

Artificial Intelligence Competencies in Postgraduate Medical Training in Germany

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Abstract. Routine medical care is to be transformed by the introduction of artificial intelligence (AI), requiring medical professionals to acquire a novel set of skills. We assessed the density of AI learning objectives and the availability of courses containing AI content in postgraduate medical education in Germany. The results reveal general paucity in AI learning objectives and content across (sub-)specialty training and continuing medical education (CME) in Germany. Innovative and regulatory solutions are needed to herald an era of physicians competent in navigating medical AI applications.

Keywords. artificial intelligence, postgraduate medical education, CME

1. Introduction

Everyday medical care is on the verge of revolution with the use of big data and introduction of artificial intelligence (AI). Physicians need to become competent in navigating these novel methods as part of modern care [1]. However, the status quo exhibits discrepancies between imparting competencies physicians require and the education they receive on this matter [2]. Our aim was to investigate the prevalence of AI learning objectives as part of medical specialty and subspecialty training and continuing medical education (CME) in Germany.

2. Methods

After ethical approval [3], we assessed training regulations by the German Medical Association (GMA) and all 17 state-level medical associations regarding AI learning objectives within medical (sub-)specialty trainings between April and June 2021. To assess all CME offerings encompassing AI related content throughout Germany, we surveyed state-level medical associations and conducted a search of the GMA register.

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3. Results

None of the 56 specialty trainings in Germany exhibit AI-related content. One (1/56, 1.8%) subspecialty training contained AI-related content, namely the subspecialty *Medical Informatics*, where AI is not a standalone subject area. Instead, it focuses on technical foundations of informatics (i.e., programming languages, databases) and application-specific concepts (i.e., decision support systems, reasoning methods). Concerning CME, seven of 17 state-level medical associations currently offer AI-related courses. The remaining 10 do not offer any AI-related courses, seven of which do not plan to do so in the future. 30 of 87,136 (0.03%) CME courses listed are AI-related. Twenty-three of these 30 were specific in specialty and application with general scarcity in teaching basic principles of AI.

4. Discussion

There is a clear mismatch between the prospect of physicians educated in encountering medical AI competently and the current landscape of postgraduate medical curricula in Germany. In lieu, medical training is very much antiquated, neglecting competencies enabling doctors to apply AI in an informed and critical fashion. There needs to be a shift towards anchoring digital skills, e.g., deploying AI and machine learning at the bedside, systematically throughout postgraduate training. Bringing this change about is difficult for several reasons. One challenge is the fragmented decision-making and heterogeneity in the design of (sub-)specialty training curricula given the multitude of state-level medical associations in Germany. These are responsible for implementing AI-related competencies in their training programs – though this implementation process takes time and medical AI research and practice is advancing quickly. In order to upskill practicing doctors, CME trainings on medical AI are in high demand and display an important vehicle in networking stakeholders and offer an ability to scale existing (online) offerings to large audiences. Another challenge lies in teaching relevant AI competencies to physicians with the backdrop of heterogeneous applications of AI throughout specialties.

5. Conclusions

The current landscape of secondary medical education serves as symbol for the general shortcoming in equipping health professionals for future-proof medicine in Germany. Redesigning postgraduate medical education to addresses challenges of the future requires innovative models and top-down regulations to impart AI learning objectives throughout postgraduate medical training underlying the German federal system.

References

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