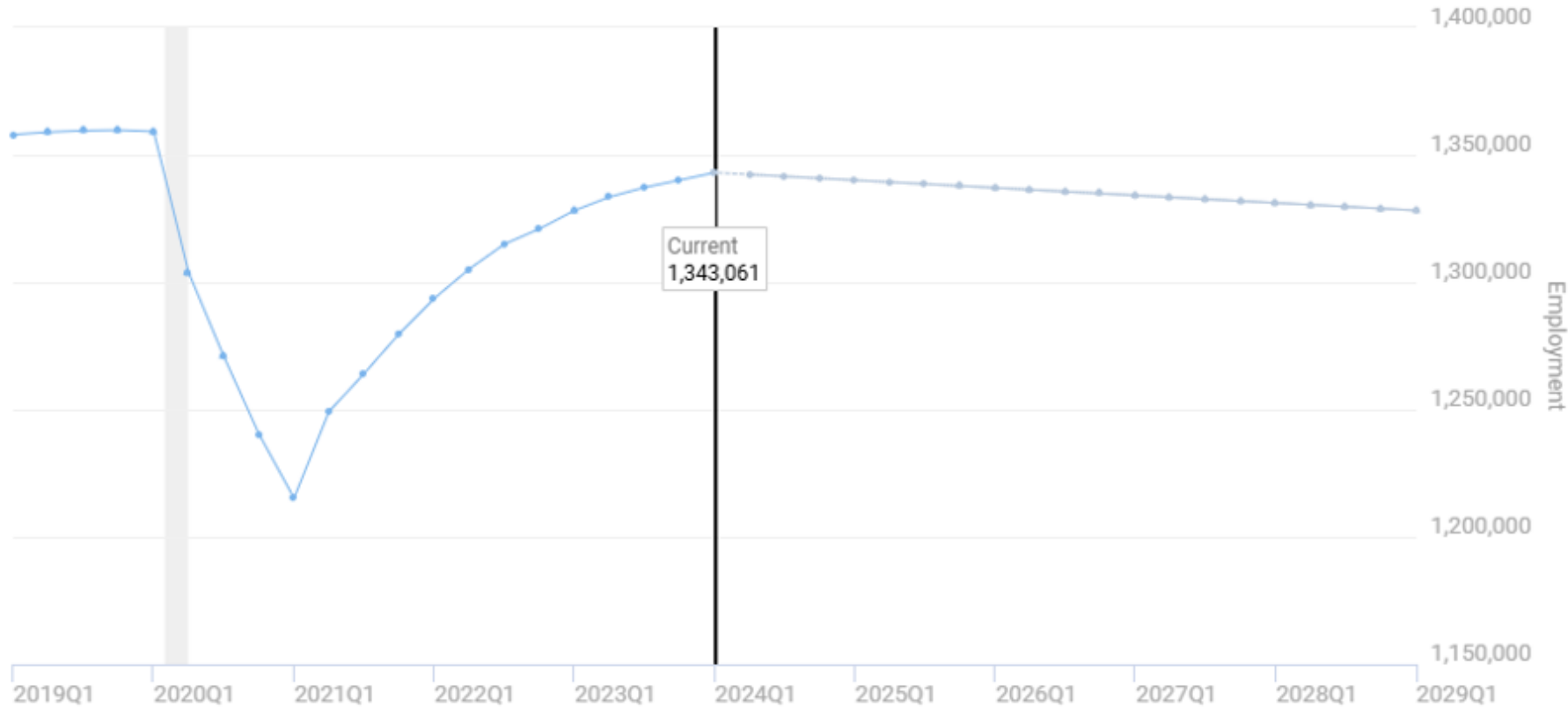
Origin-to-Gateway-to-Target Occupations for Arts, Communications, and Information Systems, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$96,000	Field: \$76,200	Field: \$69,300	Field: \$72,800	Field: \$70,800	Field: \$86,600
Unempl	Region: 2.6% Field: 2.1%	Region: 3.6% Field: 2.6%	Region: 3.2% Field: 2.3%	Region: 3.3% Field: 2.4%	Region: 2.8% Field: 2.3%	Region: 2.3% Field: 1.9%
Origin Occupations	<ul style="list-style-type: none"> <li>News Analysts, Reporters, &amp; Journalists</li> <li>Floral Designers</li> <li>Broadcast Announcers &amp; Radio Disc Jockeys</li> <li>Disc Jockeys, Except Radio</li> <li>Artists &amp; Related Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Photographers</li> <li>Audio &amp; Video Technicians</li> <li>Floral Designers</li> <li>Broadcast Announcers &amp; Radio Disc Jockeys</li> <li>Prepress Technicians &amp; Workers</li> </ul>	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Photographers</li> <li>Floral Designers</li> <li>Prepress Technicians &amp; Workers</li> <li>Print Binding &amp; Finishing Workers</li> </ul>	<ul style="list-style-type: none"> <li>Photographers</li> <li>Prepress Technicians &amp; Workers</li> <li>Floral Designers</li> <li>Broadcast Announcers &amp; Radio Disc Jockeys</li> <li>News Analysts, Reporters, &amp; Journalists</li> </ul>	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Prepress Technicians &amp; Workers</li> <li>Print Binding &amp; Finishing Workers</li> <li>Photographers</li> <li>Broadcast Announcers &amp; Radio Disc Jockeys</li> </ul>	<ul style="list-style-type: none"> <li>Photographers</li> <li>Producers &amp; Directors</li> <li>Floral Designers</li> <li>Broadcast Announcers &amp; Radio Disc Jockeys</li> <li>News Analysts, Reporters, &amp; Journalists</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Photographers</li> <li>Prepress Technicians &amp; Workers</li> <li>Print Binding &amp; Finishing Workers</li> <li>Audio &amp; Video Technicians</li> </ul>	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Producers &amp; Directors</li> <li>News Analysts, Reporters, &amp; Journalists</li> <li>Print Binding &amp; Finishing Workers</li> <li>Camera Operators, Television, Video, &amp; Film</li> </ul>	<ul style="list-style-type: none"> <li>Editors</li> <li>Broadcast Technicians</li> <li>Proofreaders &amp; Copy Markers</li> </ul>	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Print Binding &amp; Finishing Workers</li> <li>Audio &amp; Video Technicians</li> <li>Broadcast Technicians</li> <li>Proofreaders &amp; Copy Markers</li> </ul>	<ul style="list-style-type: none"> <li>Actors</li> <li>Fine Artists Incl. Painters, Sculptors &amp; Illustrators</li> <li>Entertainers &amp; Performers, Sports &amp; Related Workers, All Other</li> <li>Proofreaders &amp; Copy Makers</li> <li>Agents &amp; Business Managers of Artists, Performers, &amp; Athletes</li> </ul>	<ul style="list-style-type: none"> <li>Printing Press Operators</li> <li>Editors</li> <li>Audio &amp; Video Technicians</li> <li>Prepress Technicians &amp; Workers</li> <li>Print Binding &amp; Finishing Workers</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Computer User Support Specialists</li> <li>Computer Systems Analysts</li> <li>Computer Occupations, All Other</li> <li>Network &amp; Computer Systems Administrators</li> </ul>	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Computer Systems Analysts</li> <li>Computer Network Support Specialists</li> <li>Computer Occupations, All Other</li> <li>Telecommunications Equipment Installers</li> </ul>	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Computer Systems Analysts</li> <li>Telecommunications Equipment Installers &amp; Repairers</li> <li>Computer Occupations, All Other</li> <li>Web &amp; Digital Interface Designers</li> </ul>	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Computer User Support Specialists</li> <li>Computer Systems Analysts</li> <li>Graphic Designers</li> <li>Computer Network Support Specialists</li> </ul>	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Web &amp; Digital Interface Designers</li> <li>Web Developers</li> <li>Makeup Artists, Theatrical &amp; Performance</li> </ul>	<ul style="list-style-type: none"> <li>Software Developers</li> <li>Computer Systems Analysts</li> <li>Telecommunications Equipment Installers</li> <li>Web &amp; Digital Interface Designers</li> <li>Web Developers</li> </ul>

# Business, Management, & Administration

Minnesota

Baseline 5-Year Forecast for Business, Management, and Administration Careers, Minnesota 2024Q1



**2024Q1 Employment:** 1,343,061 (43.3% of MN employment)

**Median Wage:** \$61,700

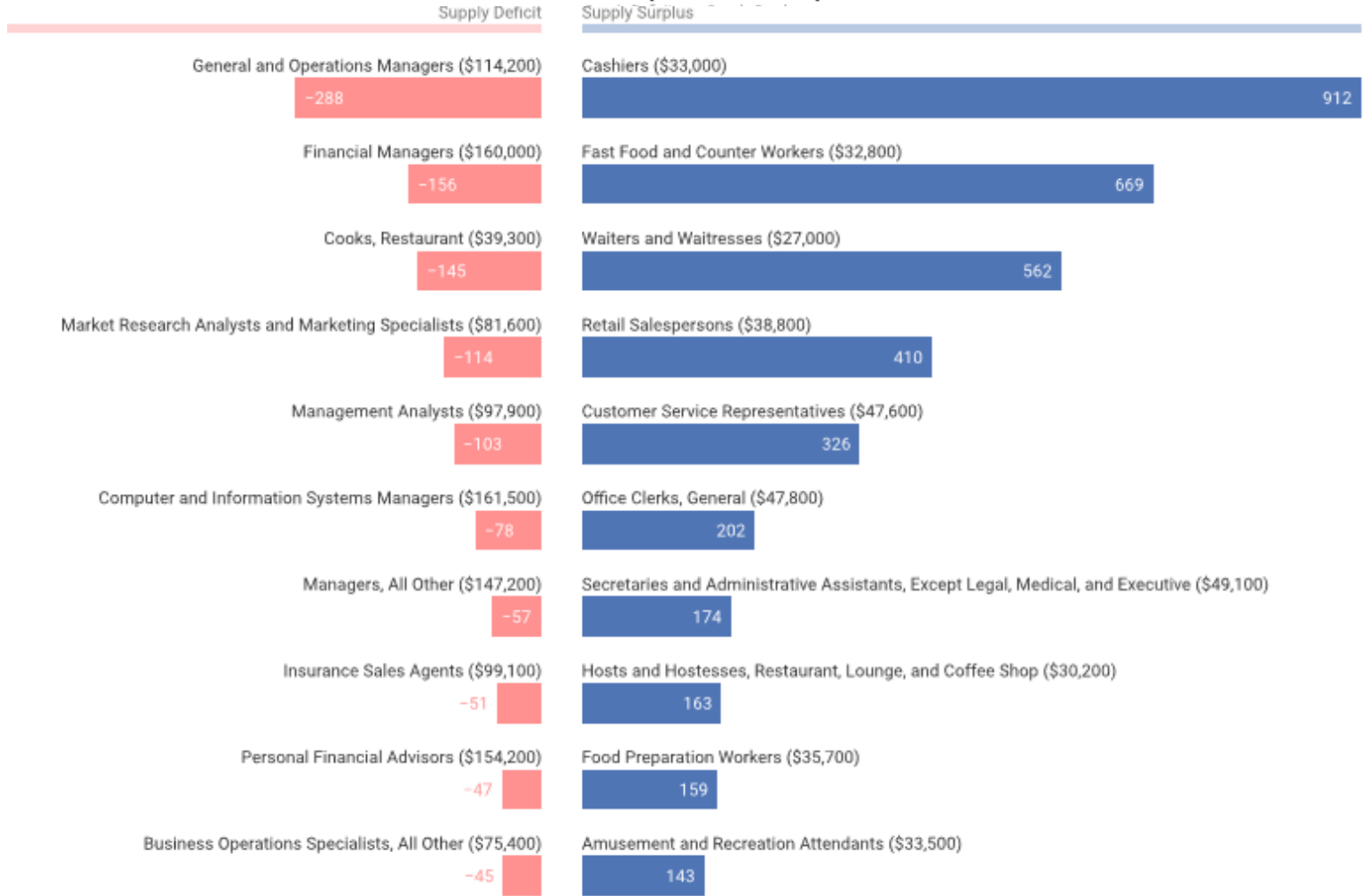
**Location Quotient:** 0.98



# Business, Management, & Administration

# Minnesota

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Business, Management, and Administration, Minnesota, 2024Q1



## Demographic Highlight

22.7% Age 55 or older

54.1% Female

83.4% White

5.4% Hispanic/Latinx

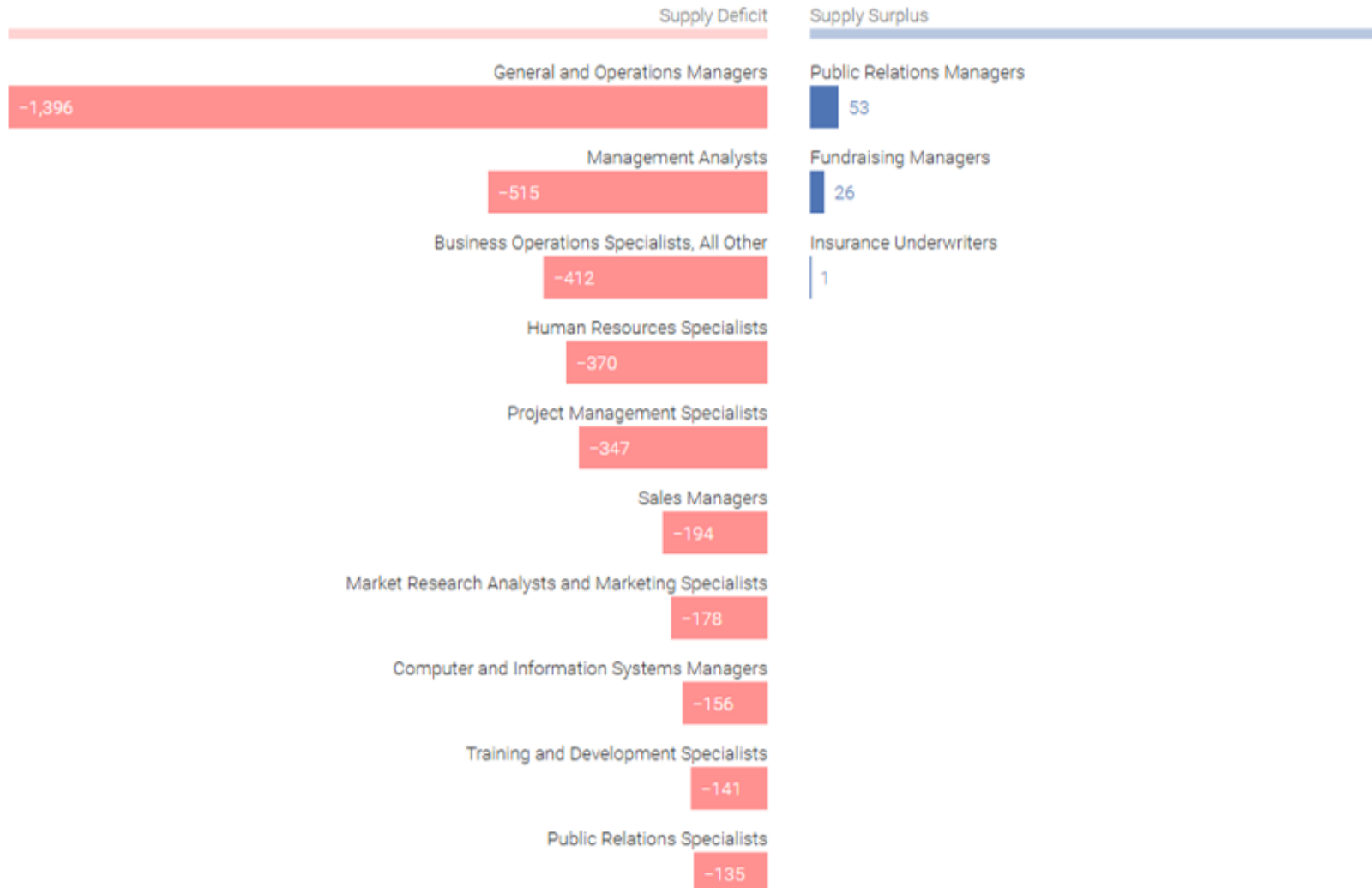




# Business, Management, & Administration

## Minnesota

Award Gaps in Business, Management, and Administration, Minnesota, 2024Q1



### Educational Attainment

- 72.2% of positions typically do not require a postsecondary credential
- In most regions, about 25% of workers hold a high school diploma as their highest level of education, about 30% attained a 2-year degree or certificate, and another 30% attained a 4-year degree or higher



# Business, Management, & Administration

Minnesota, 2024Q1

### Target Occupations (All HW, HS, HD, OG, AG)

- General & Operations Managers
- Accountants & Auditors
- Market Research Analysts & Marketing Specialists
- Management Analysts
- Business Operations Specialists

### Gateway Occupations (All HD)

- Customer Service Representatives (AG)
- Office Clerks, General (AG)
- Secretaries & Administrative Assistants
- Bookkeeping, Accounting, & Auditing Clerks (HS, AG)
- Supervisors of Retail Workers

### Origin Occupations (All HD)

- Retail Salespersons (HD)
- Cashiers
- Fast Food & Counter Workers (HD)
- Stockers & Order Fillers
- Janitors & Cleaners, Except Maids & Housekeeping Cleaners

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

High Location Quotient (LQ) Occupations for Business, Management, and Administration, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Actuaries</li> <li>Gambling &amp; Sports Book Writers &amp; Runners</li> <li>Labor Relations Specialists</li> <li>Brokerage Clerks</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Gambling &amp; Sports Book Writers &amp; Runners</li> <li>Gambling Cage Workers</li> <li>Gambling Change Persons &amp; Booth Cashiers</li> <li>First-Line Supervisors of Gambling Services Workers</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Gambling &amp; Sports Book Writers &amp; Runners</li> <li>Chief Executives</li> <li>Gambling Cage Workers</li> <li>First-Line Supervisors of Gambling Services Workers</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Gambling &amp; Sports Book Writers &amp; Runners</li> <li>First-Line Supervisors of Gambling Services Workers</li> <li>Bartenders</li> <li>Food Servers, Nonrestaurant</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Gambling &amp; Sports Book Writers &amp; Runners</li> <li>Gambling Cage Workers</li> <li>Gambling Change Persons &amp; Booth Cashiers</li> <li>First-Line Supervisors of Gambling Services Workers</li> </ul>	<ul style="list-style-type: none"> <li>Gambling Service Workers, All Other</li> <li>Telephone Operators</li> <li>Food Servers, Nonrestaurant</li> <li>Receptionists &amp; Information Clerks</li> <li>Billing &amp; Posting Clerks</li> </ul>

# Business, Management, & Administration

Minnesota

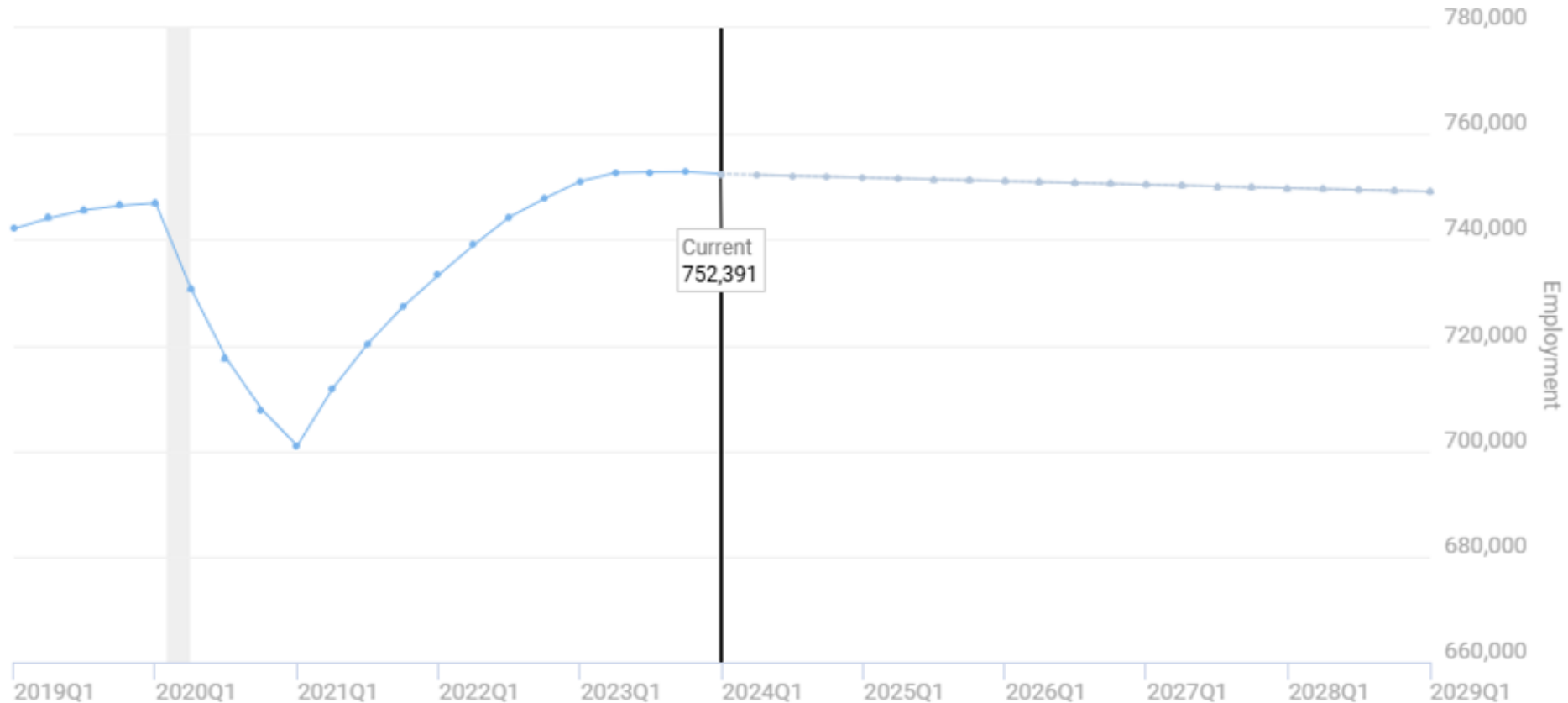
Origin-to-Gateway-to-Target Occupations for Business, Management, and Administration, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$66,600	Field: \$48,700	Field: \$50,300	Field: \$51,100	Field: \$51,700	Field: \$54,800
Une mpl	Region: 2.6% Field: 2.8%	Region: 3.6% Field: 4.1%	Region: 3.2% Field: 3.5%	Region: 3.3% Field: 3.6%	Region: 2.8% Field: 3.2%	Region: 2.3% Field: 2.8%
Origin Occupations	<ul style="list-style-type: none"> <li>Retail Salespersons</li> <li>Fast Food &amp; Counter Workers</li> <li>Cashiers</li> <li>Janitors &amp; Cleaners, Except Maids &amp; Housekeeping Cleaners</li> <li>Stockers &amp; Order Fillers</li> </ul>	<ul style="list-style-type: none"> <li>Retail Salespersons</li> <li>Cashiers</li> <li>Fast Food &amp; Counter Workers</li> <li>Waiters &amp; Waitresses</li> <li>Office Clerks, General</li> </ul>	<ul style="list-style-type: none"> <li>Cashiers</li> <li>Retail Salespersons</li> <li>Fast Food &amp; Counter Workers</li> <li>Office Clerks, General</li> <li>Stockers &amp; Order Fillers</li> </ul>	<ul style="list-style-type: none"> <li>Cashiers</li> <li>Retail Salespersons</li> <li>Fast Food &amp; Counter Workers</li> <li>Office Clerks, General</li> <li>Stockers &amp; Order Fillers</li> </ul>	<ul style="list-style-type: none"> <li>Cashiers</li> <li>Retail Salespersons</li> <li>Fast Food &amp; Counter Workers</li> <li>Office Clerks, General</li> <li>Stockers &amp; Order Fillers</li> </ul>	<ul style="list-style-type: none"> <li>Cashiers</li> <li>Retail Salespersons</li> <li>Fast Food &amp; Counter Workers</li> <li>Stockers &amp; Order Fillers</li> <li>Janitors &amp; Cleaners, Except Maids &amp; Housekeeping Cleaners</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>Customer Service Representatives</li> <li>Office Clerks, General</li> <li>Secretaries &amp; Administrative Assistants</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> <li>First-Line Supervisors of Retail Sales Workers</li> </ul>	<ul style="list-style-type: none"> <li>Secretaries &amp; Administrative Assistants</li> <li>Supervisors of Retail Workers</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> <li>Billing &amp; Posting Clerks</li> <li>Supervisors of Housekeeping &amp; Janitorial Workers</li> </ul>	<ul style="list-style-type: none"> <li>Secretaries &amp; Administrative Assistants</li> <li>First-Line Supervisors of Retail Sales Workers</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> <li>Shipping, Receiving, &amp; Inventory Clerks</li> <li>Office &amp; Administrative Support Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>First-Line Supervisors of Retail Sales Workers</li> <li>Secretaries &amp; Administrative Assistants</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> <li>Billing &amp; Posting Clerks</li> <li>Loan Interviewers &amp; Clerks</li> </ul>	<ul style="list-style-type: none"> <li>Secretaries &amp; Administrative Assistants</li> <li>First-Line Supervisors of Retail Sales Workers</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> <li>Billing &amp; Posting Clerks</li> <li>Office &amp; Administrative Support Workers, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Office Clerks, General</li> <li>Customer Service Representatives</li> <li>Receptionists &amp; Information Clerks</li> <li>Secretaries &amp; Administrative Assistants</li> <li>Bookkeeping, Accounting, &amp; Auditing Clerks</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>General &amp; Operations Managers</li> <li>Accountants &amp; Auditors</li> <li>Market Research Analysts &amp; Marketing Specialists</li> <li>Management Analysts</li> <li>Business Operations Specialists, All Others</li> </ul>	<ul style="list-style-type: none"> <li>General &amp; Operations Managers</li> <li>Accountants &amp; Auditors</li> <li>Managers, All Other</li> <li>Business Operations Specialists</li> <li>Management Analysts</li> </ul>	<ul style="list-style-type: none"> <li>Financial Managers</li> <li>Management Analysts</li> <li>Securities, Commodities, &amp; Financial Services Sales Agents</li> <li>Public Relations Specialists</li> <li>Computer &amp; Information Systems Managers</li> </ul>	<ul style="list-style-type: none"> <li>General &amp; Operations Managers</li> <li>Accountants &amp; Auditors</li> <li>Managers, All Other</li> <li>Market Research Analysts &amp; Marketing Specialists</li> <li>Business Operations Specialists, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Accountants &amp; Auditors</li> <li>Human Resources Specialists</li> <li>Financial Managers</li> <li>Management Analysts</li> <li>Computer &amp; Information Systems Managers</li> </ul>	<ul style="list-style-type: none"> <li>Human Resources Specialists</li> <li>Financial Managers</li> <li>Management Analysts</li> <li>Computer &amp; information System Managers</li> <li>Securities, Commodities, &amp; Financial Services Sales Agents</li> </ul>

# Engineering, Manufacturing, & Technology

Minnesota

5-Year Forecast for Engineering, Manufacturing, and Technology Careers, Minnesota 2024Q1



**2024Q1 Employment: 752,391 (24.2% of MN employment)**

**Median Wage: \$62,600**

**Location Quotient: 0.99**



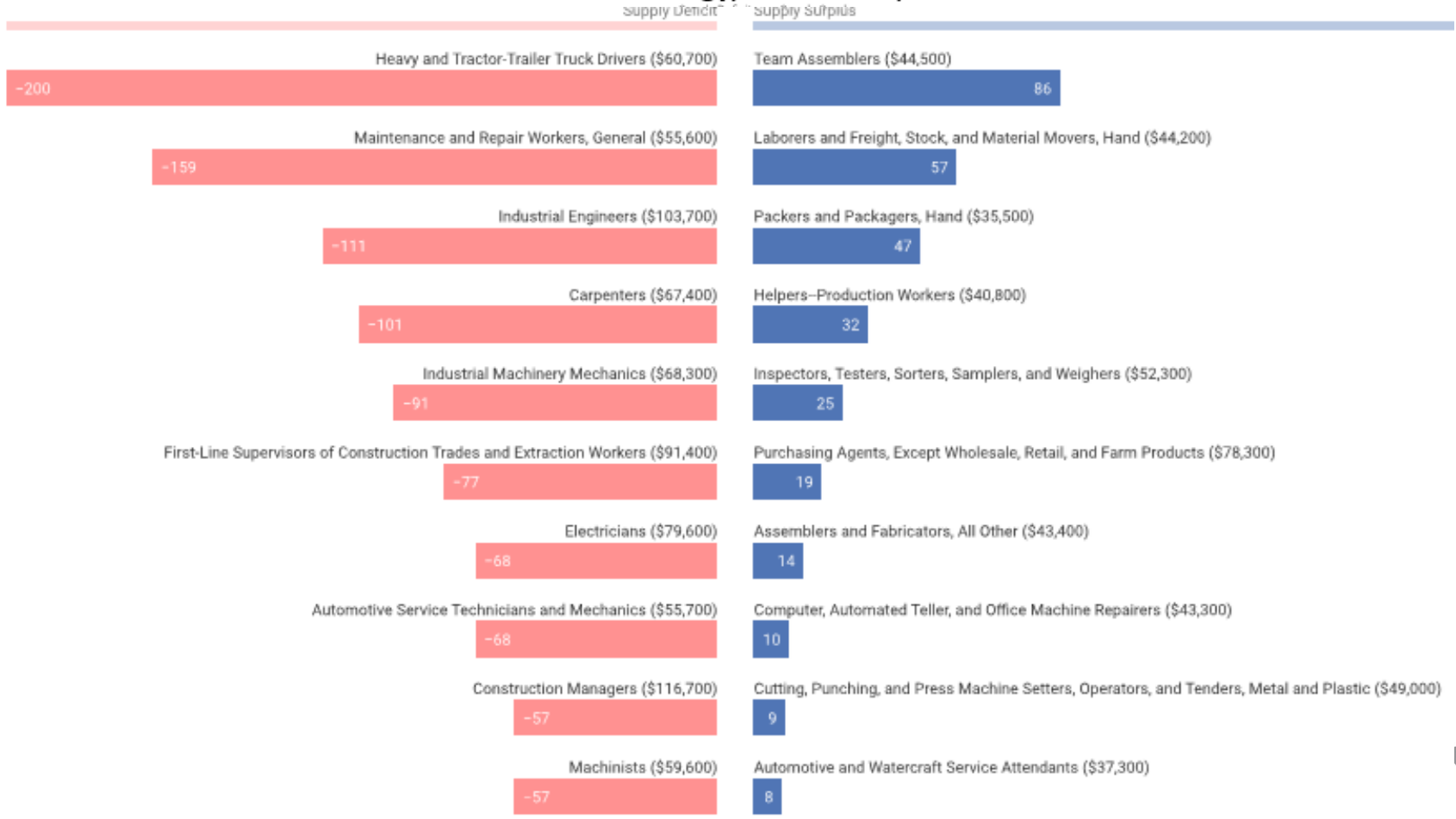
**RealTime Talent**

# Engineering, Manufacturing, & Technology



Minnesota

Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Engineering, Manufacturing, and Technology, Minnesota, 2024Q1



## Demographic Highlight

24.5% Age 55 or older

84.9% Male

84.3% White

8.0% Hispanic/Latinx

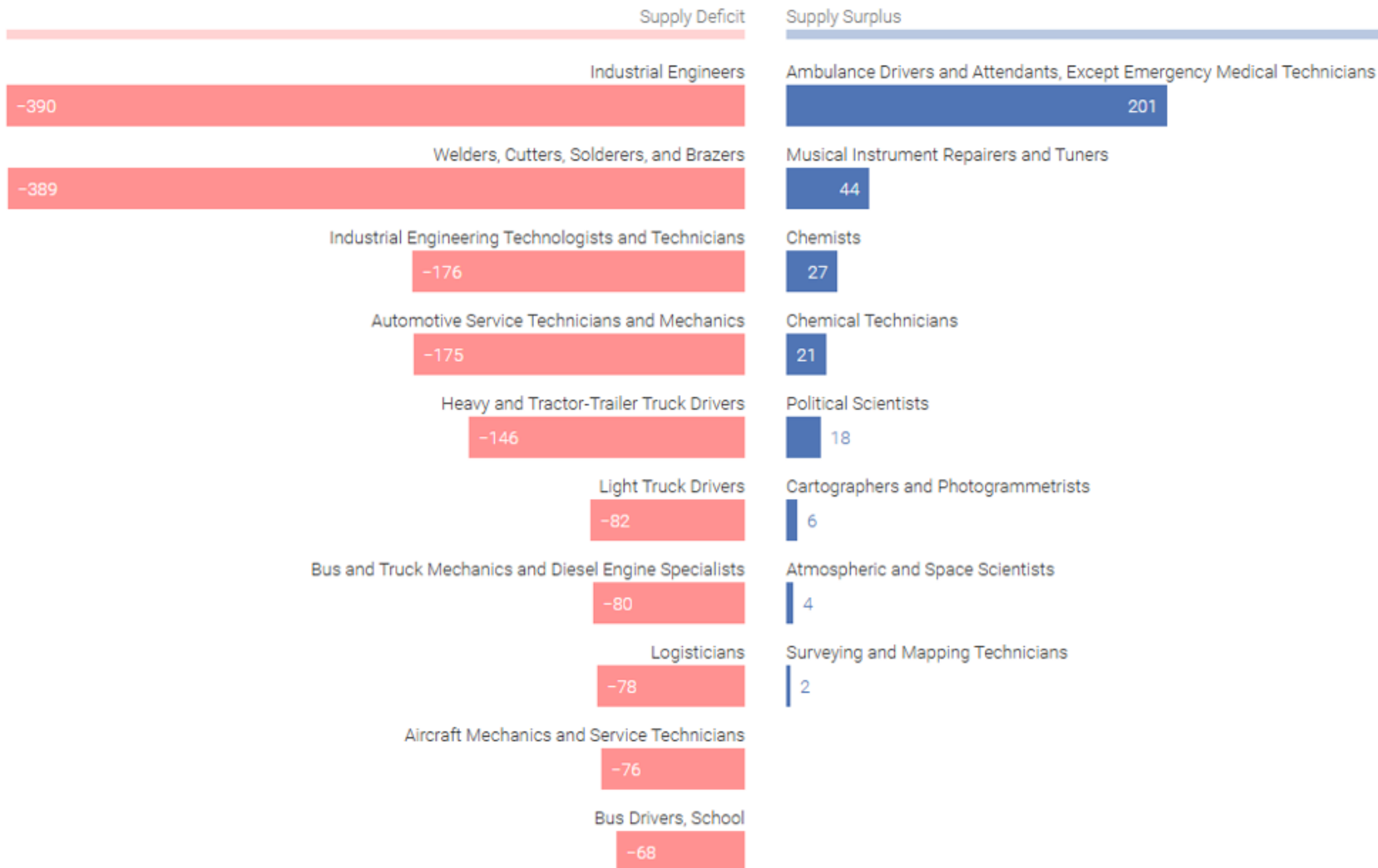


RealTime Talent

# Engineering, Manufacturing, & Technology

## Minnesota

### Award Gaps in Engineering, Manufacturing, and Technology, Minnesota, 2024Q1



### Educational Attainment

- Field with the highest percentage of the workforce who have obtained a high school diploma or less (39%-50% in each region)
- Over 75% of positions typically do not require a postsecondary credential or degree





# Engineering, Manufacturing, & Technology

Minnesota, 2024Q1

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

**Target Occupations (All HW, HS, HD)**  
 Heavy & Tractor-Trailer Truck Drivers (OG, AG)  
 Industrial Engineers (OG, AG)  
 Automotive Service Technicians & Mechanics (OG, AG)  
 Construction Managers (OG, AG)  
 Purchasing Agents, Except Wholesale, Retail, & Farm Products

**Gateway Occupations**  
 Laborers & Freight, Stock, & Material Movers, Hand (HD)  
 Light Truck Drivers (HD, AG)  
 Inspectors, Testers, Sorters, Samplers, & Weighers (HD)  
 School Bus Drivers (HD, AG)  
 Industrial Truck & Tractor Operators (AG)

**Origin Occupations**  
 Team Assemblers  
 Landscaping & Groundskeeping Workers (HD, AG)  
 Packers & Packagers, Hand  
 Packaging & Filling Machine Operators & Tenders (OG)  
 Cleaners of Vehicles & Equipment (HD)

High Location Quotient (LQ) Occupations for Engineering, Manufacturing, and Technology, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Ophthalmic Laboratory Technicians</li> <li>Industrial Engineering Technologists &amp; Technicians</li> <li>Medical Appliance Technicians</li> <li>Photographic Process Workers a&amp; Processing Machine Operators</li> <li>Timing Device Assemblers &amp; Adjusters</li> </ul>	<ul style="list-style-type: none"> <li>Underground Mining Machine Operators, All Other</li> <li>Loading &amp; Moving Machine Operators, Underground Mining</li> <li>Extraction Workers, All Other</li> <li>Continuous Mining Machine Operators</li> <li>Rail Yard Engineers, Dinkey Operators, &amp; Hostlers</li> </ul>	<ul style="list-style-type: none"> <li>Fiberglass Laminators &amp; Fabricators</li> <li>Slaughterers &amp; Meat Packers</li> <li>Woodworking Machine Setters, Operators, &amp; Tenders, Except Sawing</li> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Food Batchmakers</li> </ul>	<ul style="list-style-type: none"> <li>Nuclear Power Reactor Operators</li> <li>Nuclear Technicians</li> <li>Nuclear Engineers</li> <li>Recreational Vehicle Service Technicians</li> <li>Cabinetmakers &amp; Bench Carpenters</li> </ul>	<ul style="list-style-type: none"> <li>Shoe Machine Operators &amp; Tenders</li> <li>Slaughterers &amp; Meat Packers</li> <li>Shoe &amp; Leather Workers &amp; Repairers</li> <li>Meat, Poultry, &amp; Fish Cutters &amp; Trimmers</li> <li>Nuclear Power Reactor Operators</li> </ul>	<ul style="list-style-type: none"> <li>Slaughterers &amp; Meat Packers</li> <li>Meat, Poultry, &amp; Fish Cutters and Trimmers</li> <li>Ambulance Drivers &amp; Attendants</li> <li>Food Processing Workers, All Other</li> <li>Food Cooking Machine Operators &amp; Tenders</li> </ul>

# Engineering, Manufacturing, & Technology

Minnesota

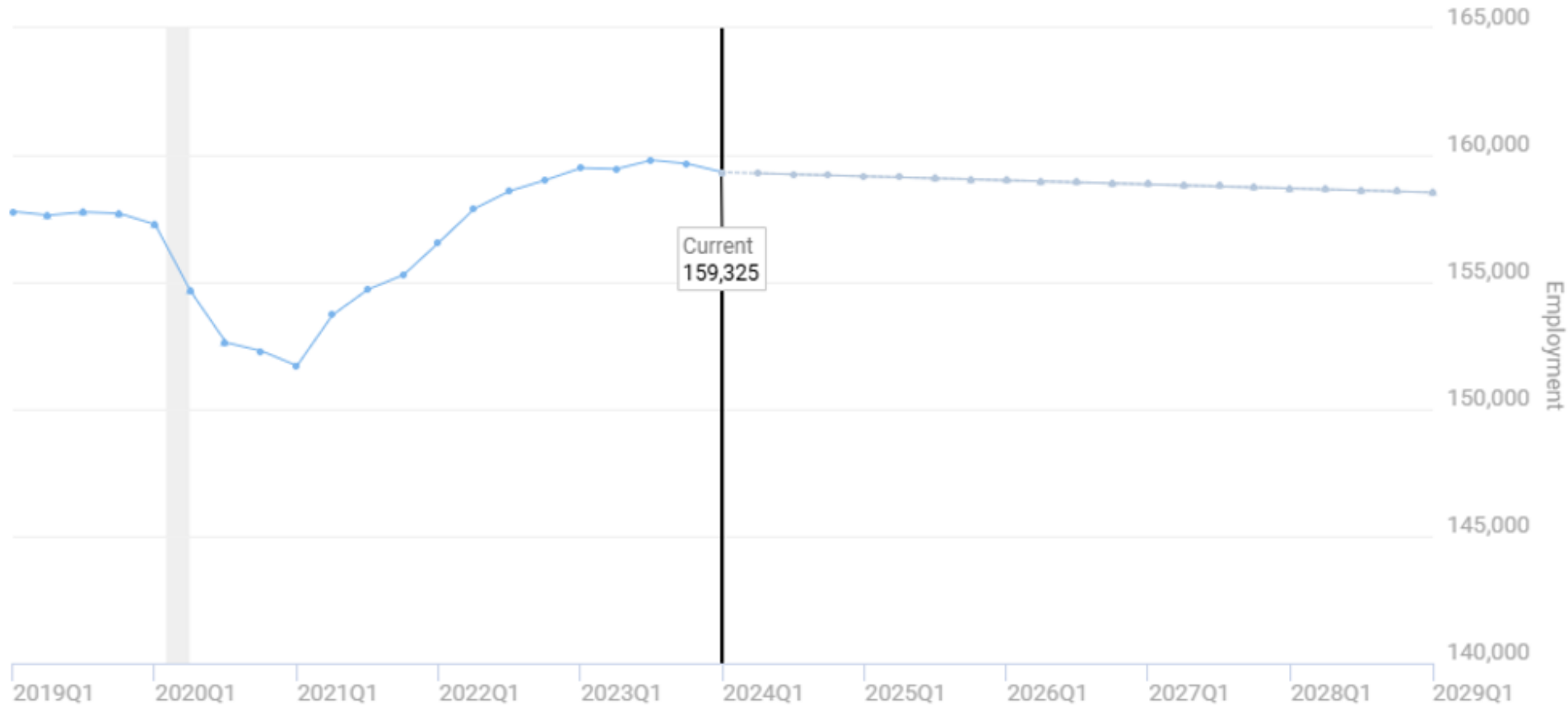
Origin-to-Gateway-to-Target Occupations for Engineering, Manufacturing, and Technology, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$67,100	Field: \$62,000	Field: \$54,200	Field: \$57,400	Field: \$55,300	Field: \$57,900
Une mpl	Region: 2.6% Field: 3.2%	Region: 3.6% Field: 4.2%	Region: 3.2% Field: 3.7%	Region: 3.3% Field: 3.7%	Region: 2.8% Field: 3.3%	Region: 2.3% Field: 2.9%
Origin Occupations	<ul style="list-style-type: none"> <li>• Packers &amp; Packers, Hand</li> <li>• Packaging &amp; Filling Machine Operators &amp; Tenders</li> <li>• Cleaners of Vehicles &amp; Equipment</li> <li>• Shuttle Drivers &amp; Chauffeurs</li> <li>• Couriers &amp; Messengers</li> </ul>	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock Movers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Team Assemblers</li> <li>• Packers &amp; Packers, Hand</li> <li>• Shuttle Drivers &amp; Chauffeurs</li> </ul>	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock, &amp; Material Movers, Hand</li> <li>• Team Assemblers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Food Batchmakers</li> <li>• Packaging &amp; Filling Machine Operators &amp; Tenders</li> </ul>	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock, &amp; Material Movers</li> <li>• Team Assemblers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Packers &amp; Packers, Hand</li> <li>• Packaging &amp; Filling Machine Operators &amp; Tenders</li> </ul>	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock &amp; Material Movers</li> <li>• Team Assemblers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Packers &amp; Filling Machine Operators &amp; Tenders</li> <li>• Slaughterers &amp; Meat Packers</li> </ul>	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock Movers</li> <li>• Team Assemblers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Slaughterers &amp; Meat Packers</li> <li>• Meat, Poultry, &amp; Fish Cutters and Trimmers</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>• Laborers &amp; Freight, Stock &amp; Material Movers, Hand</li> <li>• Team Assemblers</li> <li>• Light Truck Drivers</li> <li>• Landscaping &amp; Groundskeeping Workers</li> <li>• Inspectors, Testers, Sorters, Samplers, &amp; Weighers</li> </ul>	<ul style="list-style-type: none"> <li>• Light Truck Drivers</li> <li>• School Bus Drivers</li> <li>• Industrial Truck &amp; Tractor Operators</li> <li>• Computer Numerically Controlled Tool Operators</li> <li>• Automotive Body &amp; Related Repairers</li> </ul>	<ul style="list-style-type: none"> <li>• Light Truck Drivers</li> <li>• Automotive Service Technicians &amp; Mechanics</li> <li>• School Bus Drivers</li> <li>• Industrial Truck &amp; Tractor Operators</li> <li>• Painters, Construction &amp; Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Light Truck Drivers</li> <li>• School Bus Drivers</li> <li>• Inspectors, Testers, Sorters, Samplers, &amp; Weighers</li> <li>• Cabinetmakers &amp; Bench Carpenters</li> <li>• Industrial Truck &amp; Tractor Operators</li> </ul>	<ul style="list-style-type: none"> <li>• Light Truck Drivers</li> <li>• Inspectors, Testers, Sorters, Samplers, &amp; Weighers</li> <li>• Industrial Truck &amp; Tractor Operators</li> <li>• Production Workers, All Other</li> <li>• Cutting, Punching, &amp; Press Machine Setters, Operators, &amp; Tenders</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance &amp; Repair Workers, General</li> <li>• Construction Laborers</li> <li>• Automotive Service Technicians &amp; Mechanics</li> <li>• Light Truck Drivers</li> <li>• School Bus Drivers</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>• Heavy &amp; Tractor-Trailer Truck Drivers</li> <li>• Industrial Engineers</li> <li>• Automotive Services Technicians &amp; Mechanics</li> <li>• Construction Managers</li> <li>• Purchasing Agents</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy &amp; Tractor-Trailer Truck Drivers</li> <li>• Construction Managers</li> <li>• Industrial Engineers</li> <li>• HVAC Mechanics</li> <li>• Civil Engineers</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy &amp; Tractor-Trailer Truck Drivers</li> <li>• Industrial Engineers</li> <li>• Construction Managers</li> <li>• HVAC Mechanics &amp; Installers</li> <li>• Mechanical Engineers</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy &amp; Tractor-Trailer Truck Drivers</li> <li>• Automotive Service Technicians &amp; Mechanics</li> <li>• Industrial Engineers</li> <li>• Construction Managers</li> <li>• HVAC Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial Engineers</li> <li>• Mechanical Engineers</li> <li>• Logisticians</li> <li>• CNC Tool Programmers</li> <li>• Data Scientists</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy &amp; Tractor-Trailer Truck Drivers</li> <li>• Industrial Engineers</li> <li>• HVAC Mechanics &amp; Installers</li> <li>• Mechanical Engineers</li> <li>• Logisticians</li> </ul>

# Agriculture, Food, & Natural Resources

Minnesota

5-Year Forecast for Agriculture, Food, and Natural Resources Careers, Minnesota, 2024Q1



**2024Q1 Employment: 159,325 (5.1% of MN employment)**

**Median Wage: \$60,900**

**Location Quotient: 0.99**

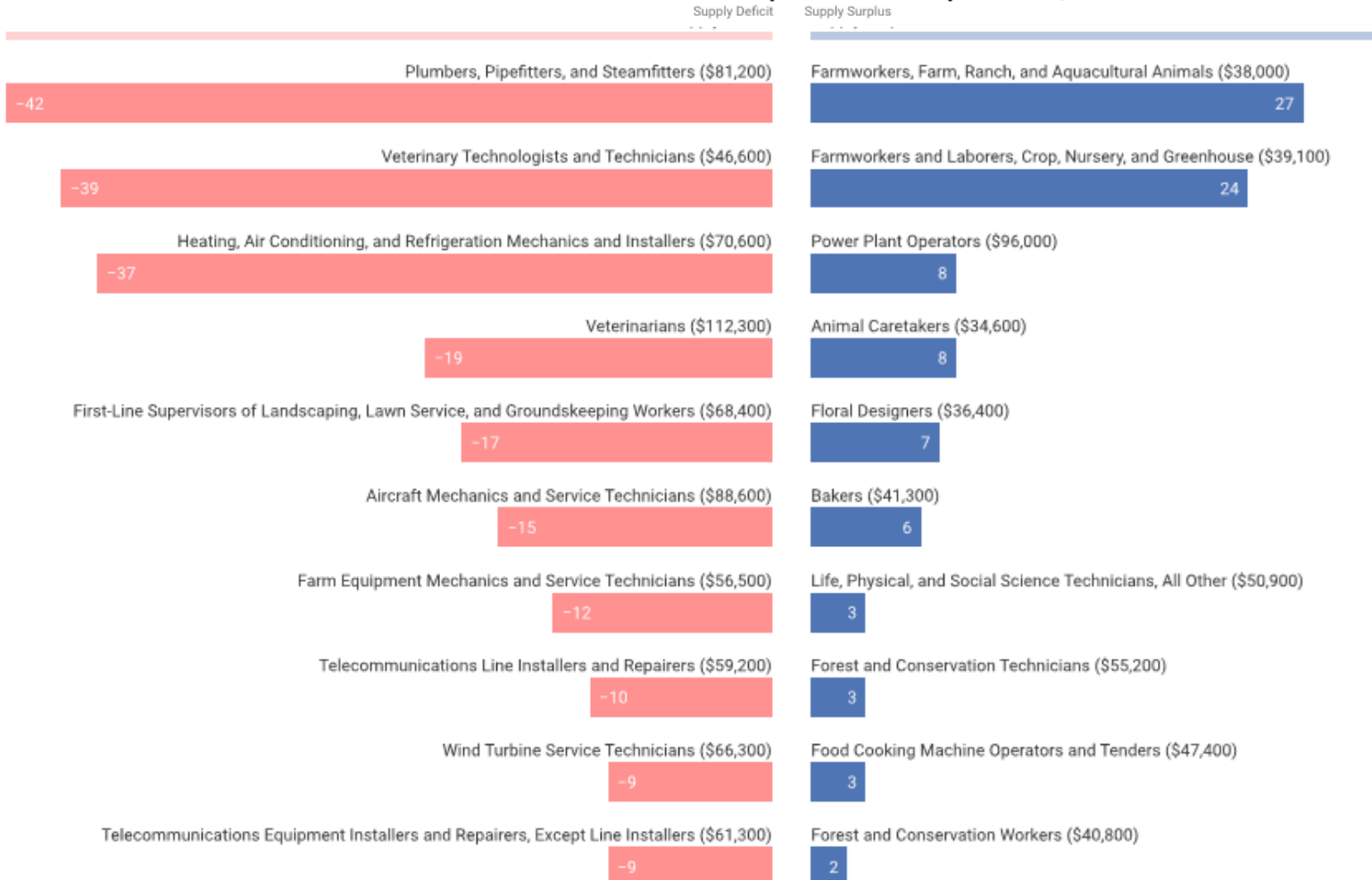


# Agriculture, Food, & Natural Resources



Minnesota

## Annual Average Occupation Gaps (i.e. Talent Shortages) for the next 10 Years in Agriculture, Food, and Natural Resources, Minnesota, 2024Q1



## Demographic Highlight

27.0% Age 55 or older

72.4% Male

88.3% White

8.5% Hispanic/Latinx



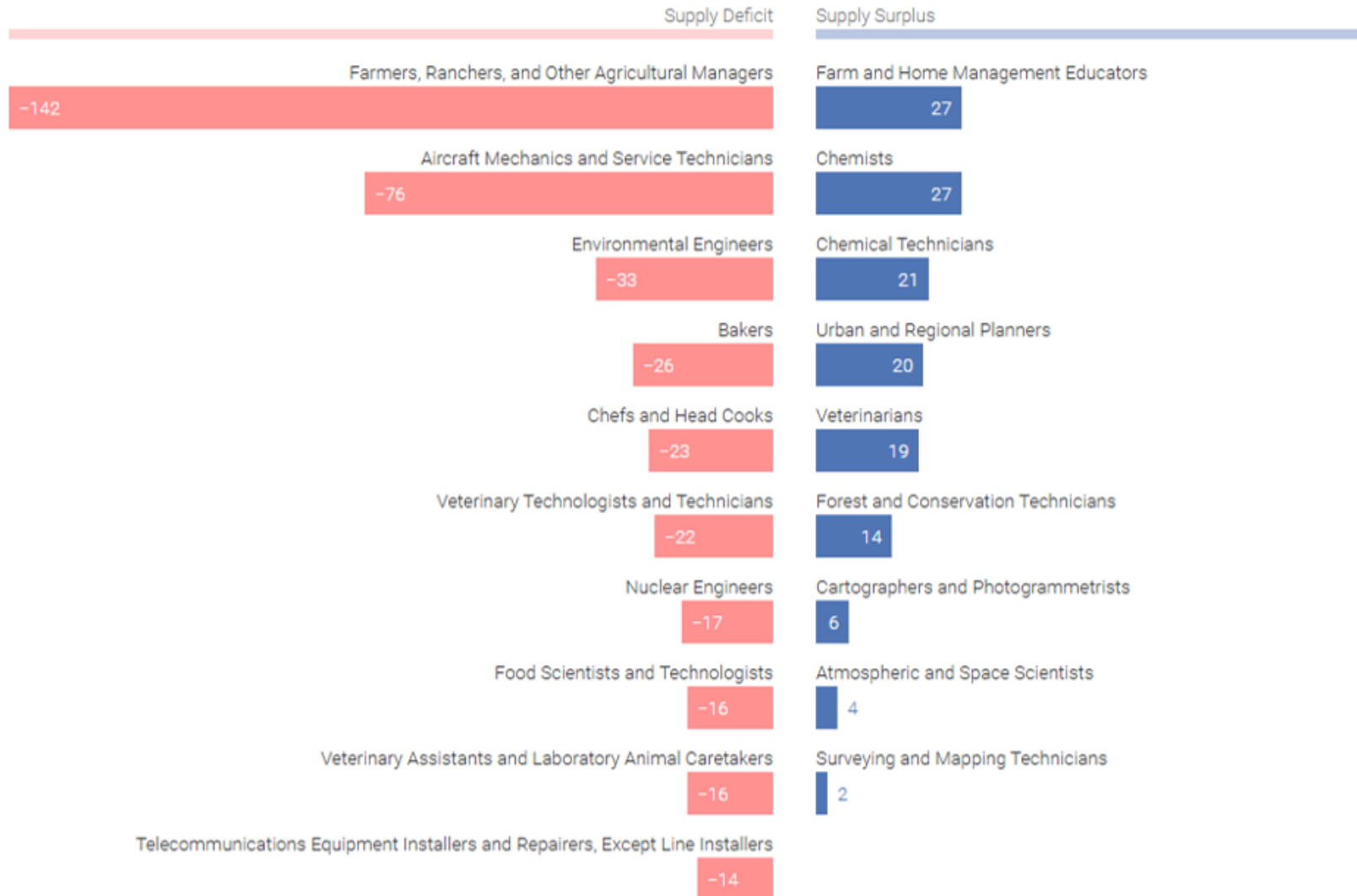
RealTime Talent

# Agriculture, Food, & Natural Resources



Minnesota

**Award Gaps in Agriculture, Food, and Natural Resources, Minnesota, 2024Q1**



## Educational Attainment

- Field with the highest percentage of the workforce who have not yet obtained a high school diploma (11.5% in each region)
- 77.1% of positions typically do not require a postsecondary credential or degree



RealTime Talent

# Agriculture, Food, & Natural Resources

Minnesota, 2024Q1

## Target Occupations (All HW, HS, HD)

HVAC Mechanics (OG)  
 Telecommunications Equipment Installers (OG, AG)  
 Veterinarians (OG)  
 Chemists  
 Environmental Scientists & Specialists (OG, AG)

## Gateway Occupations

Veterinary Technologists & Technicians (HS, HD, OG, AG)  
 Butchers & Meat Cutters (OG)  
 Agricultural Equipment Operator (HD, AG)  
 Life, Physical, & Social Science Technicians (HS, HD, AG)  
 Food Cooking Machine Operators & Tenders (HD)

## Origin Occupations

Landscaping & Groundskeeping Workers (HD, AG)  
 Farmworkers & Laborers, Crop, Nursery, & Greenhouse (AG)  
 Food Batchmakers (HD, OG, AG)  
 Animal Caretakers (HD, AG)  
 Farmworkers, Farm, Ranch, & Aquacultural Animals

HW=High-Wage  
 HS=High-Skill  
 HD=High-Demand  
 OG=Occupation Gaps  
 AG=Award Gaps

High Location Quotient (LQ) Occupations for Agriculture, Food, and Natural Resources, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
LQ > 1.20	<ul style="list-style-type: none"> <li>Hydrologists</li> <li>Animal Scientists</li> <li>Foresters</li> <li>Stationary Engineers &amp; Boiler Operators</li> <li>Food Scientists &amp; Technologists</li> </ul>	<ul style="list-style-type: none"> <li>Mining &amp; Geological Engineers, Including Mining Safety Engineers</li> <li>Logging Equipment Operators</li> <li>Logging Workers, All Other</li> <li>Fallers</li> <li>Stationary Engineers &amp; Boiler Operators</li> </ul>	<ul style="list-style-type: none"> <li>Farmers, Ranchers, &amp; Other Agricultural Managers</li> <li>Farm Equipment Mechanics &amp; Service Technicians</li> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Animal Scientists</li> <li>Food Batchmakers</li> </ul>	<ul style="list-style-type: none"> <li>Nuclear Power Reactor Operators</li> <li>Nuclear Technicians</li> <li>Animal Breeders</li> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Nuclear Engineers</li> </ul>	<ul style="list-style-type: none"> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Animal Breeders</li> <li>Farm Equipment Mechanics &amp; Service Technicians</li> <li>Animal Scientists</li> <li>Meat, Poultry, &amp; Fish Cutters &amp; Trimmers</li> </ul>	<ul style="list-style-type: none"> <li>Meat, Poultry, &amp; Fish Cutters and Trimmers</li> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Animal Breeders</li> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Farmers, Ranchers, &amp; Other Agricultural Managers</li> </ul>



# Agriculture, Food, & Natural Resources

# Minnesota

Origin-to-Gateway-to-Target Occupations for Agriculture, Food, and Natural Resources, By Region 2024Q1

	MSP Metro	Northeast	Northwest	Central	Southwest	Southeast
Mdn. Wage	Field: \$67,600	Field: \$59,600	Field: \$54,300	Field: \$58,700	Field: \$57,700	Field: \$59,400
Unempl	Region: 2.6% Field: 2.8%	Region: 3.6% Field: 3.4%	Region: 3.2% Field: 2.9%	Region: 3.3% Field: 3.0%	Region: 2.8% Field: 2.6%	Region: 2.3% Field: 2.3%
Origin Occupations	<ul style="list-style-type: none"> <li>Animal Caretakers</li> <li>Food Batchmakers</li> <li>Bakers</li> <li>Farmworkers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> <li>Veterinary Assistants &amp; Laboratory Animal Caretakers</li> </ul>	<ul style="list-style-type: none"> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Animal Caretakers</li> <li>Veterinary Technologists &amp; Technicians</li> <li>Bakers</li> <li>Farmworkers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> </ul>	<ul style="list-style-type: none"> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Farmworkers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> <li>Food Batchmakers</li> <li>Meat, Poultry, &amp; Fish Cutters &amp; Trimmers</li> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> </ul>	<ul style="list-style-type: none"> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Farm Workers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Farmworkers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> <li>Meat, Poultry, &amp; Fish Cutters &amp; Trimmers</li> <li>Food Batchmakers</li> </ul>	<ul style="list-style-type: none"> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Food Batchmakers</li> <li>Farmworkers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> <li>Meat, Poultry, &amp; Fish Cutters and Trimmers</li> </ul>	<ul style="list-style-type: none"> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Meat, Poultry, &amp; Fish Cutters &amp; Trimmers</li> <li>Farmworkers, Farm, Ranch, &amp; Aquacultural Animals</li> <li>Food Batchmakers</li> <li>Farm Workers &amp; Laborers, Crop, Nursery, &amp; Greenhouse</li> </ul>
Gateway Occupations	<ul style="list-style-type: none"> <li>Landscaping &amp; Groundskeeping Workers</li> <li>Veterinary Technologists &amp; Technicians</li> <li>Butchers &amp; Meat Cutters</li> <li>Biological Technicians</li> <li>Life, Physical, &amp; Social Science Technicians, All Other</li> </ul>	<ul style="list-style-type: none"> <li>Logging Equipment Operators</li> <li>Butchers &amp; Meat Cutters</li> <li>Biological Technicians</li> <li>Outdoor Power Equipment Mechanics</li> <li>Pesticide Handlers, Sprayers, &amp; Applicators, Vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural Equipment Operators</li> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Logging Equipment Operators</li> <li>Pesticide Handlers, Sprayers, &amp; Applicators, Vegetation</li> <li>Outdoor Power Equipment &amp; Other Small Engine Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Outdoor Power Equipment &amp; Other Small Engine Mechanics</li> <li>Food &amp; Tobacco Roasting, Baking, &amp; Drying Machine Operators &amp; Tenders</li> <li>Logging Equipment Operators</li> <li>Animal Breeders</li> </ul>	<ul style="list-style-type: none"> <li>Butchers &amp; Meat Cutters</li> <li>Food Cooking Machine Operators &amp; Tenders</li> <li>Pesticide Handlers, Sprayers, &amp; Applicators, Vegetation</li> <li>Graders and Sorters, Agricultural Products</li> <li>Outdoor Power Equipment &amp; Other Small Engine Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>Butchers &amp; Meat Cutters</li> <li>Refuse &amp; Recyclable Material Collectors</li> <li>Agricultural Equipment Operators</li> <li>Chemical Technicians</li> <li>Outdoor Power Equipment &amp; Other Small Engine Mechanics</li> </ul>
Target Occupations	<ul style="list-style-type: none"> <li>HVAC Mechanics &amp; Installers</li> <li>Chemists</li> <li>Veterinarians</li> <li>Chemical Technicians</li> <li>Food Science Technicians</li> </ul>	<ul style="list-style-type: none"> <li>HVAC Mechanics</li> <li>Telecommunications Equipment Installers</li> <li>Environmental Scientists &amp; Specialists</li> <li>Chemical Technicians</li> <li>Surveyors</li> </ul>	<ul style="list-style-type: none"> <li>HVAC Mechanics &amp; Installers</li> <li>Telecommunications Equipment Installers &amp; Repairers</li> <li>Environmental Scientists &amp; Specialists</li> <li>Urban &amp; Regional Planners</li> <li>Biological Science Teachers, Postsecondary</li> </ul>	<ul style="list-style-type: none"> <li>HVAC Mechanics</li> <li>Veterinarians</li> <li>Telecommunications Equipment Installers &amp; Repairers</li> <li>Nuclear Engineers</li> <li>Environmental Scientists &amp; Specialists</li> </ul>	<ul style="list-style-type: none"> <li>Veterinarians</li> <li>Food Science Technicians</li> <li>Biological Technicians</li> <li>Biological Science Teachers, Postsecondary</li> <li>Wind Turbine Service Technicians</li> </ul>	<ul style="list-style-type: none"> <li>HVAC Mechanics</li> <li>Telecommunications Equipment Installers</li> <li>Biological Technicians</li> <li>Conservation Scientists</li> <li>Wind Turbine Service Technicians</li> </ul>

# Summary and Discussion

# Thank you!

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# Appendix

