What is important to young medical technologists for radiology when choosing a job?

Results of a survey on job attractiveness among MTR trainees

Was ist dem MTR-Nachwuchs bei der Stellenwahl wichtig?

Ergebnisse einer Befragung zur Arbeitsplatzattraktivität unter MTR-Auszubildenden

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ABSTRACT

Aim Given the intensifying competition in Germany for medical technologists for radiology (MTR), our aim was to identify job-related preferences among MTR trainees.

Materials and Methods For this purpose, a survey was carried out among MTR trainees at the MTR schools in Düsseldorf, Mainz, and Heidelberg. The focus was on the individual influence of 40 work- and employer-related factors and on the preferred place of work (hospital, practice) and area of operation (radiology, nuclear medicine, radiation therapy) after completing training.

Results 90 MTR trainees took part in the survey. On average, they indicated a pleasant working atmosphere, regular compensation for overtime, and good teamwork as the most important criteria for applying for an MTR position. With regard to their preferred place of work, more than two-thirds stated that they would initially apply to a hospital after completing their training. Moreover, the majority of the respondents prefer to start their MTR careers in diagnostic and interventional radiology, followed by radiation therapy and nuclear medicine.

Conclusion Imaging clinics and practices can use the present results for targeted personnel recruitment in order to make their MTR positions as attractive as possible from the point of view of young MTRs.

Key Points

- The increasing competition for qualified young talent also affects imaging centers.
- The aim of the survey was to gain insight into the career- and job-related preferences of MTRs.

- Imaging clinics/practices can use these results as a starting point for establishing specific human resources measures for technologists.
- An increase in perceived employer attractiveness can lead to competitive advantages with respect to attracting and retaining qualified MTRs.

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ZUSAMMENFASSUNG

Ziel Angesichts des sich intensivierenden Wettbewerbs um Medizinische Technolog*innen für Radiologie (MTR) war es unser Ziel, arbeitsplatzbezogene Präferenzen bei MTR-Auszubildenden zu identifizieren.

Material und Methoden Hierzu wurde eine Befragung unter MTR-Auszubildenden an den Standorten Düsseldorf, Mainz und Heidelberg durchgeführt. Fokussiert wurden der individuelle Einfluss von 40 Faktoren auf die Arbeitgeberwahl sowie Angaben zu dem nach Ausbildungsabschluss präferierten Arbeitsort (Krankenhaus, Praxis) und Einsatzgebiet (Radiologie, Nuklearmedizin, Strahlentherapie).

Ergebnisse An der Befragung nahmen 90 MTR-Auszubildende teil. Diese gaben im Mittel ein angenehmes Betriebsklima, den geregelten Ausgleich von Überstunden und eine gute Zusammenarbeit im Team als wichtigste Kriterien für die Bewerbung um eine MTR-Stelle an. Mit Blick auf den bevorzugten Arbeitsort gaben mehr als zwei Drittel der Befragten an, sich nach Ausbildungsabschluss zunächst in einem Krankenhaus zu bewerben. In Bezug auf das Fachgebiet strebt die Mehrzahl nach Ausbildungsabschluss eine Tätigkeit in der diagnostischen und interventionellen Radiologie an, gefolgt von Strahlentherapie und Nuklearmedizin.

Schlussfolgerung Bildgebungskliniken und -praxen können die vorliegenden Ergebnisse im Sinne einer gezielten Personalbeschaffung nutzen, um ihre Stellen aus Sicht des MTR-Nachwuchses möglichst attraktiv auszugestalten.

Kernaussagen

- Der stärker werdende Wettbewerb um qualifizierte Nachwuchskräfte macht auch vor Bildgebungseinrichtungen nicht halt.
- Ziel einer Befragung war es, Einblicke in die karriere- und arbeitsplatzbezogenen Präferenzen von MTR-Auszubildenden zu gewinnen.
- Bildgebungskliniken und -praxen können die Ergebnisse als Anknüpfungspunkt für den gezielten Einsatz von personalwirtschaftlichen Maßnahmen nutzen.
- Eine gesteigert wahrgenommene Arbeitgeberattraktivität kann zu Wettbewerbsvorteilen bei der Gewinnung und Bindung des examinierten MTR-Nachwuchses führen.

1. Introduction

The health care industry is facing an increasing shortage of skilled labor [1]. This shortage also applies to medical technologists for radiology (MTRs [2])[1] working in radiology, nuclear medicine, radiation therapy, and dosimetry/radiation protection [3]. According to the German Hospital Institute, almost half (46 %) of surveyed hospitals reported MTR staffing issues in 2019 [4], corresponding to an increase of 34 % since 2016 and doubling of the percentage in 2011 (23 %) [5]. Additional publications also define MTRs as a limited personnel resource [6, 7].

Considering this, not only the retention and motivation of current employees [8] but also the recruiting of new MTR graduates are becoming increasingly important with respect to maintaining the quality of imaging-based diagnostic and treatment services. In order for imaging clinics and practices to be able to fill MTR positions as quickly and cost-effectively as possible, positions need to be set up so that they are particularly attractive to new MTRs. In light of this, we were interested in determining which criteria are particularly important to new MTRs when applying for an MTR position after the completion of training and thus are central to the selection of a place of work and employer.

2. Materials and Methods

With this goal, a standardized online survey of MTR trainees in year 1–3 of training at MTR schools in Düsseldorf, Mainz, and Heidelberg was conducted from April to July 2023. The questionnaire was based on a set of 40 factors regarding employer attractiveness collected from the literature on work satisfaction and employer selection/attractiveness in health care facilities (e. g., [9–16]), adapted to the MTR setting, and grouped in four main categories (image of the clinic/practice, location of the clinic/practice, personnel policy factors, work-life balance). Personnel-related criteria were further divided into five subcategories (type of work, career opportunities, compensation, work environment, place of work). The importance of the criteria for employer selection was rated as either "unimportant" or "very important" by participants based on a four-point ratings scale. The trainees were also able to select up to five criteria from the criteria pool that they felt were particularly important for job selection. Moreover, survey participants were asked to provide information regarding gender, training year, preferred place of work, and area of application after the completion of training. The dataset was then evaluated primarily descriptively due to the explorative nature of the study goal.

1 The professional title MTR, which is valid since 2023, is used below. From a methodological point of view, we would like to point out that the test subjects requested for the study at the locations still underwent training under the “old” legislation or training and examination regulations with the job title “MTRA” and are completing it.

3. Results

n = 90 MTR trainees participated in the online survey with 35 (39 %) being from Düsseldorf, 31 (34 %) from Mainz, and 24 (27 %) from Heidelberg. Based on the information provided by survey participants, 34 (38 %) were in year two of their training, 26 (29 %) were in their first year, and 26 (29 %) were in their third year. Four trainees (4 %) did not provide any data regarding their year of training. 74 % of those surveyed were female, 19 % were male, and 1 % were other. Five survey participants (6 %) did not provide an answer to this question (▶ **Table 1**).

▶ **Table 1** Characteristics and distribution of surveyed MTR trainees (n = 90).

	Absolute (n)	Relative
Location		
Düsseldorf	35	39 %
Mainz	31	34 %
Heidelberg	24	27 %
Year of training		
First year of training	26	29 %
Second year of training	34	38 %
Third year of training	26	29 %
No data	4	4 %
Gender		
Female	67	74 %
Male	17	19 %
Other	1	1 %
No data	5	6 %

Factors influencing employer attractiveness

According to the surveyed trainees, a pleasant work environment, regular compensation for overtime, and good teamwork were on average the most important criteria for applying to an MTR position (average: 3.9 per criterion, ▶ **Fig. 1**). Furthermore, strict adherence to work and health protection standards (3.8) and work-life balance (3.7) were rated as very important followed by special bonuses, transparent communication, compensation, flexible work hours, structured job training, and benefits (3.6 per criterion). Among all listed factors, almost every second participant (49 %) rated a pleasant work environment as one of the five most important influencing factors followed by compensation (46 %) and good teamwork (33 %).

Preferred place of work and operational area

With respect to the preferred place of work, more than two thirds of those surveyed (69 %) stated that they would first apply for a position at a hospital after completion of their training. Significantly fewer (17 %) stated that they did not have a preference (yet), while 7 % preferred a practice and 1 % preferred another type of facility. Six participants (7 %) did not provide a response.

In relation to the area of specialization, most participants (59 %) wanted a job in diagnostic and interventional radiology followed by radiation therapy (16 %), and nuclear medicine (2 %). 13 MTR trainees (14 %) specified that they did not (yet) have a preference and 8 (9 %) did not answer the question.

4. Discussion and Conclusion

The MTR situation is characterized by a tight labor market with it taking a long time to fill positions [4, 7]. The situation is expected to worsen with the impending retirement of the baby boomer generation. In light of this, we were interested in which criteria are important to new MTRs with respect to selecting where to apply after the completion of training and which work settings are preferred.

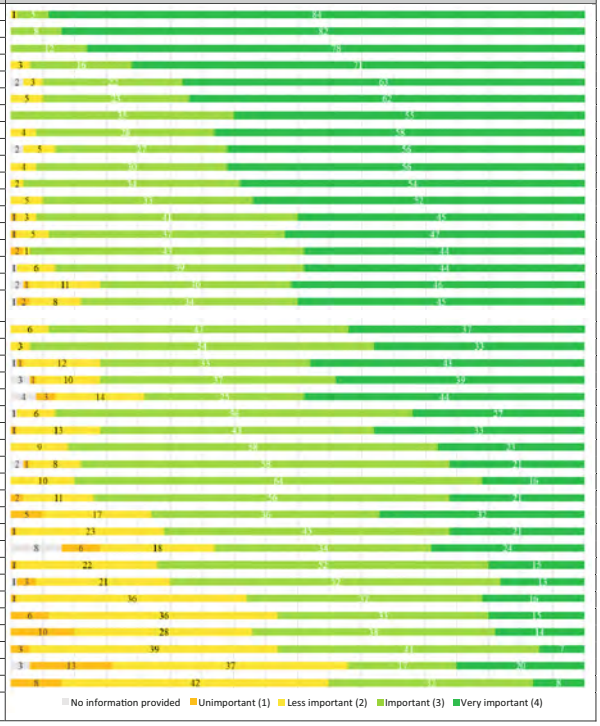
Focus on generation Z

The ranking of the criteria clearly shows that on average primarily factors that can be affected by human resource management are rated as (very) important. In contrast, criteria that cannot be influenced or are difficult to influence like recreational value, environmental quality of the location, or size of the facility are ranked lowest. This is good news for personnel management of imaging clinics and practices with respect to actively attracting young MTRs. It continues to be noteworthy that the top-ranked factors – in addition to compensation factors – are primarily associated with the ideals and behaviors of generation Z [17]. This confirms study results regarding the selection of place of work in other health professions. In a survey of people studying human medicine at University Medicine Göttingen regarding place of work selection, a good relationship with colleagues was rated as the most important criterion and teamwork as the third most important [18]. These factors were also rated as extremely important in a survey of medical students in 2012 [12]. The authors feel that this makes particular sense in the context of imaging since imaging is characterized by a close exchange among professions and team members and a high degree of interprofessional cooperation in the daily routine [19].

When interpreting the results of the survey, it was clear that the importance of individual criteria differed in some cases depending on gender and preferred future place of work and operational area. Based on the results, female MTR trainees placed on average greater value on minimal night and shift work, childcare opportunities (group-specific assessment difference Δ 0.5), flexible work hours, job security, and flat hierarchies (Δ 0.4). In contrast, the surveyed male MTR trainees found minimal administrative tasks (Δ 0.4) and performance-based compensation components (Δ 0.3) to be more important. While trainees with a hospital as their preferred place of work rated specialization opportunities (Δ 0.6) and teamwork (Δ 0.4) as comparatively important, participants wishing to work in a practice after completion of their training rated minimal night/shift work (Δ 0.8), high environmental quality, and childcare opportunities (Δ 0.5) as having above average importance. Finally, intensive communication (Δ

Rank	Criterion	Average value*	Standard deviation	Frequency distribution for criteria ratings
1	Pleasant work environment (e.g., teamwork, relaxed atmosphere)	3.9	0.3	
2	Compensation for overtime (e.g., payment, time off)	3.9	0.3	
3	Good teamwork (e.g., mutual support, constructive conflict resolution)	3.9	0.3	
4	Strict adherence to work and health protection standards (e.g., dosimeter, lead apron)	3.8	0.5	
5	Work-life balance (e.g., part-time work, emergency childcare)	3.7	0.5	
6	Bonuses (e.g., vacation pay or Christmas bonus)	3.6	0.6	
7	Transparent communication (e.g., information provided in a timely manner)	3.6	0.5	
8	High compensation	3.6	0.6	
9	Flexible work model (e.g., part time, team-oriented scheduling)	3.6	0.6	
10	Intensive orientation/support (e.g., orientation plan, mentoring)	3.6	0.6	
11	Additional benefits (e.g., retirement plan, job ticket)	3.6	0.5	
12	Teamwork	3.5	0.6	
13	Autonomy	3.4	0.6	
14	Job security (e.g., employment after completion of training)	3.4	0.7	
15	Recognition and appreciation of good work (e.g., praise from superiors)	3.4	0.6	
16	Physiological workload	3.4	0.6	
17	Regulated work schedule (e.g., no overtime)	3.4	0.7	
18	Comprehensive continuing education/advanced training opportunities (e.g., specific methods, postgraduate studies)	3.4	0.7	
19	Flat hierarchy (e.g., open communication, employee participation)	3.3	0.6	
20	Availability of modern imaging devices (e.g., MRI, PET/CT)	3.3	0.5	
21	Opportunities for advancement/opportunities for personal development (e.g., senior MTR)	3.3	0.7	
22	Workplace health management (e.g., break room, ergonomic work)	3.3	0.7	
23	Performance-based compensation (e.g., additional compensation for better performance)	3.3	0.9	
24	Use of digital imaging software	3.2	0.6	
25	Opportunities for specialization (e.g., CT specialization, cardiac/vascular imaging)	3.2	0.7	
26	Varied responsibilities (e.g., task rotation)	3.2	0.6	
27	Intensive patient orientation	3.1	0.6	
28	Good reputation of the hospital/practice	3.1	0.5	
29	Accountability (e.g., independent decision-making)	3.1	0.7	
30	Good housing market (e.g., inexpensive housing, good schools)	3.1	0.9	
31	Intensive communication (e.g., regular team meetings, events)	3.0	0.7	
32	Availability of childcare (e.g., affiliation with nearby daycare facilities)	2.9	0.9	
33	Work rooms (e.g., brightness, size)	2.9	0.7	
34	Minimal administrative tasks	2.8	0.7	
35	Broad patient collective (e.g., intensive care medicine, pediatric, etc.)	2.8	0.7	
36	High recreational value (e.g., opportunities to play sports, cultural events)	2.6	0.8	
37	High environmental quality (e.g., clean air, woods, parks)	2.6	0.9	
38	Regular performance evaluation (e.g., annual performance reviews)	2.6	0.7	
39	Minimal night/shift work	2.5	1.0	
40	Size of the hospital/practice (e.g., number of beds and employees)	2.4	0.8	

* A four-point ratings scale ranging from "unimportant" (1) to "very important" (4) was used.



▶ **Fig. 1** Criteria and their importance according to surveyed trainees with respect to applying for an MTR job (n = 90).

▶ **Table 2** Preferred future place of work and area of operation of surveyed MTR trainees, data in absolute value and percentage (n = 90).

Place of work \ Area of operation	Radiology	Nuclear medicine	Radiation therapy	No preference (yet)	No data	Sum
Hospital	42 (47 %)	2 (2 %)	9 (10 %)	7 (8 %)	2 (2 %)	**62 (69 %)**
Imaging practice	3 (3 %)	0 (0 %)	3 (3 %)	0 (0 %)	0 (0 %)	**6 (7 %)**
Other (e. g., research facility, MTR school)	0 (0 %)	0 (0 %)	0 (0 %)	1 (1 %)	0 (0 %)	**1 (1 %)**
No preference (yet)	7 (8 %)	0 (0 %)	2 (2 %)	5 (6 %)	1 (1 %)	**15 (17 %)**
No data	1 (1 %)	0 (0 %)	0 (0 %)	0 (0 %)	5 (6 %)	**6 (7 %)**
Sum	**53 (59 %)**	**2 (2 %)**	**14 (16 %)**	**13 (14 %)**	**8 (9 %)**	**90 (100 %)**

0.7) and comprehensive advanced training and continuing education opportunities (Δ 0.4) were particularly important for MTR trainees hoping to work in radiology. In contrast, the aspects minimal night/shift work (Δ 1.3) and regulated hours (Δ 0.5) were on average comparatively important in the field of radiation therapy.

Radiology clinics with job applicant advantage

More than two thirds of participants (69 %) stated that they would prefer to apply for a position at a hospital after completing their training (▶ **Table 2**). Significantly fewer survey participants (7 %) specified a practice as their desired place of work. This makes sense in light of the fact that MTR schools are primarily affiliated with hospitals and survey participants in practical MTR training primarily work in the imaging departments of these hospitals. Imaging clinics can take advantage of this, for example, by offering MTR trainees the prospect of a longterm position, e. g., with direct hiring as a permanent employee or development opportunities (for example, practice management, Radiology technology degree) even before the completion of their final examination. It is also clear how important it is to convince MTR trainees already during training of their role as future employers. The introduction of standards for practical MTR training [20] and the use of mentors [21] are useful measures here.

Radiology was specified as the desired field of operation by more than half of those surveyed (59 %). Radiation therapy (16 %)

and nuclear medicine (2 %) were selected significantly less frequently. One possible explanation for this clear preference could be that content associated with radiology plays a comparatively greater role in practical training. Therefore, the number of hours for radiology (700 hours) included in practical MTR training is exactly the same as radiation therapy (400 hours) and nuclear medicine (300 hours) combined [22]. This presents challenges particularly for nuclear medicine because this field is presumably especially reliant on young MTRs due to the number of innovative (theranostic) radiotracers and radiopharmaceutical developments [23, 24] as well as the associated opportunities for growth. It will be interesting to see whether the preferred place of work and area of operation will be affected by possible changes in training centers as a result of new laws [2] or the Training and Examination Ordinance for MTRs [25].

Limitations

This study has several limitations. First, analogously to other studies on employer attractiveness [9–12], the application decision was viewed in the present study as a multifactorial and complex decision process determined by a number of influencing factors and alternatives. According to this, MTR graduates apply for the position that they feel comes closest to meeting their personal requirements (measured based on their reported criteria rankings) and thus seems most attractive to them. However, it cannot be ruled out that this decision may be influenced by further criteria not included in our survey. Individual life events like marriage, pregnancy, or illness can also cause survey participants to apply for a comparatively unattractive job in spite of their specified preferences [12]. Secondly, it must be taken into consideration with respect to the preferred place of work and field of operation that we surveyed trainees early in their training. At this point in their training, trainees typically have initially had greater exposure to the diagnostic-radiological clinical setting and may not yet have had experience with all conceivable operational areas in theory and practice which can affect their reported preferences. Thirdly, n = 90 trainees from three schools participated in the survey. Even though this is a good number compared to other surveys of MTR trainees [8], the inclusion of additional MTR schools would be desirable for subsequent surveys in order to increase the level of significance. Fourth, the survey was conducted at training sites on the Rhein and Neckar. In light of regional differences (e. g., cost of living, border location, etc.), the results cannot be applied without restriction to MTR trainees in other parts of Germany. Bearing the stated limitations in mind, the presented results can highlight fundamental tendencies in employer selection by new MTRs and imaging facilities can use this as a practical basis for targeted talent acquisition.

Conflict of Interest

All authors declare that they have no conflicts of interest regarding this article. Disclosures: Frederik L. Giesel is a consultant at ABX, SOFIE Biosciences and Telix and holds small patent interests in F18-PSMA-1007 and FAP ligands.

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