RADIOLOGY PARTNERS BEST PRACTICES

Incidental Thyroid Nodule (ITN)

PATIENT AGE	NODULE SIZE	FOLLOW-UP GUIDELINES
≤ **18** years	Any	**Consider Ultrasound**
>18 years and **< 35** years	**≥ 1** cm	**Ultrasound**
≥ 35 years	**≥ 1.5** cm	**Ultrasound**
Locally invasive or abnormal LNs	Any	**Ultrasound**
Heterogeneous, enlarged thyroid	Any	**Ultrasound**
Increase uptake on PET	Any	**Ultrasound and Recommend Biopsy**
Significant co-morbidities or limited life expectancy	Any	**No follow-up** (unless clinically warranted)

Note: If an ITN does not meet the criteria for further evaluation, it may or may not be mentioned in the body of the report at the radiologist's discretion, but should **not** be mentioned in the Impression. If mentioned in the body of the report, the ITN should be identified as **"not clinically significant"** and the statement should be made, **"No follow-up imaging recommended."**

Note: For multiple thyroid nodules, above recommendations are to be applied to the largest nodule

Note: These recommendations do not apply to pts with increased risk for thyroid CA or with symptomatic thyroid disease

ITN BPRs based on ACR White paper: J Am Coll Radiol. 2015 Feb;12(2): 143-50 (Available on RadWiki)

RADIOLOGY PARTNERS BEST PRACTICES

GENERAL REPORTING RECOMMENDATIONS

OVARIAN CYSTS

- US BPRs are applied to asymptomatic cysts and may be helpful in symptomatic cysts, but management of symptomatic cysts should be determined by the clinical setting.
- CT/MR BPRs are applied to incidental, asymptomatic cysts
- Report **LMP** in Clinical Indication/History section
- Report all measurements in **cm**
- **Body of Report**: include all measurements of ovarian lesions
- **Impression:** only maximum diameter of ovarian lesions
- **Impression:** state f/u recommendations

  "No follow-up imaging recommended" may be in body of report if cyst not mentioned in the Impression

Ov Cyst on US BPRs based on SRU Consensus Statement: Radiology. 2010 Sep;256(3):943-54

Ov Cyst on CT/MR BPRs based on ACR White paper: J Am Coll Radiol 2013;10:675-681

(Both references available on RadWiki)

Ovarian Cysts on US

SIMPLE OVARIAN CYSTS

PRE-Menopause		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	At the rad's discretion	If mentioned (in body of report) describe as "**dominant follicle**" State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 5 cm	**Yes** State: " **almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 5 cm to ≤ 7 cm	**Yes** State: "**almost certainly benign**"	**US f/u annually**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

POST-Menopause (≥ 1 year from LMP)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 1 cm	At the rad's discretion	State: "**No follow-up imaging recommended**"
> 1 cm to ≤ 3 cm	**Yes** State: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 7 cm	**Yes** State: "**almost certainly benign**"	**US f/u annually**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Note: Simple Ovarian Cysts include those with single <3 mm septation or focal calcification in cyst wall

Ovarian Cysts on US

INDETERMINATE, Probably Benign -- Septations or non-vascular nodule (ANY AGE)

Any Size	Document in Report	Follow-Up Guidelines
Septations: < 3 mm, Multiple	**Yes**	**Surgical evaluation**
Nodule (non-hyperechoic), any size: without blood flow	**Yes**	**MR w/IV contrast or surgical evaluation**

INDETERMINATE, Probably Benign – Suggestive of but not classic for hemorrhagic cyst, endometrioma, dermoid

PRE-Menopause		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 7 cm	**Yes**	**US f/u 6—12 weeks** If unchanged, continue f/u with US or MR w/IV contrast If f/u studies do not confirm endometrioma or dermoid, consider surgical evaluation
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

POST-Menopause (≥ 1 year from LMP)		
Size	**Document in Report**	**Follow-Up Guidelines**
Any	**Yes**	**Surgical evaluation**

Ovarian Cysts on US and CT/MR

WORRISOME FOR MALIGNANCY (ANY AGE)

Any Size	Document in Report	Follow-Up Guidelines
Septations: **≥ 3 mm**, Single/multiple/irregular	**Yes**	**Surgical evaluation**
Nodule, any size: with blood flow	**Yes**	**Surgical evaluation**

Ovarian Cysts on US

HEMORRHAGIC CYST

PRE-Menopause		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	At the rad's discretion	State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 5 cm	**Yes**	State: "**No follow-up imaging recommended**"
> 5 cm	**Yes**	**US f/u 6—12 weeks** If not resolved, US f/u annually

Early POST-Menopause (1-5 years from LMP)		
Size	**Document in Report**	**Follow-Up Guidelines**
Any	**Yes**	**US f/u 6—12 weeks** If not resolved, US f/u annually

Late POST-Menopause (> 5 years from LMP)		
Size	**Document in Report**	**Follow-Up Guidelines**
Any	**Yes**	**Surgical evaluation**

Ovarian Cysts on US

CORPUS LUTEUM CYST W/O PREGNANCY

Size	Document in Report	Follow-Up Guidelines
≤ 3 cm	At the rad's discretion	State: "**No follow-up imaging recommended**"
> 3 cm	**Yes**	**US f/u 6—12 weeks** If resolved/smaller, no further f/u If stable/larger, continue US f/u or consider MR w/IV contrast

DERMOID (ANY AGE)

Size	Document in Report	Follow-Up Guidelines
≤ 5 cm	**Yes**	**MR w/IV contrast** If not surgically resected, US f/u annually
> 5 cm	**Yes**	**Surgical evaluation** and if not resected, MR w/IV contrast; then US f/u annually

ENDOMETRIOMA (ANY AGE)

Size	Document in Report	Follow-Up Guidelines
≤ 7 cm	**Yes**	**US f/u 6—12 weeks** If not surgically resected, US f/u annually
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation** If not surgically resected, US f/u annually

RADIOLOGY PARTNERS BEST PRACTICES

Ovarian Cysts on CT/MR

Benign appearing cysts on MR and IV contrast CT (simple cyst, layering hemorrhage if premenopausal; Excludes normal/benign: Corpus luteum cyst, ovarian calcifications w/o solid mass/nodule, stable > 2 years)

PRE-Menopause (≤ 50 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 5 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 5 cm to ≤ 7 cm	**Yes**	**US f/u 6—12 weeks**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Early POST-Menopause (≤ 5 years from LMP; > 50 to ≤ 55 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"*
> 3 cm to ≤ 5 cm	**Yes**	**US f/u 6—12 months***
> 5 cm to ≤ 7 cm	**Yes**	**US f/u promptly**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

* If internal hemorrhage suspected in cyst, US f/u 6-12 weeks

Late POST-Menopause (> 5 years from LMP; > 55 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 7 cm	**Yes**	**US f/u promptly**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Ovarian Cysts on CT/MR

Probably benign cyst (non-IV contrast CT, cyst not round or oval, portion of cyst poorly imaged)

PRE-Menopause (≤ 50 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 5 cm	**Yes**	**US f/u 6—12 weeks**
> 5 cm to ≤ 7 cm	**Yes**	**US f/u promptly**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Early POST-Menopause (≤ 5 years from LMP; > 50 to ≤ 55 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 3 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 3 cm to ≤ 7 cm	**Yes**	**US f/u promptly**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Late POST-Menopause (> 5 years from LMP; > 55 years if LMP unknown)		
Size	**Document in Report**	**Follow-Up Guidelines**
≤ 1 cm	If reported, state: "**almost certainly benign**"	State: "**No follow-up imaging recommended**"
> 1 cm to ≤ 7 cm	**Yes**	**US f/u promptly**
> 7 cm	**Yes**	**MR w/IV contrast or surgical evaluation**

Abdominal Aortic Aneurysm (AAA)*

Infrarenal Aortic Diameter (cm)	RECOMMENDED FOLLOW-UP
≤ 2.0 cm	Normal diameter of infrarenal aorta
2.1 cm to 2.5 cm	Not AAA. If reported AND described as dilated, no f/u rec
2.6 cm to 2.9 cm	Every 5 years[1]
3.0 cm to 3.4 cm	Every 3 years
3.5 cm to 3.9 cm	Every 2 years
4.0 cm to 4.4 cm	Every 12 months, Recommend vascular consultation
4.5 cm to 5.4 cm	Every 6 months, Recommend vascular consultation
≥ 5.5 cm	Referral to vascular specialist

*Does not apply to Suprarenal Aorta

[1]For aortas of maximum diameter 2.6--2.9 cm meeting the criteria for AAA (≥1.5 x proximal normal segment; no f/u if < 1.5 x proximal normal segment)

- **How to measure aorta:** Outer wall to outer wall, maximum diameter of aorta, perpendicular to blood flow
- **Definition of AAA:** Focal dilatation of the abdominal aorta that is ≥ 3 cm in maximum diameter or 2.6 – 2.9 cm when ≥ 1.5 x proximal normal segment. **(No follow-up for aortas < 2.6 cm)**.

Recommended: The term "ectasia" not be used as it is ambiguous, especially when recommending f/u of a AAA.

Enlarging Fusiform AAA: Recommend vascular consultation if enlarges ≥ 0.5 cm in 6 months or ≥ 1 cm in 1 year.
Saccular AAA of any size: Recommend vascular consultation.

AAA BPRs based on ACR White paper: J Am Coll Radiol 2013;10 (10):789-794. (Available on RadWiki)

Updated 03/2020

Incidental Pulmonary Nodules on CT

(Complete & Incomplete Chest CTs)

Single Solid Nodule

Single Solid Nodule	NODULE SIZE (measured in mm increments)			
	0-5 mm (<100 mm^3)		6-8 mm (100-250 mm^3)	9+ mm (> 250 mm^3)
	Low Risk Nodule	High Risk Nodule (suspicious morphology and/or located in upper lobe)		
Low Risk Patient (Usually not applicable, see note below)	No routine follow-up	No routine follow-up	CT at 6-12 months, then consider CT at 18-24 months	Complete Chest CT: Consider CT at 3 months, PET/CT or tissue sampling Incomplete Chest CT: Non-emergent complete chest CT
Unknown Risk Patient		If patient is low risk, no routine follow-up. If patient is high risk, optional CT at 12 months; if stable at 12 months, no further f/u.	CT at 6-12 months, then CT at 18-24 months (For low risk patient CT 18-24 months is optional)	
High Risk Patient (see note below)		Optional CT at 12 months. If stable at 12 months, no further f/u.	CT at 6-12 months, then CT at 18-24 months	

Multiple Solid Nodules

Multiple Solid Nodules (f/u based on most suspicious nodule)	NODULE SIZE (measured in mm increments)		
	0-5 mm (<100 mm^3)		6+ mm (≥100 mm3)
	Low Risk Nodule	High Risk Nodule (suspicious morphology and/or located in upper lobe)	
Low Risk Patient (Usually not applicable, see note below)	No routine follow-up	No routine follow-up	CT at 3-6 months, then consider CT at 18-24 months
Unknown Risk Patient		If patient is low risk, no routine follow-up. If patient is high risk, optional CT at 12 months; if stable at 12 months, no further f/u.	CT at 3-6 months, then CT at 18-24 months (For low risk patient CT 18-24 months is optional)
High Risk Patient (see note below)		Optional CT at 12 months. If stable at 12 months, no further f/u.	CT at 3-6 months, then CT at 18-24 months

Note: from the reading radiologist's perspective, the patient can only be Unknown Risk or High Risk. Only the referring physician has enough information to determine that a patient is Low Risk.
Note: high risk patients include individuals with a history of smoking, emphysema, pulmonary fibrosis, family history of lung cancer, and/or other known risk factors.
Reference: Radiology. 2017 Jul; 284(1):228-243

Sub Solid Nodules

	NODULE SIZE (measured in mm increments)	
Sub Solid Nodules	**0-5 mm (<100 mm^3)**	**6+ mm (≥100 mm^3)**
Single Ground Glass Nodule	No routine follow-up. (For 5 mm nodule with suspicious morphology consider f/u at 2 and 4 years. Suspicious = bubbly lucencies/cystic areas. If solid component(s) or growth develops, consider resection.)	CT at 6-12 months to confirm persistence, then CT every 2 years until 5 years, if stable. (Recommend first f/u CT at 6 months for > 10 mm nodules and for ≥ 6 mm nodules with bubbly lucencies.) If solid components(s) or growth develops, consider resection.
Single Part Solid Nodule	No routine follow-up. (For 5 mm nodule with suspicious morphology consider f/u at 2 and 4 years. Suspicious = bubbly lucencies/cystic areas. If solid components(s) or growth develops, consider resection.) (Part solid nodule < 6 mm cannot be reliably defined as such and should be treated similar to ground glass nodule.)	CT at 3-6 to confirm persistence* If unchanged and solid component remains < 6 mm, annual CT should be performed for 5 years. For persistent suspicious part solid nodules: recommend PET/CT (if solid component > 8 mm), biopsy or resection (suspicious= lobulated or spiculated margins, cystic areas, growing solid component, or solid component ≥ 6 mm) *If largest diameter > 15 mm, no short term CT. Proceed directly to PET/CT, biopsy or resection.
Multiple Sub Solid Nodules	CT at 3–6 months. If stable, consider CT at 2 and 4 years.	CT at 3–6 months. Subsequent management based on the most suspicious nodule(s).

Reference: Radiology. 2017 Jul; 284(1):228-243; *Chest. 2013 May; 143(5)(Suppl):e93S-e120S

Perifissural Nodules (PFNs) and Juxtapleural Nodules

Type of Nodule	Characteristics	Management Recommendations
Typical PFNs and benign juxtapleural nodules (intrapulmonary lymph nodes)	• Well circumscribed, smooth margins, solid, homogeneous • Commonly triangular or oval/lentiform in shape • In contact with or closely related to a fissure or pleural surface, often showing a septal attachment • Majority < 5 mm, but can measure larger; can increase or decrease in size • Usually located below carina	No routine follow-up
Atypical PFNs (PFN likely)	• Usually perifissural in location • Defined as nodules that meet all features of typical PFNs, but not visibly attached to a fissure • Fissure-attached PFNs which are convex on one side and rounded on the other (suggesting they are not influenced by the fissure)	Consider follow-up CT in 6-12 months

Reference: Radiology. **2017 Jul; 284(1):228-243;** Radiology. **2012 Nov; 265(2):611-6;** Radiology. **2010 Mar; 254:949-56**

Nodules Detected on Incomplete Chest CTs (Abdomen, Neck, Heart)

Nodule Size (measured in mm increments)	9+ mm (> 250 mm^3)		All other sizes (solid & subsolid)
Density	Solid	Subsolid	
Recommendation	Non-emergent complete chest CT	Manage as if detected on complete chest CT, per Fleischner Guidelines	

Reference: Radiology. **2017 Jul; 284(1):228-243**

Guidelines for Measuring and Reporting Incidental Pulmonary Nodules on CT

- **Guidelines for solid and sub solid nodules do not apply to the following:** Patients younger than 35 years, immunocompromised patients, and patients with known primary cancer. F/u in patients with significant comorbidities as clinically warranted. For lung cancer screening, adhere to Lung-RADS guidelines.
- Evaluate nodules on all planes (axial, coronal and sagittal)
- Measure nodules < 10 mm on lung windows (sharp filter)
- Measurements should be performed on axial plane unless maximal dimension on coronal or sagittal plane
- Both axes should be measured on same image which shows maximal dimension
- Nodules < 10 mm: Report as average of maximal long-axis and perpendicular maximal short-axis measurements on same image
- Nodules ≥ 10 mm (average diameter): Report as both long- and perpendicular short-axis measurements
- Measurements and averages reported as rounded to nearest whole millimeter
- Micronodules < 3 mm should not be measured
- Part solid nodules, overall total nodule size: Report as per above guidelines
- Part solid nodules, solid component: Report only maximum diameter and only if > 3 mm. (This may be on different or same image as overall total nodule maximum dimension.)
- Spiculated nodules: Measure and report nodule core (do not include spiculations)

For lung nodules, include: location, density (solid, ground glass or part solid), size, margins and other relevant characteristics

GENERAL REPORTING RECOMMENDATIONS: ADRENAL MASS

- Measurements are applied to maximum diameter of adrenal mass. Follow-up measurements should be in the same dimension.
- Guidelines for placement of ROI and measuring HU on CT:
    - Homogeneous adrenal mass: HU measurements should be in the center, the ROI encompassing about 2/3rd of the adrenal mass
    - Avoid calcifications, blood vessels, cystic or necrotic areas, hemorrhagic components and peripheral portions to prevent partial volume artifacts.
    - Heterogeneous adrenal mass: Measure most vascular component
    - Cyst on non contrast CT: Create high contrast window to confirm mass is homogeneous and measure central 2/3
- For bilateral adrenal masses, assess each mass separately.
- Work-up of adrenal mass in patients with serious comorbidities or limited life expectancy may be unnecessary, unless clinically warranted.

Incidental Benign Adrenal Mass on CT/MR

Size	HU and other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	if contrast portal venous phase CT, ≤ 130 HU	probably benign	No follow-up imaging is recommended
Any Size	≤ 10 HU on noncontrast CT	lipid-rich adenoma	No follow-up imaging is recommended
< 4 cm	asymptomatic, macroscopic fat	myelolipoma	No follow-up imaging is recommended
< 4 cm	symptomatic (abdominal or flank pain not of other known etiology), macroscopic fat	myelolipoma	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
≥ 4 cm	macroscopic fat	myelolipoma	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
Any Size	calcification w/o associated mass or soft tissue component	benign	No follow-up imaging is recommended
Any Size	cyst	benign	No follow-up imaging is recommended
Any Size	signal loss compared with the spleen between in- and opposed-phase images on chemical shift MR	lipid-rich adenoma[1]	No follow-up imaging is recommended

1. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI

Incidental Indeterminate Adrenal Mass on CT

Noncontrast CT, No prior imaging, No cancer history

Size	HU and other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	No follow-up imaging is recommended
≥ 1 - 2 cm	> 10 HU, homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	> 10 HU, heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	> 10 HU, homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4 cm	> 10 HU, heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm	> 10 HU	possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

Contrast portal venous phase CT, No prior imaging, No cancer history

Size	HU and other Characterisitics	Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	No follow up imaging is recommended
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up CT abdomen w/c. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	≤ 130 HU, homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	≤ 130 HU, heterogeneous **OR** > 130 HU, homogeneous or heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	≤ 130 HU, homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4cm	≤ 130 HU, heterogeneous **OR** > 130 HU, homogeneous or heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection.

Incidental Indeterminate Adrenal Mass on MR

W/O or W/C MR, No prior imaging, No cancer history

Size	Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	No follow-up imaging is recommended
≥ 1 - 2 cm	Homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	Heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	Homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4 cm	Heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm	Any	possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

Non-Incidental Indeterminate Adrenal Mass on CT

W/O or W/C portal venous phase CT, No prior imaging, History of cancer other than RCC or HCC, no other metastatic disease

Size	HU on PV Phase	Type of Cancer, Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	Follow-up for stability in surveillance imaging for primary cancer
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, follow-up for stability in surveillance imaging for primary cancer
≥ 1 - < 4cm	≤ 130 HU	other than RCC or HCC, possible metastasis	Adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis)
≥ 1 - < 4cm	> 130 HU	other than RCC or HCC, possible pheochromocytoma or metastasis	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis.)
≥ 4 cm		other than RCC or HCC, possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy.

W/O or W/C portal venous phase CT, No prior imaging, History of RCC or HCC, no other metastatic disease

Size	HU on PV Phase	Cancer Type, Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC
≥ 1 - < 4cm	≤ 130 HU	RCC[1] or HCC[1], possible metastasis	Staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 1 - < 4cm	> 130 HU	RCC[1] or HCC[1], possible pheochromocytoma or metastasis	Biochemical evaluation for pheochromocytoma and staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 4 cm		RCC[1] or HCC[1], possible metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Adrenal metastasis from RCC and HCC are commonly hypervascular and can have the same rapid washout characteristics as adenoma on adrenal washout CT. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI. PET-CT is of limited value in RCC and HCC as FDG uptake is variable in both.

Confidential and Proprietary

Non-Incidental Indeterminate Adrenal Mass on CT

Contrast arterial/corticomedullary and portal venous/nephrographic phases of initial staging renal/liver mass protocol CT, History of RCC or HCC, no other metastatic disease:

Size	HU arterial (A) and venous (V) phases & other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC[1]
≥ 1 - < 4cm	≤ 100 HU arterial **AND** either venous = arterial (Δ < 5 HU) or venous > arterial (Δ ≥ 5 HU), **AND** homogeneous	suggestive of adenoma	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC[1]
≥ 1 - < 4cm	>100 HU arterial **OR** arterial > venous(Δ ≥5 HU), **OR** heterogeneous	suspicious for metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection
≥ 4 cm		suspicious for metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. If > 100 HU arterial or > 130 HU venous, recommend biochemical lab evaluation for pheochromocytoma if not already done.

RADIOLOGY PARTNERS BEST PRACTICES

Non-Incidental Indeterminate Adrenal Mass on CT

W/O or W/C portal venous phase CT, Prior imaging, No cancer history

Size	HU PV & other Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	≤ 130 HU, stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	> 130 HU, stable ≥ 1 year	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, no further f/u imaging
< 4 cm	≤ 130 HU, new or enlarging[1]	possible malignancy	Consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
< 4 cm	> 130 HU, new or enlarging[1]	possible pheochromocytoma, possible malignancy	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status prior to resection
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

W/O or W/C portal venous phase CT, Prior imaging, History of cancer, no other metastatic disease

Size	HU PV & other Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	≤ 130 HU, stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	> 130 HU, stable ≥ 1 year	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, no further f/u imaging
< 4 cm	≤ 130 HU, new or enlarging[1]	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
< 4 cm	> 130 HU, new or enlarging[1]	possible pheochromocytoma, possible metastasis	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status prior to biopsy
≥ 4 cm		possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

Non-Incidental Indeterminate Adrenal Mass on MR

W/O or W/C MR, No prior imaging, History of cancer, no other metastatic disease

Size	Cancer Type	Suggested	Recommendation
< 1 cm	any	probably benign	Follow-up for stability in surveillance imaging for primary cancer
≥ 1 - < 4 cm	other than RCC or HCC	possible metastasis	Adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis)
≥ 1 - < 4 cm	RCC[1] or HCC[1]	possible metastasis	Staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 4 cm	other than RCC or HCC	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
≥ 4 cm	RCC[1] or HCC[1]	possible metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection

1. Adrenal metastasis from RCC and HCC are commonly hypervascular and can have the same rapid washout characteristics as adenoma on adrenal washout CT. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI. PET-CT is of limited value in RCC and HCC as FDG uptake is variable in both.

RADIOLOGY PARTNERS BEST PRACTICES

Non-Incidental Indeterminate Adrenal Mass on MR

W/O or W/C MR, Prior imaging, No cancer history

Size	Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	new or enlarging[1]	possible malignancy	Consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

W/O or W/C MR, Prior imaging, History of cancer, no other metastatic disease

Size	Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	new or enlarging[1]	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
≥ 4 cm		possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

Interpretation of Adrenal Washout CT

APW & RPW	HU on portal venous phase	Suggested Diagnosis	Recommendation
No enhancement (Δ <10 HU between W/O and W/C)		benign – cyst or hemorrhage	No follow-up imaging is recommended
APW ≥ 60% and/or RPW ≥ 40%	≤ 130 HU	Washout characteristics consistent with adenoma	No follow-up imaging is recommended
APW ≥ 60% and/or RPW ≥ 40%	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider f/u CT in one year to assess for growth
APW < 60% and/or RPW < 40%	≤ 130 HU	possible malignancy	Consider f/u CT Abdomen w/c 6-12 months, PET-CT, biopsy or surgical consultation depending on clinical scenario. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection
APW < 60% and/or RPW < 40%	> 130 HU	possible pheochromocytoma, possible malignancy	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider f/u CT Abdomen w/c 6-12 months, PET-CT, biopsy or surgical consultation depending on clinical scenario. Consider biochemical lab evaluation for functional status prior to biopsy or resection

1. RPW is used when unenhanced CT is not available

Inferior Vena Cava Filter Placement

Components	Description
Use Standardized Template	This is identified on the report template as SIR_IVCFilterInsertion2.0 IVCPLID-v1y19q1 DO NOT DELETE OR MODIFY
Appropriate Indication	Select one of nine acceptable indications
Filter Type	Manufacturer and device name
Follow up plan	Permanent placement or evaluation at 3 months for potential retrieval

Opportunities for improvement:

- **Decision to place filter** - Only place for approved indications
- **Filter selection** - Place permanent filters when appropriate
- **Differences and risk profiles** - Be aware of different Retrievable IVC filters
- **Follow up program** - Prevent legal risk from morbidity and costs associated with complications
- **Removal when appropriate** - Follow up programs, training, and preparation for “advanced” techniques

IVC Filter Placement BP based on ACR white paper: 2016 ACR-SIR-SPR Resolution 18 (Available on RadWiki)

Inferior Vena Cava Filter Placement

Acceptable Indications:

For patients with VTE/DVT:

1. Contraindication to anticoagulation
2. Inability to achieve/maintain therapeutic AC
3. Failure of anticoagulation
4. Massive PE (within 14 d)
5. Limited Cardiopulmonary Reserve
6. Free Floating Iliac or IVC Thrombus
7. PE or Iliocaval DVT treated with thrombolysis

For patients receiving a prophylactic filter:

8. Absolute contraindication to anticoagulation
9. Inability to ambulate

Coronavirus Disease 2019 (COVID-19)

COVID-19 Pneumonia Imaging Classification	Rationale	CT Findings	Suggested Reporting Language
Atypical appearance	Uncommonly or not reported features of COVID-19 pneumonia	Absence of typical or indeterminate features AND presence of: •Isolated lobar or segmental consolidation without GGO •Discrete small nodules (centrilobular, "tree-in-bud") •Lung cavitation •Smooth interlobular septal thickening with pleural effusion	"Imaging features are atypical or uncommonly reported for (COVID-19 or viral) pneumonia. Alternative diagnoses should be considered."
Indeterminate appearance	Nonspecific imaging features of COVID-19 pneumonia	Absence of typical features AND presence of: •Multifocal, diffuse, perihilar, or unilateral GGO with or without consolidation lacking a specific distribution and are non-rounded or non-peripheral. •Few very small GGO with a non-rounded and non-peripheral distribution	"Imaging features can be seen with (COVID-19 or viral) pneumonia, though are nonspecific and can occur with a variety of infectious and noninfectious processes."
Negative for pneumonia	No features of pneumonia	No CT features to suggest pneumonia	"No CT findings present to indicate pneumonia. Note: CT may be negative in the early stages of (COVID-19 or viral pneumonia)."
Typical appearance	Commonly reported imaging features of greater specificity for COVID-19 pneumonia	•Peripheral, bilateral GGO with or without consolidation or visible intralobular lines ("crazy-paving") •Multifocal GGO of rounded morphology with or without consolidation or visible intralobular lines ("crazy-paving") •Reverse halo sign or other findings of organizing pneumonia (seen later in the disease)	"Commonly reported imaging features of (COVID-19 or viral) pneumonia are present. Other processes such as influenza pneumonia and organizing pneumonia, as can be seen with drug toxicity and connective tissue disease, can cause a similar imaging pattern."

COVID BPRs based on RSNA Expert Consensus Statement on Reporting Chest CT Findings Related to COVID-19. Endorsed by the Society of Thoracic Radiology, the American College of Radiology, and RSNA, 2020