Metro Kansas City's Traded Cluster Assets

in talent, innovation, and opportunity

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KC Rising Traded Sector Task Force
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Objectives

1. Review quantitative findings on sector opportunity, talent, and innovation factors.

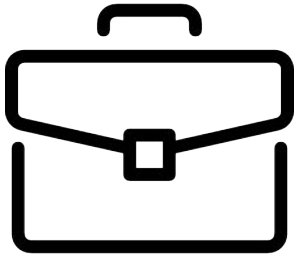
2. Narrow focus for further qualitative analysis and data questions.

Identifying traded sector strategies requires multiple lenses

- Distinct competitive advantage – "where KC is a differentiator"
- Not tied to traditional industry – where the world is going
- Beyond something "we are good at" – rallying cry for a strong recovery
- Advancing Horizon Goals – attract talent, high-value productivity, self-sustaining households, shared prosperity (Black-white wealth gap)

Now versus Next?

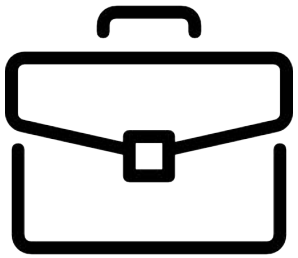
Leveraging assets to grow good jobs in traded clusters



Opportunity

Talent

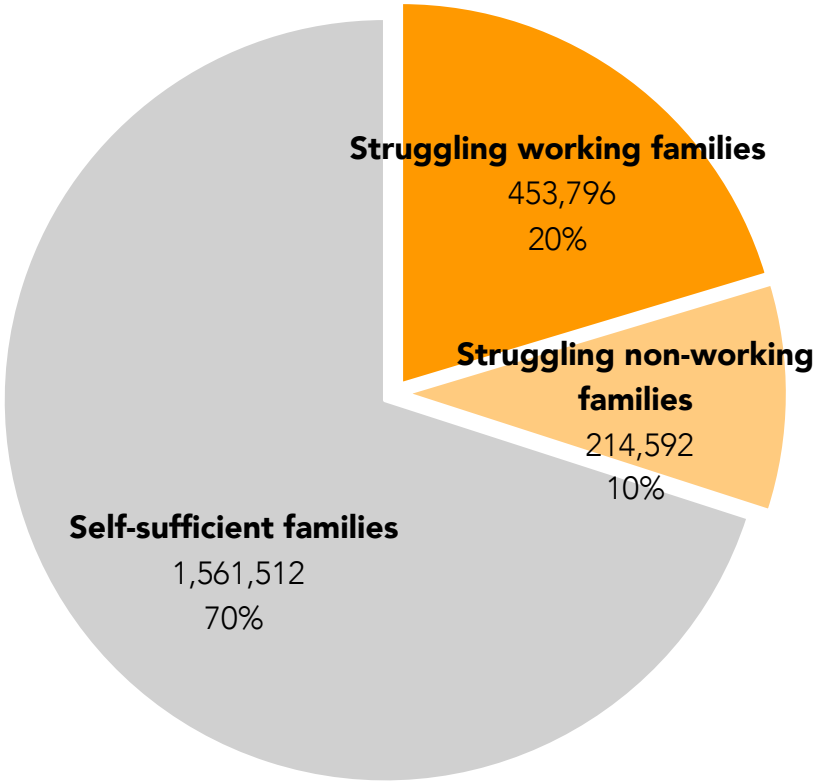
Innovation



Opportunity

30%

of Metro Kansas City residents belonged to families that struggled to make ends meet in 2019



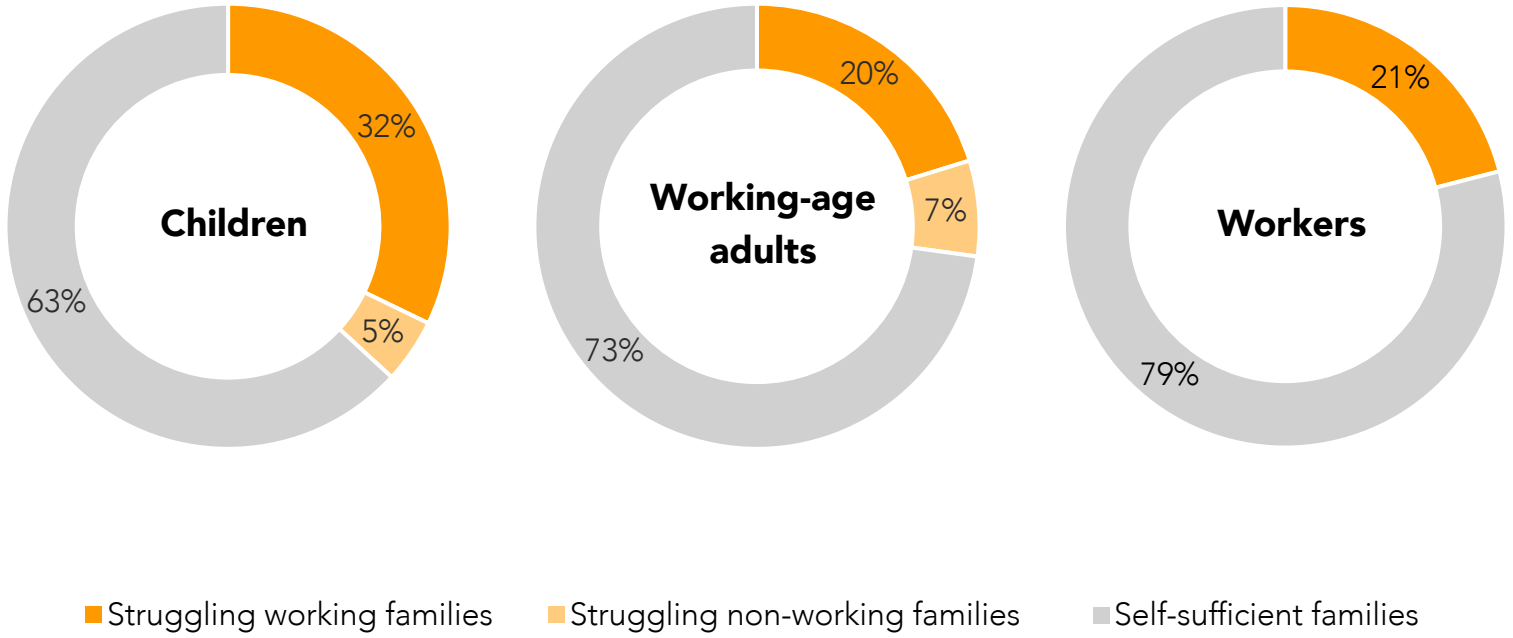
Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

One-in-three children belong to a struggling *working* family

The likelihood of belonging to a family that struggles to make ends meet varies by age group:

- 37% of children in metro Kansas City belong to a struggling family; 32% belong to struggling *working* families
- 27% of working-age adults aged 18 to 64 years belong to a struggling family; 20% belong to a struggling *working* family
- About one-fifth of adult workers struggle to make ends meet for their families

These differences mean that children are overrepresented in struggling families, comprising close to 40% of people in struggling working families, although they account for just 24% of the metro area's total population.



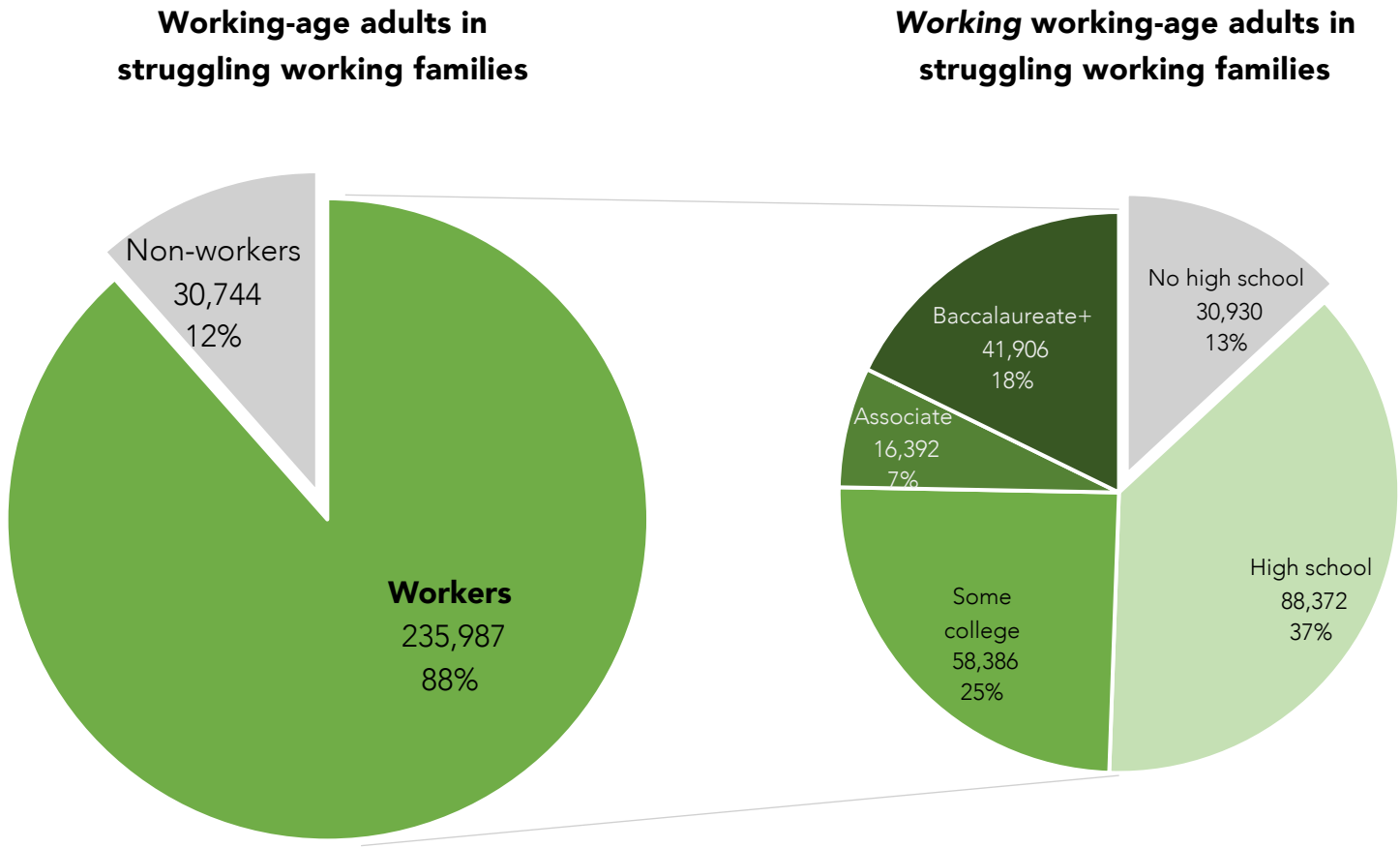
Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

The vast majority of struggling working-age adults participate in the labor market

Struggling adult workers represent an important target audience for efforts to increase the economic security of Kansas City families. Their earnings support most people and, more crucially, most children in struggling families.

- Adults who are employed or looking for work **comprise 88% of all working-age adults** in struggling working families.
- Half of those workers have at least some post-secondary education; Another 37% have a high school diploma or equivalent.

About 205,000 of the 267,000 or 77% of the working-age adults in metro Kansas City's struggling working families have credentials and are actively participating in the labor force yet still struggle to make ends meet for their families.



Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

Struggling workers may face different types of barriers to opportunity than their peers

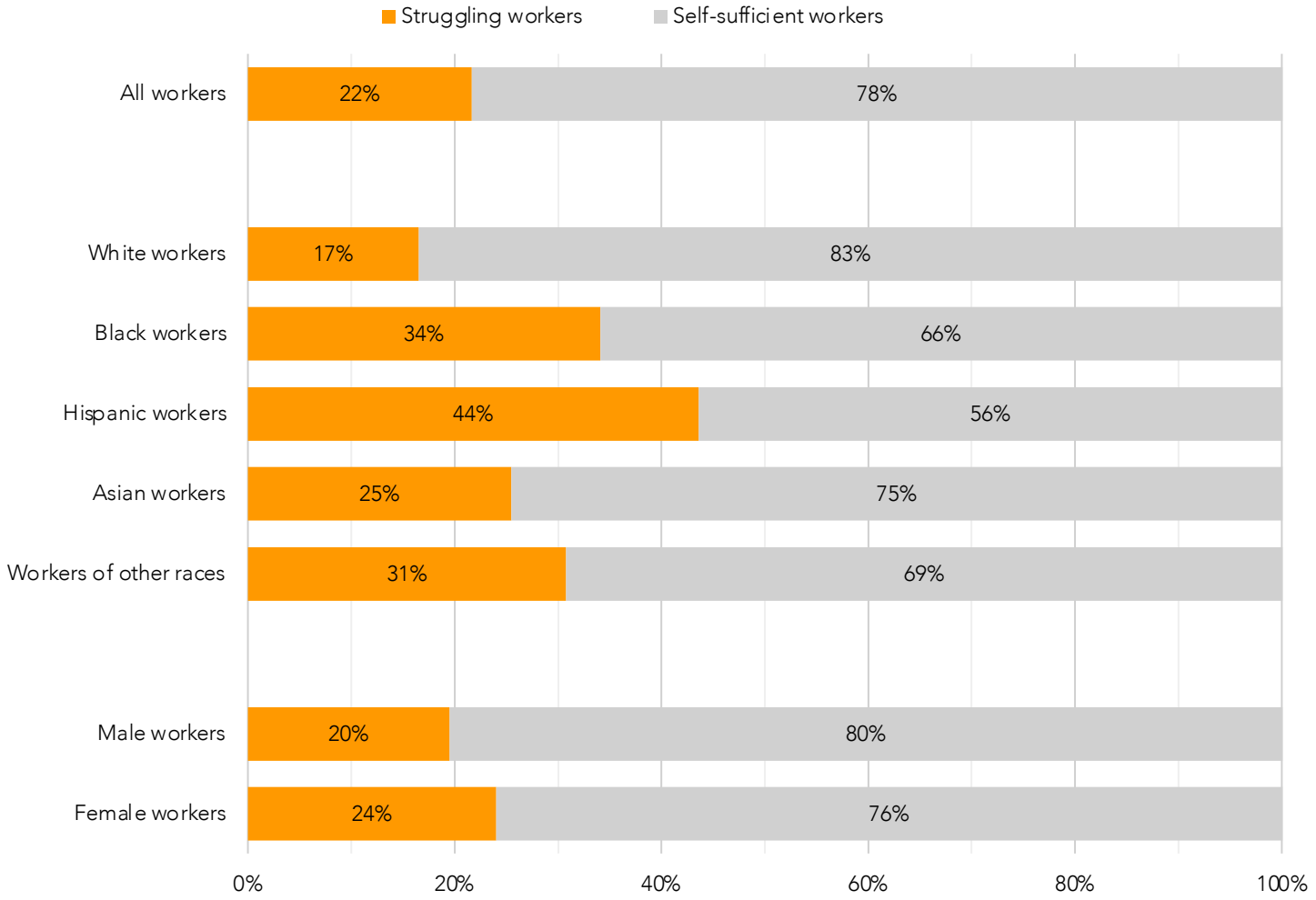
Women and workers of color are more likely to struggle to make ends meet for their families than their peers.

- Women are 20% more likely to struggle to make ends meet than men.
- Black and Hispanic workers are *more than twice as likely* to struggle to make ends meet than white workers.

One reason female workers are more likely to struggle is that a higher share are single parents compared to men, meaning they need to earn more to make ends meet.

Racial and ethnic disparities have myriad causes. One is that workers of color skew younger than white workers. Another is that structural, self-reinforcing barriers to education lead to lower educational attainment among workers of color.

Share of workers that struggle to make ends meet by race, ethnicity, and sex



Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

The self-sufficiency wage varies among people who struggle to make ends meet

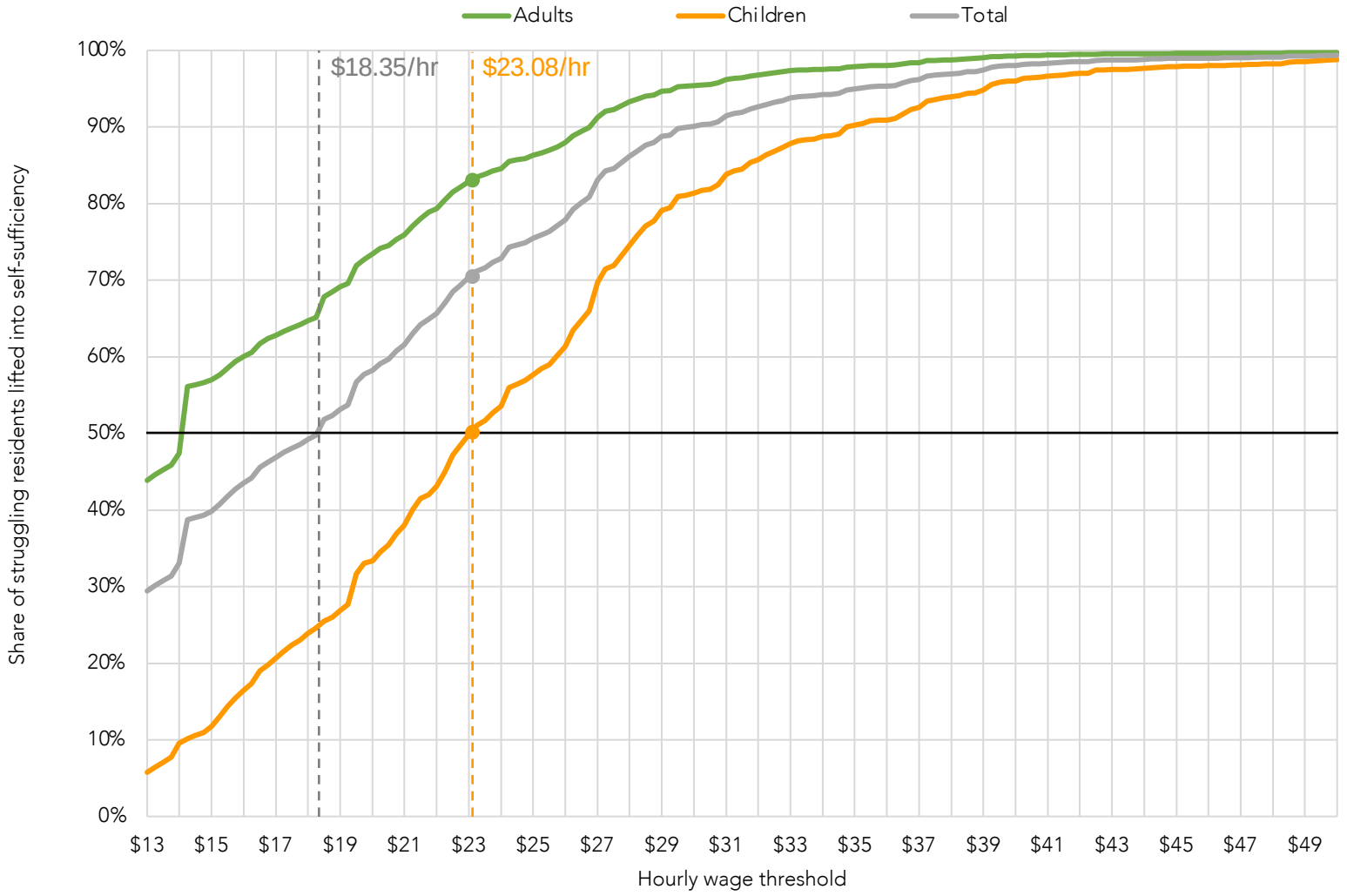
Because different family compositions require different levels of income to make ends meet, there is not one target wage for that enables self-sufficiency for all.

Decisionmakers must decide on how to settle on a wage level for "good jobs" based on how many individuals or families would be made self sufficient.

- A wage of $23 per hour on a full-time year-round basis would make the families of a majority of struggling children self-sufficient.
- At wage of $18.35 per hour would make a majority of all people in struggling would families self-sufficient.

Tying the region's economic development goals to the future of its struggling children is ambitious but can keep efforts focused on strategies that have the highest impact.

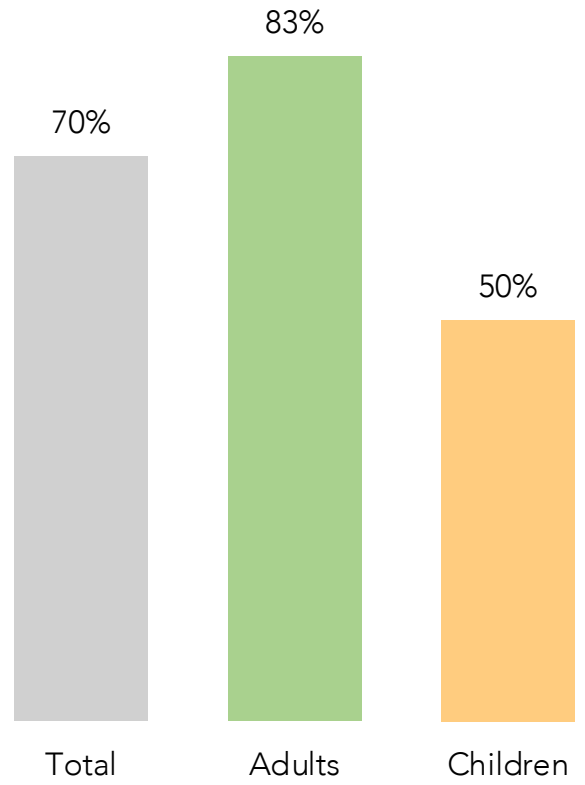
Impact of wage on the share of metro Kansas City's struggling people made self-sufficient



Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

$23 per hour

would make the families of half of metro Kansas City's struggling children self-sufficient



Share of population in struggling working families lifted into self-sufficiency

Source: Authors' analysis of American Community Survey public-use microdata and the University of Washington Sufficiency Standard.

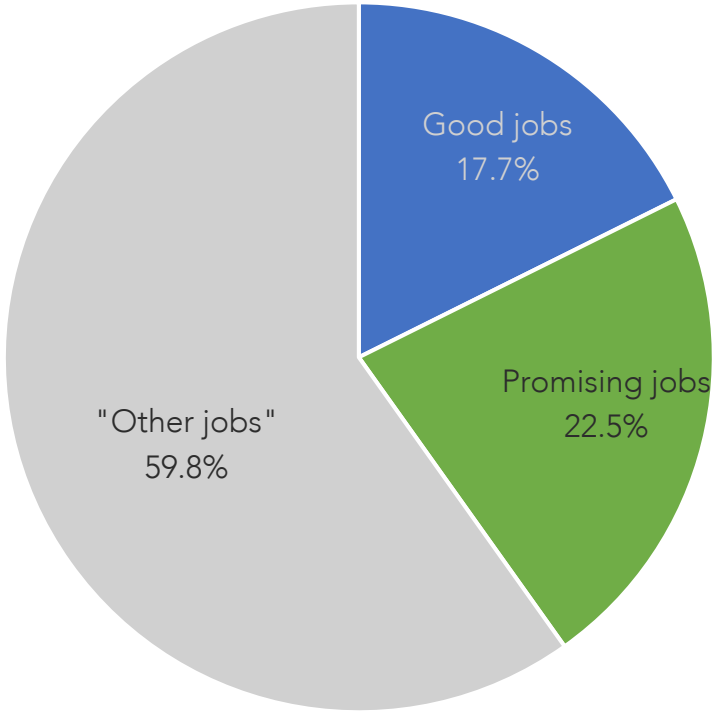
About 18% of the region's jobs are "good" or "promising"

Good and promising jobs provide pathways to economic security and self-sufficiency.

- A **good job** pays at least $23 per hour or $46,920 per year, provides employer-sponsored health insurance, and provides durable opportunity.
- A **promising job** provides career pathways that will lead to a good job within 10 years.
- "**Other jobs**" do not meet all the criteria of a good job nor do they provide pathways to good jobs.

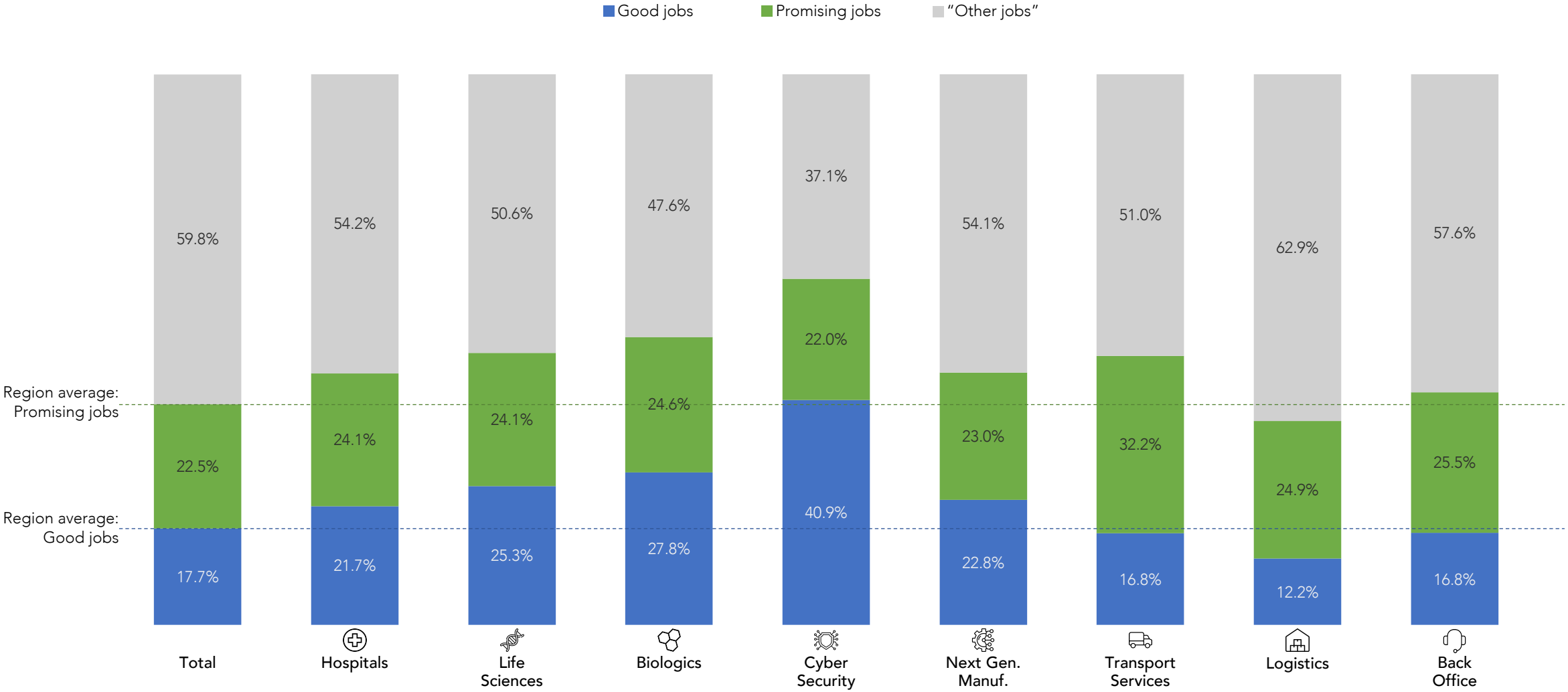
A person who holds a good job will earn enough income and benefits that she will be ineligible for state-run Medicaid or SNAP programs.

Share of metro Kansas city's jobs, 2019



Source: Authors' analysis; see Shearer & Shah, "Opportunity Industries", Brookings.

Share of jobs that are good or promising by cluster, 2019



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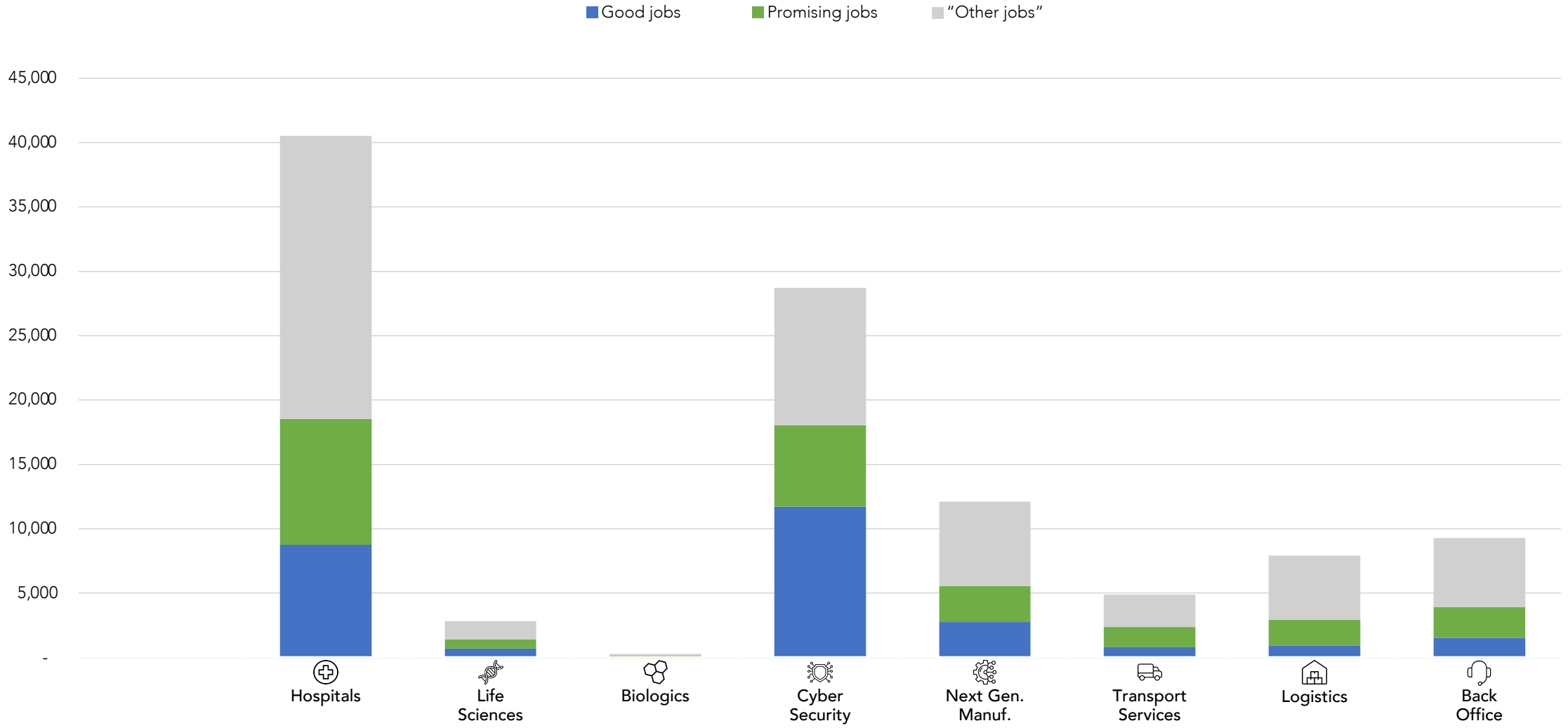
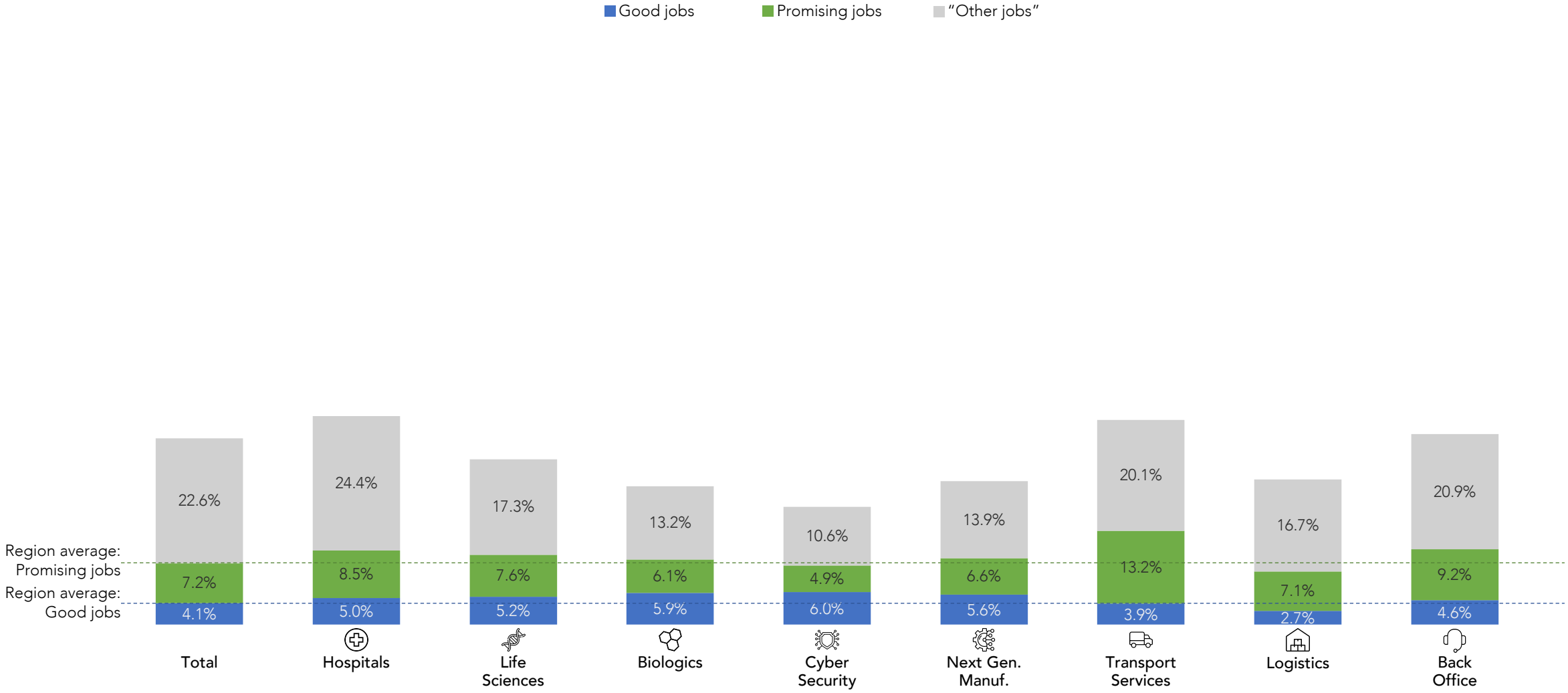


Source: Authors' analysis; see Shearer & Shah, "Opportunity Industries", Brookings.

Share of jobs held by middle-skilled workers that are good or promising by cluster, 2019



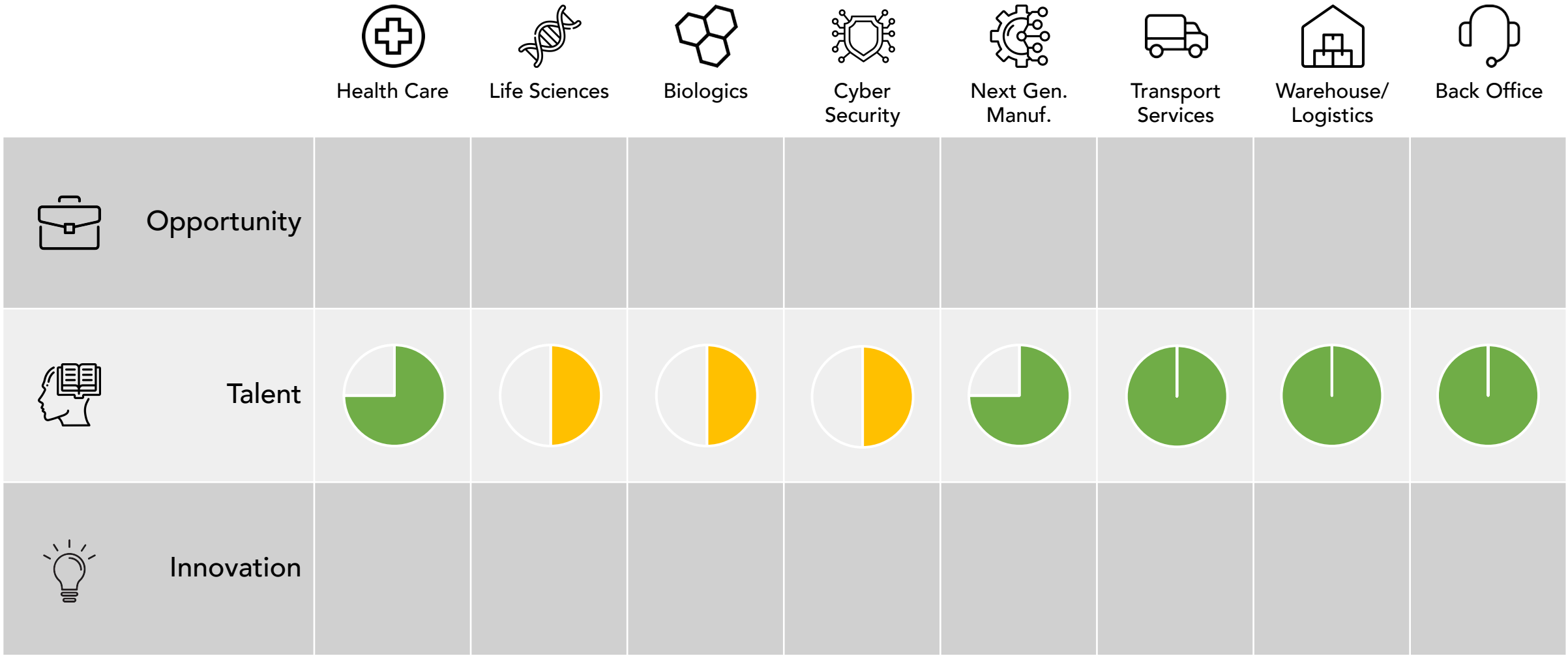
Source: Authors' analysis; see Shearer & Shah, "Opportunity Industries", Brookings.

Most of these clusters concentrate good and promising jobs

	Health Care	Life Sciences	Biologics	Cyber Security	Next Gen. Manuf.	Transport Services	Warehouse/ Logistics	Back Office
Opportunity								
Talent								
Innovation								

Talent

The region has the talent to compete in most clusters

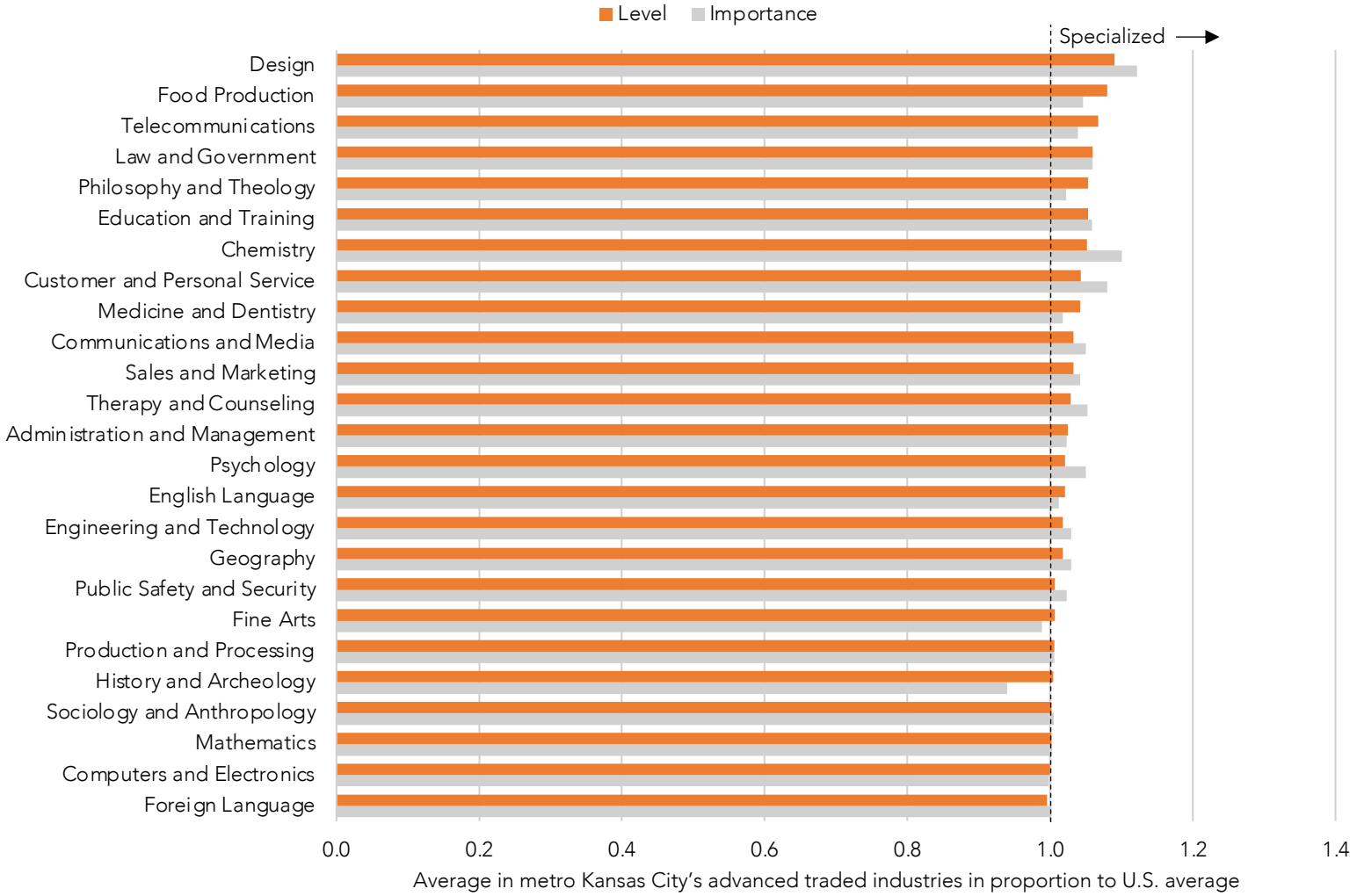


Traded sector workers possess specialized knowledge that reflects the role of these clusters

Metro Kansas City's traded sector workforce contains outsized ***levels*** of knowledge in certain fields, which are also more ***important*** to the work of these clusters compared to the nation:

- Traded sector workers have high levels of knowledge in fields the region is well known for, including design, food, telecommunications, and medicine.
- Other specialized fields indicate how metro Kansas City's traded clusters produce innovation, such as through chemistry, engineering, and the arts.
- Fields such as law and government, philosophy, customer service, and administration and management indicate the headquarters- and service-orientation of the region's existing traded clusters.

Metro Kansas City's traded sector ***knowledge specializations*** compared to the United States



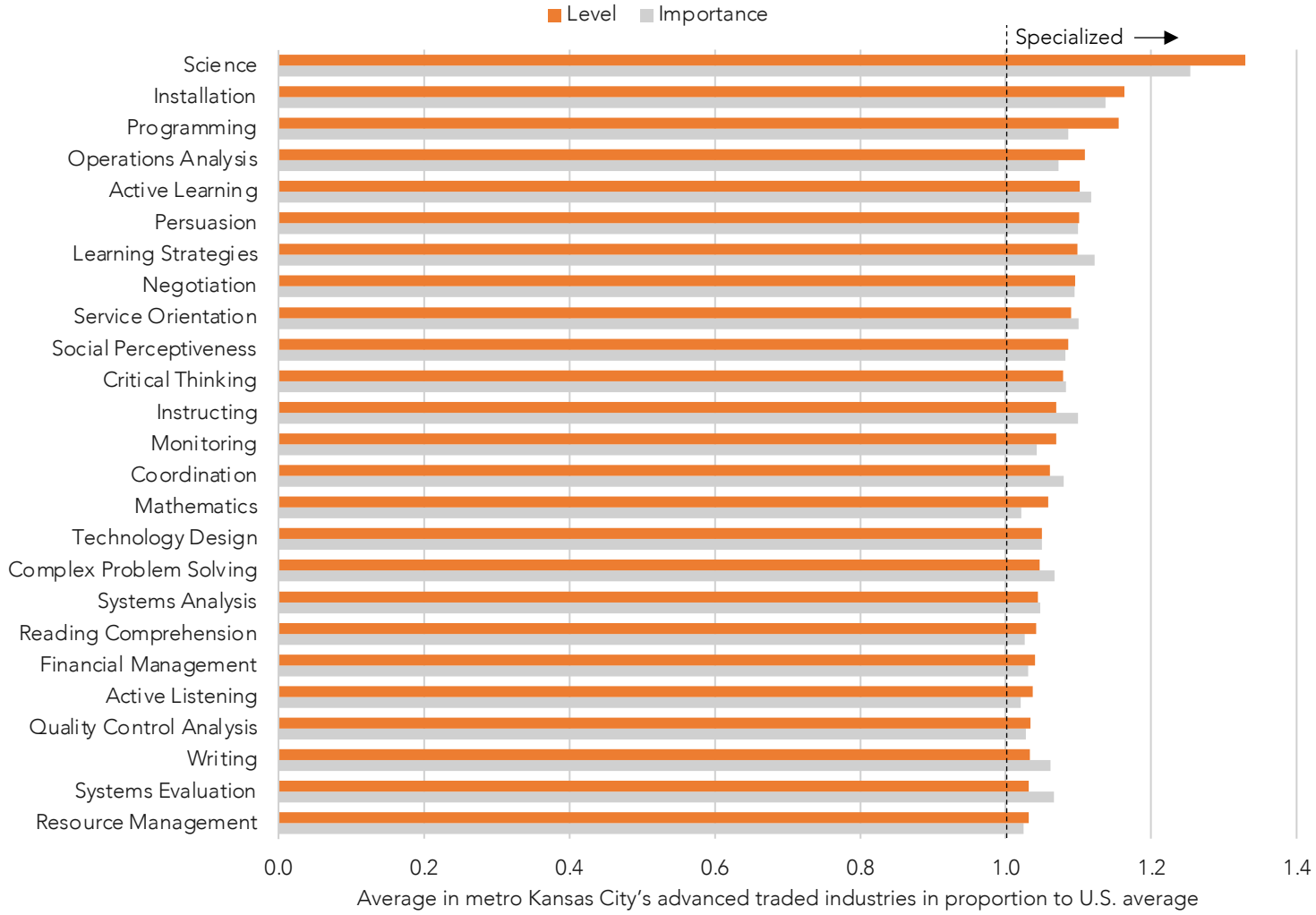
*Source: Authors' analysis of O*Net, Emsi, and U.S. Clusters Mapping Project data.*

Workers in traded clusters specialize in reasoning, social, learning, and technical skills

Certain skills are also more essential to metro Kansas City's existing traded clusters:

- ***Reasoning skills*** such as science (deduction), critical thinking, and problem solving suggest ***discovery and innovation*** are especially crucial.
- ***Social skills*** including persuasion, negotiation, listening, and perception underscore the essential roles of ***communication and leadership***.
- ***Technical skills*** such as installation, programming, specific types of analysis and evaluation, and service indicate that clusters may require advanced training.
- Active learning, learning strategies, instruction, and social skills underscore the ***essential role of knowledge and continuous learning***.

Metro Kansas City's traded cluster ***skills specializations*** compared to the United States



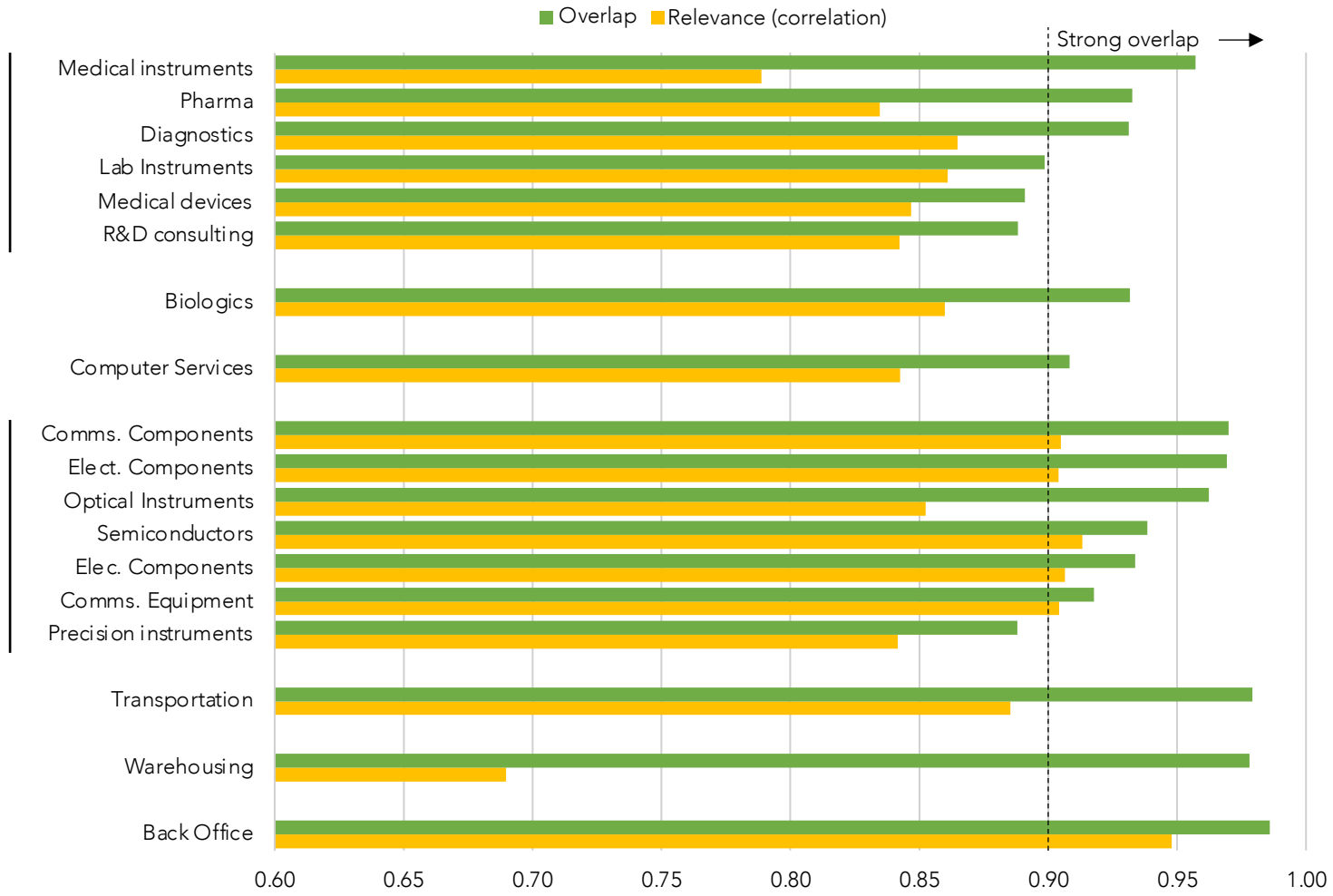
*Source: Authors' analysis of O*Net, Emsi, and U.S. Clusters Mapping Project data.*

Metro Kansas City's specialized human capital is relevant to other traded clusters…

Metro Kansas City can leverage its human capital strengths to grow traded clusters:

- Many medical product manufacturing sector needs can be met by existing human capital, but worker capabilities may be better suited to other sectors.
- Biologics and cyber security require human capital that can largely be met by the existing workforce, though there may be gaps in specialized areas.
- Next Gen.'s human capital requirements are highly correlated with the average worker and easily met by existing human capital in the region.
- Transportation, warehousing, and back office clusters entail many low-skill jobs, making them exceedingly easy to fill but ill-suited to the capabilities of the average worker.

Metro Kansas City's traded clusters human capital compared to other clusters



*Source: Authors' analysis of O*Net, Emsi, and U.S. Clusters Project data.*

Talent

Key findings:

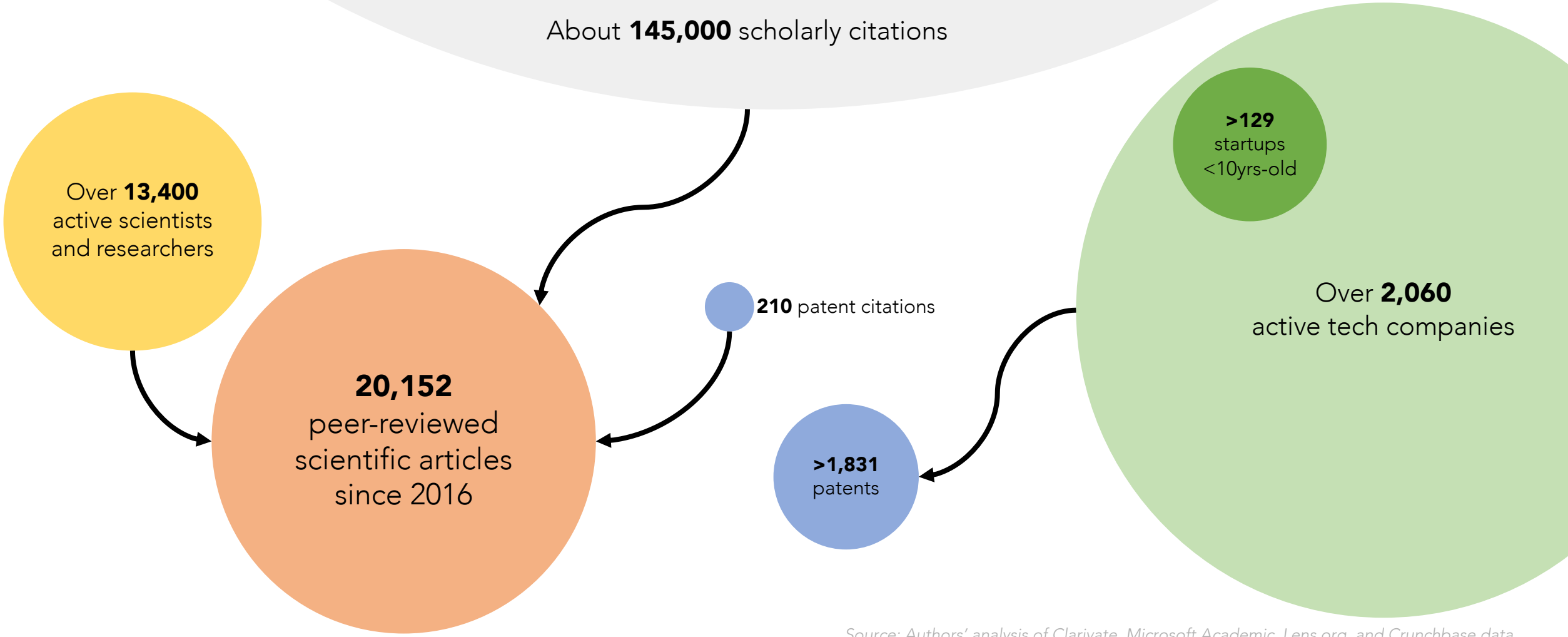
- Metro Kansas City's traded clusters show a strong orientation toward design, telecommunications, chemistry, medicine, and engineering
- They also contain very strong capacities in reasoning, learning, technical, and social skills
- The region's existing traded sector workforce meets at least 90% of human capital requirements in the cluster options being considered.
- However, the existing workforce appears to specialize in knowledge and skills that are not as relevant to the needs of these cluster options.
- Mismatch between workers' specializations and clusters' needs is greatest in warehousing and transportation.
- The small human capital gaps in high-tech clusters such as life science, biologics, and "Next Gen" could require extensive training in very specific skills.
- The human capital required by high-tech clusters is evolving, which makes continuous learning crucial.

Innovation

Innovation in the region is focused in one set of clusters

	Health Care	Life Sciences	Biologics	Cyber Security	Next Gen. Manuf.	Transport Services	Warehouse/ Logistics	Back Office
Opportunity								
Talent								
Innovation								NA

Metro Kansas City contains a lot of R&D activity…



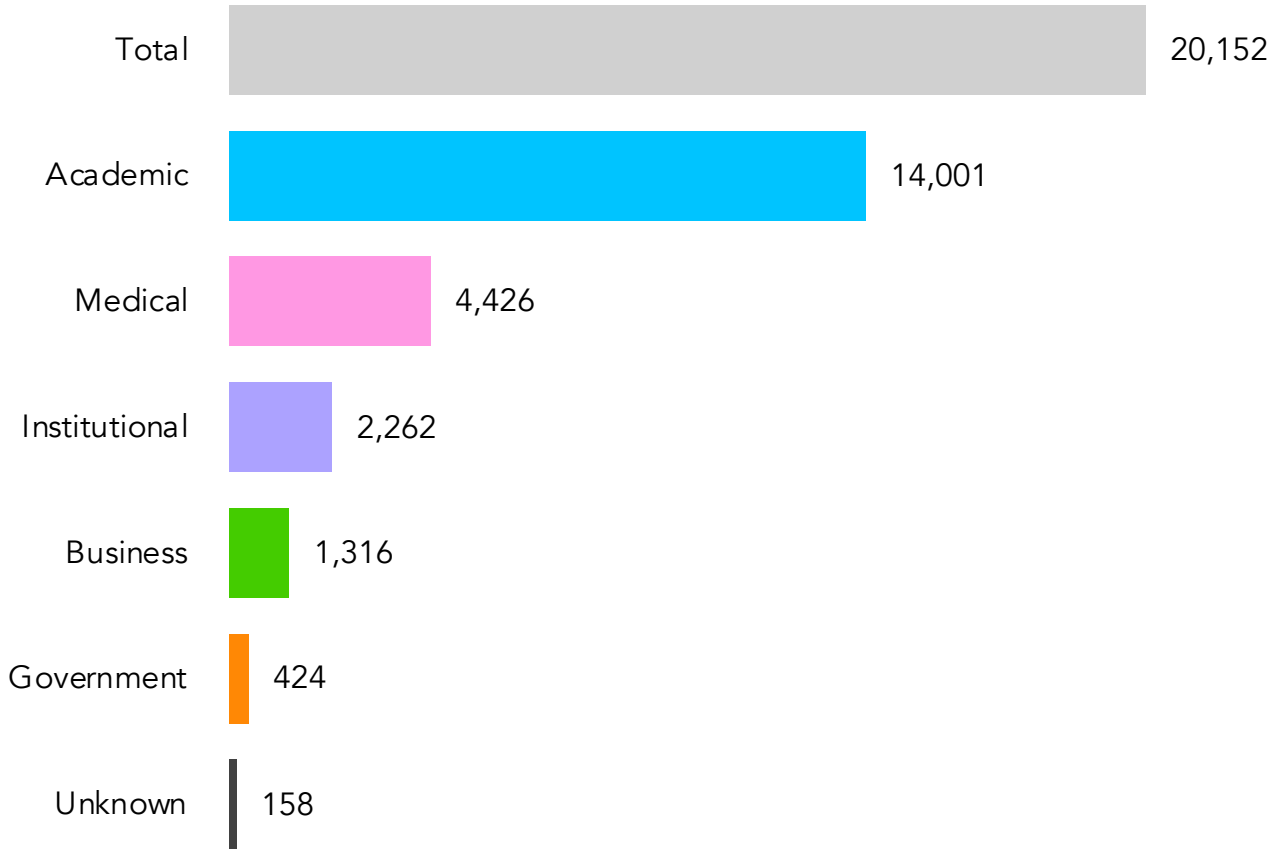
Source: Authors' analysis of Clarivate, Microsoft Academic, Lens.org, and Crunchbase data.

Academic and medical institutions publish the most peer-reviewed articles

Colleges, universities and metro Kansas City's leading hospitals are its R&D powerhouses.

- **KU and UMKC published close to 7,800 and 5,700 articles from the metro area,** respectively (including their affiliated medical centers).
- As a group, non-academic medical centers including **St. Luke's, the VA, and specialized clinical care facilities** and offices published over **4,400 articles**.
- Institutions are also major R&D players. **The Mid America Heart Institute and Stowers published 855 and 544 articles,** respectively.
- Businesses such as **Cerner, Honeywell, MRI, and IQVIA each published over 50 articles**.

Metro Kansas City's peer-reviewed articles by type of publishing organization, 2016 to 2020*



* Counts sum to more than the total because of collaboration between different types of organizations.

Source: Authors' analysis of Clarivate data.

Business groups are major behind-the-scenes players in the region's scientific research

Businesses located in the Kansas City metro area published less than 7% of its peer-reviewed articles from 2016 to 2020.

However, business groups play a significant hidden role in the region's R&D:

- 5,133 or over 25% of the region's peer-reviewed articles are sponsored or co-authored by businesses.
- Life sciences companies are the most common business sponsors, including AstraZeneca, Bayer, Merck, Pfizer, GSK, Eli Lilly, AbbVie, Amgen, Novartis, Regeneron, and GE Health.
- The share of the region's research conducted with business is almost certainly higher then the U.S. average, which ***suggests a strong orientation toward translational research***.

Source: Authors' analysis of Clarivate and Lens.org data

R&D collaboration is common but opportunistic in the region

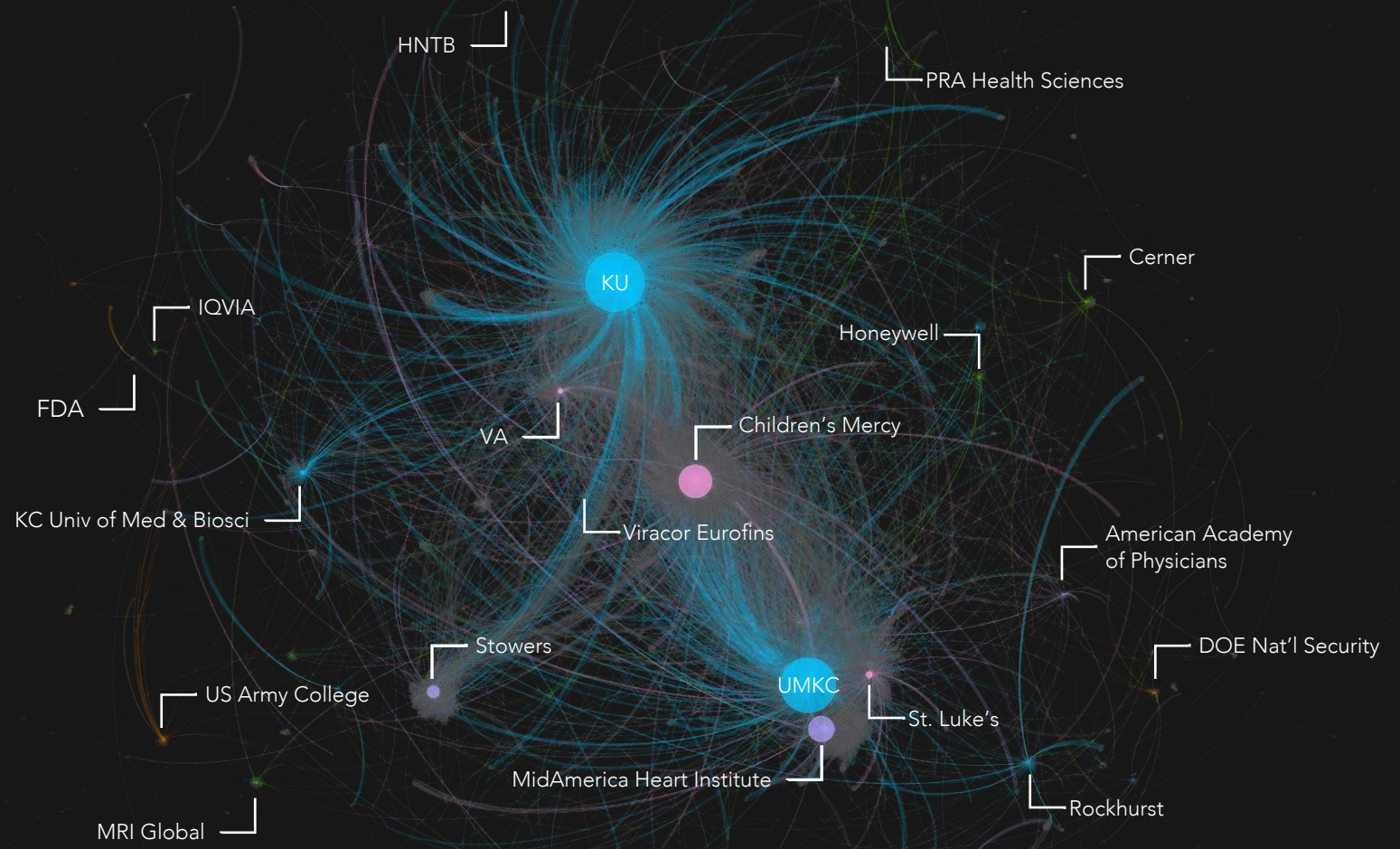
This network shows the extent of collaboration between organizations. Organizations that collaborate more frequently appear closer to each other.

Organizations are differentiated by type:

- Academic and affiliated institutions
- Medical centers
- Other institutions
- Businesses
- Government
- Authors

The compactness of this network indicates that collaboration is common.

The weak structure of the network indicates collaboration is not organized but is instead opportunistic. The network contains few clusters and connections run perpendicular to the center.



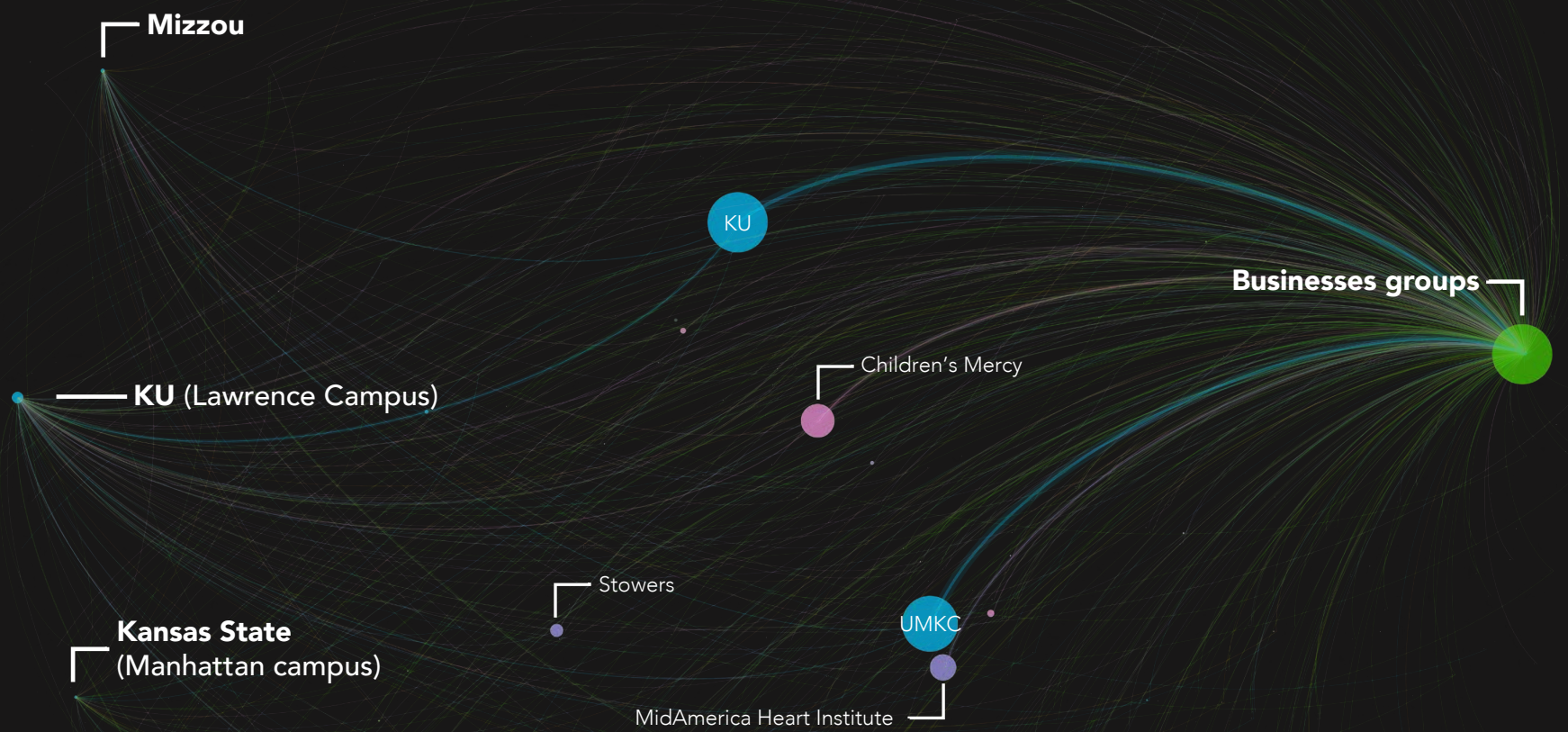
Note: Node size indicates number of citations.
Source: Authors' analysis of Clarivate data.

Business groups play a larger role in the region's R&D than neighboring universities

Business groups share some affiliation to at least one quarter of metro Kansas City's peer-reviewed articles published from 2016 through 2020. This is more extensive than the roles played by major land grant universities near the metro area.

- Business groups sponsored or co-authored 5,133 articles with metro Kansas City- based researchers during this period.
- Researchers from KU's campus in Lawrence co-authored 687 articles with researchers in the region, including those who are affiliated with KU's campuses in the region.
- Mizzou researchers at the Columbia campus co-authored 286 articles with researchers in the region.
- Kansas State researchers in Manhattan co-authored 144 articles with researchers in the region.

Articles affiliated with business groups are more *impactful*, garnering more than twice as many citations as articles published by or with other types of organizations, on average.



Note: Node size indicates number of citations.
Source: Authors' analysis of Clarivate data.

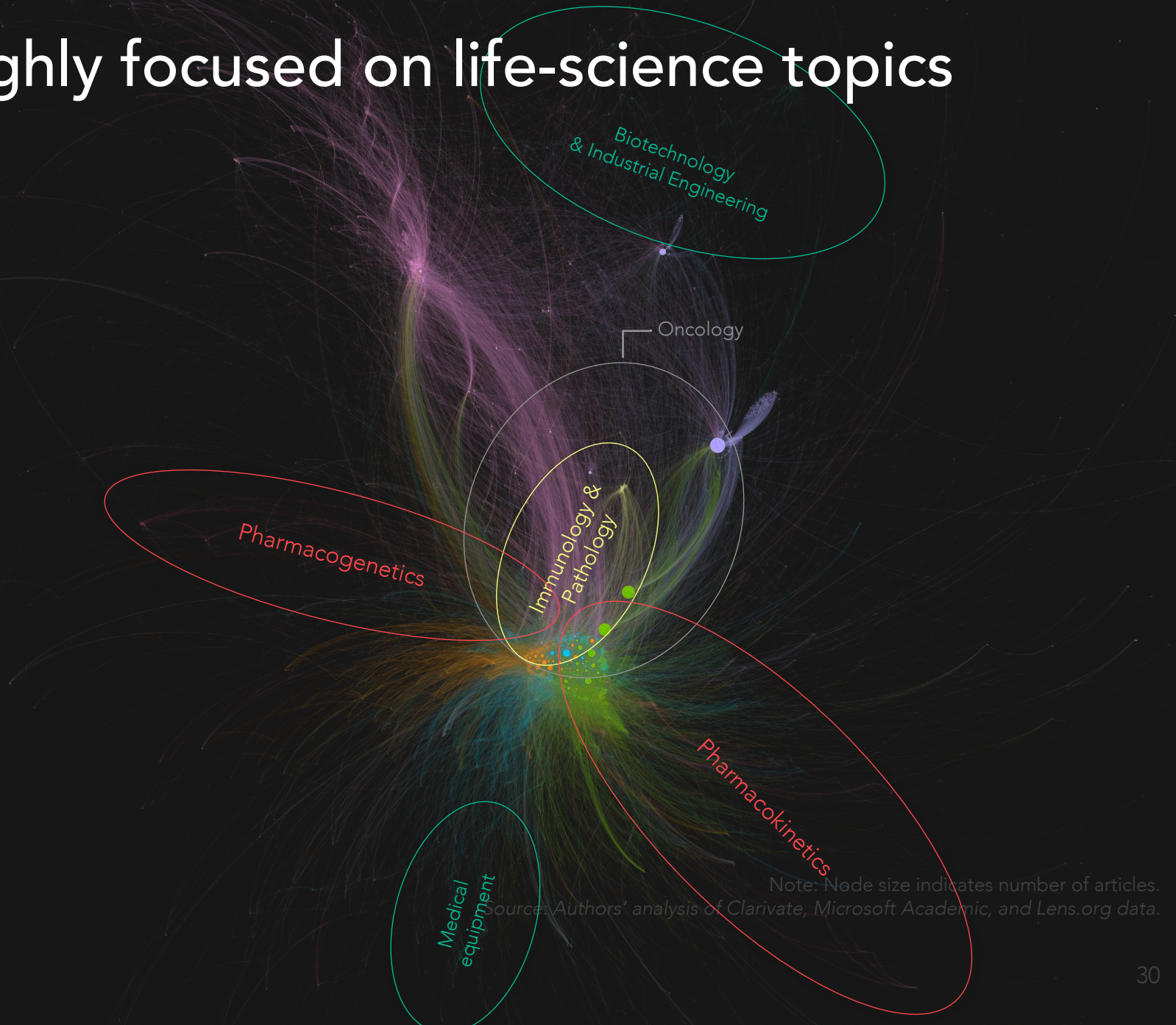
Research is highly focused on life-science topics

Articles contain keywords and terms that describe their contents. This network depicts the frequency that keywords and terms appear in the same article. The more two terms are used together, the closer they are in the network.

Analysis of the strength of connections in this network finds eight topic clusters:

- Cardiology & Pulmonology
- Experimental medicine
- Internal medicine
- Neurology & Psychiatry
- Pediatrics
- Pharmacology and toxicology
- Immunology & Pathology
- Biotechnology

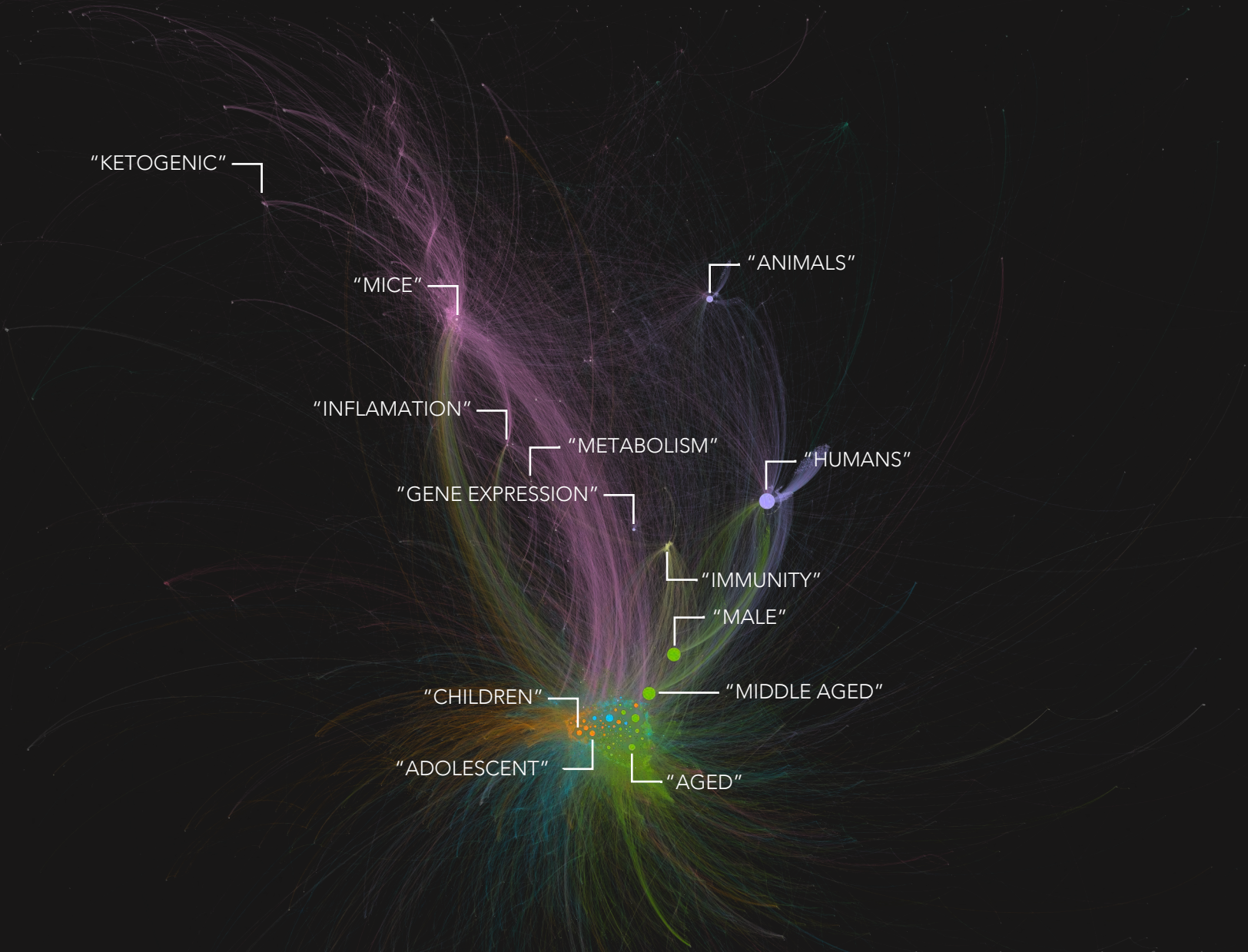
These labels describe the most central disciplines or theme of keywords in each category.



Note: Node size indicates number of articles.
Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

The network reveals strengths in *applied* or "translational" medical research

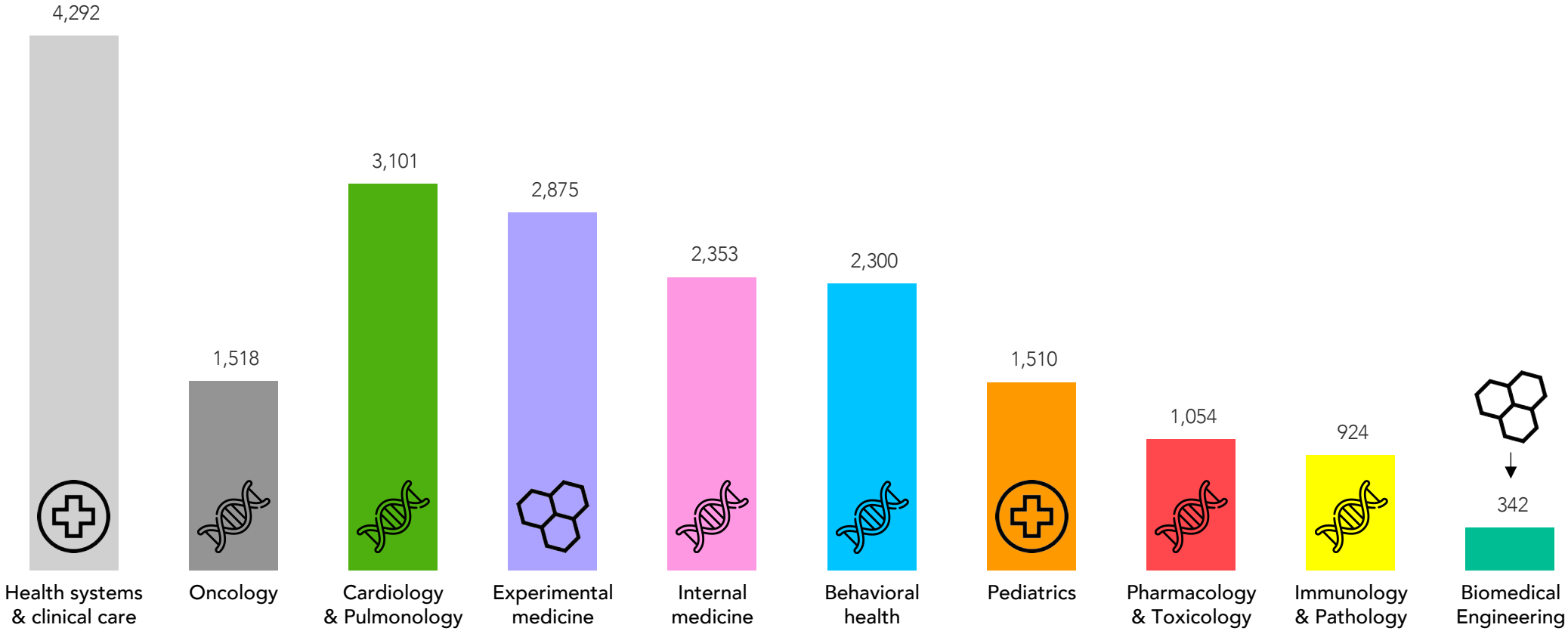
- Keyword relationships indicate applied research, with frequent co-occurrence of terms regarding a subject, therapy, and outcome:
  - For example, "mice", "obesity", "ketogenic", "adverse effect"
  - Or "aged over 80 years", "aortic valve stenosis", "surgery", "replacement", "mortality"
- The study of *how substances move through and interact with the body* is a recurring theme across topic clusters.
- Incidence of disease and effectiveness of therapies *for different age groups* is also common across topic clusters.
- This evidence may point to a regional *specialization in research for clinical and pre-clinical trials*.



Note: Node size indicates number of articles.
Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

Metro Kansas City has produced hundreds of articles in on each of these topics in recent years

Number of articles published in each field from metro Kansas City, 2016 to 2020*

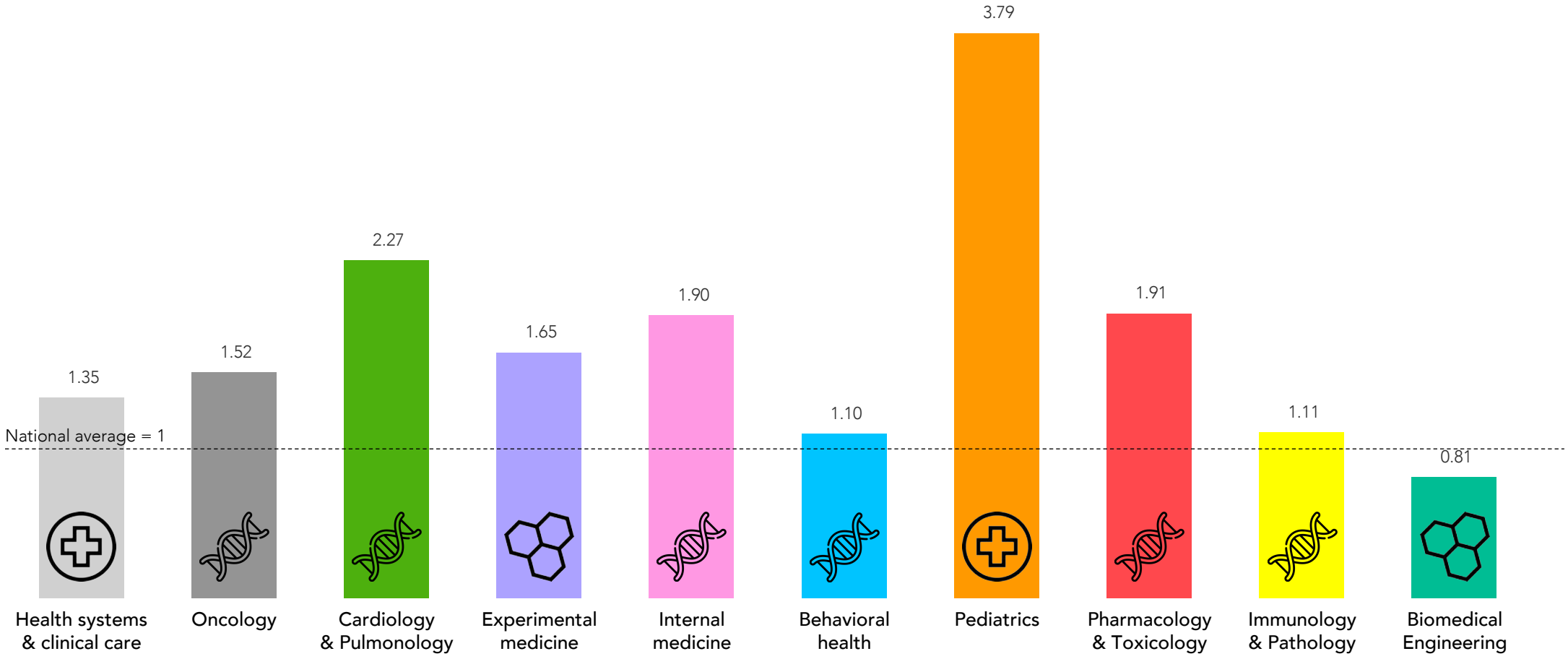


Articles can belong to more than one category.

Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

The region's articles-per-job exceeds the national average in almost every topic

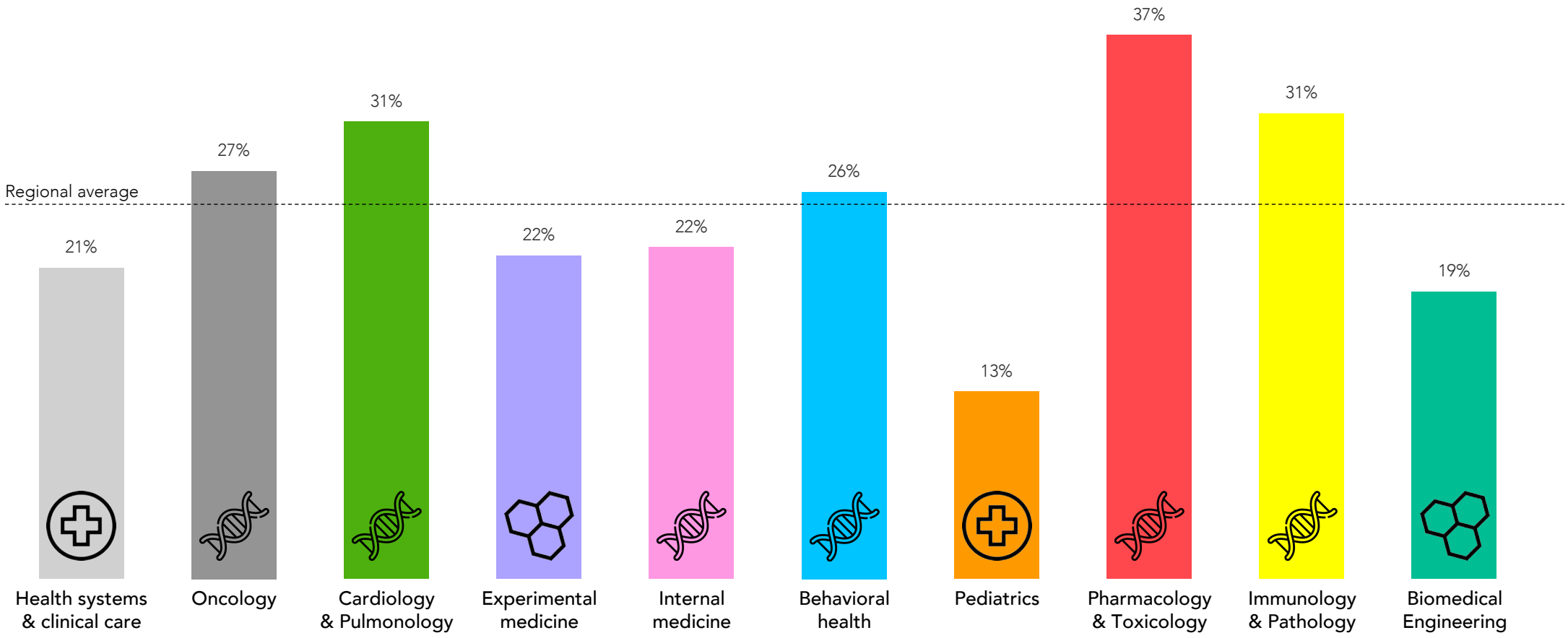
Number of articles published per job in metro Kansas city in proportion to the nation



Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

Businesses have sponsored or co-authored a high share of articles in most life science topics

Number of articles published per job in metro Kansas city in proportion to the nation

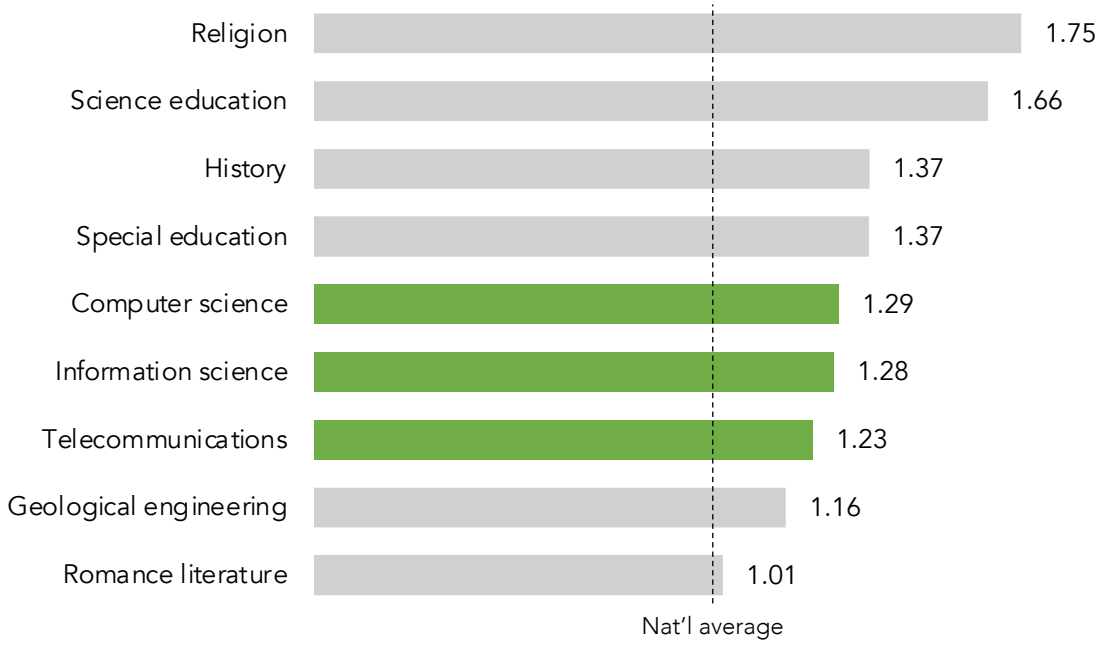


Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

Metro Kansas City has more limited R&D capacity in other areas

~4,900/20,152

Number of articles <u>not</u> related to life sciences, with higher-than-average articles-per-job in:



Source: Authors' analysis of Clarivate, Microsoft Academic, and Lens.org data.

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Companies that provide cyber security solutions for companies, ecommerce, consumers, and government

Source: Authors' analysis of Crunchbase data.

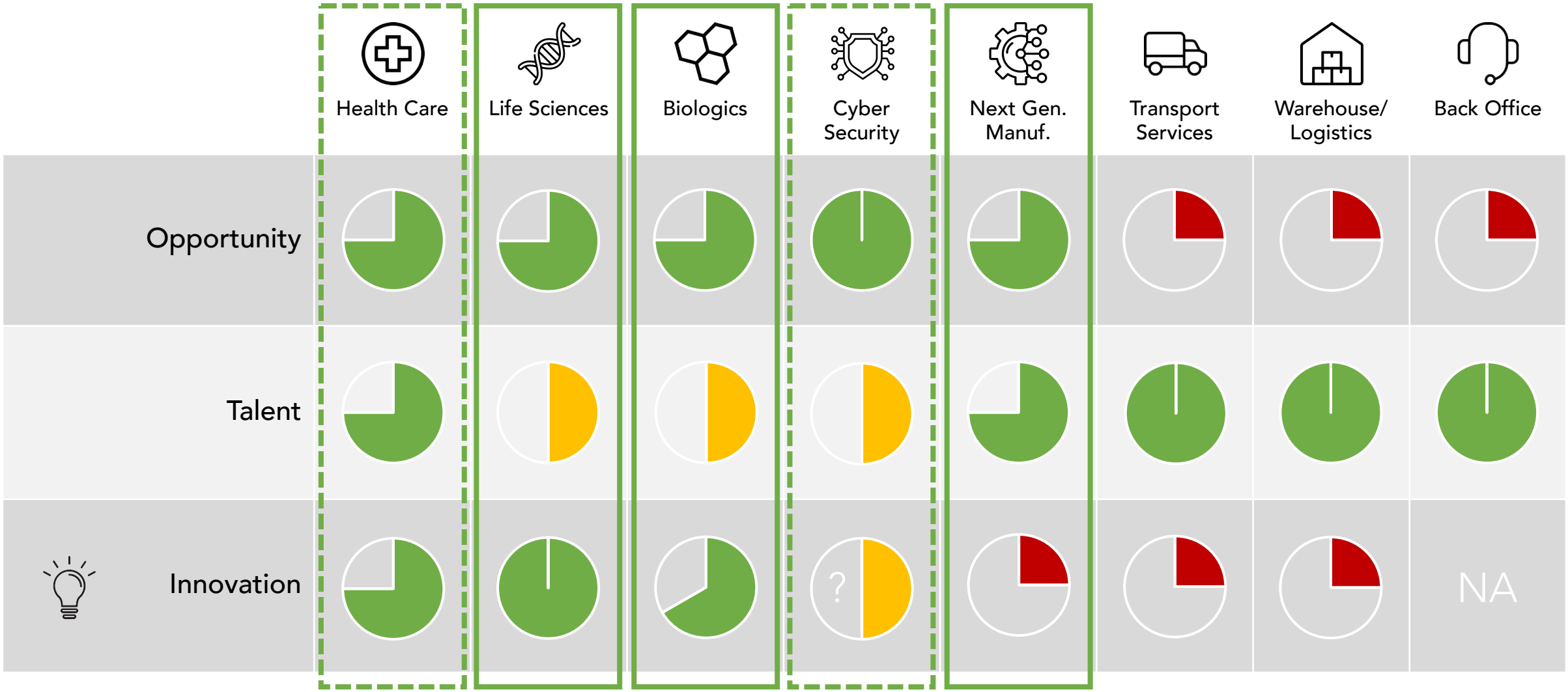
Innovation

Key findings:

- The region boasts significant *applied* R&D strengths in discrete but convergent fields of life science—strengths that may have applications outside of human health.
- The region appears to have many of the ingredients to compete in the burgeoning global biologics market and could have a first-mover advantage.
- Other regions seeking to compete in the life sciences fields metro Kansas City is strong in are investing heavily in computing and data science to gain an edge.
- Traded activity in health care delivery must contend with a highly competitive landscape. This suggests limited growth potential.
- The region's innovation capability in cyber security is difficult to discern but it does have start-up traction and government facilities that deal with national security.
- The region has limited *visible* R&D capacity in industry-4.0 topics relevant to manufacturing and logistics, such as automation, robotics, cybernetics, remote sensing, materials science, or manufacturing engineering.

Summary

Metro Kansas City boasts assets and potential in five clusters



Metro Kansas City boasts assets and potential in five clusters

Health care

- The region boasts considerable strengths in life science R&D, clinical care, and health care software
- The region faces stiff competition in *traded* health care delivery, however
- Talent and opportunity metrics depend on how this cluster is defined, and may change as the focus narrows

Biologics

- So far represents a very small portion of R&D activity, partially because this is a nascent field
- The region contains the assets to excel in this growing field, in both R&D and production
- The region can obtain a first-mover advantage if it moves quickly; this field is becoming highly competitive

Next Gen. Manuf.

- The region does not contain R&D strengths in the technologies that drive next generation manufacturing
- The region does have a large and advanced manufacturing sector where continuous process improvements are critical
- The region does boasts talent to compete this cluster

Warehouse/Logistics

- The region does not contain R&D strengths in the technologies that drive innovation in logistics
- Talent adjacencies imply that this cluster would underutilize the human capital of the local workforce
- The lower-than-average quality of jobs in this cluster make it ill-equipped to advance opportunity

Life Sciences

- Life sciences represents the region's most significant area of R&D
- Life sciences R&D is focused on translational research and clinical care, especial medical trials
- These strengths do not appear to be leading to a significant amount of new commercial activity in the forms of patenting or startups

Cyber Security

- Little evidence of significant R&D capacity or industry activity, but hard to measure given secrecy
- A small cluster of cyber security companies and the DOE/Honeywell facility suggest existing capacity
- Clarifying the potential opportunity in cyber security could enable better analysis of assets

Transport Services

- The region does not contain R&D strengths in the technologies that drive innovation in transportation
- Talent adjacencies imply that this cluster would underutilize the human capital of the local workforce
- The lower-than-average quality of jobs in this cluster make it ill-equipped to advance opportunity

Back Office

- The lower-than-average quality of jobs in this cluster make it ill-equipped to advance opportunity

Notes

Struggling families analysis:

Sources:

- 2015 – 2019 American Community Survey (ACS) 1-year public-use microdata samples (PUMS), U.S. Census Bureau
- Current Price Index for All Items among All Urban Consumers, U.S. Bureau of Labor Statistics
- The 2020 Self-Sufficiency Standard for Kansas, University of Washington
- The 2020 Self-Sufficiency Standard for Missouri, University of Washington

Methods:

1. Household members are grouped into families
    A. Members are grouped into small family units using their reported relationship to the head of household/respondent.
    B. The purpose of these groupings is to differentiate families in the same household to accurately assess their needs.
    C. Examples of why this is necessary include households that comprise only unrelated adult roommates, households with boarders, and households where related members cohabitate for economic reasons.
2. Survey weights are adjusted for multi-county PUMAs
    A. Person records are duplicated for each county the PUMA contains and person weights are then adjusted by the portion of the PUMA's population that lives in each county.
    B. This skews measures of statistical significance but is the only way of obtaining reasonable estimates for a metropolitan area from PUMS.
3. Dollar-denominated ACS variables are adjusted to 2020 dollars
4. Family budgets are calculated and compared to total income
    A. Family budgets depend on number and age of members: adults, infants, preschoolers, school children, teenagers.
    B. Post-secondary (but not graduate) students under 25 years-old that live with a guardian are treated as teenagers.
    C. Adults that are not in work or school are assumed to provide free childcare in households with children.
    D. Emergency savings are included in each family's budget by default; savings for retirement or wealth-building are not.
    E. Total income includes all sources of income except the value of public social assistance transfer payments.
5. Results are summarized by demography and geography

University of Washington sample family budgets: