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The Current Status of Nuclear Medicine in Africa

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We aimed to investigate the current status of nuclear medicine (NM) services across Africa, including identifying infrastructure gaps, radiopharmaceutical availability, systemic challenges, uneven growth trends, and efforts to improve access. **Methods:** Data on NM infrastructure, radiopharmaceutical availability, and challenges faced by NM professionals in the region were collected at regional International Atomic Energy Agency (IAEA) training courses, from IAEA databases, and by direct correspondence with NM professionals in the region between September 2024 and September 2025. **Results:** NM services are available in 29 countries. Seven countries have more than 1 SPECT or SPECT/CT camera per million inhabitants, and 12 countries offer PET/CT services, with no country in the region having more than 1 PET/CT camera per million inhabitants. There are 29 cyclotrons in 11 countries. There has been a 5.58% compound annual growth rate of SPECT or SPECT/CT and 32.8% growth (above global averages) in PET/CT cameras since 2022. ^{99m}Tc is available in all countries with NM services, and all, except Burkina Faso, have access to ^{131}I. Prostate-specific membrane antigen imaging is available in 9 countries, and somatostatin receptor type 2 imaging is available in 8 countries. Targeted radiopharmaceutical therapy services are limited to ^{131}I for benign or malignant thyroid disease in most countries. ^{177}Lu-therapies are restricted to 7 countries, and the availability of [^{131}I]MIBG remains limited. Clinical trials with ^{225}Ac and ^{161}Tb are under way. Member states face similar challenges, including high costs of medical equipment and consumables, limited health care infrastructure, low government health care expenditures, weak economies, staff shortages, and limited educational opportunities. **Conclusion:** Despite challenges, there is clear momentum and NM growth in Africa. Although infrastructure, radiopharmaceutical access, and workforce gaps remain, data show progress. Sustained investment in facilities, training, and regulatory frameworks is essential to achieve equitable access to care. IAEA's regional anchor centers as part of the Rays of Hope initiative exemplifies strategic capacity building, collaboration, and knowledge sharing in the region.

Key Words: Africa; radiopharmaceuticals; SPECT; PET

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Africa is home to over 1.5 billion people, yet access to basic nuclear medicine (NM) procedures remains limited and unequal (*1*). Health care challenges include a shortage of skilled professionals, insufficient funding, and weak leadership and management. Addressing these issues requires targeted training, increased health sector investment, and advocacy for stronger political support and commitment (*2*).

NM and molecular imaging are essential tools in modern health care, enabling the diagnosis and treatment of diseases using radiopharmaceuticals. Although NM has advanced in recent decades, Africa's progress has been uneven (*3*).

South Africa and certain northern African countries (Egypt, Algeria, Morocco, and Tunisia) have established training programs, advanced imaging technologies, and radiopharmaceutical production capabilities (*3*,*4*). In contrast, many African nations offer only basic NM procedures, such as ^{99m}Tc radiopharmaceutical-based diagnostic scans and ^{131}I therapy for thyroid diseases (*3*).

We aimed to investigate the current status of NM services across the continent, identifying infrastructure gaps, radiopharmaceutical availability, systemic challenges, uneven growth trends, and efforts to improve access.

MATERIALS AND METHODS

Data were collected from 50 African International Atomic Energy Agency (IAEA) member states. No data were presented for the 4 non-IAEA member states: Equatorial Guinea, Guinea-Bissau, São Tomé and Principe, and South Sudan.

To identify challenges, a questionnaire (available in the supplemental materials at http://jnm.snmjournals.org) was distributed to participants during an IAEA regional training course on SPECT/CT in Egypt in August 2024. In total, 52 (67.5%) of the 77 participants, which included NM physicians, radiopharmacists, and medical physicists, completed the questionnaire.

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Data were supplemented with information from IAEA: results from the survey of the status of radiotheranostics (*5*), the nuclear medicine database (*6*), IAEA medical imaging and nuclear medicine global resources database (*7*), and the database of cyclotrons for radionuclide production (*8*). When data were limited, NM professionals from the respective countries were contacted via email between September 2024 and September 2025 to obtain further information.

Data collected included the number of functional SPECT, hybrid SPECT/CT, and PET/CT cameras, number of installed medical cyclotrons per country and per million inhabitants, availability of diagnostic and therapeutic radiopharmaceuticals, challenges faced by NM professionals, and planned service expansions.

Ethical clearance was not required because the study did not involve patient data, and no identifiable information was collected.

RESULTS

Currently, 20 African IAEA member states (Burundi, Cabo Verde, Central African Republic, Chad, Republic of Congo, Comoros, Djibouti, Eritrea, Eswatini, Guinea, Lesotho, Liberia, Malawi, Mozambique, Rwanda, Seychelles, Sierra Leone, Somalia, Gambia, and Togo) have no NM service.

Twenty-nine IAEA African member states have in vivo NM service delivery: Algeria, Angola, Botswana, Burkina Faso, Cameroon, Democratic Republic of Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Libya, Madagascar, Mali, Mauritania, Mauritius, Morocco, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zambia, and Zimbabwe. NM service delivery in Cameroon was interrupted due to

TABLE 1
SPECT or SPECT/CT and PET/CT Cameras in African IAEA Member States

Country	Income status	SPECT or SPECT/CT	SPECT or SPECT/CT per million inhabitants	PET/CT	PET/CT Cameras per million inhabitants
Algeria	UMIC	58	1.23	8	0.17
Angola	LIC	1	0.05		
Botswana	LMIC	1	0.4		
Burkina Faso	LIC	2	0.04		
Cameroon	LMIC	1	0.03		
Côte d’Ivoire	LMIC	1	0.03		
Democratic Republic of Congo	LIC	1	<0.01		
Egypt	LMIC	115	0.97	106	0.9
Ethiopia	LIC	3	0.02		
Gabon	UMIC	2	0.8		
Ghana	LMIC	3	0.09	1	0.03
Kenya	LMIC	3	0.05	7	0.12
Libya	LMIC	8	1.14	2	0.27
Madagascar	LIC	2	0.06		
Mali	LIC	1	0.04		
Mauritania	UMIC	1	0.2		
Mauritius	LMIC	3	2.5	2	0.83
Morocco	UMIC	39	0.76	30	0.79
Namibia	UMIC	7	2.33		
Niger	LIC	2	0.07		
Nigeria	LMIC	4	0.02	2	<0.01
Senegal	LIC	2	0.11		
South Africa	UMIC	91	1.42	32	0.5
Sudan	LMIC	5	0.1	1	0.02
Tanzania	LMIC	3	0.04	1	0.04
Tunisia	UMIC	12	1	4	0.33
Uganda	LIC	1	0.02		
Zambia	LMIC	1	0.05		
Zimbabwe	LMIC	1	0.06		

UMIC = upper-middle-income country; LIC = low-income country; LMIC = lower-middle-income country.
Population estimates from (*13*); country classifications from (*31*).

equipment failure but is expected to resume soon after the acquisition of a new SPECT/CT. Benin provides only radioimmune assay services but is setting up a NM service, including a cyclotron.

NM services are in the development stages in Malawi, Lesotho, and Rwanda, with efforts ranging from staff training and facility design to equipment procurement.

Participants were asked to describe NM demand and service delivery in their country. Of the 52 respondents, 5 (9.6%) reported a decline in service delivery, 6 (11.5%) noted stable service levels but rising demand, 13 (25%) reported growth keeping pace with demand, and 17 (32.7%) reported clear growth. One respondent noted significant expansion, and 10 (19.2%) did not answer the question.

Twenty-two countries have between 1 and 5 SPECT or SPECT/CT cameras. Some have more extensive SPECT or SPECT/CT infrastructure: Namibia (7 cameras), Libya (8 cameras), Tunisia (12 cameras), Morrocco (39 cameras), Algeria (58 cameras), Egypt (115 cameras), and South Africa (91 cameras) (Table 1). The lowest number of SPECT or SPECT/CT cameras per million population is in the Democratic Republic of Congo, with 0.0009 cameras per million inhabitants, while Mauritius has the highest number (2.5 cameras per million inhabitants). Only 7 countries have 1 or more SPECT or SPECT/CT cameras per million inhabitants (Table 1; Fig. 1).

Twelve countries have PET/CT services. Seven have between 1 and 4 PET/CT cameras, including Ghana, Sudan, Tanzania, Libya, Mauritius, Nigeria, and Tunisia. Five countries have 7 or more PET/CT cameras, including Kenya, Algeria, Morocco, South Africa, and Egypt. No country in Africa has more than 1 PET/CT per million population (Table 1; Fig. 1). Notably, Egypt has 1 PET/MRI camera, and Algeria has 2.

Most respondents plan to expand their current services, and most countries without NM services have plans for starting such services.

Eleven countries have cyclotron facilities: Algeria, Egypt, Ghana, Kenya, Libya, Mauritius, Morocco, Nigeria, South Africa, Tunisia, and Tanzania (Table 2). Mauritius also has access to ^{18}F radiopharmaceuticals from French Réunion Island, a European Union territory.

TABLE 2
Availability of Cyclotrons in Africa, by Size (in MeV)

Country	7.8	9.5	9.6	10	11	16	16.5	17	18	70
Algeria*	2						1			
Egypt							1		2	
Ghana									1	
Kenya	1				1		1			
Libya				1						
Mauritius		1								
Morocco						1			1	
Nigeria			1						1	
Senegal										
South Africa					2	3		1	1	1
Tunisia									1	
Tanzania									1	

*Size not reported for 3 cyclotrons.

Two accelerators are producing radiopharmaceuticals at the National Accelerator Center in South Africa. Six additional cyclotrons are distributed across the country, with a projected doubling in number within 2 y. New cyclotrons are being installed in Benin (9.2 MeV), Egypt (16 MeV), and Nigeria (2 units).

Historically, several research reactors existed across Africa, but these are now inactive or unsuitable for large-scale medical radionuclide production. Currently, 2 reactors—the ETRR-2 reactor (a pool-type reactor with a neutron flux of 2.8 × 1,014 and thermal

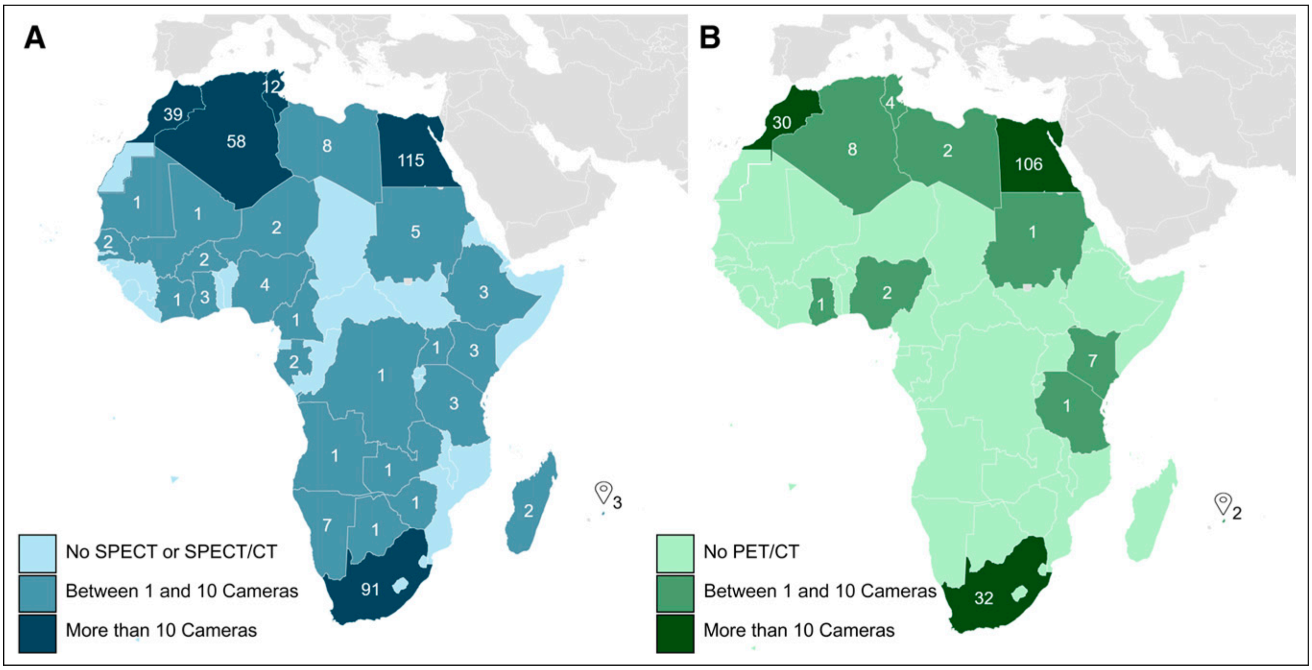

FIGURE 1. Map showing distribution of SPECT or SPECT/CT (A) and PET/CT (B) cameras in Africa.

TABLE 3
Peptide- and Peptidomimetic-Based Radiopharmaceuticals for Diagnostic and Therapeutic Use

Country	[^{99m}Tc]Tc-PSMA	[^{18}F]F-PSMA	[^{68}Ga]Ga-PSMA-11	[^{99m}Tc]Tc-SSTR2	[^{68}Ga]Ga-SSTR2	[^{68}Ga]Ga-FAPI-46	[^{177}Lu]Lu-PSMA	[^{177}Lu]Lu-SSTR2
Algeria		X	X	X			X	X
Egypt		X	X		X		X	X
Ghana	X			X			X	
Kenya		X	X		X	X	X	
Mauritius		X			X			
Morocco		X						
Nigeria	X	X		X			X	X
South Africa	X	X	X	X	X	X	X	X
Tanzania			X		X	X		
Uganda							X	X

SSTR2 = somatostatin receptor type 2.

power of 22,000 kW) in Egypt and the SAFARI-1 reactor (a pool-type reactor with a neutron flux of 2.8 × 1,014 and a thermal power of 20,000 kW) in South Africa—produce medical radionuclides for distribution. The SAFARI-1 reactor is among the 5 main global ^{99}Mo producers. Other research reactors produce limited quantities of radionuclides (such as ^{131}I) (*9*).

^{99m}Tc is available in all countries with in vivo NM services. All except Burkina Faso have ^{131}I available for imaging thyroid diseases. Only Egypt and South Africa have ^{123}I available. [^{123}I]MIBG is available in South Africa and Tunisia, whereas [^{131}I]MIBG is available in 5 countries.

Peptide- and peptidomimetic-based radiopharmaceuticals, such as those targeting prostate-specific membrane antigen (PSMA), somatostatin receptor type 2, and fibroblast activation protein, enable molecular-level disease evaluation. Three countries use [^{99m}Tc]Tc-PSMA, 6 countries have [^{18}F]F-PSMA, and 5 countries use [^{68}Ga]Ga-PSMA-11 (Table 3). Algeria, Egypt, and Kenya use both [^{68}Ga]Ga-PSMA-11 and [^{18}F]F-PSMA, and South Africa is using all PSMA agents.

The use of [^{99m}Tc]Tc-HYNICTOC is limited to 4 countries. [^{68}Ga]Ga-SSTR2 radiopharmaceuticals, such as DOTATATE, DOTATOC, and DOTANOC is used in 5 IAEA member states (Table 3).

South Africa, Kenya, and Tanzania report access to [^{68}Ga]Ga-FAPI-46. Although this agent is used mostly in the research setting, Tanzania has incorporated it into routine clinical practice.

Therapeutic radiopharmaceutical use is mainly limited to ^{131}I therapy for thyroid diseases in 21 countries; it is not available for therapies in the following countries with NM services: Burkina Faso, Gabon, Côte d'Ivoire, Mali, Mauritania, Sudan, and Zambia), whereas [^{131}I]MIBG therapies are performed in 3 countries (Algeria, Egypt, and South Africa). [^{177}Lu]Lu-PSMA is used in 7 countries, and 6 of these offer [^{177}Lu]Lu-DOTATATE treatments (Table 3).

South Africa runs ^{225}Ac-labeled radiopharmaceutical clinical trials. Nigeria reported limited use of ^{161}Tb-PSMA, and ^{161}Tb is produced and used for research in South Africa.

Challenges Faced by African Member States

The survey results, with 52 responses from 25 countries, revealed challenges in NM. Respondents could select multiple factors that contribute to these challenges.

The most commonly cited economic barriers were high equipment and supply costs (75%), limited health care infrastructure (55.8%), low government health care spending (44.2%), weak national economies (34.6%), and urban rural disparities in service access (26.9%) (Fig. 2).

The reported limitations to NM development included insufficient investment in equipment (62%), inadequate funding (61.5%), and inequitable health care distribution and governance issues (25%). Obstacles to training included limited educational opportunities (42%) and language barriers (13.5%).

Infrastructure challenges included an unreliable power supply (25%) and limited Internet and information technology services (15.4%). Some participants noted factors such as famine, drought, conflict, and war as additional challenges.

Sources of funding for training were external support (e.g., IAEA) (64.7%), government funding (37.3%), self-funding for studies abroad (17.6%), and self-funding for local studies (9.8%)

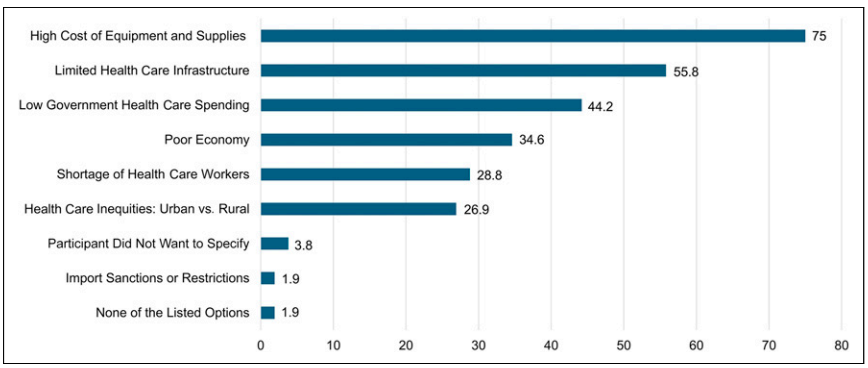

FIGURE 2. Factors hampering progress of NM in IAEA African member states.

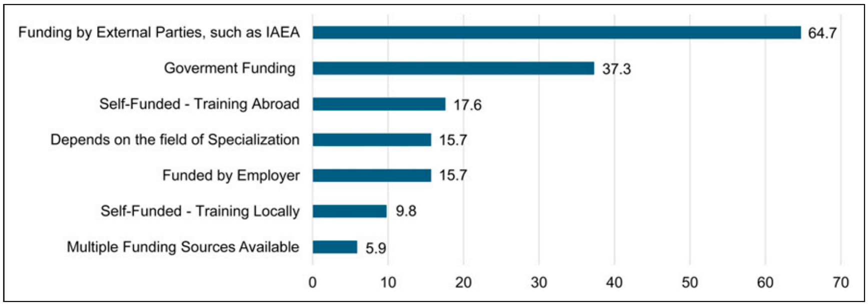

FIGURE 3. Funding sources of NM professionals in Africa.

(Fig. 3). Only 5.9% of respondents noted sufficient in-country funding opportunities. One respondent stated that "The IAEA is responsible for the training of more than 70% of the nuclear medicine staff in our country."

Retention of trained NM personnel varied across countries. Retention was rated excellent by 32.7% of respondents, good by 32.7%, fair by 17.3%, and poor by 5.8%; 7.7% reported many trained professionals leaving the country, and 3.8% were unsure of NM personnel retention. Poor retention was reported in countries with limited NM infrastructure, whereas excellent staff retention was noted in those with well-established NM services.

Staff often move from public institutions to higher-paying private institutions, and medical physicists often shift to radiotherapy because of better opportunities. Some trained staff remain in-country but leave NM because of limited employment opportunities.

Reporting the number of SPECT and PET cameras in countries with extensive NM services was challenging because of recent installations of cameras and conflicting responses, although discrepancies were minor. Further, questionnaire-based data may have lacked qualitative insights, such as personal motivations, preferences, or opinions.

DISCUSSION

Eighty-eight percent of the SPECT or SPECT/CT cameras and 95% of the PET/CT cameras are in 7 northern and southern African countries (mostly upper-middle-income countries), and access is often limited to major cities. Many countries have only basic equipment or none, with 20 countries having no NM facilities.

Despite these gaps, NM is growing. Kenya, Tanzania, Ghana, and others have recently launched services, with some performing their first PET scans. However, meeting the continent's rising health care demands will require expansion in both infrastructure and geographic coverage.

As of 2025, Africa has approximately 374 SPECT or SPECT/CT cameras compared with 301 in 2022 (*3*), representing a 5.58% compound annual growth rate, which remains below global averages (*10*,*11*). The equipment is concentrated in a handful of countries. South Africa, an upper-middle-income country with 59 million people, has 91 SPECT and SPECT/CT cameras (~1.4 cameras per million people). In contrast, Nigeria (233 million people) has 4 γ-cameras (0.02 per million inhabitants). Countries with small populations, such as Namibia and Mauritius, have the highest number of SPECT or SPECT/CT cameras per million inhabitants (2.3 and 2.5, respectively).

NM physicians in private practice in South Africa and Egypt prefer SPECT cameras over SPECT/CT cameras because of lower cost and equal reimbursement. There is also a shift toward PET imaging, with some countries (such as Tanzania) adopting the use of ^{68}Ge/^{68}Ga generators, as its long half-life ensures reliable albeit limited service delivery, especially in countries with inconsistent delivery of ^{99}Mo generators (*12*).

Africa currently has 196 PET/CT cameras, up from 63 in 2019 (*3*), reflecting a compound annual growth rate of 32.8%, above global averages (*10*,*11*). Despite this growth in infrastructure, only 12 countries offer PET imaging, up from 7 in 2019 (*3*). New adopters include Ghana, Mauritius, Nigeria, Sudan, and Tanzania. Nigeria, despite being the most populous country in Africa, has only 2 privately operated PET/CT cameras (*13*). Benin will soon launch NM imaging services through the assistance of IAEA. No country in Africa has more than 1 PET/CT camera per million inhabitants compared with 5.1 PET/CT cameras per million in Australia and New Zealand (*7*).

To expand their capacity for PET/CT, some private hospitals are installing hybrid cameras with SPECT/PET/CT capabilities, offering a cost-effective strategy to broaden imaging capabilities.

Europe operates approximately 320 cyclotrons, whereas Africa has only 29 across 11 countries, up from 17 in 2019 (*3*). Some countries. such as Mauritius, can also receive [^{18}F]FDG from neighboring countries, but most lack PET/CT services because of logistic barriers and the absence of local cyclotrons. Most NM services in Africa rely on SPECT imaging with ^{99m}Tc-labeled radiopharmaceuticals obtained from ^{99}Mo generators. A significant investment in infrastructure development, including the expansion of the cyclotron network, is needed to ensure sustainable growth of NM in Africa.

Several countries depend on imported generators, radionuclides, and cold kits, making them vulnerable to supply disruptions. Delivery is hindered by long distances, limited flight availability, and strict import regulations, which increase cost and restrict the range of usable radionuclides (*12*). In many sub-Saharan nations, ^{99}Mo/^{99m}Tc generators are imported once or twice per month, often facing delays because of licensing, customs, and high transport fees, leading to cancellations or suboptimal scans (*3*,*12*,*14*).

The COVID-19 pandemic highlighted these vulnerabilities. Lockdowns and flight suspensions, especially the closure of South African Airlines routes, disrupted NM supply chains (*15*). A 2020 IAEA survey confirmed that supply chain interruptions were among the most damaging factors for NM services in Africa and Latin America, with some African countries experiencing complete delivery halts (*16*).

Recent global shortages of ^{99m}Mo generators impacted Africa disproportionately, as exporting countries prioritized domestic needs; Africa's production capacity remains limited (*17*,*18*).

South Africa and Egypt produce ^{99}Mo/^{99m}Tc generators and cold kits (*4*). The production capacity of ^{99}Mo generators is fragile, and production in South Africa is currently halted for an undefined period (*19*). Despite this, South Africa continues to produce ^{99}Mo for global supply and remains the only African country with full domestic production capability of key medical and research radioisotopes, such as ^{99}Mo, ^{131}I, and ^{161}Tb (*3*,*18*).

Algeria, Egypt, Libya, and Morocco have small research reactors or cyclotrons producing limited quantities of radionuclides (*9*,*12*). Additionally, iThemba LABS in South Africa manufactures a commercial ^{68}Ge/^{68}Ga generator (*4*).

Most countries use ^{99m}Tc-pertechnetate to image benign thyroid conditions. ^{131}I is used for imaging well-differentiated thyroid cancer. Although ^{123}I offers superior imaging and lower radiation exposure, its short half-life (13 h) and high cost limit its use to Egypt and South Africa.

[^{131}I]MIBG and [^{123}I]MIBG are used for imaging pheochromocytomas, paragangliomas, and neuroblastomas in some countries. [^{131}I]MIBG is available only in northern and southern Africa. [^{123}I]MIBG is produced in South Africa and used only in South Africa and Tunisia. Some countries use [^{18}F]DOPA and [^{68}Ga]Ga-DOTATATE/DOTATOC in lieu of [^{123}I]MIBG.

[^{99m}Tc]Tc-HYNIC-PSMA and [^{99m}Tc]Tc-HYNICTOC are well suited for Africa because of the availability of SPECT cameras. However, their use is limited because these kits are expensive, with single-dose vials increasing the per-patient cost. They are mainly used to guide [^{177}Lu]Lu-PSMA or [^{177}Lu]Lu-DOTATATE treatments, which are rarely performed in the region.

[^{18}F]F-PSMA-1007 is available in Algeria, Egypt, Mauritius, Morocco, Nigeria, and South Africa. In contrast, ^{68}Ga-labeled radiopharmaceuticals are gaining popularity because of the availability of ^{68}Ge/^{68}Ga generators (*20*). Labeled PSMA agents are used in Algeria, Egypt, Kenya, Mauritius, Morocco, Nigeria, and South Africa, with many of these countries having more than 1 labeled PSMA option available.

^{131}I remains the most widely used therapeutic radionuclide because of its long half-life (8.01 d) and reasonable cost.

[^{177}Lu]Lu-PSMA is a treatment for castration-resistant prostate cancer and is used in Algeria, Egypt, Ghana, Kenya, Nigeria, South Africa, and Uganda (*21*). However, the cost of [^{177}Lu]Lu-[^{177}Lu]Lu-PSMA-617, approved by the Food and Drug Administration, limits its use (*22*). Alternatives such as [^{177}Lu]Lu-PSMA I&T or [^{177}Lu]Lu-iPSMA are being introduced, although ^{177}Lu remains expensive to import. South Africa's NuMeRI center, an IAEA anchor center, is a global leader in the use of ^{225}Ac-labeled radiopharmaceuticals, especially [^{225}Ac]Ac-PSMA (*23*).

[^{177}Lu]Lu-DOTATATE/DOTATOC, used for treating metastatic neuroendocrine tumors, is available in only 5 African countries (Algeria, Egypt, Nigeria, South Africa, and Uganda). The cost and rarity of this disease limits the use of these agents, but increased awareness has led to increasing diagnoses.

African countries face common barriers to establishing reliable NM services. These include the high cost of equipment, maintenance, consumables, and staff; a shortage of trained personnel; limited training infrastructure; restricted access to radiopharmaceuticals; regulatory hurdles; and low awareness among health care providers and policymakers (*3*,*12*,*14*).

Financial limitations are the biggest challenge, particularly for theranostic applications. Costs extend beyond the initial investment in equipment to maintenance, staffing, and consumables. Many facilities cannot afford repairs of advanced technologies.

In most African countries, NM services are not covered by the national health insurance plan, requiring patients to pay themselves. Even basic NM procedures are often considered expensive, limiting patient referrals. Where public NM services exist, facilities are too few to meet demand.

Imported materials and the regulatory fees further increase expenses (*12*,*14*). Without sustainable financing through government support, insurance coverage, private public partnerships, or donor assistance, NM departments struggle to operate and expand.

Maintenance is another challenge. Manufacturers often have no service centers outside hubs such as South Africa or Egypt. Equipment breakdowns can result in prolonged downtime because of delays in repairs, high service costs, and limited access to spare parts. Unreliable electricity supply is an additional problem (*12*).

Human resources are critically lacking. NM professionals (NM physicians, technologists, radiopharmacists, and medical physicists) are concentrated in countries with established NM departments (*3*). A recent survey found that 70% of all qualified radiopharmacists are in Egypt and South Africa (*24*).

Limited training infrastructure is an additional barrier. Only Algeria, Egypt, Morocco, South Africa, and Tunisia offer full postgraduate training programs for NM physicians (*3*). Radiopharmacy training is available at just 3 institutions supported by IAEA: Stellenbosch University in South Africa, Sefako Makgatho Health Sciences University (in South Africa), and the University Mohamed V Faculty of Medicine and Pharmacy in partnership with the National Center of Nuclear Energy, Science and Technology (in Morocco) (*4*). The number of radiopharmacists on the continent has increased from 1 in 2000 to over 80 in 2025 (*3*,*4*).

Increased training of staff in all fields of NM is needed. However, to ensure sustainable NM service delivery, countries should ensure sustainable employment of trained professionals to strengthen and grow the field for continuous patient service delivery. Currently, many trained professionals leave for better opportunities abroad or shift to private practice for higher renumeration. The likelihood of leaving a country is higher if the NM infrastructure is not well-established. Poor career prospects and lack of recognition for NM in some countries further discourage new graduates (*25*).

Excessive regulatory requirements delay the import and registration of equipment, radiopharmaceuticals, and professional licensing, driving up cost and reducing service delivery (*14*).

Awareness of NM remains low among physicians, patients, and decision-makers. Misconceptions about radiation and limited understanding of NM services, especially theranostics, leads to underutilization and weak institutional support.

International partnerships have been vital to advancing NM in Africa, with IAEA playing a leading role. Through its technical cooperation programs, coordinated research projects, training initiatives, and the Rays of Hope campaign, IAEA has helped build capacity across the continent. The most success is seen when the assistance aligns well with national health priorities and there is strong government buy-in (*3*).

IAEA has trained a significant portion of Africa's NM workforce. This is done through short-term fellowships (2 wk to 6 mo), with a focus on specific topics like SPECT/CT, or long-term fellowships (up to 4 y), which support full specialization. In the past 3 y alone, 14 NM physicians were trained.

IAEA partnered with the University of Ghana to offer a medical physics training program for students from the region (*26*). In radiopharmacy, it supports 3 institutions and in 2023 launched a harmonized master's curriculum with 9 universities across 6 countries (*27*). It has also published *Guidelines for the Harmonization of Education and Training Requirements in Radiopharmacy* and "Guiding Principles on the Education and Practice of Theranostics" (*28*,*29*).

The Rays of Hope initiative, launched in 2022, aims to close cancer care gaps in Africa. It supports regional anchor centers with training, equipment, and research opportunities. These centers serve as hubs for training and education, with the goal to strengthen service delivery in the region (*30*).

CONCLUSION

Achieving equitable access to NM across Africa requires a coordinated strategy that prioritizes investment in regional hybrid imaging infrastructure, cyclotrons, and the development and strengthening of harmonized training pathways. This goal can be advanced by leveraging existing partnerships, such as those facilitated by IAEA.

DISCLOSURE

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KEY POINTS

QUESTION: What is the current status of NM services across Africa, and what are the implications of existing infrastructure, radiopharmaceutical availability, and workforce challenges on patient care?

PERTINENT FINDINGS: Nuclear medicine services are available in 29 of 50 African IAEA member states. Twenty-one countries have 1–5 SPECT or SPECT/CT cameras, while 12 offer at least one PET/CT camera, with none exceeding 1 PET/CT per million inhabitants. There are 29 cyclotrons in 11 countries. Since 2022, SPECT or SPECT/CT systems have grown at 5.58% annually, and PET/CT systems at 32.8%. ^{99m}Tc is available in all countries with a NM service, ^{131}I in all but Burkina Faso, PSMA PET in 9 countries, and somatostatin receptor type 2 imaging in 8 countries. Radionuclide therapies are mainly limited to ^{131}I, with ^{177}Lu available in 7 countries and ^{131}I-MIBG still restricted. Common challenges include high costs, limited infrastructure, low health care spending, staff shortages, and scarce training opportunities.

IMPLICATIONS FOR PATIENT CARE: Despite persistent infrastructure and workforce gaps, NM capacity in Africa is expanding. However, uneven distribution of services, limited advanced therapies, and resource constraints continue to restrict equitable access.

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