

Global Statement Defining Interventional Radiology—Have We Reached the Tipping Point?



Robert A. Morgan, Parag J. Patel, Christoph Binkert, and Alda Tam; on behalf of the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) and the Society of Interventional Radiology (SIR)

ABBREVIATIONS

AHP = allied health professional, CIRSE = Cardiovascular and Interventional Radiological Society of Europe, IR = interventional radiology

INTRODUCTION

In 2010, spurred by the Royal College of Physicians and Surgeons of Canada's denial of the Canadian Interventional Radiology Association's request for official recognition of interventional radiology (IR) (1), a representative writing group of IR societies around the world developed a consensus statement to define IR (2). This initial effort provided a statement setting forth the basic elements of the specialty which apply to interventional radiologists wherever they work worldwide. In the intervening 15 years, much has changed, and a revisit of the definition of IR is appropriate.

The following is a consensus statement developed by the Cardiovascular and Interventional Radiological Society of Europe (CIRSE; Europe); the Society of Interventional Radiology (SIR; US), the Society of African Interventional Radiology & Endovascular Therapy (SAFIRE; Africa), the Argentine College of Vascular and Interventional Radiology (CARVI; Argentina), the Asia Pacific Society of Cardiovascular and Interventional Radiology (APSCVIR; Asia Pacific region), the Interventional Radiology Society of Australasia (IRSA; Australia and New Zealand), the Austrian Society of Interventional Radiology and Minimally Invasive Therapy (ÖGIR; Austria), the Brazilian Society of Interventional Radiology and Endovascular Surgery (SOBRICE; Brazil), the British Society of Interventional Radiology (BSIR; United Kingdom), the Canadian Association for Interventional Radiology (CAIR; Canada), the Chinese College of Interventionalists (CCI; China), the Czech Society of Interventional Radiology (CSIR; Czech Republic), the

Georgian Association of Cardiovascular and Interventional Radiology (GACIR; Georgia), the German Society of Interventional Radiology and Minimally Invasive Therapy (DeGIR; Germany), the Greek Society of Interventional Radiology (GSIR; Greece), the Hong Kong Society of Interventional Radiology (HKSIR; China), the Hungarian Society of Cardiovascular and Interventional Radiology (HSCIR; Hungary), the IberoAmerican Society of Interventionism (SIDI; Latin America), the Indian Society of Vascular and Interventional Radiology (ISVIR; India), the Interventional Radiology Division of the Iranian Society of Radiology (ISR; Iran), the Irish Society of Interventional Radiology (ISIR; Ireland), the Israeli Society of Interventional Radiology (ILSIR; Israel), the Italian Society of Medical and Interventional Radiology (SIRM; Italy), the Japanese Society of Interventional Radiology (JSIR; Japan), the Korean Society of Interventional Radiology (KSIR; Korea), the Lithuanian Association of Interventional Radiology (LIRA; Lithuania), the Malaysian Society of Interventional Radiology (MYSIR; Malaysia), the Moroccan Society of Interventional Radiology (SMRI; Morocco), the Dutch Society of Interventional Radiology (NVIR; Netherlands), the Nigerian Society of Interventional Radiology (NiSIR; Nigeria), the Society of Interventional Radiology of North Macedonia (SIRNM; North Macedonia), the Norwegian Society of Interventional Radiology (NFIR; Norway), the Pan Arab Interventional Radiology Society (PAIRS; Pan Arab region), the Philippine Society of Vascular and Interventional Radiology (PSVIR; Philippines), the Interventional Radiology Section of the Polish Medical Society of Radiology (PLTR; Poland), the Portuguese Association of Interventional Radiology (APRI; Portugal), the Romanian Society of Neuroradiology and Interventional Radiology (SNRIR; Romania), the Society of Interventional Radiologists of Serbia (SIRS; Serbia), the Division of Interventional Radiology of the Slovak

Radiological Society (SRS-SIRS; Slovakia), the Slovak Society of Cardiovascular and Interventional Radiology (SKVIR; Slovakia), the South African Interventional Society (SAINTS; South Africa), the Spanish Society of Vascular and Interventional Radiology (SERVEI; Spain), the Seldinger Society of Vascular and Interventional Radiology (SSVIR; Sweden), the Swiss Society of Vascular and Interventional Radiology (SSVIR; Switzerland), the Thai Society of Vascular and Interventional Radiology (TSVIR; Thailand), the Tunisian Interventional Radiology Association (TIRA; Tunisia), and the Turkish Society of Interventional Radiology (TGRD; Turkey). (The societies listed represent the national and regional IR societies which have endorsed this statement as of August 30, 2024.)

Purpose

An updated global statement setting forth the essential elements of IR and continuing challenges facing the specialty.

Background

IR originated within diagnostic radiology and the initial procedures developed formed the basis of a therapeutic subspecialty. Invasive diagnostic procedures such as angiography and cholangiography evolved into therapeutic interventions such as angioplasty and biliary stent placing, and now include many more therapies such as embolization, ablation, and thrombectomy as well as endovascular aortic repair. IR therapies have increased in precision and sophistication, and are applied to an increasing spectrum of pathologic conditions for adults and children. The domain of IR continues to grow, and IR has become indispensable to the practice of modern medicine (3–5).

Since 2010, several major shifts have occurred. First, the clinical evaluation and longitudinal care of patients by IR physicians, essential for determining a patient's suitability for treatment and providing management of the patient's underlying disease, has become an integral element of contemporary IR practices, and it has codified into training and certification processes. Second, there has been significant growth in the adoption of IR across the world (6) with a multitude of ongoing outreach and education initiatives for developing countries in Africa, Asia, and Latin America. Lastly, the health-care landscape has undergone substantial change including a focus on multidisciplinary care for complex clinical conditions, emphasis on access to care, and consideration of workforce needs which have brought attention to workforce diversity gaps and introduced allied health professionals into many IR practices (7).

DEFINITION OF INTERVENTIONAL RADIOLOGY

IR practices around the world continue to vary according to local factors. In some countries, IR remains under the house

of diagnostic radiology without subspecialty distinction; in others, IR is recognized as an own subspecialty within radiology; and in the US, IR has been formally recognized as one of the thirty-nine distinct medical specialties (8,9). Among others, Japan, Canada, and the UK have achieved subspecialty status (10). Regardless of local geographic specialty or subspecialty recognition or lack thereof, there are several constant features common to IR throughout the world:

1. Expertise in the clinical evaluation and management of patients suitable for the image-guided therapy across the growing disease states within the domain of IR.
2. Expertise in image-guided minimally invasive therapies.
3. Expertise in diagnostic imaging and radiation safety.
4. Continual invention and innovation of new treatments, devices, and procedures.

Based on these features, IR is unique and distinct from all other disciplines in radiology and all other surgical and medical specialties.

ELEMENTS OF IR

The following elements define IR:

Clinical Scope

Clinical scope encompasses:

1. The clinical evaluation and management of patients with diseases or conditions amenable to image-guided therapy
2. The performance and interpretation of noninvasive diagnostic imaging as relevant to the local practice of interventional radiology
3. The performance and interpretation of image-guided therapy as relevant to the local practice of interventional radiology
4. The provision of 24-h emergency IR care as relevant to the local practice of interventional radiology

Interventional radiology's scope continues to grow to include minimally invasive image-guided therapy for vascular (including aortic), oncologic, gastrointestinal, hepatobiliary, genitourinary, pulmonary, musculoskeletal, gynecologic, and neurologic conditions in adult and pediatric patients. In the past decade, IR therapies have expanded substantially in interventional oncology, embolotherapy (including treatments for benign prostatic hyper trophy and osteoarthritis), venous disease, and pulmonary embolism.

The interventional radiologist should provide the requisite clinical care for the conditions or disease states in which they perform therapeutic interventions. This can occur within the auspices of a multidisciplinary care team or independently by the IR depending on the local practice in

the country where they work. IR practice models may vary: they can work in collaboration with other physicians in multi-specialty practices, as part of a diagnostic radiology group, or independently. Similarly, IR practice locations may be hospital based or free standing depending on the local geographic practice conditions.

Finally, interventional radiologists must provide 24/7 emergency IR care to treat IR emergencies such as the embolization of hemorrhage and drainage of infected fluid collections including hydronephrosis and abdominopelvic abscesses. This will usually involve IR work in emergency on-call rotations, which ideally every hospital should provide (11).

Clinical Practice

Since 2010, the requirement for interventional radiologists to provide comprehensive clinical care of their patients has become established in interventional radiology practice. Clinical practice for interventional radiologists is now recognized by many health systems to be essential for interventional radiologists to be able to function at the top of their clinical scope and to optimize patient care and safety.

The clinical practice of IR requires patient care in outpatient clinical facilities, allocated time for consultations, treatment planning, and follow-up (12). Interventional radiologists should have admitting privileges for their patients. Interventional radiologists should perform inpatient rounds on their admitted patients, and any decisions made by interventional radiologists should be documented in the inpatient records. Simply put, IR is a patient-facing specialty. There is no aspect of our work that can be accomplished without the direct assessment and continued care of our patients.

The practice of IR requires dedicated and adequate imaging equipment and the requisite tools to perform image-guided therapy. Adherence to radiation safety for patients and staff is of paramount importance as are provisions to allow for local standards of patient monitoring. Dedicated IR clerical, technical, nursing, advanced practice providers, and radiation safety staff are required. Historically and in most instances, IR practice is combined with diagnostic radiology; however, the past 20 years has seen IR practices become increasingly independent of diagnostic radiology in many countries.

In summary, interventional radiologists must be clinicians delivering longitudinal patient care in conjunction with image-guided therapy (13,14).

Training and Certification

Dedicated, standardized, and regulated IR training programs must include clinical practice training in addition to formal training and assessment in image-guided minimally invasive therapies, diagnostic imaging, radiation physics, and safety. Such training is mandatory in all health systems.

The goal should be to standardize requirements for training programs to ensure that IR training is uniform and

consistent regardless of the geographic location of the training provided.

In countries where there is less well-developed IR training, the global IR community has a duty to assist in bringing these programs up to a requisite standard level for the benefit of patients in these countries.

Training in IR must be open to all qualified doctors no matter their gender or ethnicity. Nobody should be discouraged or disadvantaged from pursuing a career in IR based on their sex or ethnic status. Although there is an increased number of females in the IR workforce in many countries, their numbers still lag those of males (15,16). Collective, ongoing efforts are required to increase gender and ethnic diversity in IR training programs and ultimately the IR workforce in all countries (17).

Completion of standardized clinical IR training programs must be followed by formal examination of the trainee. The examination ought to be comprehensive in the clinical management of patients and the scope of IR treatments. The examination should be administered by a nationally or locally recognized medical certifying body. Smaller countries may benefit from an internationally organized examination, such as the European Board of Interventional Radiology (EBIR) that is organized by CIRSE. The first EBIR examination was held in 2010, and uptake of this examination continues to increase around the world (18). Ideally, successful completion of a certifying examination would be followed by a system of continued maintenance of certification and/or education. Formal acknowledgment by board-certifying organizations (or their equivalent) of IR as a distinct subspecialty of radiology or primary specialty ought to be aspired to and pursued.

Quality and Quality Improvement

Interventional radiologists must practice lifelong dedication to continuous quality improvement. Local or national IR societies should set forth practice standards, and best practices should be adopted when applicable. As our specialty has grown to treat countless patients around the world, we must endeavor to formal data collection, procedure recording, and analysis of adverse events and outcomes. Interventional radiologists must continue to aspire to be leader in the delivery of image-guided therapy (19).

Research

Interventional radiologists have long been at the forefront of innovation and development of minimally invasive image-guided therapies. Basic, laboratory, and clinical research must be performed according to the internationally accepted principles of ethical research practices and standards of quality. Interventional radiologists must continue to support innovation proving that outcomes of IR treatments are safe, efficacious, and equivalent or superior to alternative treatment options.

In addition to already published high-quality research IR literature, interventional radiologists must continue to

Goals and challenges	Collaborative opportunities
Adoption of clinical practice by interventional radiologists, encompassing evaluation, management, and delivery of longitudinal clinical care	Consistent, unified, global messaging to cement the cultural change transformation from “proceduralist” to clinician Promotion and advocacy to hospital systems and DR practices for time and resources required for a successful IR clinical practice
Desire to increase the global provision of IR therapies and the global recognition of IR therapies being safe and effective alternatives to more invasive therapies	Standardized, global clinical practice guidance for IR Global messaging to increase the awareness of IR
Desire to increase the education, training, and certification of interventional radiologists worldwide	Standardized, global IR training curriculum Standardized options for certification Global effort to increase gender and ethnic diversity in IR training programs and the workforce
Need for more high-quality, outcomes focused IR research	Investment in formal research education and support for clinician scientists around the world
Pursuit of IR subspecialty or primary specialty status in every country	Collective support and assistance as individual countries apply for subspecialty/specialty recognition

investigate the diseases and conditions in which our treatments aim to heal. The development and completion of randomized prospective clinical trials and the collection of large real-world registry datasets should be prioritized. Additional studies, including comparative, safety, and cost-effectiveness studies compared to non-IR treatments, are also needed.

Research is expensive, and the funding for IR research may be provided by national grant awarding bodies or in partnership with industry. Interventional radiologists should explore all avenues of potential funding to support their research endeavors. Collaborative research in partnership with industry is encouraged if interventional radiologists have a major influence on research protocol creation and trial conduct.

Our global IR societies must invest in research training and education. Formal research education and support for clinician scientists within our own ranks is the next challenge for IR around the world.

Professionalism and Workforce Considerations

Safe, high-quality IR practice requires competency in periprocedural, outpatient and inpatient care, often in a collaborative multidisciplinary setting. In many hospitals, interventional radiologists are key members of multidisciplinary teams including vascular, oncology, musculoskeletal, trauma, and obstetrics and gynecology. Interventional radiologists must maintain the best interests of the patient in all clinical interactions, and this can be facilitated by collaboration with other specialties to optimize patient outcomes.

Open disclosure of conflicts of interest (especially financial) to patients, referring physicians, hospital administrators, audiences, and journal referees represents optimal ethical and professional conduct.

In many countries, allied health professionals (AHPs) have become an important component of the IR team; these may include nurse practitioners, radiographic technologists, and physician associates. These individuals undergo

additional training to perform important roles for the IR department including minor IR procedures. In general, AHPs should be managed by interventional radiologists in the IR department, working with interventional radiologists to provide IR services. They should not be employed to work outside these parameters. In countries that employ them, AHPs should have their own regulatory body to ensure that their practice aligns with local and national IR structures. Correctly managed and regulated, AHPs are an asset to IR departments. Efforts must be made to ensure that AHPs are employed and function within these boundaries.

Interventional radiologists have continued to experience conflicts in some clinical areas with competing specialties for patients. In general, these disputes are harmful to patients and are discouraged. The best way for interventional radiologists to continue to provide care for their patients in all clinical domains is to provide optimal clinical practice care, to maintain their expertise in image-guided therapies, and to prioritize communications to colleagues, hospitals, and the general population that interventional radiologists are best placed to deliver minimally invasive image-guided therapy.

GLOBAL GOALS AND CHALLENGES FOR IR

During the Society of Interventional Radiology's (SIR) 2024 Annual Scientific Meeting, IR society representatives from around the world presented on the current state and future directions of IR in their region at the inaugural Global Society Summit. While there were some differences, common themes emerged with the worldwide IR community endorsing the following goals and challenges. These are presented in Table 1.

SUMMARY AND A CALL TO ACTION

There has been tremendous growth and progress in the field of Interventional Radiology since the original Statement on

Global Interventional Radiology in 2010. While the definition of IR and many of the original elements of IR have stood the test of time, there has undoubtedly been a fundamental cultural shift toward identifying and prioritizing the delivery of longitudinal patient care in conjunction with image-guided therapy as the foundational feature of what it means to be an interventional radiologist. The delivery of comprehensive clinical care (ie, evaluation, management, and therapy) was seen as an important distinguishing factor which led to the primary specialty designation for IR in the US (8). With the solidification of this clinical focus, the prevalence and growth of IR globally, and the increasing success of countries achieving recognition for IR, it is possible we have reached a tipping point for the specialty, where the next two decades will see formal designation of IR as a distinct subspecialty or as a primary specialty in medicine around the world. To that end, our global IR societies must collaborate closely to advance common strategic goals and must continue to promote the field of IR and the treatments we provide as first options for patients whenever appropriate.

ACKNOWLEDGMENTS

This consensus statement is based on cooperation between the societies CIRSE and SIR. The article has been reviewed internally by both societies, distributed to national and regional IR societies for their comments and peer-reviewed in *Cardiovascular and Interventional Radiology* (CVIR). After review, the article was published in the journals CVIR and *Journal of Vascular and Interventional Radiology* (JVIR). The article is identical in both journals, apart from minor stylistic and spelling differences which are consistent with the style of each journal. Either citation can be used when citing this article.

Open Access: This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any noncommercial use, sharing, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if you modified the licensed material. You do not have permission under this license to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will

need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

AUTHOR INFORMATION

From the St George's University of London (R.A.M.), London, United Kingdom; Medical College of Wisconsin (R.J.P.), Milwaukee, Wisconsin; MRI Group (C.B.), IR Clinic, Zurich, Switzerland; and MD Anderson Cancer Center (A.T.), University of Texas, Houston, Texas. Address correspondence to: Robert A. Morgan; E-mail: rmorgan@sgul.ac.uk

None of the authors have identified a conflict of interest.

REFERENCES

- Kaufman JA, Reekers JA. We are IR. *J Vasc Interv Radiol* 2010; 21:1150–1151.
- Kaufman JA, Reekers JA, Burnes JP, et al. Global statement defining interventional radiology. *J Vasc Interv Radiol* 2010; 21:1147–1149.
- Shah SS, Tennakoon L, O'Beirne E, Staudenmayer KL, Kothary N. The economic footprint of interventional radiology in the United States: implications for systems development. *J Am Coll Radiol* 2021; 18:53–59.
- Charalel RA, McGinty G, Brant-Zawadzki M, et al. Interventional radiology delivers high-value health care and is an imaging 3.0 vanguard. *J Am Coll Radiol* 2015; 12:501–506.
- Matsumoto AH, Dake MD. Implications of IR being a primary specialty on the professional organizational relationship between interventional and diagnostic radiology. *J Vasc Interv Radiol* 2023; 34:2080–2084.
- Guan J, Elhakim T, Matsumoto M, Laage-Gaupp F, Iqbal S, Sofocleous C. Interventional radiology global survey on the status of awareness and access to interventional radiology resources. *J Vasc Interv Radiol* 2024; 35:S77.
- Morgan R, Cleveland T, Hamady M, et al. Interventional radiology in the 21st century: planning for the future. *Clin Radiol* 2021; 76:865–869.
- Kaufman JA, Mauro MA. The path to primary specialty recognition of interventional radiology and the IR/DR certificate. *J Vasc Interv Radiol* 2023; 34:2052–2057.
- Lee MJ, Adam A. The impact of the US IR/DR primary certificate on the global recognition of IR. *J Vasc Interv Radiol* 2023; 34:2085–2086.
- Lee MJ, Belli AM, Brountzos E, Morgan R, Reekers JA. Specialty status for interventional radiology: the time is now. *Cardiovasc Intervent Radiol* 2014; 37:862.
- Morgan RA, Haslam P, McCafferty IJ, et al. The provision of interventional radiology services. *Cardiovasc Intervent Radiol* 2023; 47:3–25.
- Lakshminarayan R, Bent C, Tylor J, et al. Developing day-case units: imperative for optimal patient care in interventional radiology. *Clin Rad* 2023; 78:295–300.
- Mahnken AH, Boulosa Seoane E, Cannavale A, et al. CIRSE clinical practice manual. *Cardiovasc Intervent Radiol* 2021; 44:1323–1353.
- ACR–SIR–SNIS–SPR Practice parameter for the clinical practice of interventional radiology. 2019. Available at: <https://www.sirweb.org/contentassets/19a555481dc248b28f16d3a63134efb5/acr-2025-ir-clinical-practice.pdf>.
- Rosenkrantz AB, Englander MJ, Deipolyi AR, Findeiss L, Duszak Jr R. Clinical practice patterns of interventional radiologists by gender. *AJR Am J Roentgenol* 2019; 213:867–874.
- McGinnis HD, Sze DY. The IR trainee workforce 10 years after becoming a primary medical specialty. *J Vasc Interv Radiol* 2023; 34:2067–2073.e1.
- Wah TM, Belli AM. The interventional radiology (IR) gender gap: a prospective online survey by the Cardiovascular and Interventional Radiological Society of Europe (CIRSE). *Cardiovasc Intervent Radiol* 2018; 41:1241–1253.
- Uberoi R, Nice C, Morgan R. The history of the EBIR. *Cardiovasc Intervent Radiol* 2023; 46:1–4.
- Brady AP, Uberoi R, Lee MJ, Müller-Hülsbeck S, Adam A. Leadership in interventional radiology—fostering a culture of excellence. *Can Assoc Radiol J* 2023; 74:185–191.