

# Skills for Isotopes: Building Workforce Capacity and Capability

Skills Intelligence Services



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# Message from the Chair

On the international stage, Canada is a leader in the production, research, and use of medical isotopes, supplying a significant portion of the world's isotopes to sterilize essential medical equipment and for use in life-saving diagnostics and treatments. As demand for isotopes is projected to rise exponentially in the coming years, Canada is faced with a significant opportunity to maximize the potential of its existing supply chain, infrastructure, and talent and take its leadership to new heights. Canadian companies are already demonstrating this leadership by exploring innovative ways to produce rare isotopes and developing cutting-edge techniques and solutions to address pressing supply chain problems. However, to sustain this growth, Canada needs the right talent in place to maintain this momentum into the future.

The results of the Canadian Nuclear Isotope Council's report, *Securing Medical Isotope Talent and Expertise*, are clear. Canada's isotope workforce will need to increase by a third to support the new projects and expansion across the industry. We cannot allow a lack of personnel to stall future progress and growth.

That's why our work with Ontario Tech TALENT is essential to Canada's medical isotope future. By identifying the industry's critical skills needs and working towards a targeted national workforce strategy, we can identify new opportunities for innovation in training, education, and collaboration.

The world is looking to Canada to meet the growing demand for medical isotopes. We must ensure our workforce is well equipped to meet this challenge. Everything we do in Canada's isotope sector is about people: From helping people facing life-changing health challenges, to supporting front-line health care professionals with the best tools to help patients and families. But we also must recognize that it's talented, dedicated people in our sector that contribute every day to achieving great things. We're in the people business.



# Introduction

## Why Skills Matter: Introducing Skills First Workforce Strategies

Following the publication of the Canadian Nuclear Isotope Council's (CNIC) report 'Securing Canadian Medical Isotope Talent and Expertise', CNIC members expressed strong interest in moving ahead with the development of a comprehensive national workforce strategy for the industry.

As a first step in the development of this strategy, the CNIC and TALENT have conducted an initial skills assessment for the production and processing of medical isotopes in Canada. The objective of this initial skills assessment was to identify the skills currently in highest demand in the sector and examine the availability of these skills. The findings from which are available in this new publication entitled 'Skills for Isotopes - Building Workforce Capacity and Capability'.

A skills assessment is a critical first step in the development of a national skills-first workforce strategy. Skills assessments enable

all labour market beneficiaries (employers, government, post secondary institutions and the workforce itself) to better understand the skills needed by the industry as well as the current supply of skills available in the incumbent or prospective workforce. This assessment of demand and supply then allows for an understanding of the skills delta; the skills that are needed over and above those currently available and the skills that are no longer needed. Skills assessments enable what has become known as a 'skills-first' workforce strategy.

A "skills-first" workforce strategy prioritizes the development and utilization of employees' skills over traditional qualifications like degrees or certifications. However, it does not seek to devalue traditional qualifications but instead recognizes that traditional qualifications are just ONE way in which our workforce can develop the skills employers need.

## Here's why adopting such a strategy is beneficial for the medical isotope industry:

### Flexibility and Adaptability

In today's rapidly evolving economic landscape, the skills that are most valuable can change quickly. By focusing on skills, rather than job roles and traditional qualifications, businesses can adapt more readily to new technologies, changing market demands, and industry trends. This is particularly important in industries such as Canada's medical isotope industry where so much of the work is project based; where funding is allocated to the duration of the project and resources, including the workforce, need to move between projects rapidly and efficiently.

### Access to Diverse Talent

Many highly skilled individuals may not possess traditional qualifications due to various reasons such as financial barriers or unconventional career paths. Emphasizing skills opens the door to a more diverse talent pool, allowing businesses to tap into a broader range of experiences and perspectives. This is particularly important given the tight labour market Canada is experiencing and expecting to experience for decades. We cannot afford to exclude skilled individuals from accessing meaningful employment in the medical isotope industry.

### Cost-effectiveness

Traditional recruitment often involves significant costs associated with hiring individuals solely based on their educational background or certifications. By prioritizing skills, businesses can better identify and develop talent internally, reducing the need for expensive external recruitment processes. At TALENT we call this a 'build' strategy.

### Employee Engagement and Retention

Employees are more likely to feel valued and engaged when their skills are recognized and utilized effectively. A skills-first approach encourages ongoing learning and development, leading to higher job satisfaction and higher retention rates.

### Performance and Innovation

Employees who are encouraged to continuously develop and apply their skills are more likely to contribute to innovation within the organization. A workforce that prioritizes skills is better equipped to tackle complex challenges and drive business growth.

### Future-proofing the Business

As automation and artificial intelligence continue to reshape the workforce, certain jobs may become obsolete while new ones emerge. An understanding of which skills to sunset is as important as understanding emerging skills needs. A skills-first strategy enables businesses to future-proof their workforce by fostering a culture of lifelong learning and adaptability.

### Competitive Advantage

Businesses that prioritize skills are better positioned to stay ahead of the competition. By leveraging the unique talents and capabilities of their employees, organizations can differentiate themselves in the marketplace and deliver greater value to customers.

# Methodology and Limitations

Our primary objective was to gain a deeper understanding of the required skills in the industry and the existing skill pool in the current or potential workforce. The goal is to guarantee that investments in training and development are effectively targeted to close any skill deficiencies. Assessing demand and supply helps to identify the skills gap - the skills required beyond what is currently available and the skills that are no longer needed. Skill assessments enable the implementation of a 'skills first' workforce strategy.

To begin, we divided the industry into two parts: CNIC and the entire industry. The purpose of comparing the data from CNIC and the broader industry is to identify skill gaps within CNIC and analyze them within the industry context. Surveys and interviews were conducted with individuals working in companies

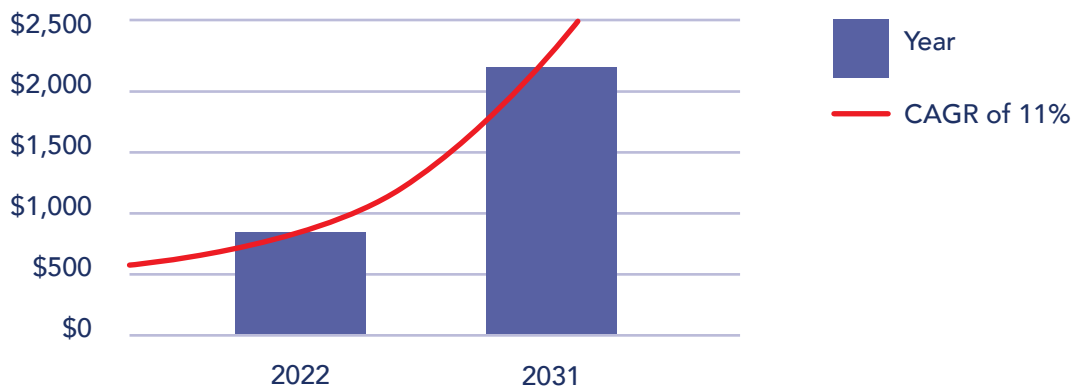
affiliated with CNIC to gather this information. We also evaluated the skills and growth within CNIC member organizations, as well as companies in the broader medical isotope sector.

Finally, we reviewed recent job postings to determine the in-demand skills for both groups. Similar to the CNIC report, "Securing Canadian Medical Isotope Talent and Expertise," we encountered challenges in focusing solely on isotope producers outside CNIC due to the lack of a comprehensive database. Nevertheless, the data presented provides valuable insights into the industry, highlighting areas where CNIC can address their skills shortages. It also emphasizes the necessity for a more extensive and detailed skills assessment of the current workforce.



# Industry Overview

Canada's medical isotope market is projected to grow from \$911 million in 2022 to over \$2 billion by 2031, a CAGR of 11.8%. This growth is driven by increasing demand for medical isotopes in diagnostic imaging and therapeutic applications, the rising prevalence of cardiovascular diseases and cancer, plus advancements in nuclear medicine technologies <sup>1</sup>.



In 2023, the Government of Canada through Strategic Innovation Fund (SIF) announced the creation of a new Canadian Medical Isotope Ecosystem (CMIE) initiative. The CMIE received up to \$35 million dollars in investment over a span of five years to fund new and ongoing isotope projects and accelerate technology development and commercialization . The CMIE will be spearheaded by the Centre for Probe Development and Commercialization (CPDC) and TRIUMF Innovations, and will work in collaboration with partners like Bruce Power, the Saugeen Ojibway Nation, BWXT Medical, McMaster University, and Canadian Nuclear Laboratories.<sup>2</sup> The objective of this investment is to drive the production of medical isotopes within the country, enhance Canadian proficiency, and establish Canada as an attractive hub for investing in the medical isotopes industry.

<sup>1</sup> "Medical Isotope Market Report Scope & Overview", SNS Insider, April 2024, <https://www.snsinsider.com/reports/medical-isotope-market-2670>

<sup>2</sup> "Canada strengthens medical isotope production", Nuclear Engineering International, July 4 2023, <https://www.neimagazine.com/news/newscanada-strengthens-medical-isotope-production-10983454>

# Labour Market Context

The professional, scientific, and technical services sector, which includes various scientific roles, has experienced significant employment growth during the pandemic recovery. By early 2023, employment in this sector had risen by 52.1% compared to pre-pandemic levels.<sup>3</sup> There is a strong demand for technical skills in Canada, such as data analytics, programming, cloud computing, and AI/automation. Certain occupations like medical laboratory technologists are expected to face labor shortages from 2022 to 2031, with more job openings than new job seekers in scientific and technical fields. One challenge is ensuring that graduates possess the necessary skills for emerging jobs.

Canada is also facing a “brain drain”. The country is known for its excellence in isotope production, benefiting from its advanced expertise. This reputation leads to a high demand for Canadian professionals from global organizations and institutions. Many of them are attracted by better pay and the prestige of American companies. Reports suggest that a significant amount of Canadian science and technology graduates ultimately find employment overseas. Often academics and researchers will encounter challenges in commercializing their innovations due to bureaucratic obstacles and limited commercialization knowledge within

<sup>3</sup> “Analysis on labour challenges in Canada, second quarter of 2023”, Stats Can, June 22, 2023, <https://www150.statcan.gc.ca/n1/pub/11-621-m/11-621-m2023009-eng.htm>





# Labour Market Context (Cont.)

Canada. In addition, the acquisition of several prominent Canadian isotope companies by foreign firms has led to concerns about a loss of skilled workers. These takeovers highlight the challenges Canada faces in retaining its expertise and talented workforce in isotope production. A notable example is Telix Pharmaceuticals' recent acquisition of ARTMS, a Canadian company specializing in radioisotope technology. Telix, an Australian biopharmaceutical company with significant operations in the United States, aims to enhance its supply chain and manufacturing capabilities for diagnostic and therapeutic radiopharmaceuticals through this purchase. By integrating ARTMS's advanced technologies into Telix's global supply chain, some Canadian professionals and researchers could be lost during the transition, adding to the talent drain from Canada.

The future of the isotope industry is seeing significant investment, with the workforce expected to grow by 33%. However, there is a growing shortage of skilled

workers in isotope production due to various factors, including a lack of well-trained professionals entering the field. The future workforce will depend on technical experts such as radiochemists, regulatory and quality assurance specialists, project managers with strong collaboration skills, and operational leaders.<sup>4</sup> Given the scarcity of qualified workers, enhancing skills and providing training within organizations will be crucial for meeting the industry's growth demands. As one person we interviewed stated, "instead of relying on universities to offer a specialized course, we took the approach to train on the job."



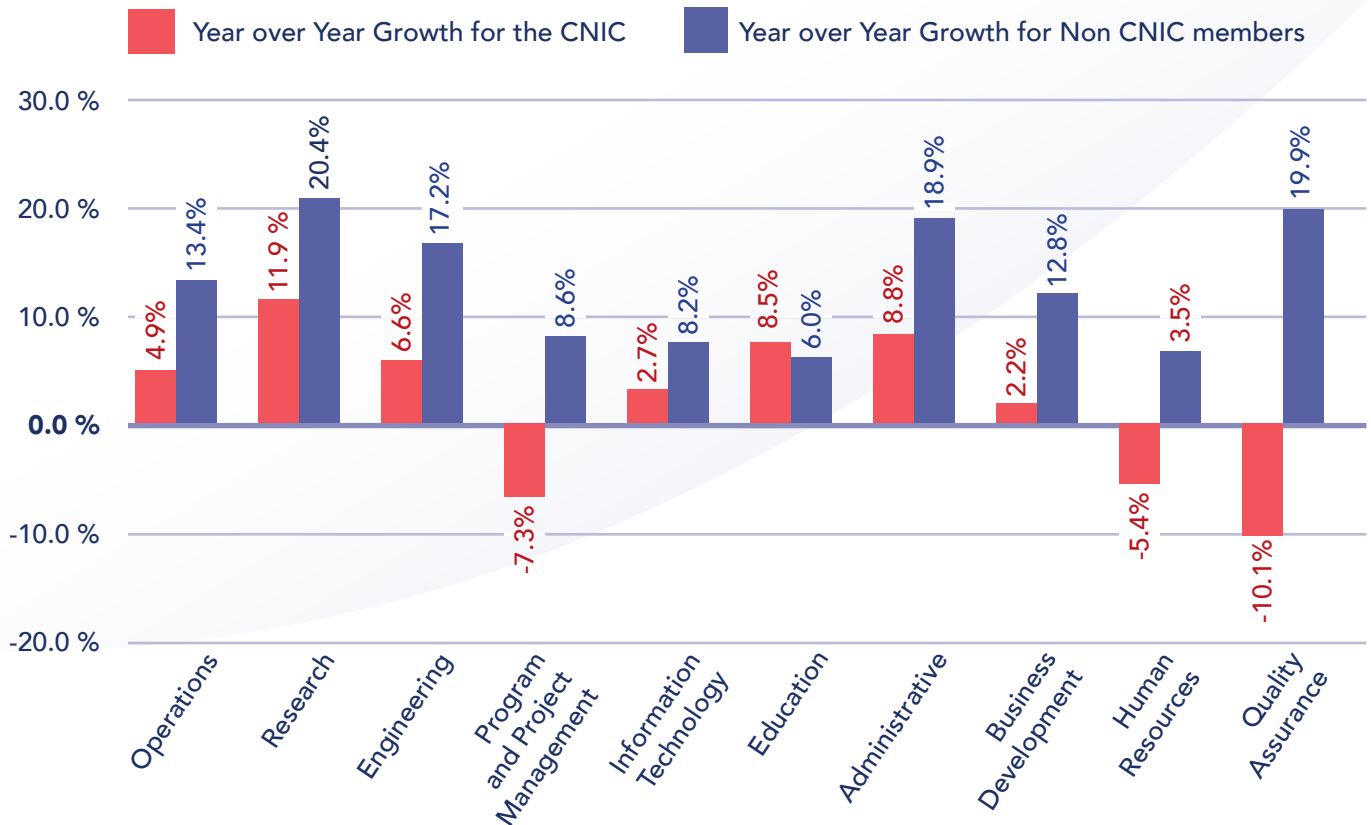
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4 "New CNIC report emphasizes that the importance of sufficient labour to support innovation in Canada's isotope supply chain", CNIC, July 2023, <https://www.canadianisotopes.ca/new-cnic-report-emphasizes-that-the-importance-of-sufficient-labour-to-support-innovation-in-canadas-isotope-supply-chain/>

# Skills Assessment

## Year over Year Growth by Function

To complete our skills assessment, we collected data from various sources to compare companies within the CNIC membership with companies outside CNIC but within the isotope industry.



In the critical areas of Project Management, Research and Quality Assurance the industry overall saw growth compared to the companies just within the CNIC membership.

Program and Project Management within the CNIC membership experienced a 7.3% decline, which was highlighted as a risk area based on internal survey data.<sup>5</sup> Project Managers faced a notable 25% decrease, whereas the Project Lead position showed a growth of 16%. The industry overall observed an 8.6% growth in Project and Program Management. Specifically, the Project Manager role increased by 6%, while the Project Lead role remained stable. Overall project management has been a

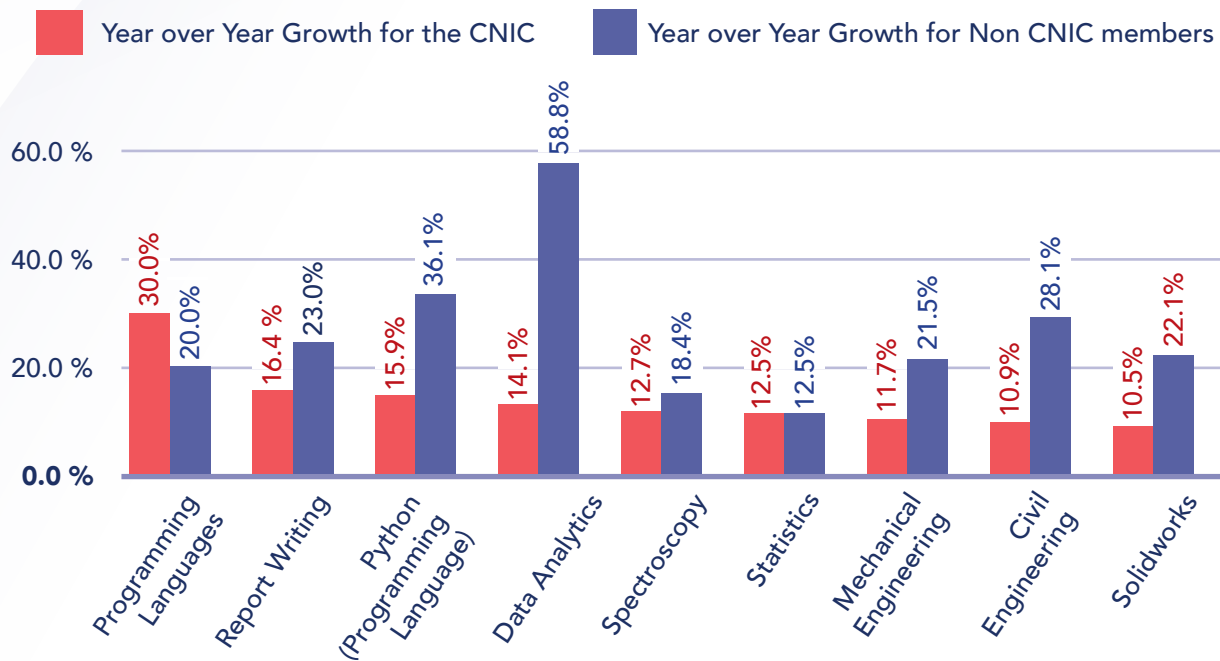
challenging role to fill. According to one industry leader, combining technical skills with the administrative skills required for a Project Manager can be tough.

**Some companies opt to “hire based on technical expertise and then provide training for administrative tasks”.**

Within the industry, Quality Assurance experienced a significant growth of 19.9%, however CNIC member companies witnessed a decrease of 10.1% in their talent year over year. This indicates that there are professionals available in the market but some internal training could be required to make them the right fit.

<sup>5</sup> TALENT survey of CNIC member leadership, November 2023

## Fastest Growing Skills



In most cases, the skills that grew the fastest for the CNIC companies were outpaced by the overall industry. This is especially evident in data analytics, which showed a remarkable growth rate of 58.8% compared to only 14.1% for the CNIC companies. For the industry, Python experienced a significant increase of 36.1%, while the CNIC companies saw a growth rate of 15.9%.

However, programming languages in general were more prevalent in CNIC companies. Two notable areas of growth in the industry, not observed in CNIC companies, are Artificial Intelligence (AI) at 67% and Health and Safety at 64.8%. By comparing these two categories, we can begin to assess the priorities of the two groups.

# Recruitment Analysis

Functions in Demand According to Job Postings	
CNIC	Non-CNIC
Business	Business
Information Technology	Information Technology
Engineering	Manufacturing and Production
Law, Regulation, and Compliance	Science and Research
Science and Research	Engineering

Reviewing jobs postings from the past year, TALENT noticed that both CNIC and other companies usually have similar trends. Companies outside of CNIC rank regulation and quality as the sixth most important aspect, even though they are not explicitly mentioned above. When looking into more specific skills, project management stands out as the main common skill, along with Quality Assurance (QA), commissioning, procurement, and radiopharmacology. These specialized skills align with the established priorities and are recognized as skill gaps based on the internal survey carried out by TALENT.<sup>6</sup>

Software Skills in Demand According to Job Postings	
CNIC	Non-CNIC
Python (Programming Language)	Ansys Simulation Software
C++ (Programming Language)	Primavera (Software)
R (Programming Language)	Application Programming Interface (API)
C (Programming Language)	Geographic Information Systems
Document Management Systems	AutoCAD

At the software level, the two groups require different skills. The CNIC emphasizes strong programming skills, this is also shown by the growth in this area. In contrast, the industry values expertise in analysis and business tools, which is evident in the areas where they have experienced growth.

<sup>6</sup> TALENT survey of CNIC member leadership, November 2023

# Survey Responses

58.6%

"Our Workforce plan for medical isotopes is limited and/or in development"

13.8%

"We don't currently have a workforce plan for medical isotopes"

10.3%

"We have a robust workforce plan for medical isotopes with a time horizon of >1year."

6.9%

"We have a robust workforce plan for medical isotopes with a time horizon of <1year."

3.45%

"We have a robust workforce plan for our new manufacturing family, which encompass isotope supply with a time horizon of >1 year."

3.45%

"Our Workforce plan is (and is likely to remain) informal and based on discussion amongst company leadership."

3.45%

"We are both currently training and planning to meet industry needs of the future."

CNIC company leaders have revealed that more than 72% of them do not have a strong workforce plan, while only 28% feel confident about their planning. With a shortage of qualified workers for important positions, it is crucial to take immediate action and plan carefully. Survey results show that CNIC members are mainly worried about project management, MS Office, and communication skills, highlighting these as key areas for improvement. Although these skills may be scarce, analysis indicates they are present in the labor market. By introducing new recruitment and training strategies, these skills, along with others, can be cultivated to bridge the gaps. However, technical skills such as chemistry and nuclear physics present a bigger challenge in

recruitment due to the limited supply of these skills from the traditional education system and the growing level of competition for these skills. One leader we spoke to explained that when hiring a radiochemist, he did not need extensive experience. Instead, he looked for basic laboratory experience and then offered the essential training for the required skills. This approach helped him successfully acquire the talent he needed and retain them for 2-3 years longer than usual. Another person we interviewed discussed his challenges and how he resolved them by looking internationally. He has noticed a pool of talented individuals from India and Pakistan who are eager to advance their careers and view Canada as a place where they can secure that opportunity.

# Recommendations to Employers

As a result of the findings from the initial Skills Assessment, we offer these recommendations to employers in the medical isotope industry.

## Establish a skills framework.

Begin by establishing a skills framework with a common language to accurately assess the skills of your employees and the ones required for future success.

Communicate to your HR team on a regular basis about the effective utilization of skills intelligence and interpreting the resulting data. This will equip them with the ability to leverage it to its fullest potential in their recruitment processes.

This report serves as a valuable starting point by highlighting talent gaps and providing an overview of industry skills. Transitioning to a skills-based candidate profiling method offers an alternative to the traditional credential-focused hiring process. This new approach prioritizes the specific skills and abilities of candidates, which are more reliable indicators of job performance.

## Focus on skills that are challenging to teach.

While credential-based hiring remains relevant in technical industries, it is crucial to also focus on skills that are challenging to teach, like communication, when making hiring decisions. One professional we interviewed mentioned that the presence of Liberal Arts classes, such as English Language and Literature electives, could help indicate a candidate's potential for strong communication skills when captured on their degree transcript.

## Implement programs to continuously upskill and reskill your workforce.

This practice not only closes skill gaps but also helps retain employees by aligning their career aspirations with the organization's requirements. Skills in MS Office products and programming languages are crucial for advancement, especially with the increasing focus on analytical decision-making. These skills are perfect for internal training for your incumbent workforce.

# Recommendations to Employers

## **Encourage career growth.**

To encourage career growth within the company, start by using skills intelligence to identify potential career paths for employees. Human skills such as communication, leadership, strategic thinking, and organization empower project managers to lead teams effectively, communicate clearly, resolve conflicts, build relationships, and adapt to changing situations, all of which contribute to project success. Many times, the necessary skills are already within the organization, and with additional training, both the employee and the company can benefit. The employee can progress in their career, while the company can address skill gaps.

## **Work with educational institutions.**

Finally, the lack of educated graduates is greatly impacting the availability of well-trained staff. The isotope industry can help by encouraging educational institutions to create programs that cultivate the needed talent. Through strategic initiatives, this industry can effectively motivate educational institutions to improve programs and nurture skilled individuals essential for its growth and sustainability. These initiatives may involve collaborative research projects, advisory boards, internships, and industry conferences.



## Conclusion

In conclusion, the medical isotope industry is poised for rapid growth in the next 5-10 years, and the demand for skilled talent poses a significant risk for Canada to maintain its global leadership. Various factors have contributed to this shortage, notably the insufficient number of qualified individuals graduating from the education system with the necessary skills and the continued reliance upon traditional qualifications as a means of assessing and developing talent. By focusing on improving the utilization of existing talent through training (build strategy) and adopting a skills-first approach to recruitment (buy strategy), it is feasible to meaningfully address some of these challenges.



# Call to Action

Join the Canadian Nuclear Isotope Council and TALENT as together we build a national skills-first workforce strategy for our industry.

## STEP 1: Increase Skills Intelligence

### A. Skills Demand

Collaborate with a consortium of medical isotope industry employers to develop a 'future state' assessment of skills needed (3-5 year view)

Include an analysis of the impact of Machine Learning/Digital Transformation on core activities

### B. Skills Supply

Analyze existing skills of incumbent workforce

Analyze existing skills of prospective workforce

- Post secondary graduates
- Canadian Newcomers
- Other equity deserving communities

### C. Identify Skills Delta

Quantify skills gaps at the enterprise, industry and national level

## STEP 2: Design Skills First Workforce Strategy

### Build 'Buy, Build, Borrow' Model

Using Skills Intelligence, determine whether employers need to most cost effectively buy (recruit), build (develop) or borrow (contract) necessary skills

- **Buy**  
Develop a national talent attraction strategy that showcases meaningful employment opportunities in the medical isotope industry and drives down the cost of talent acquisition for CNIC members
- **Build**  
Develop a national workforce development strategy in partnership with government, post secondary institutions and commercial training providers
- **Borrow**  
Develop a contract/contingent worker strategy that enables talent to be retained in the industry using 21st century collaborative contracting models

# TALENT

TALENT is a Canadian company on a mission to help people make actionable and meaningful workforce transformation decisions. Founded in 2020, TALENT has evolved its offerings to focus on three lines of business: Skills Intelligence, Skills-Verified Courses, and Assessments. By 2026, TALENT will be Canada's leading skills intelligence organization, working with employers in regulated industries to transform their workforce.

Contact us at [info@ontariotechtalement.ca](mailto:info@ontariotechtalement.ca) for more information.



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