



Current and Future Needs for Interventional Radiologists in Saudi Arabia: Position Statement by the Saudi Interventional Radiology Society

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Abstract

Keywords

- ▶ interventional radiology
- ▶ interventional radiologist
- ▶ Saudi health care system
- ▶ Saudi Arabia
- ▶ IR
- ▶ 2030
- ▶ future needs
- ▶ physician
- ▶ ministry of health
- ▶ MOH

Saudi Arabia has gone through a huge expansion in the medical services, which increased the demand for interventional radiologist (IR) services. However, the current number of IRs is considerably less than the needed number, which poses a challenge to provide a 24/7 IR service coverage. The shortage may improve in the future, but it will continue through 2030 despite the successful local fellowship training program.

Background

The health care sector in Saudi Arabia (SA) is one of the most important and advanced sectors in the Middle East. It has shown remarkable progress in the infrastructure over the past 10 years, in which the GDP per capita had reached

\$23,311.¹ The total budget of the Ministry of Health (MOH) in 2021 had increased around 19% compared with that of 2017, which represents 8.6% of the government budget. Health care in SA is provided by three main sectors: the first and largest is the MOH, followed by other governmental sectors (OGS; i.e., Armed Forces Medical Services under the Ministry of

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Defense [MOD], National Guard Health Affairs under the Ministry of National Guard [MNG], Ministry of Interior Medical Services [MOI], King Faisal Specialist Hospital & Research Center [KFSHRC], Royal Commission [RC] Hospitals, Johns Hopkins Aramco Health Care [JAHA] Hospital, Ministry of Education [MOE], and other small governmental sectors), and finally the private sector (PS).

The number of hospitals in SA has increased by 14% in the past 10 years in all sectors, which translates to 26% increase in bed capacity as illustrated in **Table 1**.¹

The overall number of physicians has significantly increased in the past 10 years by 71% from 71,518 in 2012 to 122,356 in 2021.¹ This was paralleled by an increase in the number of radiologists. Currently, there are 3,255 radiologists distributed across different regions of SA. There are 2,510 radiologists in the MOH and PS (**Table 2**). The number of radiologists in OGS is 666 (**Table 3**).

The increasing number of radiologists in the past two decades allowed subspecialties to expand. Interventional radiology (IR) has become a pivotal clinical service in any health care facility. The United Kingdom workforce census report in 2019 indicated that six interventional radiologists are required in each hospital to provide 24/7 coverage.² The Royal College of Radiologists (RCR) guidelines and the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) recommend having a formal schedule of ~1:6 call frequency to provide off-hours IR coverage with a safe and reliable service.³ Nonetheless, the number of IRs in SA is barely enough to provide emergency services, respond to patients' routine needs, and cover 24/7 services in some of the major hospitals in major cities.

This article highlights the current status of IR in SA, and the future potential of our health care system to provide a safe and effective, elective, and emergency IR services in most of the Saudi hospitals. Although the focus here is on physicians, one should not ignore the comparable need for allied health professionals, interventional radiology nurses in particular.

Table 1 Number of hospitals and beds in Saudi Arabia

	2012	2021	Percentage increase
Hospitals	435	497	14.3
MOH	259	287	10.8
OGS	39	51	30.8
PS	137	159	16.1
Beds	61,036	77,889	27.6
MOH	35,828	45,330	26.5
OGS	11,043	14,005	26.8
PS	14,165	17,889	26.3

Abbreviations: MOH, Ministry of Health; OGS, other governmental sectors; PS, private sector.

Table 2 Number of radiologists in MOH and private sectors

Region	Total number of radiologists	
	MOH	PS
Riyadh	310	304
Holy Capital	117	60
Jeddah	109	220
Ta'if	73	26
Madinah	83	59
Qassem	119	28
Eastern	115	179
Hafr Al-Baten	16	10
Aseer	93	45
Bishah	27	1
Tabouk	44	12
Ha'il	49	19
Northern	35	7
Jazan	76	18
Najran	60	11
Al-Bahah	37	3
Al-Jouf	36	4
Qurayyat	10	0
Qunfudah	18	0
Total	1,479	1,031

Abbreviations: MOH, Ministry of Health; PS, private sector.

Current Scope and Demand for IR in Saudi Arabia

The value of IR is well established by shortening the length of stay through minimally invasive care. IR clinics and admission privileges became integral parts of the IR training and practice.

Due to the continuous increase in the number and complexity of elective and emergency IR procedures, clinical

Table 3 Number of radiologists in other governmental sectors

Other governmental sectors	Total number of radiologists
Armed Medical Forces Services	233
National Medical Guard Services	130
Ministry Interior of Medical Services	30
King Faisal Specialist Hospital	101
Royal Commission Hospitals	19
ARAMCO JAHA Hospitals	15
Ministry of Education	138
Total	666

duties, scope of service, and afterhours coverage in the past 15 years, the specialty has realized a great deal of interest from trainees and institutions alike.

To cope with the increasing demand, a group of senior interventional radiologist worked with the Saudi Commission for Health Specialties (SCFHS; the accreditation body for graduate medical education) to establish a 2-year accredited IR fellowship program. The program started in 2014 with two fellows in two accredited centers. Today, there are 9 accredited centers accepting 15 candidates per year, with a total of 141 IRs distributed in all health care sectors as demonstrated in ►Fig. 1.

Despite this great evolution, assessment of the current needs and future demands remains challenging. Sunshine et al suggested that the estimated number of needed interventional radiologists should be at least 10% of the number of radiologists.⁴ If we apply the same principle, then we ought to have nearly 320 IRs from the 3,255 practicing radiologists in SA, which is nearly 180 physicians short of the current number across all sectors (►Fig. 2). One should keep in mind that these data were published in 2004 when IR was not as diverse or complex as it is today. Many procedures have evolved since then and the role of IR have expanded significantly.

Another way to estimate the number of IRs needed is per capita as postulated by Avrin, who proposed that 1 interven-

tional radiologist is needed per 100,000 population.⁵ This translates to 340 IRs needed to serve the 34 million people in SA, with a total deficiency of 188 IRs. This analogy resulted in a comparable number with the previous principle using the number of radiologists as a reference.

The geographic distribution of interventional radiologist in the United States varies significantly. Nearly 85% of U.S. counties lack IR services.⁶ Similarly, the geographic coverage of interventional radiologist differs significantly across SA (►Table 4). Contrasting the number of radiologists and IRs in SA to that of the United States as a proposed benchmark highlights the current shortage in IR services and the urge to act to fill the gap (►Table 5).

In 2030, the population of SA is expected to rise to 39 million at minimum. If the number of yearly graduates from the local fellowship persisted at 15 per year, 105 interventional radiologist will be added to the existing workforce of 141 for a total of 246 interventional radiologist. Although the number is promising, it would remain short by 130 to 150 interventional radiologist (~30–40%) from the needed number (375–390 interventional radiologist) based on the above-mentioned principles.

The limitation of this report is the lack of a validated principle to accurately calculate the numbers needed. However, similar reports were referenced to minimize the error and approximate the gap.

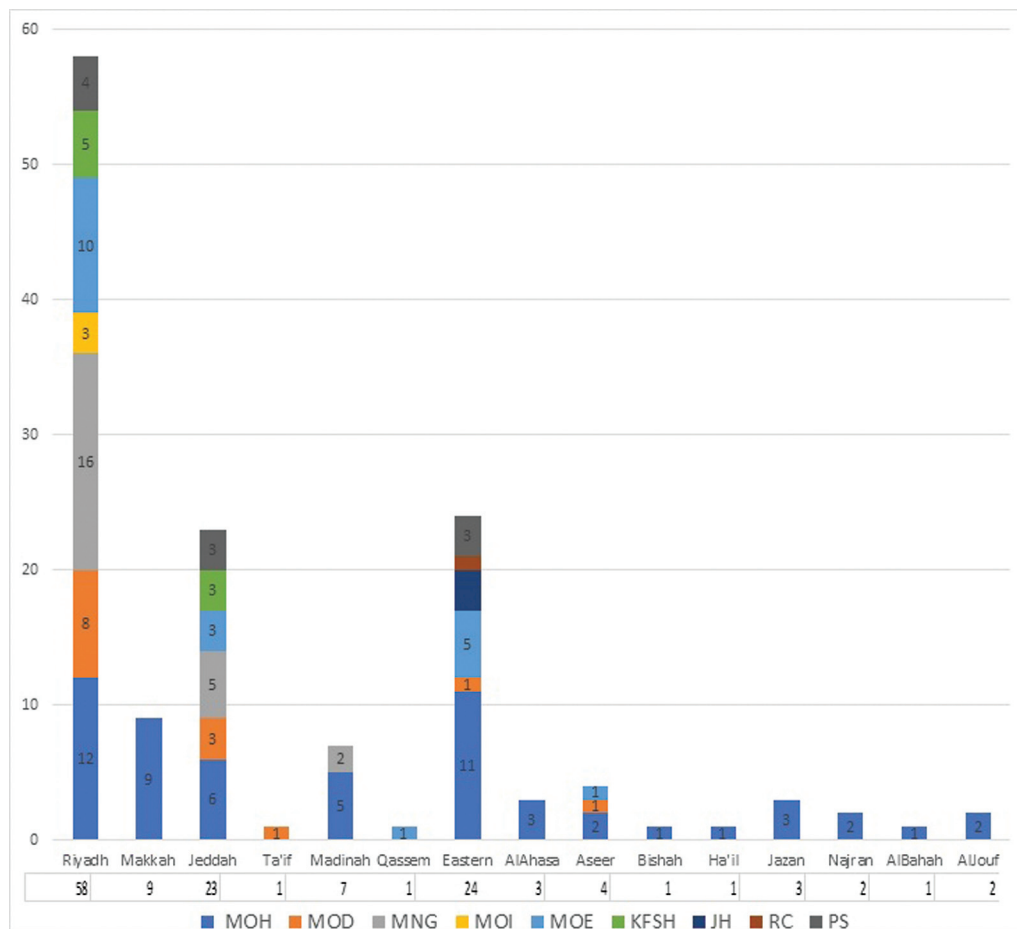


Fig. 1 Number of interventional radiologists per sector in every region.

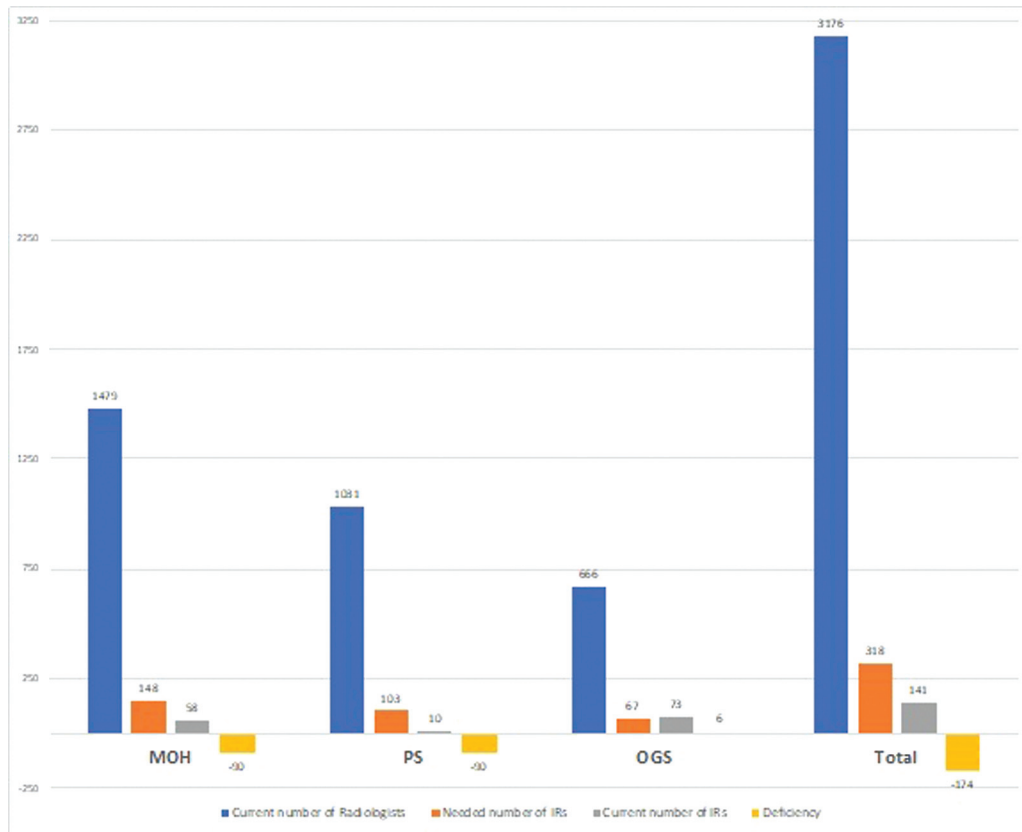


Fig. 2 The estimated deficiency of interventional radiologists in different health care sectors (MOH, Ministry of Health; OGS, other governmental sectors; PS, private sector).

In addition, using the number of radiologists as a reference may not be accurate since IR is becoming a separate specialty with a distinct gamut of roles and responsibilities. In the past 20 years, and since the referenced report was published, the specialty has evolved significantly, that is, the needed number could be higher. Moreover, the ambitious

number of populations in 2030 can reach up to 50 million, which would require more interventional radiologist.

Another limitation is that the provided data were collected manually using the Society database, reinforced by direct communication to each sector and institution to the best of our knowledge.

Table 4 The estimated deficiency of interventional radiologists (IRs) per location

Region	Population	No. of IRs	Needed no. of IRs	Deficiency
Riyadh	8,660,885	58	86	28 (33%)
Makkah/Jeddah/Qnfudah/Ta'if	9,033,491	33	90	57 (63%)
Madinah	2,239,923	7	22	15 (68%)
Qassem	1,488,285	1	14	13 (92%)
Eastern/Alahsa/Hafer Al- Baten	5,148,598	26	51	25 (49%)
Aseer/Bisha	2,308,329	4	23	19 (82%)
Tabouk	949,612	0	9	9 (100%)
Ha'il	731,147	1	7	6 (86%)
Northern	383,051	0	4	4 (100%)
Jazan	1,637,361	3	16	13 (81%)
Najran	608,467	2	6	4 (67%)
Al-Bahah	497,068	1	5	4 (80%)
Al-Jouf/Qurayyat	531,952	2	5	3 (60%)
Total	34,218,169	137	338	201 (59%)

Table 5 The estimated deficiency of interventional radiologists (IRs) in the United States compared with Saudi Arabia

	United States	Kingdom of Saudi Arabia
Population	325 million	34 Million
No. of radiologist	29,530	3,255
No. of IRs	3,000	141
Percentage of IRs	8.5–11.5%	4%
Needed no. of IRs	>3,000	325

In conclusion, the current number of IRs in SA is considerably less than the needed number, which poses a challenge to provide a 24/7 IR service coverage. The shortage may improve but will continue through 2030 despite the successful local fellowship training program. Failure to establish an easy access to IR services may compromise patient care. Attention to satisfying the needs across all sectors and regions is essential to realize the ambitious vision of 2030.

Recommendations

The Saudi Interventional Radiology Society sets forth the following recommendations to enhance the current IR capacity and access to IR services in all sectors and across all regions:

- Encourage centers in all health care sectors that have the capabilities and meet the SCFHS requirement to apply for the IR fellowship accreditation and participate in IR training.
- Encourage the current accredited training centers to increase their training positions without compromising the quality or the number of required cases.
- Increase awareness among medical students and radiology residents to further increase recruitment of trainees.
- Facilitate external scholarships for IR residency or fellowship training.
- Encourage direct hiring of full-time interventional radiologist to bridge the existing gap, especially in the PS and peripheral centers, where IR services are scarce or unavailable.

- Encourage practicing interventional radiologist to provide cross-coverage in the PS in compliance with the national regulations.

Registration of Research Studies

1. Name of the registry: Not required.
2. Unique Identifying number or registration ID: N/A.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked).

Ethical Approval

Not applicable.

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Conflict of Interest

None declared.

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