

## AMSER GUIDE TO APPLYING FOR INTERVENTIONAL RADIOLOGY RESIDENCY

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### INTRODUCTION

This document is intended to provide guidance for students considering applying to a residency in interventional radiology, known to many as IR/DR). It includes answers to the most common questions that advisors and program directors have been asked, as well as some “hard data” from the national websites. Some advice reflects personal opinion of the authors.

### WHY INTERVENTIONAL RADIOLOGY?

Unfortunately, many medical students are not exposed to interventional radiology until their third or fourth year of medical school, if at all. This can make it difficult for students to decide if this is the specialty choice for them. The following is general information about the specialty and the sort of personalities that tend to enjoy it as a profession.

### Careers in Medicine® (CiM)

Vascular and interventional radiologists use their expertise in interpreting X-rays, ultrasound, and cross-sectional imaging other medical modalities to guide small instruments such as catheters and wires through the blood vessels or other pathways to treat disease percutaneously. These procedures are typically much less invasive and much less costly than traditional surgery. These radiologists diagnose and treat diseases by various radiologic imaging modalities including fluoroscopy, digital radiography, computed tomography, sonography, and magnetic resonance imaging. Common interventional radiological procedures include: angioplasty; thrombolytic therapy for blood clots; chemoembolization--delivery of chemotherapy directly to the site of the tumor; infection and abscess drainage; uterine fibroid embolization; removal of a urinary tract or fallopian tube obstruction; needle biopsy; and radiofrequency ablation. Research and technological innovations are rapid in this field.

Practice options include academic medical centers, community hospitals, and group private practices.

Following a year of clinical training in medicine or surgery (ideally the latter), training in interventional radiology initially focuses on general training in all areas of diagnostic imaging and image-guided interventions, similar to diagnostic radiology residents. Strong foundations in diagnostic radiology and clinical medicine are essential to successful development as an interventional radiologist. Unlike many areas of diagnostic radiology, direct patient care is a crucial part of day-to-day practice in IR. Many interventional radiologists participate in thriving outpatient clinics one or more days per week. IR trainees with their faculty evaluate patients in consultation daily and recommend a further course of treatment, which may result in a minimally invasive interventional procedure (MIIP).

Both academic and private practice opportunities exist for interventional radiologists. In academics, interventional radiologists frequently specialize in a specific area or service line (such as vascular disease or interventional oncology), while the scope in private practice is often more general and may involve some diagnostic radiology responsibilities as well; this varies depending on the specific practice, however. Research and publication are generally necessary parts of an academic career, but there are also opportunities for those in private practice who enjoy teaching and research (e.g., by being affiliated with or by volunteering at an academic center).

Interventional radiology is an exciting field that uses cutting edge technology to perform minimally invasive procedures. As technology evolves, new procedures (and newer and more efficient ways to perform existing procedures) are constantly being developed. This spirit of innovation is a cornerstone of the history and future of interventional radiology.

Interventional radiologists are never bored – they diagnose and treat a wide variety of conditions using a full armamentarium of diagnostic and therapeutic technology and tools. Interventional radiologists are, in general, well reimbursed for their work. While salary varies from region to region and from academic to private practice, it has traditionally been known as one of the higher-paid specialties. The amount of vacation in general is less than for diagnostic radiology, but is still considered competitive in the market, ranging from 4-10 weeks per year. Job satisfaction amongst interventional radiologists tends to be extremely high. A frequent statement of interventional radiologists is that their job “doesn’t feel like work,” is fun and engaging, and that they look forward to going to work each day.

What kind of people enjoy interventional radiology?

1. People who enjoy developing innovative solutions to both common and uncommon problems.
2. People who enjoy evaluating and directing care for difficult patients that multiple other specialists may be unable to or unwilling to address.
3. People who enjoy healing the sickest patients who may not be candidates for anything other than our minimally invasive techniques.
4. People who enjoy puzzles and mysteries, and the problem solving, analytical nature of the profession, but also take pride in being able to fix these problems once the mystery is solved.
5. People with strong hand-eye coordination tend to do well in the technical aspects of this career. Do you enjoy video games? Many have compared interventional radiology procedures to “video-game surgery,” with your hands working remotely to fix a problem inside the patient, watching the treatment unfold on a screen in front of you.
6. People who enjoy surgical procedures but want to focus on minimally invasive techniques. In general, IRs function similar to surgeons in practice, but tend to be less intense.
7. Those that enjoy working as a part of a team do well in interventional radiology. Many of our procedures are performed because of multidisciplinary decision making, help

bridge patients to a future surgical therapy, or better equip our surgical and procedural colleagues to perform their own therapies safely and effectively in the future.

8. The “technologically inclined” love the “cool toys” part of the job and the ability to produce spectacular images... we get to use all the newest equipment and tools, and invent new ways to use them to help patients!
9. People that aren’t afraid of a challenge.

## WHY NOT INTERVENTIONAL RADIOLOGY?

Some aspects to consider:

1. Interventional radiology requires a longer residency compared with primary care specialties. Most trainees will complete a six-year training program.
2. People that do NOT enjoy looking at diagnostic imaging, at least on some level, should NOT pursue interventional radiology. Diagnostic radiology is at the core of our image-guided procedures and diagnostic expertise, and most IRs provide at least some image interpretation for their practice. Remember - a large amount of your first three years of IR residency involves training in the interpretation of imaging.
3. More study time required due to the breadth of knowledge required, i.e., all organ systems and diseases.
4. More study time required throughout career to keep up with new technologies and trends.
5. Patients might not know exactly what it is you do, as interventional radiology is a relatively new field. You have to be willing to explain what exactly it is that you do to patients, friends, and sometimes even your own family!
6. More physician consultation time – you may be interrupted often.
7. Have to be able to stand for long periods of time, most of the time wearing a lead apron.
8. Imaging and image-guided intervention is a large contributor to the increasing cost of healthcare, so there may be decreases in reimbursement in future years.
9. Interventional radiology is a physically and mentally challenging profession, and many other specialists covet our field and our techniques. You may have to compete with other specialists that want a “piece of your pie” and can’t be afraid to work hard to show that you are the best equipped doctor for the job!
10. Longer hours than your diagnostic radiology partners in most practices (although generally you are paid some degree of additional salary as compensation for this).

## TIMELINE

The timeline illustrated below is an ideal guideline. Please realize that even if you decide that you want to apply to an interventional radiology residency program as late as mid-summer (or even fall) in your 4th year of medical school, it is not “too late.”

## FIRST YEAR OF MEDICAL SCHOOL

### GENERAL

- Job one: Study as hard as you did in college.

- We can't understate the value of having a solid knowledge base... and doing well on USMLE Step 1 and/or COMLEX (for D.O. students).
- THE VALUE OF A GOOD STEP 1 SCORE CANNOT BE OVERSTATED.
- You will have greater options – i.e., you won't be shut out of a specialty based on a single number.
- Be well-balanced:
  - Join student interest groups to learn about different fields. You aren't obligated to pursue a particular specialty just by checking it out.
  - Check into the availability of a Interventional Radiology Interest Group (IRIG) at your medical school. If one does not yet exist, you have two options: join a (diagnostic) radiology interest group, or START ONE! There are resources on the Society of Interventional Radiology (SIR) RFS-MSC website to assist you in starting an IRIG if you are so inclined.
  - Get involved with at least one volunteer/charity organization. One with direct patient contact is preferable, such as a community clinic for underserved patients, but any experience is better than none.
  - Literature may help you decide on a specialty ("I don't mind reading articles on... all of my life").
  - Good on residency application: "I was a member of the XXX since my 1st year of medical school."
  - Join professional societies from different specialties. Many societies have free or significantly reduced fees for students.

The Society of Interventional Radiology is an EXCELLENT resource for medical students interested in IR, with numerous resources for students and many opportunities to become involved in projects and leadership.

Get to know the field of interventional radiology: (see "WHY NOT INTERVENTIONAL RADIOLOGY?" section)

- Interventional radiology is a consultation-based field that needs a deep and broad knowledge base, and has continually changing modalities and techniques. It is a field that requires a serious commitment to consistent studying to obtain skills and stay current.
- Shadow interventional radiologists and talk to residents to get to know the field. If there are radiology or interventional radiology faculty advisors at your school, you can meet with them.

## SPRING

- If you're not involved in a research project already, begin to look for a project for the summer. Programs like to see that you have the discipline and interest to do research – and it does not have to be in the field you finally decide on. You also have a chance at the end of 3rd year to do research in the specialty you choose. A research project will:
  - Broaden your experience.
  - Develop opportunities to present at a conference or submit research for publication.

- Help you work closely with a faculty member, who can write you a strong letter of recommendation. (see “LETTERS OF REFERENCE” section)
- Have a game plan for your research project.
- Assess your interests, special skills, inclinations, and shortcomings.
- Look for major radiology and interventional radiology society national meetings: SIR, ISET, WCIO, RSNA, AUR, ACR, etc.
- Approach a potential research mentor with a CV or summary of your experiences and skills.
- Exercise ingenuity and initiative in finding a project. Start early and be persistent.
- Pick your research mentor wisely: this is one of the most important factors in being productive.
  - Ask around for research opportunities and be persistent until you find one. If one doesn't work or the timeline doesn't seem right, consider pursuing another one.
  - e.g., email the student director(s) in areas you are interested for suggestions. They often circulate emails to the department.
  - It may help to confirm that the attending you picked has been productive recently.
  - Do not expect the attendings to have menus of instantly available projects ready to go.
  - You may present your own ideas and ask for mentorship.
  - Projects listed as “in progress” or “submitted” may not yet officially exist.
  - Show initiative in finishing a project – try to set a goal with your mentor, such as an exhibit or presentation at a national conference, rather than vague “research.”
  - Consider doing several projects, with different mentors, as you may not know which ones will be fruitful.

## SUMMER

- Do a research project over the summer – you can make your first contacts in interventional radiology.
  - If you have done a research project already (paper, exhibit), you may do something else that will strengthen your application, e.g., working abroad on a medical mission, volunteer work, charity work.
  - Summer Stipends - there are often multiple opportunities available, so apply for these.
    - Check with your Dean's Office.
    - Check with professional societies: e.g., SIR, RSNA, AUR, AMSER, NIH, etc.
    - This site is helpful to get ideas for Funding Opportunities for Short-Term Research:  
[http://www.med.upenn.edu/mdresearchchops/shortterm\\_opps.shtml](http://www.med.upenn.edu/mdresearchchops/shortterm_opps.shtml)
- If you haven't done so, consider shadowing interventional radiologists and/or radiologists.
- Enjoy this summer - this is also a great time to travel and have fun.

## SECOND YEAR OF MEDICAL SCHOOL

### GENERAL

- Study hard. Grades and USMLE/COMLEX are VERY IMPORTANT!
- Set up a 6-month study schedule for USMLE/COMLEX Step 1.
- Continue to be active in your interest groups and other extracurricular organizations.
- Become an officer of a group, e.g., the Interventional Radiology Interest Group.
- Continue your “summer” research or start another project.
- Schedule your 3rd year rotations.
  - Schedule early rotations in areas of your interest - to confirm or reject areas. Don't panic if you can't take it early or you don't have a 3rd year interventional radiology rotation at your school.
  - If interventional radiology is a 4th year rotation, to get exposure in the field, you should:
    - Follow up your patients' radiological studies on other rotations.
    - Shadow interventional radiologists/talk to IR residents if you haven't done so already.
    - Consider a diagnostic radiology rotation. Often these can be tailored to provide you with more exposure in IR.
- Stay involved with interest groups, if possible.

### HOW TO STUDY FOR STEP 1:

- Study hard during year 1 and year 2.
- Did we say “THE VALUE OF A GOOD STEP 1 SCORE CANNOT BE OVERSTATED?”
- Doing well on Step 1 lays a solid foundation for your clinical years.
- January Year 2: Begin to review material from year 1, with your priority being to do well in class.
- Once classes end in year 2, take 4-5 weeks for the intensive Step 1 studying.
- Take a few full exams – e.g., December of your 2nd year, after your 2nd year exams, a few weeks before the exams, etc., to assess where you are and what you should concentrate on.
- For at least 3 weeks before the exam, go to bed early (e.g., 10p), wake up at 6a, take a 1 or 1 ½ hr mini-exam before you start studying – so you simulate the exam day.
- What to use for studying:
  - Pick a few resources and stick to them. Use these while studying for the 1st & 2nd year exams. For example:
    - Online question bank
    - USMLE World
    - National Board of Medical Examiners (NBME) website
    - Mini-tests that use real questions, which may appear on the real test
      - Timed and give you a score report – correlates well to end score
    - Rapid Review Pathology by Edward Goljan
    - First Aid for Step 1 - good review resource, but not enough material or detail

## THIRD YEAR OF MEDICAL SCHOOL

### GENERAL

- 3rd year rotations:
  - Interventional radiology residencies look for excellent grades in the core rotations.
- How to do well in 3rd year:
  - Work and study hard to get honors, especially in medicine and surgery, if you can.
  - The grading system for 3rd year is subjective. The grade is based on a combination of your evaluation and a “shelf” exam (multiple choice tests taken by all students nationally).
  - Always show up on time, be enthusiastic, offer to help, ask a lot of appropriate questions, and try to learn as much as you can.
  - Stand out from the crowd - do more than “just pass.”
  - Study hard, like you did in years 1 and 2, for the “shelf” exams.
- Letters of Reference (see “Letters of Reference” section):
  - If you do well in a rotation, ask for a letter right away so your attending still has details fresh in their minds and will be able to write a more personal letter. It’s best if they offer an unsolicited letter, but at any rate, ask if they feel comfortable in writing a strong letter.
- Plan your 4th year schedule
  - Ask current 4th year students at your school, especially those planning to pursue interventional radiology, how, where and why they scheduled their 4th year and what they would have done again or changed. Talk also with your faculty advisor.
  - If interventional radiology is not a 3rd year rotation at your school, apply early for 4th year interventional radiology clerkships - July or August. If you can’t get one, meet with the radiology clerkship director to explain your interest in IR. (see “WHEN SHOULD I TAKE MY RADIOLOGY CLERKSHIP?” section)
  - Consider doing Subinternship or Acting Internship in medicine or surgery early during 4th year
    - Can boost your grades/evaluations if needed
    - Can yield a strong letter of recommendation, if needed
    - Often required for transitional year or preliminary year applications
    - Will allow flexibility during interviews and a fun end to your 4th year (if it is a required 4th year rotation)
  - Interview season: late October - early February, with the peak in late November to mid-January
    - Schedule flexible rotations, e.g., online course, research, self-study, flexible clerkships.
    - Consider using vacation/discretionary time in December, January, or both months.

## SPRING/EARLY SUMMER

- Contact the interventional radiology and/or radiology faculty advisor (and any other areas that you are interested in) and arrange a preliminary meeting to discuss your grades, Step 1 score, and career plans.
- Set up email account that sounds professional and one that will roll over when your school email closes if it does not have an alumni account.
- Schedule a physical exam and update immunization records and titers, including varicella, in case needed.
- Check the website of programs you are interested in to see if they require anything special.
- Get a letter that you are in good academic standing from academic affairs.
- Update your CV: make it professional-looking and concise, ideally 1-2 pages, longer only if multiple publications.
  - Summarize research, including citations for all your publications – another page if needed.
  - Consider putting your picture on it. You can carry copies of these with you to hand to interviewers.
- Start working on your Personal Statement (see “PERSONAL STATEMENT” section) – 1 page only.
- Photograph for applications.
  - Play it safe: look professional and show that you understand the unwritten conventions.
  - Don't give anyone the chance to say “what was he/she thinking...”
  - No weird stuff. No Pets. No significant others.
  - The photograph will be used during ranking to help remember who is who, so make sure it looks like what you will look like on the day of your interview (clothes, hairstyle, facial hair etc.)
  - Pleasant smile – reshoot if needed.
  - Head-and-shoulders only.
  - Send as jpeg, not too low or high resolution so it prints as ~ 3x4 cm.

## Away rotations: (see “AWAY ROTATIONS” section)

- Consider scheduling at a place where you think you may want to do residency: at a target, not a “reach” place. Many programs will offer an interview to rotating away students as a courtesy, but this is NOT guaranteed.
- “Meet the Experts” get-together
  - Many schools arrange a meeting or dinner for interested 3rd year students with the matched 4th year students (they are the REAL experts in this!) for an information exchange session. If this does not occur at your school, start one by contacting the interventional radiology and/or radiology faculty advisor (also a great thing to add to CV, in addition to being valuable for you and your classmates). Students who have participated in these get-togethers have found them incredibly useful. Make it informal, e.g., over pizza.

- Remember: You are being evaluated at all times at these activities so don't criticize other people or places, gossip or get drunk.
- Also remember: you have something to sell - yourself - so be confident.
- Mock Interviews
  - If this is not formally done at your school, ask your advisor or students affairs office if you may need one.
  - You can set one up with a faculty member you don't know so they can give you feedback.

#### FOURTH YEAR OF MEDICAL SCHOOL

##### SUMMER

- Do an interventional radiology Clerkship/Selective/Elective if you have not done so previously.
- Meet with the interventional radiology faculty advisor to discuss your draft personal statement, letters of reference and program application lists (see sections below).

##### ERAS (Electronic Residency Application Service) Timeline:

- You can register and start working on your residency application on June 6
- MSPE: Schedule a meeting for your Medical Student Performance Evaluation (MSPE) with your Dean.
- TRANSCRIPT: Check your transcript to make sure all of your grades have been submitted and submitted correctly. Don't let that HONORS you earned get transcribed as a PASS. If you are missing grades, contact the department secretary and use gentle encouragement: "Is there any additional information I can provide to help my evaluator complete this?"
- Plan to take Step 2
- SEPTEMBER/OCTOBER
  - Interventional Radiology participates in the NRMP Match.
  - SUBMIT APPLICATIONS AS SOON AS POSSIBLE ON OR AFTER SEPTEMBER 6. RESIDENCY PROGRAMS START RECEIVING APPLICATIONS ON SEPTEMBER 15.
    - It shows how motivated and enthusiastic you are about applying to residency.
    - Many programs grant interviews on a rolling basis. The earlier you apply, the greater the chance you have of being considered for interviews.
    - The earliest programs start sending out interview offers in late September or early October.
  - Make a tentative calendar, making blocks of time for each region you plan on interviewing in.
- OCTOBER/NOVEMBER
  - MSPEs are released October 1st.
  - Be strong! You may feel crushed when those rejections start to come (possibly by the end of October or the 1st two weeks of November)... and then the interview invitations start rolling in.

- Interview offers will come in more steadily until the end of November/beginning of December. California programs usually send out interviews later - often in December.
- Schedule as many interviews in November as your schedule allows, enabling greater flexibility later.
- Do not write off a program even if you do not hear from them by December.
- No news means you are still on the list. Applicants cancel interviews so programs may contact you even at the last minute. Always be available to take an interview offer.
- NOVEMBER/DECEMBER/JANUARY
  - Take vacation. You want to present your best self at interviews. You want to have time to exercise, rest, and eat well. You'll want to have time to research the program beforehand.
  - Even a rotation where you can miss A LOT of time off for interviews, such as an online course, research, self-study, and flexible electives where it is understood that you can take time off at the last minute and make up requirements without penalty, is not ideal. You may be thinking of how to minimize days off, and having to make up time; you may have to squeeze in work into a shorter amount of time. In other words, you may put stress on yourself at a time that you should try to be relaxed.
- LATE JANUARY-FEBRUARY
  - Make your rank list: set up meeting with advisors to help with rank order.
- FEBRUARY-APRIL
  - Consider taking BLS/ACLS early so you won't have to take it at the last minute before internship (and you might get that time off during internship orientation).
- MARCH-MAY
  - "Meet the Experts Meeting" - Arrange a meeting with the other 4th years to celebrate, commiserate, and share with interventional radiology faculty advisor and 3rd years about what you did right or wrong.

## SUMMARY TIMELINE (VARIES WITH SCHOOL)

Contact radiology faculty advisor	As soon as possible, or by March of Year 3
“Meet the Experts” Dinner/Meeting	March/April, Year 3
Group Meeting with radiology faculty advisor	April-July, Year 3
Mock Interviews (can arrange if not offered)	May-October, Year 3
IR or Radiology Clerkship/Selective/Elective	If not in the 3rd year, take early in 4th year May-August, Year 4
Draft personal statement	June/July, Year 4 (send to advisors/friends)
Final personal statement	July/August, Year 4
Develop program lists	July/August, Year 4, discuss with faculty advisor or dean
ERAS application submission (NRMP Match)	September 6, Year 4 <b>STRONGLY RECOMMENDED</b> on day 1
ERAS applications close	Variable
MSPE released	October 1, Year 4
Interviews	November-January, Year 4
Rank list entry open	Mid January
Rank list entry close	Mid February
Did I match?	Mid March, Monday
Match day	Mid March, Friday