

# UCSD Radiology Resident Call Guide, v1.4

2023 – 2024

# Quick Reference

## ERPM Workflow and Reporting Guidelines (7/11/2024):

- If clinicians have questions about vRAD reads, the resident should direct them to communicate directly with vRAD
- If urgent studies sent to vRAD still do not have a read for >1 hour, residents may put in a preliminary report. This can be situation dependent, so please use your discretion.
- if residents don't feel comfortable preliming a body/chest/MSK MRI AND someone is calling for an immediate read, escalate to:
  - CHEST
    - 1st contact: ER PM (5-11p), otherwise overnight faculty (if scheduled)
    - 2nd contact: vRad final
  - MSK
    - 1st contact: MSK fellow
    - 2nd contact: MSK attending
    - 3rd contact: vRad final
  - BODY
    - 1st contact: ERPM faculty (5-11p), otherwise Body fellow
    - 2nd contact: Body attending
    - 3rd contact - vRad final
  - Escalate MRIs to vRad if residents are uncomfortable and the studies in question are both STAT AND someone is calling for an immediate read
  - A significant portion of these exams are likely not impacting immediate treatment decisions, despite their STAT designation, and do not require evening/overnight escalation
- Residents may preview any studies sent to VRAD for educational purposes without generating a prelim dictation (if resident feels there is a discrepancy with the final vRad read, then the resident should call vRad)

5 pm – 11 pm

	CT	MRI	X-ray	Ultrasound
<b>ER/Trauma/Urgent care</b>	Final	Neuro Prelim (Fellow)	Final	Final
		Body/Chest/MSK Prelim		
<b>Inpatient STAT</b>	Neuro Stroke Codes Prelim vs final Other Final (VRAD)	Neuro Prelim (Fellow)	Final	DVT Final
	Body, MSK, Chest Prelim	Body/Chest/MSK Prelim		Other Prelim
<b>Inpatient Routine</b>	Neuro Final (VRAD)	Neuro Prelim (Fellow)	Neuro, Body, MSK Prelim	Prelim
	Body, MSK Prelim	Body/Chest/MSK Prelim	Chest No read necessary	
	Chest No read necessary			

# 11 pm – 7 am

## Schedule A – Overnight faculty

	CT	MRI	X-ray	Ultrasound
<b>ER/Trauma/Urgent care</b>	Final	Neuro Prelim (VRAD)	Final	Final
		Body/Chest/MSK Prelim		
<b>Inpatient STAT</b>	Neuro Stroke Codes Prelim vs final Other Final (VRAD)	Neuro Prelim (VRAD)	Final	DVT Final
	Body, MSK, Chest Prelim	Body/Chest/MSK Prelim		Other Prelim
<b>Inpatient Routine</b>	Neuro Final (VRAD)	Neuro Prelim (VRAD)	Neuro, Body, MSK Prelim	Prelim
	Body, MSK Prelim	Body/Chest/MSK Prelim	Chest No read necessary	
	Chest No read necessary			
<b>East Campus ED and Inpatient Stat</b>	Prelim vs final Stroke Codes, all other studies Final (VRAD)			

## Schedule B – No overnight faculty (VRAD)

	CT	MRI	X-ray	Ultrasound
<b>ER/Trauma/Urgent care</b>	ED Final (VRAD)	Neuro Prelim (VRAD)	Prelim	Prelim
	Trauma Prelim	Body/Chest/MSK Prelim		
<b>Inpatient STAT</b>	Neuro Stroke Codes Prelim Other Final (VRAD)	Neuro Prelim (VRAD)	Prelim	Prelim
	Body, MSK, Chest Prelim	Body/Chest/MSK Prelim		
<b>Inpatient Routine</b>	Neuro Final (VRAD)	Neuro Prelim (VRAD)	Neuro, Body, MSK Prelim	Prelim
	Body, MSK Prelim	Body/Chest/MSK Prelim	Chest No read necessary	
	Chest No read necessary			
<b>East Campus ED and Inpatient Stat</b>	Prelim Stroke Codes, all other studies Final (VRAD)			

Call Assignment	Location	Pager
Body	Thornton	8734
Chest	KOP	7750
Neuro	Hillcrest	8788
MSK	Variable (typically KOP)	7867
VA – ER or Weekend	VA (MSK or Body room)	9834
ERPM and NF	KOP	5063 and 9834

Policy on Required Radiology Resident Trainee Communication with the On-Call Supervisor or On-Call Faculty Member After Hours:
Ectopic pregnancy where OB-GYN is planning to treat with methotrexate. As a general rule, this would be an attending-to-attending communication
Head CT ordered for clearance prior to anticoagulation. A teleradiology read may suffice for this purpose.
STAT CT abdomen/pelvis ordered by the Emergency Department. These studies are typically sent automatically to teleradiology.
Request by an ordering provider for immediate attending radiologist interpretation
Request by an ordering provider for immediate attending radiologist assistance with a non-interpretive need (e.g. protocoling or scheduling an urgent exam)
Resident self-driven request for help with an interpretation
Resident self-driven request for help with a non-interpretive need

Schedule						
Monday - Friday						
8:00 AM	5:00 PM	6:00 PM	8:00 PM	11:00 PM	1:00 AM	8:00 AM
Weekday shift						
	VA ER					
	ER PM (resident)					
		Night float				
Weekend/Holiday						
7:00 AM	5:00 PM	6:00 PM	8:00 PM	11:00 PM	1:00 AM	7:00 AM
VA						
Neuro						
Chest						
MSK						
Body						
	ERPM (resident)					
		Night float				
<ul style="list-style-type: none"> <li>On weekends/holidays, call starts at 7 AM, and NF shifts are as follows: Fri 8p-7a, Sat 6p-7a, Sun 6p-8a.</li> <li>On weekends/holidays, there is no VA-ER call. Instead, daytime VA call stays until 6PM to cover the 1 hour of VA-ER until night float comes in at 6 PM.</li> </ul>						

Trauma	Phone or Pager
Floor pager	6363
SICU pager	6917
Trauma bay	36747
ED	
Hillcrest	32130 32140
Thornton	77660
VA	858-642-3386
CT	
Hillcrest	37348 37347
Sulpizio	78128
US	
Hillcrest	32620 Pager 0951
Thornton	76663 76664
PACS	
UCSD	1-0244
VA	6248
PIV exemption	(855) 673-4357
<b>VA main</b>	858-552-8585

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# Section Pagers

Pagers must be forwarded to your personal pager from 7am- 5pm on weekends and holidays (7a-6p at VA)

Page copy (**preferred method**): Any messages sent to one pager (eg, Radiology call pager) will also be sent to your cell phone number. To do this, call the operator to “page copy” a pager to your phone. Only the operators can do this. You only need to do this once and it will be like this until you call and ask them to stop “page copy”. For text message copying, just be aware that reception in the hospital can be spotty.

Page forward (**not recommended**): Any messages sent to one pager will be forwarded to another pager. In general, you should not do this because it means the original pager will not receive the message. In particular, do not do this for the stroke code pager or IR pagers as other people on those lists will not receive the messages. Unlike page copy, residents are able to do this themselves following the instructions below, but you can also call the operator to have them do this.

- How to self forward pager
- Dial the Pager number you want to forward
- Dial 9 (if you are using a UC San Diego phone)
- Dial 0, 1234 press #
- Press 9 for additional Features/Options
- Press 3 to access Forwarding menu
- Press 3 to Cancel previous forwarding
- Press 1 to Set up forwarding
- Enter the new 10-digit pager number to be forwarded to (enter only one time)
- Press #
- Press 1 to confirm

Section	Pager
Body	8734
MSK	7867
Chest	7750
Neuro	8788
VA	9834
ERPM/NF	5063

# Weekend and Holiday Call

There are usually 4-5 residents on call during each weekend day and holidays: Body, Chest, Neuro, VA, and occasionally MSK. General checklists to perform for all weekend assignments are as follows:

- Upon arrival:
  - Copy page the appropriate section pager to your cell phone
  - Send a “test page” to ensure that this was successful
  - Post your phone number on the daily info page on radres.ucsd.edu
- Before leaving:
  - Unforward the section pager
  - Sign out any relevant information (pending studies, protocols, etc) to ERPM

## Body

Hours: 7 am – 5 pm

Location: Thornton

Contrast coverage: All Thornton/JMC CT & MRI scanners

- Duties
  - Protocol and dictate ED, trauma, and inpatient UCSD body studies.
  - There may be a fellow on with you; if so, they usually will handle the MRIs.
  - You may read some outpatients if there is time.

## Neuro

Hours: 7 am – 5 pm

Location: Hillcrest

Contrast coverage: All HC CT & MRI scanners

- Duties
  - Protocol and dictate ED, trauma, and inpatient UCSD neuro CTs; some attendings may have you grab some MRIs.
  - You may read some outpatients if there is time.
  - Fellow protocols and dictates all MRIs.

## Chest

Hours: 7am-5pm

Location: KOP (MSK or body reading rooms on the first floor)

Contrast coverage: All KOP CT & MRI scanners

- Duties
  - Dictate ED, trauma, and inpatient UCSD chest studies.
  - You may read some outpatients if there is time.

## VA Weekend

Hours: 7am-6pm

Location: MSK or Body reading room

Upon arrival, log into Microsoft Teams as attendings will often contact you this way. In general, read the IP/ED studies of all modalities. Read-out styles vary between attendings. Some will contact you periodically throughout the day. Others will pick up studies from you and you will never hear from them. See below for some specifics.

From 5-6 PM, the resident will function as [VA ER](#) until night float comes in at 6p. This includes preimaging inpatient and ED VA studies and protocoling UCSD IP/ED studies using CWP. For protocols, the technologists will come to you for verbal orders.

To enter/dictate a prelim, enter pertinent findings beginning with "Rad Pre:" into the "Study Comments" box beneath the study info section in EI. This will be displayed in the Xero Viewer application clinicians use. This may be helpful for ED studies or any urgent findings and can prevent phone call from clinicians looking for reads. Xero Viewer is the image viewer incorporated into CPRS that non-radiology clinicians use to look at images and also to view preliminary reads by radiology. However, some clinicians don't know how Xero Viewer and will call for a read after it has been posted. Except in urgent situations, it is discouraged to simply read the report after it has already been posted, as this unnecessarily duplicates work and encourages repeated behavior. Instead, please (kindly) tell them to ask a nearby colleague for instructions on how to access Xero Viewer at their own workstations. Please note that every VA health employee has access to Xero Viewer, even though some will say they do not.

You may have to call in an on-call US, MRI, or CT technologist while at the VA on the weekends. Please refer to the [section below for details](#).

- Duties
  - Body
    - Predictate ED and inpatient studies
    - Help predictate outpatient studies if time allows (usually only if Dr. Aganovic, Cassidy, or Vahdat are scheduled)
  - Chest
    - Saturday (Dr. Stark)
      - Prelim ED and inpatient studies.
    - Sunday (Dr. Karunamuni)
      - Predictate all ED and inpatient studies
  - MSK
    - Predictate ED and inpatient studies
  - Neuro
    - Predictate ED and inpatient studies
  - IR
    - Prelim CTA runoff cases done as ED/IP
    - If a final read is needed, page the IR attending on call (or send it out).

## **Weekend Day Float**

When scheduled for day float, you must report to the hospital within 1 hour of being called. You may be called in as needed for weekend call shifts or ERPM shifts. Night float absences will be covered by the ERPM resident, with weekend float filling in on ERPM. Please carry your pager and ensure that the chiefs have your current cell phone number.



# Evening/Night Call

## VA ER

Hours: Monday – Friday 5p-11p

Location: VA MSK or Body reading room

As of July 2023, there is a new workflow for entering/dictating prelims:

- In Powerscribe, choose your signoff attending to be "staff, physician" and either:
  - Generate a prelim impression only report that has: "IMPRESSION: THIS PRELIMINARY INTERPRETATION HAS NOT BEEN REVIEWED BY AN ATTENDING RADIOLOGIST: "
  - OR
  - Dictate a full report with impression field as above.
- For reference, the old method to dictate prelim reads at the VA was as follows:
  - Enter pertinent findings beginning with "Rad Pre:" into the "Study Comments" box beneath the study info section in EI. This will be displayed in the Xero Viewer application clinicians use. This may be helpful for ED studies or any urgent findings and can prevent phone call from clinicians looking for reads. Xero Viewer is the image viewer incorporated into CPRS that non-radiology clinicians use to look at images and also to view preliminary reads by radiology. However, some clinicians don't know how Xero Viewer and will call for a read after it has been posted. Except in urgent situations, it is discouraged to simply read the report after it has already been posted, as this unnecessarily duplicates work and encourages repeated behavior. Instead, please (kindly) tell them to ask a nearby colleague for instructions on how to access Xero Viewer at their own workstations. Please note that every VA health employee has access to Xero Viewer, even though some will say they do not.
- Arrival:
  - Forward the VA pager (9834)
  - Post your 10 digit # on radres and pager
  - Login to Epic via CWP (cwp.ucsd.edu), which you can use to access iShare documents
- VA duties:
  - Prelim all VA studies (ED & IP) for all modalities, including MRI
  - If "final read" is requested by the ordering clinician these can be sent to tele (NTP, see "Teleradiology" section).
  - Protocol all VA studies if asked by tech, including MRI
  - MRI techs usually leave around 10-10:30, and so the on-call MRI technologist will need to be called in for STAT MRs during this time
  - To contact on-call technologists (US, MRI, and CT), [please refer to instructions below.](#)
- UCSD duties:
  - Protocol all UCSD studies (ED & IP)

## UCSD ER-PM and NF

Prelimining guide (ERPM/NF)					
	CT – Neuro	CT - Body/MSK	CT – Chest	X-ray (all)	Ultrasound
ER/Trauma/ Urgent Care	Final	Final	Final	Final	Final
Inpatient STAT	Final	Prelim	Prelim	Final	Prelim*
Inpatient Routine	Prelim	Prelim	No read necessary	Prelim**	Prelim
*DVT US final read **Inpatient routine Chest X-ray do not require final reads or prelims					

Simple way to remember what to read during ER-PM hours:

- Final sign: All ED/Trauma, STAT neuro, STAT plain films, all DVT studies
- Prelim: All other inpatient studies except for routine chest (CT and radiographs, which can be ignored)

There are 3 residents on ER-PM/NF which rotate through a 9-day block: 3 ER-PM, 3 NF, and 3 off days, beginning on the Sunday of the new block (otherwise the NF resident rotating off would go straight into a day shift). This is a 27 day cycle but a 4 week block is 28 days, so one day will be extra. Fellows are on for 1 week at a time and switch on Mondays. The attending changes daily. Chest, MRI, MSK, Body, and Breast fellows are scheduled for ER-PM throughout the year; neuro fellows are not.

ERPM/NF workflow has been updated by Dr. Jaffray (07/2023). Currently, the attending and fellow will typically divide study or site (JMC vs HC) responsibility at the beginning of each shift or share the list. Residents will not be restricted in which ED cases they read. If residents are asked to dictate specific cases only, please kindly decline and refer the requestor to Dr. Jaffray.

- For context, historically the types of studies covered by the ERPM/NF resident depended on the on-call attending preferences. Some attendings read everything (or nearly everything), in which case the resident and fellow also covered all sections. Another possibility is that the attending covered 2 sections and the fellow covered the other two. In this case, the resident was supposed to work with the attending, but may also work with both fellow and attending depending on team preferences. A final possibility is that the attending only covers their section. In this case, the fellow picks two others. The resident then prelims one section entirely and helps the fellow with their two sections, leaving the attending to work independently.

Occasionally, a particularly complex study may be left for the subspecialty attendings to read the next day (in some cases the resident may be asked to page either the on-call fellow or attending for a prelim). In that case, if the resident has already prepared a dictation, it is okay to leave it in the ER-PM pool as long as a prelim (“WET READ”) is in place, and the day attending can just pick it up. Some cases should be signed out to the incoming day-time resident and given a prelim. A common example are strokes that happen near shift change when 3D recons are pending, small bowel follow-throughs, any particularly complex case, and when waiting for a call to communicate a finding.

Communication between the ER-PM team is usually through Epic group chat (useful for everyone to be kept in the loop). Dictations are signed to the “ER-PM” pool in Fluency. Unlike when assigning a report directly to an attending, assigning a preliminary report to “ER-PM” does not populate in Epic and is not available to the referring providers, which only occurs after the fellow or attending has picked up the report and signed it. To publish a preliminary read, assign the case to the “WET READ” pool, making sure to add the “Wet Read” macro template.

The primary worklist is “CALL ALL IP ED Urgent Care TODAY,” which should have most studies and none of the unnecessary outpatient studies. Sometimes when an ED patient is brought to CT or US, their location changes to outpatient temporarily and they can disappear from the main list. A good way to set up the work list is:

- Priority, Elapsed, Fluency status, Skip, Patient Class, Patient Name, Study Description  
Aidoc is very helpful in triaging studies. Make sure that the pulmonary embolism, intracranial hemorrhage, pneumothorax, and large vessel occlusion notifications are turned on.

Pediatric cases in the ED or urgent care fall under ER-PM, but the neonatal ICU films do not (just add the comment “peds” for your sake - Rady’s will read them in the morning). ER-PM does not cover nuclear medicine, which is covered by the nuclear medicine attending on call. The only overnight breast cases are for breast abscesses, which falls under the purview of ultrasound. All arterial US studies (except carotids) are now done through the vascular lab under vascular surgery, and if one of these studies needs to be done after hours, VA surgery needs to be contacted to come in and do the exam themselves (paged by the ordering

provider). This is unpopular with the vascular surgery residents on call, so typically this will end up resulting in a CTA which ER-PM/NF will be responsible for, even if a duplex ultrasound would have otherwise been appropriate. Many attendings will not read CTA run-offs/extremities. If your attending does not read CTA run-offs, please have the techs send these to VRAD. Do put in a prelim if you do not think your report will be signed off in a timely manner, as this is a medicolegal hazard.

A rule of thumb is to always call the ED directly, page whoever is listed as first call, call the Trauma Bay, or page trauma (6917 for the resident for new traumas, 6363 for the intern for admitted traumas) for reportable findings or complex cases that need some discussion. Epic message can be used, however, you must ensure that a readback is obtained. Generally, most positive acute findings should be communicated. Additionally, it's generally helpful to communicate something you're hedging about; talking to the provider can often clarify some of the history and help narrow the differential or finding.

The VA-ER resident should be protocolling UCSD studies until 11p (6pm on weekends). MRI protocolling is the responsibility of the section fellow until 11p. The VA-ER resident is expected to be judicious in approving CT studies, ideally not just giving a rubber stamp to unnecessary or inappropriate studies. On holidays and weekends, the NF and ER-PM residents are in charge of CT protocols after 6 pm (when VA Weekend call leaves for the day). Until 11 pm, section fellows take care of all STAT MRI protocols and prelims.

If after 11 pm you are ever in a situation where the volume is exceeding your capacity to prelim, studies can be sent to vRad according to approved guidelines below, but you need to let the tech know to send them out. Occasionally, studies are not transmitted to VRAD despite calling, in which case you should call the technologists a second time. Below are the following guidelines for sending studies time marked before 1AM to vRad:

- Chest
  - No CTs should be sent to vRad. CT prelims can be bare minimum, limited to those findings that change management
  - CXRs may be sent to vRad
- Neuro
  - Okay to send to vRad
- MSK
  - Okay to send to vRad
- Body
  - ER CTs already sent to vRad. Double prelim not needed.
  - Inpatient CTs may be sent to vRad

## ERPM

Hours: 5pm – 1 am

Location: KOP

Contrast coverage: KOP MRI

Arrival instructions:

1. Post your information on Radres like you would for any call shift
2. Copy page the general radiology pager (5063) and VA pager (9834). This pager's main purpose is to receive all stroke codes. It also is paged about incoming traumas, which can be helpful in the middle of the night when things may have slowed down.

ER-PM is officially from 5 pm – 1 am for the resident and 5 pm – 11 pm for the attending and the fellow. The resident's job is to pre-dictate or prelim studies based on the ER-PM prelim guidelines (summarized in this document) and receive all of the phone calls (notably stroke codes, general inquiries, and sonographers) so that the fellow and attending can focus on final signing reports.

On ER-PM, the workflow really revolves around the fellow and attending since they need to final sign most studies. This has a few implications for the resident: when one or both are falling behind, the resident will start to get phone calls asking for prelim reads. This can be very disruptive, so the resident should make sure that older studies are not going too long without a prelim. In general, it is good practice to publish a prelim read if it is busy since it may be hours before the report is signed.

Triaging patients on this shift can be difficult. Be sensitive to ED/Trauma turnaround time but do not

neglect complex inpatients. The resident is going to be responsible for most of the “prelim-only” studies, which can be very complex. It is okay to leave the ED and traumas to the fellow and attending as long as they are not falling behind. It is good practice to try to take all studies for a single patient, both continuity of care and to avoid overlapping phone calls. In general, the resident should focus on studies that come directly to them for review (e.g. stroke and US). Pre-dictating the complex cases, including post-op neuro and cancer staging from the ED, can be particularly helpful since these can really slow down the attending or fellow. Do not forget to send stroke CTAs for final signature after 3D recons are completed, which generally have <1 hr turnaround time.

Although ER-PM is busy, do not rush through your dictations. Proof-read. Your dictation may get signed off without sufficient review or the fellow/attending has to fix up so much that it slows them down. Work as fast as you comfortably can but do not overextend yourself – speed will come but do not sacrifice quality. Do not be afraid to message the fellow or attending when you are unsure of something, even for a “prelim-only” study. You can also just share interesting cases. Although you are interacting remotely, remember you are a team.

The attending may tell the resident to prelim everything that comes in after a certain time (e.g. 10:30). Historically this has been accepted practice, but technically the fellow and attending are responsible for all studies timestamped before 11 pm and often will stay late. Switching to prelims helps them get out on time. This makes it easier for the resident, too.

After 11 pm, the ER-PM resident becomes a secondary night float and helps prelim studies timestamped before 1 am. This used to be unofficial practice and was more recently made a formal part of the shift. The ER PM resident should be dismissed at 1AM. On busy nights, ER-PM may send remaining studies to VRAD or choose to stay past 1 am to help get the list under control for NF. On slow nights the NF resident may send ER-PM home early.

## Night Float (NF)

Hours:

M-Th: 8p-8a, Fri-Sat 8p-7a, Sun 8p-8a

Arrival instructions:

- Post your information on Radres like you would for any call shift
- Copy page the general radiology pager (5063) and VA pager (9834). This pager’s main purpose is to receive all stroke codes. It also is paged about incoming traumas, which can be helpful in the middle of the night when things may have slowed down.

The hours vary depending on the day. On normal weekdays, the shift starts at 8 pm, and on weekends/holidays it starts at 6 pm (after the VA call resident leaves). The shift ends when the day team arrives: 8 am for weekdays and 7 am on weekends/holidays. This means the shift can be 11 (Fri-Sat), 12 (all other days), 13 (Sat-Sun), or 14 hours (Sun-Mon). On weekends and holidays, NF takes on VA coverage responsibilities immediately, and on other days this happens after VA-ER leaves. This includes being the primary person protocoling CT. The ER PM resident can choose to cover the VA to allow the NF resident to arrive at 8 pm, similar to weekdays. This should not be expected and generally done only after the residents are experienced at ER PM and NF.

Upon arrival at 8 pm, the NF resident acts as a secondary ER-PM resident until 11 pm, generally focusing on catching up on less pressing studies and those that need prelims only. After 11 pm, the NF resident becomes the primary resident.

As a reminder, all ED/trauma/IP studies (except routine chest) need a prelim. After 11 pm, all MRI and ED CT A/P studies will be sent to vRad and do not require a read. The exception to this rule is CT AP trauma studies, which DO require a resident prelim read. Studies with a vRAD read do not need to be prelimmed. If time allows, you are encouraged to review studies previously sent to vRad, as these reports can be variable. Some are excellent, others overcall, and others completely miss their mark. You’ll know which ones to trust over time. Around 5 am, it is acceptable to ignore the “STAT” routine chest radiographs from the ICU, especially if it is busy.

The workflow for MSK studies is slightly unique. While issuing preliminary reports (11-8am), if there is a patient that has multiple examinations that the next day attending will likely link together, the MSK division kindly asks that you dictate your entire prelim report of multiple separate examinations onto only a single accession report. The reason for this is that if individual reports are started on every study, the day team

cannot link those examinations together and thus must report them separately or open each prelim report and delete them individually, either of which take a lot of time. This applies to CT and radiographs alike.

Example:

- Patient has a right femur, right knee, right tibia/fibula, right ankle, and right foot radiographs. Whichever study you open first, please include the findings for all the other studies on that fluency report. You can use a phrase such as, "Please refer to this report for findings of the right femur, knee, tibia/fibula, ankle, and foot: " The remaining studies should stay unreported on the Visage worklist.
- Another example would be to report a CT C-spine, CT T-spine, and CT L-spine in the same manner.

Use templates from prior residents for commonly used vernacular for prelims. Prelims do not need to be long, in fact, "radpre: neg," "radpre: no acute findings," "radpre: no changes from prior," and such are acceptable and sometimes even preferable. Always start with your overall impression and don't hide clinically actionable stuff in the bottom. If listing incidental findings, they should appear after the pertinent findings/impression in a separate paragraph. If you are not too busy, a longer prelim can help the day resident with their dictation, especially with oncology or abscess measurements. After a CT is done, it is sometimes advisable to look back at the plain film to add anything missed (like a subtle rib fracture or pneumothorax). If you are unsure of a finding, you may be descriptive and give a differential. It's usually better to overcall than under call. You may need to call the team to discuss the case with them. So that you don't wait for the provider to call you back, you can add "Paged first to call" and move on to the next study. Then add a comment once you talk to them, "D/w Dr. \_\_\_\_".

If necessary, you may contact your on-call attendings for assistance. Contact information can be found on radres: Rotations → Call Guidelines → Overnight Attending Contact Info. UCSD on call attendings are also listed in webpaging under the corresponding section (Radiology - Chest and Bone, Abdomen, Neuro, etc.). Established guidelines for contacting attendings are noted on the [Quick Reference](#) page of this document, but a good rule of thumb is to contact the on call attending when you are unsure and the diagnosis is going to change management overnight (i.e. going to surgery overnight). Please note that very complicated cases are unlikely to be handled by vRad in a satisfactory way. Do not send to vRad just because you do not want to page the attending.

Starting at 11pm, the NF resident is expected to take over protocolling all UCSD studies, including MRI. As a reminder, the neither the ERPM or NF resident should be protocolling studies prior to 11 pm, as this is the responsibility of the VA-ER resident and respective fellows.

### **VA coverage while on NF**

After 11 pm, NF assumes the same responsibilities as the VA-ER shift. The KOP body reading room has a VA workstation for this purpose. All ED and IP studies at the VA need a prelim. Unlike UCSD, this includes routine chest and routine ICU chest radiographs (there are not many). The NF resident can choose to prelim any MRI studies or have them sent to NTP, which should be clarified with the MRI tech when they are called in. CT studies requesting "Attending read" are automatically sent to NTP by the CT techs, but the NF resident can also request cases to be sent to NTP – generally when the case is very complicated or it is too busy. Sometimes, the CT tech will forget to send studies to NTP so please check periodically for the study to drop from the list.

The NF resident frequently needs to call in sonographers, MRI techs, and sometimes even CT techs overnight. [Instructions for this is listed below.](#)

The direct line to the VA ED is 858-642-3386 (also listed on the hospital numbers page). Since CPRS is not open (unless using remote access), it can be confusing who to page for inpatient findings. Often, paging the ordering physician will work (hopefully will have forwarded to cross-cover) or find the VA pager for that VA service on webpaging. Strokes at the VA will often not get a call from the scanner, so the resident has to call the VA neurology pager to discuss the case (usually after the CTA has been done).

To use the VA workstation, call for a PIV exemption (and password change) because there is no PIV reader. These usually only last 2 weeks and it can take up to 30 minutes for it to go through, so come early on the first day. The VA workstation has Fluency and you can open a "Scratchpad" report to use for the VA. To



provide a prelim on the VA workstation, enter pertinent findings beginning with “Rad Pre:” into the “Study Comments” box beneath the study info section in EI. This will be displayed in the Xero Viewer application clinicians use. This may be helpful to do for ED studies or any urgent findings and can prevent phone call from clinicians looking for reads.

Xero Viewer is the image viewer incorporated into CPRS that non-radiology clinicians use to look at images and also to view preliminary reads by radiology. However, some clinicians don't know how use Xero Viewer and will call for a read after it has been posted. In these situations, please (kindly) tell them to ask a nearby colleague for instructions on how to access Xero Viewer at their own workstations. Except in urgent situations, it is discouraged to simply read the report after it has already been posted, as this unnecessarily duplicates work and can accumulate in multiple hazardous disruptions. **Please note that every VA health employee has access to Xero Viewer, even though some will say they do not.**

Beware certain VA ED attendings who call often with numerous questions, some warranted and others not. It can be very disruptive when there are calls for prelims and clarification and if boundaries are not set. Situations you may encounter with them:

- Attending read requested (which will be sent to NTP) but will also ask for a resident prelim. Please adhere to the policy of not putting a prelim for at a study that will be sent out to NTP and performing duplicative work.
- Requests for a prelim for a study that just came in. As with anyone asking for a wet read, remind them that you're triaging studies from 3 hospitals and that you'll need at least however long.

Attending back-up is available at the VA. VA studies from the ED that need a final read overnight are sent to VA teleradiology. Additionally, the VA operator has the VA on call attending schedule and pager/phone number for rare cases when teleradiology would not be appropriate.

It is acceptable for the ER-PM resident to cover the VA from 6 – 8 on weekends/holidays so that NF can come in later, but this should not be expected by the NF resident, especially when new to the shift. Do not underestimate how busy the VA can be from 6 – 8, including with non-interpretive tasks. It is the responsibility of the ER-PM resident to offer to cover the VA for the NF resident. The ER-PM resident's primary responsibility is to the busy ER-PM shift and should only take on VA coverage if they are comfortable with it.

# Non-interpretive tasks

Non-interpretive skills are very important on these shifts. You will be called about a wide variety of policy questions, such as CT scans on a pregnant woman, MRI clearance, MRI protocols, contrast reactions and prophylaxis, use of IV contrast before labs are drawn, and other things. After 11 pm, you may need to consult the on-call attending.

## IT Disruption/PACS Outage

Occasionally, the PACS system may go down. If this occurs at UCSD, the protocol in place is to use Sectra IDS7, which is a full enterprise PACS for all users outside of Radiology that can be used anytime that Visage is unavailable. This backup option is in place to prevent the hospital from going on Stroke Bypass and Trauma Diversion (which must be reported to the California Department of Public Health). All Radiologists are able to login with their AD credentials. It has downtime worklists configured to ensure patient care is uninterrupted.

UCSD PACS:

- Call the PACS on-call x 10244 (619-471-0244) or p3936 (619-290-3936)

VA PACS:

- IT help desk 877-998-2633 or 800-921-9278.
- For PIV issues, call Enterprise Service Desk 855-673-4357

Calling the VA from HC:

- Option 1: Use the 858-552-8585 to reach the main line. Hit "Tone Sender" on the phone below the LCD display to activate touch tones. Dial the 4 digit extension.
- Option 2 (less reliable): If the four digit extension is 1189 (as it is for CT), you can often reach them by the direct phone number 858-642-1189. Not every extension will let you do this.
- When in doubt, the VA operator's extension is '0' after calling 858-552-8585. Also, the UCSD operator can help you out.

## VA computer access, long-term PIV exemption

There are several ways that your VA computer and remote access can be impaired:

- If you don't log into the VA every 90 days, your VA Computer Account may become inactive (which automatically de-activates remote access). You can call the Enterprise Service Desk at (855) 673-4357 to request for Active Directory Account reactivation. If the ESD representatives are unable to reactivate you, it is possibly due to the Annual Mandatory TMS Training that needs to be completed.
- In order to complete your TMS training, you may need a functional PIV card. If your PIV card is expired or not functional, you should reach out to Mr. Joaquin Mendoza (Joaquin.Mendoza@va.gov) to request assistance in reactivating your TMS account so you can complete your training if your card is not working. Mr. Mendoza is the TMS Manager for the whole San Diego VAMC, and is currently the only person who can reactivate a deleted TMS account.
- PIV cards usually expire after 3 years during your R3-R4 transition. If you let your PIV card expire, you will need to start the process over and get your fingerprints redone. To avoid this, residents should contact the Stephanie Heimback ([Stephanie.Heimback@va.gov](mailto:Stephanie.Heimback@va.gov)) 6 weeks prior to your card expiration to be renewed and you won't have to get re-fingerprinted. If you need to get fingerprints redone, you need to fill out a fingerprint/SAC form and take that in on a walk-in basis Mon-Fri 0700-1430. You will also need to bring one form of ID. After the prints are received and cleared, she will place your usaccess application; you will receive an autogenerated email stating to schedule a photo appointment.

- To request a long-term PIV exemption (60 days) which allows you to log in to the VA computers on site without a PIV card and also at the VA station at UCSD (night float), you should call the Enterprise Service Desk at (855) 673-4357 and you state that you are a “health trainee resident physician who will be accessing a non-VA hospital computer without a PIV reader.” Stating that you will be using certain software or an ipad no longer works for getting a long-term PIV exemption.
- In order to access the VA desktop remotely on your personal computer with a PIV card/reader, you will need to be approved for “Remote Access” by again calling the Enterprise Service Desk at (855) 673-4357, and they will direct you to the “Remote Access Portal” where you must request approval and list Dr. Gentili as your supervisor. Approval usually takes about 2 days. This step is usually only necessary if your account access lapses from not logging in every 90 days.
- In order to access the VA desktop remotely on your personal computer **without** a PIV card/reader, once you are approved for remote access, you will need to separately request a “Remote Access Exemption” to allow you to log into citrix using your domain username and password by again calling the Enterprise Service Desk at (855) 673-4357. These exemptions will last 14 days if you PIV card is expired, lost, or you are having difficulty scheduling an appointment with the PIV office. Otherwise, they will last 7 days.

## Intravenous Contrast

### Relevant documents

- [UCSD Extravasation Policy \(2022\)](#)
- [UCSD Intravenous Contrast Media Guidelines \(2022\)](#)
- [ACR contrast manual](#)

The ACR contrast manual is a terrific resource for the utilization and management of intravenous contrast in diagnostic imaging. Additionally, review the select UCSD guidelines prior to your shifts. Brief summaries are provided below:

- Renal Failure:
  - In general, if a request comes in for use of iodinated contrast for CT on an emergent basis not falling within standard guidelines (e.g. GFR is not back yet or <30) and you agree the study is necessary, you may proceed so long as the ordering provider documents in Epic that they had a risk/benefit conversation with the patient/representative and adequate patient hydration is maintained.
  - Patients >60 years of age are to have a recent (within 6 weeks) serum Creatinine prior to contrast injection. If there has been significant interval change in the patient’s condition, a more recent serum Creatinine should be obtained.
  - Patients <60 years of age do not require labs, UNLESS the patient has one or more of the following:
    - Renal disease or surgery on the kidneys:
      - Including dialysis, kidney transplant, single kidney, kidney surgery
    - Diabetes mellitus
    - Hypertension
    - Renal Cancer
    - Recently (within 3 months) had chemotherapy
  - For patients with end stage renal disease who are on chronic peritoneal dialysis, noncontrast should be considered and contrast should only be administered after discussion with the patient’s nephrologist. This conversation must be documented.
- Contrast allergy
  - Pre-treatment to prevent or lessen reactions should be given under the following guidelines:
    - Patients with history of



- Prior moderate or severe contrast reaction
- Severe asthmatics with active wheezing or acute shortness of breath
- If a patient arrives without being pre-treated, it is preferable to reschedule the exam to allow steroid treatment. Alternative options are at the discretion of the Radiologist. If there is a history of moderate to severe contrast reaction, another radiological procedure (MRI, non-contrast CT, US or Nuclear Medicine) should be considered as an alternative.
- If patient requires pre-medication for contrast allergy, but exam needs to be done urgently, use the alternative IV premedication dosing.

	Medication	Dose	Time
Standard	Prednisone	50 mg PO	13 hrs, 7hrs, and 1 hr prior to injection
	Diphenhydramine	50 mg PO	1 hr prior to injection
Alternate	Hydrocortisone	200 mg IV	6 and 2 hours prior to exam
	Diphenhydramine	50 mg PO or IM or IV	1 hour prior to exam

- Intravenous access
  - When the power injector is utilized, a 22g or larger needle/cannula 1.25” to 1.5” length is preferred for IV contrast injection.
  - Only power-injection rated PICC or central lines are approved for power injection.

## **MRI Protocolling (UCSD)**

Until 11 pm, the Body, MSK, Neuro fellows are responsible for MRI protocols and prelims. After 11 pm, the NF resident protocols all MRI studies, and techs will send studies to vRad. MRI techs are usually in-house overnight. Under the circumstance they are not, the NF resident will have to contact the on-call MRI tech for emergent MRI studies.

The MRI techs will generally call or Epic message when they need a protocol. If you are unsure of which MRI protocol to choose, sometimes asking the MRI techs can be helpful. CT and MRI protocols do not need to be one of the preset buttons. You can simply type in the protocol box what you want. E.g. if concerned for a bleed, get an arterial and a delayed image, maybe include a noncon if there is surgical material that might confuse you. You can tailor protocols to the exact clinical question once you get comfortable with this. For complex studies after hours, the resident may choose to contact the section fellow for help with the protocol. Two instances where a fellow must be contacted at all hours for interpretation:

- Pregnant appendicitis MRI (Body)
- Rule out septic joint MRI (MSK)

For these studies, the MRI techs should know to contact the body fellow and MSK fellow on call for any possible septic joint MRIs. If there is no response in 30 minutes, then the attending on call is contacted, and after 30 more minutes it goes to vRad. The NF resident should not feel pressured to give a prelim read in these cases since this is UCSD policy.

MRI protocol guidelines by specialty (to be updated):

- MSK
  - Osteomyelitis:
    - Pick the location of the ulcer and add IV contrast.
    - If it is for a sacral ulcer, ask that they prone the patient (if the patient can tolerate). Proning the patient allows us to differentiate non-enhancement due to gravity/pressure from non-enhancement due to tissue necrosis).
    - If it is an extremity ulcer, ask the techs to mark the location of the ulcer. If there is no ulcer, we try to talk them out of it if we have lots of free time, or we just do the study knowing that it is most likely going to be negative.
    - If they are ordering more than 2 studies, you may ask them to pick their top 2. Each MRI takes about 30 min. Most patients cannot lie still more than an hour, so any study after

the second one is going to be motion-y and worthless. Generally, the pretest probability of any single study being positive goes down with each study ordered. Medicine will often try to order bilateral lower extremities (knees, ankles, feet). This would take approximately 3 hours and is wasted scan time that could be used on patients with more acute problems (stroke, cauda equina, tumor).

- Occult (usually hip) fracture:
  - Unless there is a concern for underlying malignancy, an MRI without contrast is sufficient.
- Neuro
  - Dissection
    - MRA can be used for cases which are equivocal on CTA
    - Include “Black blood imaging protocol” in comments to look for T1-bright blood.
  - Ischemia
    - In general, do not use the “Acute Stroke” protocol unless the **Stroke Team Leader** specifically orders it. Instead, the more appropriate protocol is “Brain WO” for most cases of “altered mental status”, including suspected subacute stroke.
    - In certain cases, an abbreviated MRI (“Acute Stroke”) protocol is appropriate for patients in the 6-24 hour or wake-up stroke window. The following steps must be taken:
      - Stroke team must put in “Acute Stroke Brain MRI” and MRA orders (if vessel imaging not performed by CTA)
      - Head CT and CXR screen for metal
      - Stroke Leader Calls MRI to discuss ETA and logistics
      - Radiologist calls MRI to give them a heads up and that metal was screened for
      - No discussion between stroke team and radiology is required
      - If the patient is moving during the DWI, the exam will not continue
- Body
  - Refer to the [Body MR protocols](#) document for guidance.

## MRI Clearance

Relevant resources:

[http://www.mrisafety.com/SafetyInformation\\_view.php?editid1=192](http://www.mrisafety.com/SafetyInformation_view.php?editid1=192)

<https://mriquestions.com/bullets-and-shrapnel.html>

There are specific policies and workflow for patients with cardiac devices and vagal nerve stimulators.

There is no formal policy on shrapnel. In general, the MR safety policy is at the discretion of the radiologist. Ultimately, these safety discussions are often risk vs benefit calculations. In general, be hesitant to scan a patient with shrapnel. It almost always has a ferrous/steel or steel component and hence, it can move. If positioned superficially or embedded in bone, you can consider scanning at 1.5T. If in other soft tissue/organ, it is likely best not to scan. You can use CT to identify the exact position of the shrapnel.

Bullets are a separate issue, please see the above resources. Here is one example of a real scenario and decision making:

- Long standing bullet in a patient who had an order for MR enterography. It was unclear if the bullet was a military or civilian bullet, but patient had it for 40 years (so have to assume ferrous). While there was likely scar tissue surrounding the bullet due to chronicity, the bullet was right next to the brachiocephalic vein. Is it worth the risk? No. The provider was messaged and radiologist recommended performing CT enterography instead.

There is always an alternative to MR, especially in the acute setting. The alternative may not be ideal, but we don't want to cause harm.

In general, patients under sedation (including post-operative patients) with shrapnel/bullets should not be scanned, since the patient will be unable to verbalize or feel pain should there be movement of metal components or RF-induced burn injuries.

## Outpatient CT and MRI Examinations

Outpatient CT and MRI examinations are scheduled 24/7 at KOP where the NF/ERPM residents are stationed. Hence, residents may occasionally be asked to complete certain tasks by the technologists related to these studies. Some technologists are unfamiliar with the evening departmental policies and procedures, which differ from daytime, and will ask you to perform certain tasks that are **not** the responsibility of ERPM/night float, which include:

- Overnight residents should **not** be asked to protocol outpatient CT or MRI exams or provide MRI clearance (checking for orbital metal and abandoned cardiac leads), as these tasks should be completed by the respective divisions during normal day time hours. If residents are frequently asked to protocol outpatient studies or clear patients for metal, please make the chiefs and program directors aware.
- Some technologists have asked residents to protocol CT or MRI examinations or perform MRI clearance for scans that are scheduled far in advance or the next day during normal day time hours. Residents are encouraged to defer these tasks to the day team in order to focus on more pertinent, acute tasks.
- Residents should not be asked to clear outpatient ILD studies after 5pm. If a CT tech calls and asks you to do this, please gently remind them of this policy and refer them to their lead CT technologist or CT supervisor, who are both aware of this policy.

For STAT add-on outpatients PE studies, technologists must have a radiologist check images before the patient can be sent home or taken off the table, and it is good practice to put in a prelim (e.g. "no acute findings, full subspecialty read in the am").

Residents should periodically check Aidoc for any unexpected urgent/emergent findings on outpatient studies that occur after hours. Such findings may include intracranial hemorrhage, PE, pneumothorax, etc. If found, the radiologist must alert the ordering provider. Since these scans generally occur after hours, it may be difficult to get in contact with the ordering provider. You may try contacting the on-call trainee/attending for that service (eg, the on-call heme-onc fellow) through UCSD webpaging. Otherwise, if no provider is available to take the read, the patient should be contacted directly and advised, such as instructions to go to the ED if necessary (using your best clinical judgement).

The ERPM/NF residents are responsible for providing contrast coverage at the KOP and will be expected to manage contrast reactions and extravasations.

## Imaging in Pregnancy

Relevant documents

- [UCSD Policy - Imaging of Pregnant Patient \(2022\)](#)

### **CT in pregnancy**

UCSD policy states that, "Prior to all abdominal imaging (requiring radiation) of female patients between the ages of 12-55 years will be asked if they are or may be pregnant. If a patient may possibly be pregnant, they must be given a questionnaire asking Last Menstrual Period and whether they are pregnant. They must sign before imaging, unless the acuity of their illness and need for therapy supersedes the possible risk to a fetus." Similar to daytime shifts, attendings should be notified of CT A/P on pregnant patients. This is not necessary for other CT scans on anatomy other than abdomen/pelvis.

### **MRI for appendicitis in pregnancy**

These studies are typically protocolled by the body fellow on call, but since the MRI fellow is not in-house, ERPM or night float may be asked to get consent from the patient (unusual these days). If requested, please protocol by choosing the specific MRI protocol for evaluation of appendicitis in pregnant women. Typically, this involves walking to the MRI scanner when the MRI tech pages you or sometimes the ER depending on where the patient is and going over the written consent form with the patient. Usually this does not take more than 5 minutes. You can say something like "MR does not use radiation and has no known adverse effects on the

fetus. We believe it is safe but because there are no large clinical trials, we need to have you to sign this consent. Do you have any questions?" We never use gadolinium for pregnant patients (it is contraindicated) so no need to discuss that.

## Ectopic Pregnancy

From Dr. O'Boyle: Several years ago after legal cases that ensued regarding inappropriate treatment of pregnancies with Methotrexate, a task force was formed with OB/GYN, Body Imaging and Pharmacy. This task force was authorized by UCSD Risk Management. Any suspected ectopic pregnancy that may be treated with Methotrexate must first have the ATTENDING OB/GYN who is managing the case and the BODY IMAGING ATTENDING of the day (in house or on call if after hours) review the case together before MTX is administered. So if you are on call or an evening or night shift, these cases need to involve the BODY IMAGING attending and not the fellow or the attending that is covering if they are not BODY. This is to protect the patient and the fetus as well as to medicolegally protect our residents and faculty. Please contact Dr. O'Boyle if you have any questions or are on with staff that do not understand this or are questioning this.

If you are concerned for ectopic, provide a prelim and notify the ordering MD just like any other critical finding. Most of the time, there will be no need to page the overnight body attending or involve anyone else. However, if the ordering team is planning methotrexate therapy, or demands a "final read" on these cases prior to the OR, page the on-call body attending (not just the ERPM Attending if they are non-body). Body faculty MUST be called IF there is an ectopic pregnancy AND the OB team is planning on giving methotrexate. The OB team should let you know, as this is part of the protocol.

## Second Reads

UCSD policy states that residents are not allowed to provide preliminary reports (in writing or verbally as a "curbside") on outside images uploaded into PACS. Outside studies have already been interpreted at the other site by a board-certified radiologist. The outside facility is required to provide that report with the images to the care team. These reports are increasingly available via Care Everywhere in EPIC; some are scanned in EPIC media with other clinic transfer notes, and in rare cases they are available in PACS with the outside images.

Second reads are only performed during the day after attending approval and generally for discussing a patient at tumor board before the patient is scanned at UCSD. If contacted to give your opinion on an outside study for clinical decision making, state that the patient will need repeat imaging at UCSD before radiology can comment, which should be protocolled to focus on any remaining clinical questions. You may direct ordering providers to the 2nd read policy (<http://radres.ucsd.edu/policies.html>). Second reads are not available on an emergent basis. We are happy to tailor (and expedite within the limits of UCSD scheduling) imaging at UCSD to address any outstanding clinical questions not addressed by the outside report and refer to the outside studies as a comparison. When in doubt, the faculty requesting the over-read can speak with the service faculty on duty/on call above the patient and imaging needs.

## Calling in Technologists at the VA

After-hours US, MRI and CT requests at the VA are coordinated through the on-call resident. The schedule and contact info for all on-call technologists (US, MRI, and CT) can be found under radres → Contact → Tech Call Info → [VA Tech and Indications](#).

Generally, there is 24-hour CT coverage at the VA and coordination with the resident is not needed (**Note: as of September 18, 2023, CT services at the VA will once again be on-call only between midnight-0730, 7 days a week. It is estimated that this will be in effect until mid-December.**). In contrast, there is limited US and MRI coverage overnight on a nightly basis, and these scans need to be approved by the on-call resident. If the ER requests an MRI or US study when a CT can provide an answer, it is preferable to suggest CT as an alternative imaging modality (provided there is a CT technologist on site).

In general, technologists should only be called in when a study will change management or ED disposition (e.g. strokes, spinal cord compromise, or when a patient may need to go to the OR overnight). For both MRI and US, there are well-defined criteria for calling in a technologist (listed in each subsection below). For CT studies, there are no strict criteria and it is solely up to the radiologist's discretion. Please review the indications when discussing with the ordering provider whether a scan will be approved.

It is the approving radiologist's responsibility to contact the designated on-call technologist to report to the VA for emergent after-hours exams. It is expected the on-call technologist will be on site within 30 minutes of being contacted to report. For scan requests that occur close to shift change (eg, 5:00 am), it may be worth asking the ordering provider if the scan can wait until the day team arrives. However, never promise that a patient will be added on first thing in the morning; MRI typically has outpatients already scheduled in the morning that cannot be easily rearranged, unless the MRI tech says a patient can be scheduled for the morning.

### Issues with contacting the on-call technologist

If the on-call technologist is not answering the phone, please try calling up to three times. If the updated monthly technologist schedule is not posted, or the technologist does not respond, please contact the modality supervisor for assistance first. Dr. Gentili should also be informed if there is persistent difficulty contacting the technologist, either by email the next day or the night of. It is ok to contact Dr. Gentili at any hour if necessary, and he can help arrange for the technologist to come in.

- MRI supervisor: Zari Pirsateh, 619-7472-1902
- US supervisor: Costi Ciobanu, 702-355-0190
- CT supervisor: Warren S. Spitz, 610-203-8088

### Ultrasound

Normal Operational Hours:

- Monday through Friday, 7:00 AM to 12:00 AM.
- On-call hours:
  - Monday through Friday, 8:00 PM to 7:00 AM.
  - Weekends and Holidays, 24 hours.

After hour ultrasound requests must be coordinated through the radiology on-call resident. Specific indication for on-call ultrasound include:

- Carotid ultrasound for stroke code to be ordered by the Stroke Code Fellow/Attending only
- Carotid ultrasound for acute TIA symptoms to be ordered by the on-call neurology attending only
- Post-procedural pseudo-aneurysm
- Biliary tract disease (CT scan to be performed first)
- Tubo-ovarian abscess
- Testicular torsion
- Ovarian torsion
- Ectopic pregnancy (must have current positive urine/serum HCG test)
- Vaginal bleeding in a pregnant patient (must have current positive current urine/serum HCG test)
- Non-menstrual vaginal bleeding (includes postpartum bleeding). Before approving, the following must be documented:
  - Clinical pelvic examination
  - Evidence of abnormal labs (e.g. low or decreased hemoglobin)
- Gallstones, renal stone, and appendicitis on confirmed pregnant patients. No fetal evaluation will be done.
- DVT
- Renal Transplant less than 6 weeks post-transplant.

### MRI

Normal Operational Hours:

- Monday-Friday, 6:00 AM to 10:30 PM.
- Saturday-Sunday, 6:00 AM to 2:30 PM.
- On-call hours:
  - Monday through Friday, 10:00 PM to 6:00 AM.
  - Weekends and Holidays, 24 hours.

While there is an in-house technologist Monday-Friday 6:00 AM until 10:30 PM, and Saturday and Sunday 8:30 AM to 5:00 PM, it is the responsibility of the ordering provider to contact the on-call resident **after 5:00 PM** Monday-Friday and 24 hours Saturday, Sunday, and holidays, in order to discuss emergent cases so that an appropriate protocol for the examination can be given to the technologist by the radiologist. Specific indication for emergent MRI is a high likelihood of:

- Cord compression (cauda equina syndrome)
- Epidural abscess
- Posterior circulation stroke
- Appendicitis, gallstones and renal stones in confirmed pregnant patients (ultrasound to be done first with inconclusive findings)

## CT

Operational Hours:

- Monday-Friday, 24-hour on-site coverage
- Saturday-Sunday, 7:30 AM to 12:00 PM
- On-call hours (updated 9/12/2023):
  - Starting on September 18, 2023, CT services at the VA will once again be on-call only between midnight-0730, 7 days a week. It is estimated that this will be in effect until mid-December.

After hours CT examinations ordered by the ED should be approved by the radiologist for any potentially emergent situation. There are no defined criteria, rather, it is up to the resident to discuss the clinical scenario with the ordering provider on an individual basis and use their best clinical judgement with the information they have at the time.

## Communicating Critical Results

Relevant documents:

- [UCSD Critical Results \(2022\)](#)

Please review the UCSD critical results reporting for your reference.

Generally, most positive acute findings should be communicated. As a rule of thumb, it's usually best to call the ED directly, page whoever is listed as first call, call the Trauma Bay, or page trauma (6917 for the resident for new traumas, 6363 for the intern for admitted traumas) for reportable findings or complex cases that need discussion. Epic message can be used for more straightforward cases, however, you must ensure that readback is obtained. Additionally, it's generally helpful to communicate something you're hedging about; talking to the provider can often clarify some of the history and help narrow the differential or finding. Sometimes this can help you figure out what to do with indeterminate findings or let you know what they are clinically worried about. Err on the side of calling people to discuss the case and document the discussion, even if it is not official policy to call. This is helpful for communication and also builds a professional connection, fostering trust and a sense of teamwork. You will get to know the trauma resident and intern, many of the ED residents and attendings, ICU fellows, and a few others. So that you don't have to wait for the provider to call you back before moving on to the next case, you can add "Paged first to call" and move on to the next study. Then add a comment once you talk to them, "D/w Dr. \_\_\_\_".



## Teleradiology

### UCSD - VRAD

VRAD Guidelines (11 pm – 8 am)	
Chest	No CTs should be sent to vRad. CT prelims can be bare minimum, limited to those findings that change management. CXRs may be sent to vRad.
Neuro	Okay to send to VRAD
MSK	Okay to send to VRAD
Body	Okay to send to VRAD

- VRAD
  - access: <https://access.vrad.com/login.aspx>
  - Username: firstname.lastname (lower case)
  - Temporary password: admin will let you know
  - Rarely necessary to login, techs will send studies

Please review department-specific guidelines for sending studies to teleradiology after 11pm (above). Any study (except ultrasounds) from UCSD can be sent to teleradiology if requested by ordering MD or radiology resident. Call the CT technologist to let them know you would like the study sent to vRad. Other studies can also be sent to vRad at either the request of the resident or the ordering team (often surgery). If vRad is taking too long to provide a read, if you want to check on the progress of a read, or if you want to discuss a case with their radiologist, you can call them yourself. The CT techs can give you the phone number or it can be found on the bottom of any vRad report.

### VA - NTP

The VA teleradiology provider is called National Teleradiology Program (NTP). A NTP radiologist will provide a final read for every STAT case that is pushed to them after hours. You must ask the technologists to send the study, or the ordering physician must indicate in the history section of the order that a STAT attending read is requested. If a study has already been completed and the ordering physician decides that they want an attending-level read, then they must write it in their note in CPRS. If a study is sent to tele, then the resident should NOT provide a prelim. One exception is stroke codes, which will receive prelim by resident on call at all times. These are not supposed to be sent to NTP. Neurology and Neuro IR will also be evaluating this exam, as usual.

STAT MRIs overnight (except neuro MRI before 11p) can be sent to NTP; STAT MRIs on the weekend may be read by the on call attending or resident if there is time; if the attending is unable to be reached, they can be sent to NTP.

# General Advice (compiled from prior residents)

It is common to be nervous about starting ER-PM and night float, but you should pick it up within a few shifts. You will be surprised at how much you know. This is your chance to work independently and integrate all that you have learned. It is actually quite fun, edifying, and a preview of life after residency. It may be busy but do not stress out; you are not really alone and you have been preparing for this for the past 1.5 years (more, actually). It really is a highlight of our residency program, even if you have heard the upper years complain about it. You will come across findings you have never seen before or have only read about – learning how to approach these unknown cases is the next step in your evolution to become an independent radiologist.

Remember that you are not truly alone and there are fail-safes in place: ED/surgery/neurosurg/neuro/ICU will also be looking at the imaging (especially for the very sick patients), AIDOC is second set of eyes, and you have vRad or the on-call fellows/attendings as backup if needed.

Only a few types of mistakes can result in any serious patient harm overnight, which are not usually subtle findings – examples would be brain herniation, brain bleeds, ischemic bowel/closed loop obstruction, type-A dissection, massive PE (and “massive” is a clinical diagnosis anyway), aortic rupture, acute limb ischemia, active arterial extravasation in a hemodynamically unstable patient, and necrotizing soft tissue infections.

If you want to, you can do a buddy call shift with the current R3s, but this is not generally necessary. A good resource for preparation is “One Night at the ED,” a collection of scrollable CT scans covering most of the do-not-miss cases for body and chest with discussions, including post-surgical complications, various bowel obstructions, etc. <http://radiology.cornfeld.org/EDindex.php>

If you feel weak in a particular subject, then you can trade for a call shift in that subject, do some targeted reading, or simply review cases in Visage. The CQI/Good Call labels are a great resource to learn from. Challenge yourself with a new type of study/idea every day – get used to CTAs, MRI clearance, etc. Many techniques exist for de-stressing, for example having a mantra to repeat when things get crazy. Find something that works for you.

Do not get sloppy with your search pattern just because it is a prelim. Beware the corner shots, which are a good source of both CQIs and GOOD CALLS. “Call Checklist and Pearls” on Radres has some helpful differentials and search patterns. Try not to get bogged down in details in the prelim.

Do not take CQIs or a lack of GOOD CALLS to heart. They are not given out evenly, and sometimes attendings will not have even read your prelim. Some attendings are more prone to use these than others. Of course, it always hurts to get a CQI, but do not stress about it. Most misses do not get a CQI, and most good calls do not get a GOOD CALL, so do not rely on them for follow up. You may get e-mails about cases to review without a CQI (including the typical Stark e-mails). Be graceful when someone points out your mistakes. Say “thank you” and drop it. It is always possible to come up with an excuse (or rather explanation) but this does not allow you to grow from your mistakes. Learn from your colleague’s mistakes too – you will view CQI conference differently.

Follow up on all of your cases the next day – if you wait any longer, the cases will no longer be fresh or you will not have the time. This generally means coming in 15-20 minute early or staying late – it is much harder to follow up so many cases from home. On ER-PM, check the changes to your reports in Fluency before you leave – in addition to seeing your mistakes, you’ll learn the fellow’s/attending’s style and they will notice and appreciate it. Check the final reads for every single one of your prelims (even radiographs) every single day. If low on time, prioritize reviewing MSK over chest radiographs. You can track your cases in Fluency or by using Mmodal Scout/Catalyst.



Use all resources at your disposal. Look at notes and lab values, previous studies, Google/radiopaedia/articles/etc. It can be helpful to have anatomic maps up when reading studies, for instance an e-anatomy leg MRI with only arteries labeled when reading a CTA of the leg, or a labeled model of a bone when describing a fracture. You may occasionally need to send a sonographer back to get more images, or send a patient back to the CT.

It can be fun when just the ER-PM and NF resident are in the room together. It may be busy but also you will have time to chat and share cases between each other (also with your fellow and attending if it's a great case). Bringing food or treats to share is always nice. This is a good chance to commiserate or to share exciting moments. You control the room, including the lights, music, and temperature. Bring or stream your preferred playlists, or keep the room quiet. One resident mentioned using the "confidence booster" playlist on Spotify. Take care of yourself. Bring food and drink. Dress warm. Get up and go for short walks or stretching breaks. Use the call room. The typical rhythm of the hospital is to slow down by 1-2 am, and pick up again around 5-6 am. The main disruptors of this pattern are stroke codes and traumas, which are both paged out to the general pager x5063. Some nights will just be very slow, and others will be constant without any natural breaks. Even when it is busy, take a short break every now and then.

The hardest thing to deal with is the sleep disruption from the 3-3-3 day cycle. By the end of a NF shift, the resident may be very sleepy, which is a problem for work performance and also for driving home safely. Over the course of 4 to 6 weeks, the sleep disturbance can really add up. The call room can be used for a nap if needed before driving home – be safe first. Here are some ways to deal with sleeping issues:

- Circadian rhythm
  - On a typical day shift, a resident goes to work soon after waking up and does not sleep right after coming home. Trying to replicate this for this block would mean staying up until 9 am every day and sleeping until ~3-4 pm whether on ER-PM, NF, or off. Then ER-PM would be like a morning shift and NF like an evening shift. This is the best approach except taking into account other factors (significant others, family, non-work obligations, etc).
- Block out bright lights
  - Wear sunglasses when outside to avoid the bright morning light from giving your brain conflicting signals.
  - Blackout curtains, sleeping masks, or even a fort of pillows to sleep in the darkness.
  - Try to avoid screen time right before bed, especially bright blue light.
- Noise
  - White noise generators are very helpful for drowning out the daytime hubbub. There are free ones online (e.g. rain sounds on Youtube) and sound generators for purchase.
  - Earplugs are another option.
- Medications
  - Melatonin (and related ramelteon etc) can be used. It can also be helpful when rotating back to a normal day shift.
  - Antihistamines like diphenhydramine are available OTC, and turn off the histaminergic "wake" neurons. The drowsiness can help with sleep length but not sleep quality. Still, low quality sleep is better than no sleep. Note that diphenhydramine has a half-life of 3 – 9 hours so will stay in your system all day, and peaks around 2 hours. If going this route, try it before hand on a non-working day to see if you have any daytime drowsiness.
  - Z-drugs like Ambien can be obtained from your primary provider, if need be.
  - Caffeine is tempting to use to stay awake at the end of a shift, but this will cause problems later. Caffeine has a half-life of 5 hours (range 1.5 – 9) and will cause your sleep to be lower quality even once you get to sleep. It is best to drink caffeine, if any, before the shift or at the beginning.
  - Many herbals like valerian root do not have good evidence for or against them.
- Other tips

- If you sleep hot, consider a cooling mattress (ex. Ooler brand).
- If you feel wired by the end of the night, a few strategies that might help are having a “sleepy playlist” or a relaxing bath.
- Dealing with anxiety (e.g. about misses) before getting into bed.

# Appendix

## Full Month Schedule

	<u>Sunday</u>	<u>Monday</u>	<u>Tuesday</u>	<u>Wednesday</u>	<u>Thursday</u>	<u>Friday</u>	<u>Saturday</u>
	1	2	3	4	5	6	7
R1:	ER PM	ER PM	NF	NF	NF	OFF	OFF
R2:	NF	NF	OFF	OFF	OFF	ER PM	ER PM
R3:	OFF	OFF	ER PM	ER PM	ER PM	NF	NF
	8	9	10	11	12	13	14
R1:	OFF	ER PM	ER PM	ER PM	NF	NF	NF
R2:	ER PM	NF	NF	NF	OFF	OFF	OFF
R3:	NF	OFF	OFF	OFF	ER PM	ER PM	ER PM
	15	16	17	18	19	20	21
R1:	OFF	OFF	ER PM	ER PM	ER PM	NF	NF
R2:	ER PM	ER PM	NF	NF	NF	OFF	OFF
R3:	NF	NF	OFF	OFF	OFF	ER PM	ER PM
	22	23	24	25	26	27	28
R1:	NF	OFF	OFF	OFF	ER PM	ER PM	NF
R2:	OFF	ER PM	ER PM	ER PM	NF	NF	OFF
R3:	ER PM	NF	NF	NF	OFF	OFF	ER PM

## Template Checklist and Pearls

### CT Abdomen/Pelvis

#### Lung bases

- Extend thru abdomen for pneumoperitoneum/pneumatosis/pneumobilia/portal venous gas
- Causes of hepatic gas: mesenteric ischemia, liver abscess, hepatic artery thrombosis (post-transplant), trauma, emphysematous chole (rare), biliary interventions (most common), hepatic artery embo, perc liver intervention (ablation, biopsy)
- Pneumobilia – central; Portal venous gas - peripheral (generally)  Causes of pneumotosis intestinalis: Bowel ischemia, NEC, medications (steroids), autoimmune disease (scleroderma), post-endoscopy/post-operative, COPD/asthma

#### Liver

- AAST injury grades 0-6
- 1. Subcapsular hematoma (<10% SA) or Capsular tear (<1cm depth)
- 2. Subcapsular hematoma (10% to 50% SA), Intraparenchymal hematoma (<10 cm in diameter), Capsular tear (1-3 cm depth, <10 cm in length), or Multiple "Grade 1"
- 3. Subcapsular hematoma (>50% SA of ruptured subcapsular or parenchymal hematoma), Intraparenchymal hematoma (> 10 cm or expanding), Laceration (>3 cm depth), or Multiple "Grade 2"
- 4. Parenchymal disruption involving 25% to 75% hepatic lobe or 1-3 segments
- 5. Parenchymal disruption (involving >75% of hepatic lobe or >3 segments within a single lobe),

or Juxtahepatic venous injuries (retrohepatic vena cava/central major hepatic veins)

- 6. Hepatic avulsion
- Gallbladder and biliary tract
- Spleen
  - AAST injury grades 0-5
  - 1. Subcapsular hematoma (<10% SA) or capsular laceration (<1cm depth).
  - 2. Subcapsular hematoma (10% to 50% SA), Intraparenchymal hematoma (<5 cm), capsular tear (1-3 cm depth, does not involve a trabecular vessel), or Multiple "Grade 1"
  - 3. Subcapsular hematoma (>50% SA or expanding), Ruptured subcapsular or parenchymal hematoma, Intraparenchymal hematoma ( $\geq$  5 cm or expanding), Laceration (>3 cm depth or involving trabecular vessels), or Multiple "Grade 2"
  - 4. Laceration involving segmental or hilar vessels producing major devascularization (>25% of spleen).
  - 5. Completely shattered spleen, or hilar vascular injury with devascularization.
- Adrenals
- Kidneys
  - AAST injury grades 0-5
  - 1. Contusion (microscopic or gross hematuria, urologic studies normal), or Subcapsular hematoma (nonexpanding without parenchymal laceration)
  - 2. Hematoma (nonexpanding perirenal hematoma confined to renal retroperitoneum), Laceration (<1.0 cm depth of renal cortex without urinary extrav), or Multiple "Grade 1"
  - 3. Laceration (>1.0 cm depth of renal cortex without collecting system rupture or urinary extrav), or Multiple "Grade 2"
  - 4. Parenchymal laceration (extending through renal cortex, medulla, and collecting system), or Main renal artery or vein injury with contained hemorrhage
  - 5. Completely shattered kidney, or Avulsion of renal hilum
- Pancreas
  - Pancreatitis in order of severity: Edema, necrosis (non-enhancement), intra/extrapancreatic fluid collections, gas. WON occurs 4 weeks after.
- Stomach and Bowel
  - Appendix
    - Normal outer diameter  $\leq$  6mm (US and CT). Other signs: stranding, fluid, abscess, adjacent bowel wall thickening, appendicolith, mesenteric nodes
  - Ureters and bladder
    - UVJ most common site for impacted stone; also UPJ, iliac bifurcation, pelvic brim
    - Intraperitoneal bladder rupture - 15%, direct blow to distended bladder, contrast around bowel loops, surgical  Extraperitoneal bladder rupture - 85%, pelvic fx or penetrating trauma, variable path of contrast extrav, nonsurgical
  - Vessels
    - Include search for venous thrombi
  - Free fluid
  - Bones and soft tissues

CT Chest

- Lungs

- Airways

- Vessels

- If the attenuation is >100 HU, then it isn't a thrombus - streak artifact may artificially raise HU though.

- Acute thrombembolus - "polo mint" with central clot and peripheral contrast; Chronic - web or band-like, eccentric

- PE studies should have main PA (MPA) opacification of > H.U. with window 2X and level 0.5 X of the measured H.U. MPA for optimal contrast-to-noise level adjustment.

- Intramural hematoma - no intimal flap, constant circumferential relationship (dissection usual

spirals)

- Pericardium

- Heart

- Nodes

- Esophagus

- Bones and soft tissues

- Include clavicles, scapula, and visible humerus

## Chest Radiograph

**STANDARD REVIEW AREAS**

- Apices
- Retrocardiac area
- Hilar regions
- Below/behind diaphragm
- Right descending pulmonary artery (like a little finger)

**EASILY MISSED PATHOLOGY**

- Pulmonary
  - Lobar collapse (check hila)
  - Silhouette sign (i.e. desilhouetting ala Stark)
- Pleura
  - Pneumothorax (watch out for apical Ptx)
- Mediastinum
  - Thyroid mass
  - Paratracheal LNs (esp on the right)
  - Density in azygous region
  - Coarctation (i.e. rib notching)
  - right -sided aortic notch
  - Hilar LN
  - Pneumomediastinum
  - Paraspinal mass
  - Mediastinal mass  Chest wall
  - Ribs
  - Sclerotic or lucent lesions
  - Fracture
  - Extension of free intraperitoneal gas
- Bones/MSK
  - Humeral head (i.e. AVN, sickle cell)  Fracture
    - Clavicle
    - Vertebra (i.e. collapse/fracture, H-vertebrae in sickle cell)
  - Pedicle destruction
  - Paravertebral mass
- Below the diaphragm
  - Splenic calcification/Asplenia
  - Pneumoperitoneum
  - Pneumobilia
  - Pneumatosis coli
  - SBO pattern

## CT Head/brain

- Scout
- Extra axial spaces
  - Blood search along inner table, fissures, falx and tent, and dependently for blood; window #9 can be used to look very closely to the inner table, and check sag/coronal
- Basal cisterns
- Grey-white differentiation and parenchyma
  - Insula and basal ganglia too. Window #8 works well for Gray-White differentiation.
- Vessels
  - Look for hyperdense vessels on Non-con. Empty delta sign is only for CECT.
- Midline shift
  - Measure at foramen of Monroe if possible.
- Ventricles
  - Occipital horns for blood.
- Brainstem and cerebellum
- Orbits
- Soft tissues
- Bones and sinuses
  - Opacification of a sinus or air cell should increase search for fracture

## CT Temporal bone

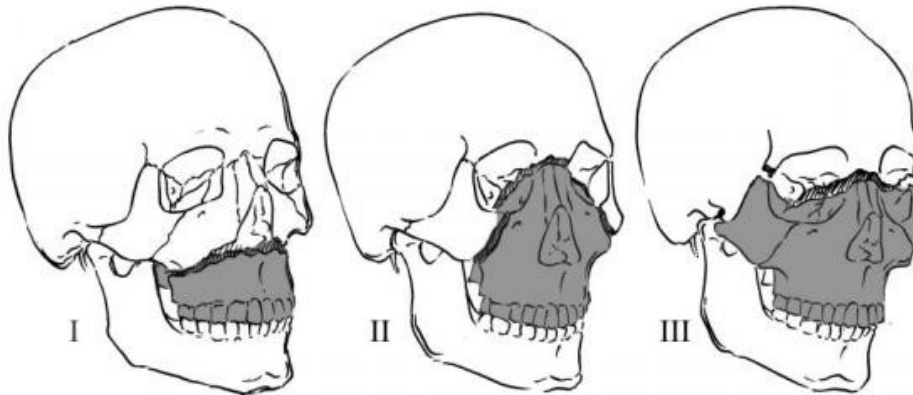
- Fractures are described as longitudinal (parallel to the axis) or transverse (perpendicular to the axis), or oblique (both)
  - Middle ear
    - Tegmen tympani (roof), jugular wall (floor), tympanic membrane and epitympanic recess (lateral wall), labyrinth with cochlear promontory (medial wall), aditus to the mastoid antrum (Posterior wall), carotid canal (anterior wall)
- Ossicles
  - MIS from lateral to medial - ice cream cone (head of malleus on body of incus)
- Cochlea
- Vestibule
- Facial nerve canal
  - Segments: Intracranial, meatal (IAC), labyrinthine segment (geniculate), tympanic segment, mastoid segment, extratemporal (TZBMC, exits temporal bone thru the stylomastoid foramen just posterior to )
- Semicircular canals
  - horizontal, superior and posterior
- Internal auditory canal
- External auditory canal
  - Consider mentioning cerumen vs differential if it appears mass-like (cholesteatoma, SCC). Hematoma will be higher density.
- Carotid canal
- Jugular foramen
- Temporomandibular joint

CT Max/face

☐ Bones

☐ Patterns:

- ☐ Naso-orbitoethmoid (nasal fracture extending posteriorly into medial canthal region, ethmoids, and medial orbital wall)
- ☐ Zygomaticomaxillary complex (fractures at sutures of zygoma with 1 - temporal, 2- frontal, 3 - maxillary, and 4- sphenoid. (a.k.a. zygomatic arch, zygomaticomaxillary buttress, inferior orbital rim, anterior/posterior maxillary sinus walls, lateral orbital rim)
- ☐ Orbital fx - can be isolated
- ☐ Lefort - 3 patterns, all have pterygomaxillary disruption



**Figure 15.** Drawings show the common Le Fort fracture patterns. The Le Fort I pattern involves fractures through the inferior portions of the medial and lateral maxillary buttresses. The Le Fort II pattern involves fractures through the zygomaticomaxillary and frontomaxillary sutures. The Le Fort III pattern involves complete craniofacial dissociation.

☐

- ☐ Sinuses and mastoids
  - ☐ Careful search for fracture if there is an air fluid level
- ☐ Globes, optic nerve, and EOMs
  - ☐ Look for entrapment with orbital fx.
- ☐ Mandible and TMJs

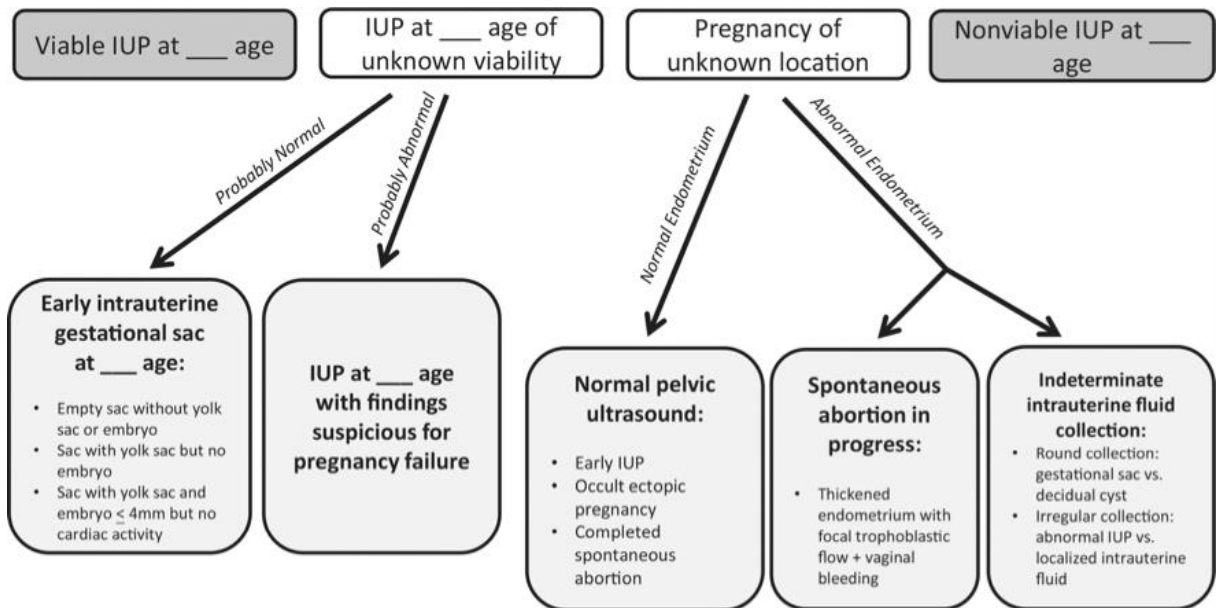
<p><b>Upper Right:</b></p> <ol style="list-style-type: none"> <li>1: 3rd Molar (wisdom tooth)</li> <li>2: 2nd Molar (12-year molar)</li> <li>3: 1st Molar (6-year molar)</li> <li>4: 2nd Bicuspisid (2nd premolar)</li> <li>5: 1st Bicuspisid (1st premolar)</li> <li>6: Cuspid (canine/eye tooth)</li> <li>7: Lateral incisor</li> <li>8: Central incisor</li> </ol>		<p><b>Upper Left:</b></p> <ol style="list-style-type: none"> <li>9: Central incisor</li> <li>10: Lateral incisor</li> <li>11: Cuspid (canine/eye tooth)</li> <li>12: 1st Bicuspisid (1st premolar)</li> <li>13: 2nd Bicuspisid (2nd premolar)</li> <li>14: 1st Molar (6-year molar)</li> <li>15: 2nd Molar (12-year molar)</li> <li>16: 3rd Molar (wisdom tooth)</li> </ol>
<p><b>Lower Right:</b></p> <ol style="list-style-type: none"> <li>25: Central incisor</li> <li>26: Lateral incisor</li> <li>27: Cuspid (canine/eye tooth)</li> <li>28: 1st Bicuspisid (1st premolar)</li> <li>29: 2nd Bicuspisid (2nd premolar)</li> <li>30: 1st Molar (6-year molar)</li> <li>31: 2nd Molar (12-year molar)</li> <li>32: 3rd Molar (wisdom tooth)</li> </ol>		<p><b>Lower Left:</b></p> <ol style="list-style-type: none"> <li>17: 3rd Molar (wisdom tooth)</li> <li>18: 2nd Molar (12-year molar)</li> <li>19: 1st Molar (6-year molar)</li> <li>20: 2nd Bicuspisid (2nd premolar)</li> <li>21: 1st Bicuspisid (1st premolar)</li> <li>22: Cuspid (canine/eye tooth)</li> <li>23: Lateral incisor</li> <li>24: Central incisor</li> </ol>

☐



## First trimester ultrasound

- ❑ Gestational sac size and appearance
  - ❑ MSD of >25mm with absent fetal pole indicates pregnancy failure
  - ❑ true gestational sac (vs pseudogestational sac): normal eccentric location, embedded in endometrium (vs centrally within the uterine cavity), yolk sac at approximately 5.5 weeks, double decidual sign at 4-6.5 weeks
  - ❑
- ❑ Yolk sac
  - ❑ Outside the amnion (if amnion is present)
- ❑ Fetal pole/fetal heart motion
  - ❑ Fetal pole with CRL > 7 mm with absent fetal heartbeat indicates pregnancy failure
- ❑ Subchorionic hemorrhage
  - ❑ Variable echotexture depending on age. Small - <20% of the size of the gestational sac. Large - >50-66%
- ❑ Adnexa and ovaries
  - ❑ Sliding sign = extra-ovarian
  - ❑ Claw sign = intra-ovarian.
- ❑ Free fluid
  - ❑ not specific for ruptured ectopic (seen in 37% of intact tubal ectopics)
- ❑ Options for impression:
  - ❑ Live IUP, IUP of uncertain viability (follow-up in 11 days if there is a fetal pole, 14 days if empty GS), embryonic demise (becomes fetus at 10 weeks), anembryonic.
  - ❑ Types of ectopic pregnancies: Tubal (~95%), interstitial/cornual (3-4% - interstitial line sign on 3D), Ovarian, cervical, scar ectopic, and abdominal (all ~1% or less)
  - ❑ Outline for various early early-pregnancy US impressions :



Adopted from Rodgers *et al.* RadioGraphics 2015.

## First Trimester Pregnancy Bleeding

- Related to pregnancy
  - Implantation bleeding
  - Subchorionic hemorrhage
    - Miscarriage (by definition <20 wks) / SAB
      - Threatened = Os Closed, No POC
      - Inevitable = Os open, No POC
      - Incomplete = Os open, POC
      - Complete = Os closed, POC expelled
- Ectopic pregnancy
- Hydatidiform moles
- Vanishing twin
- Associated with pregnancy (pre-existing or aggravated during pregnancy ):
  - Cervico-vaginitis (i.e. trichomonas vaginitis, BV)
  - Vascular erosion
  - Polyp, fibroid
  - Ruptured varicose veins
  - Malignancy
  - Trauma
  - Bleeding disorders (thrombocytopenia, VWD)
  - Drug-Induced (i.e. heparin, ASA)

### POINTS TO CONSIDER:

- Bleeding during pregnancy is VERY COMMON, affecting ~20-40% pregnancies
- always consider bleeding from another adjacent site, such as rectal or urethral

### CT C-spine

- Vertebral bodies
  - Sagittal reformats
- Posterior elements  Alignment
  - Special attention to craniocervical, atlantoaxial, and cervicothoracic alignment
  - Basion-dens interval normally less than 12 mm in adults
  - Basion-posterior axial line more reliable in children, also <12mm, up to negative 4 mm
  - Predental space (aka atlantodental interval) normally < 3 mm in adults and < 5 mm in children under 9 yrs
- Soft tissues
  - Prevertebral soft tissues should not be wider A-P than vertebral body (usually <10mm)
- Airway
- Apices

# Conclusion

Taking call is a fundamental step in becoming a successful radiologist. UCSD is one of the few remaining institutions that allows full, independent overnight call coverage by residents, which is a valuable asset to help refine your skills, speed, autonomy, and confidence. Although daunting at first, your training will prepare you well for the rigors of nights. Review this document several times to prepare. Remember, every resident before you has successfully completed overnight call, and you will too.

If you are looking for information not included in this document, please check [radres.ucsd.edu](http://radres.ucsd.edu). For any discrepancies or general questions about this document, please contact the chief residents at [radreschiefs@gmail.com](mailto:radreschiefs@gmail.com).