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Editorial

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Quality improvement initiative of the IAEA in nuclear medicine: a tool to assess staffing needs within the QUANUM framework

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Over the past two decades, there has been a trend to curb healthcare budgets, justified by the need to correct suboptimal spending and prevent possible waste of limited economic resources. However, too often this understandable trend has been expressed not through the development of a culture of optimization but rather through a series of cutbacks involving investments particularly in equipment, the level of services offered and ultimately through cuts to staffing.

Recent events have taught us the importance of being prepared for the unexpected. We could face catastrophic events, whether natural or man-made, or circumstances such as the COVID-19 pandemic that has affected the livelihoods and health of people globally and caused deterioration in the quality of life and the collapse of health systems. All of these circumstances, which highlight the fragility of people's health and their taken-for-granted well-being, are driving a rethinking of strategies and a critical analysis of the health policies that have been adopted at the dawn of the 21st century. Indeed, it has been realized that all health services are essential, not just those directly involved in the management of emergency situations. It has become more apparent than ever that all healthcare paths are complex and interlinked, and that the collapse of one service profoundly affects the provision of other services [1,2].

Strategies must be re-evaluated: have they been well conceived? Have adequate mechanisms for containing spending been implemented? It is becoming evident that scientific societies and healthcare professionals were right to raise their voices and point out the lack of attention to the matter, and also that their efforts to implement objective performance-evaluation systems, focusing on spending levels as well as staffing needs, should be taken into consideration.

Healthcare organizations have understood that not only are efficient emergency rooms or intensive care units with sufficient capacity needed, but all hospital departments and services must be operational at all times, not only during emergency situations. Since the beginning of the COVID-19 pandemic, a significant amount of guidance has been made available to the medical community, including diagnostic imaging services [3–7], to guide the adjustment of standard operating procedures and promote the continuity of essential services while incorporating enhanced protection measures and infection control for staff, patients and the public alike. It is important to note that several initiatives and efforts have been launched for the development of tools that were lacking. These efforts were initiated by health maintenance organizations, such as insurance-type healthcare systems, and are gradually reaching the level of policymakers as well.

In the field of nuclear medicine, where practitioners have always paid attention to the efficient use of often limited resources, especially staffing, and to quality management criteria, several indispensable tools have already been introduced. Indeed, staffing is one of the most expensive components of nuclear medicine services. The introduction of new imaging modalities or therapies, new roles and responsibilities, let alone the opening of new nuclear medicine services, requires assessment or reassessment of staffing needs to ensure the most efficient use of resources and to guarantee high standards of quality. One of the strategic decisions of the International Atomic Energy Agency (IAEA), the world center for scientific and technical cooperation in the peaceful use of nuclear and related technologies as part of the United Nations system, has been the promotion throughout its constituency of a culture of quality. The IAEA has developed and implemented a program aimed at improving the level of the services offered by nuclear medicine departments throughout the world, in terms of quality, safety and effectiveness. This

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program, called Quality Management Audits in Nuclear Medicine (QUANUM) [8,9], addresses many of the key components of quality management systems, including the optimal management of available resources. The UK has actively contributed to the global QUANUM initiative both by incorporating several underlying principles within the British Nuclear Medicine Society's own quality management project as well as by contribution to expert meetings on developing principles, training and delivery of the QUANUM program.

QUANUM covers all aspects involved in the practice of nuclear medicine and not only those related to quality assurance/quality control (QA/QC) of instruments, for which guidance is provided in a variety of IAEA documents [10–13]. As a key component of the QUANUM program, the IAEA has developed a model that has resulted in the preparation of an online form for assessing staffing needs for nuclear medicine departments [14]. This form, the 'IAEA Tool to assess staffing needs in Nuclear Medicine', is available at the IAEA's International Research Integration System (IRIS), a secure software platform used by the Agency. The tool can also be accessed through the IAEA's Human Health Campus, an educational resource website for health professionals [15].

The IAEA's tool is modeled on the assumption that staffing needs are linked not only to clinical workload but also to other parameters, such as the number and type of equipment, the level of hospital radiopharmacy, and the presence of an in-house cyclotron. In addition to the clinical work, which covers patient-related tasks, attendance at multidisciplinary meetings and discussions with referring physicians, nuclear medicine staff must spend time preparing equipment and performing QA/QC procedures and user-operated maintenance, as well as on administrative tasks. In the case of university/teaching hospitals, time spent on teaching and supervising must be considered. The tool can be applied to an existing facility with staffing, instrumentation and activities already defined, to assess both actual performance and the need for more staff. For the calculation, an analysis is performed combining the number and type of studies and the therapies carried out, existing equipment, and the implementation of new procedures or the acquisition of new technologies. This is the case for the implementation of cyclotron-PET/CT activities in a cancer center, or the expansion of single-photon emission computed tomography myocardial perfusion imaging in the framework of cardiac imaging programs, which are more complex technologies and perhaps require more staff. The model can also be used for planning new facilities when there is no consolidated level of activity to refer to. In this scenario, after evaluating the clinical needs, the model can help assess the level of staffing of the new department, according to the projected volume of activity, the case mix, the modalities to be implemented, and the type and number of instruments.

Ensuring that the facility is staffed with the correct number and type of staff should be a priority to ensure effective service operation. Ensuring that a facility is properly staffed dramatically improves patient and personnel safety as well as helps planning the annual operating budget. Indeed, one of the biggest obstacles of budgeting and capital planning is being able to defend and justify resource needs. Are staff members deployed in the proper locations and at the optimal time within the department?

The staffing tool, in its present version, does not cover staffing needs related to medical physicists, who are professionals specifically trained and specialized in this area of radiation medicine and play an essential role in modern nuclear medicine, as part of a multidisciplinary team. Their roles and responsibilities are well presented in specific professional statements [16]. A staffing model for medical physicists in nuclear medicine practices is provided in an ad-hoc IAEA document [17].

In conclusion, the most common goal of a staffing assessment in nuclear medicine departments is to identify, project and specify the workforce needs and associated costs. Therefore, a staffing analysis will help assess personnel posts and, based on multiple factors that are specific to the department, will help identify whether they are being prioritized appropriately to ensure well-tolerated and efficient operation.

An independent standardized assessment contributes to the further evaluation of current as well as future staffing needs and can lead to decisions that are purposeful, informed and defendable. Furthermore, the research and the findings gathered during the assessment will provide department managers with comprehensive and accurate data needed to properly support resource goals and objectives.

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Conflicts of interest

There are no conflicts of interest.

References

1 Einstein AJ, Shaw LJ, Hirschfeld CB, Williams MC, Villines TC, Better N, *et al*; on behalf of the INCAPS COVID Investigators Group. Impact of COVID-19 on the diagnosis of heart disease worldwide: findings from a 108-country IAEA study. *J Am Coll Cardiol* 2021; **77**:173–185.

2 Cinar P, Cox J, Kamal A, Bickel K, Krzyzanowska M, Armitage J, *et al*. Oncology care delivery in the COVID-19 pandemic: an opportunity to study innovations and outcomes. *JCO Oncol Pract* 2020; **16**:431–434.

3 Paez D, Gnanasegaran G, Fanti S, Bomanji J, Hacker M, Sathekge M, *et al*. COVID-19 pandemic: guidance for nuclear medicine departments. *Eur J Nucl Med Mol Imaging* 2020; **47**:1615–1619.

4 Paez D, Mikhail-Lette M, Gnanasegaran G, Dondi M, Estrada-Lobato E, Bomanji J, *et al*. Nuclear medicine departments in the era of COVID-19. *Semin Nucl Med* 2022; **52**:41–47.
5 Freudenberg LS, Paez D, Giammarile F, Cerci J, Modiselle M, Pascual TNB, *et al*. Global impact of COVID-19 on nuclear medicine departments: an International Survey in April 2020. *J Nucl Med* 2020; **61**:1278–1283.
6 International Atomic Energy Agency. *COVID-19 Pandemic: Technical Guidance for Nuclear Medicine Departments. Non-serial Publications*. IAEA; 2020.
7 Giammarile F, Delgado Bolton RC, El-Haj N, Freudenberg LS, Herrmann K, Mikhail M, *et al*. Changes in the global impact of COVID-19 on nuclear medicine departments during 2020: an international follow-up survey. *Eur J Nucl Med Mol Imaging* 2021; **48**:4318–4330.
8 Dondi M, Torres L, Marengo M, Massardo T, Mishani E, Van Zyl Ellmann A, *et al*. Comprehensive auditing in nuclear medicine through the international atomic energy agency quality management audits in nuclear medicine (QUANUM) program. Part 1: the QUANUM program and methodology. *Semin Nucl Med* 2017; **47**:680–686.
9 International Atomic Energy Agency. *QUANUM 3.0: an updated tool for nuclear medicine audits. IAEA Human Health Series, No. 33*. IAEA; 2021.
10 International Atomic Energy Agency. *Quality assurance for PET and PET/CT systems. Human Health Series, No. 1*. IAEA; 2009.
11 International Atomic Energy Agency. *Quality assurance for SPECT systems. Human Health Series, No. 6*. IAEA; 2009.
12 International Atomic Energy Agency. *Planning a clinical PET centre. Human Health Series, No. 11*. IAEA; 2010.
13 International Atomic Energy Agency. *Nuclear medicine resources manual 2020 edition. Human Health Series, No, 37*. IAEA; 2020.
14 IAEA Tool to assess staffing needs in Nuclear Medicine. https://iris.iaea.org/public/survey?cdoc=STFNM001. [Accessed 28 March 2022]
15 IAEA Human Health Campus. https://www.iaea.org/resources/hhc/nuclear-medicine. [Accessed 28 March 2022]
16 Institute of Physics and Engineering in Medicine (IPEM). Policy Statement: Medical Physics Expert Support for Nuclear Medicine. https://www.ipem.ac.uk/resources/other-resources/statements-and-notices/policy-statement-medical-physics-expert-support-for-nuclear-medicine. [Accessed 21 April 2022]
17 International Atomic Energy Agency, Medical Physics Staffing Needs in Diagnostic Imaging and Radionuclide Therapy: An Activity Based Approach, IAEA Human Health Reports No 15, IAEA, Vienna. (2018). https://www.iaea.org/publications/12208/medical-physics-staffing-needs-in-diagnostic-imaging-and-radionuclide-therapy-an-activity-based-approach. [Accessed 21 April 2022]