



# Initial Management of Indeterminate Renal Masses in a Statewide Collaborative: a MUSIC-KIDNEY analysis



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## BACKGROUND

- The widespread use of abdominal imaging has led to the increasing detection of incidental small renal lesions
- While some lesions are accurately classified as suspicious or benign, lesions without clear distinguishing characteristics are often labeled as indeterminate.
- The Michigan Urological Surgery Improvement Collaborative - Kidney mass: Identifying and Defining Necessary Evaluation and therapy (MUSIC-KIDNEY) program commenced data collection in September 2017
- 14 diverse practices across the state of Michigan

## OBJECTIVE

- Our objective was to assess current incidence and use of follow-up imaging in the management of indeterminate renal lesions to better understand the management of indeterminate lesions.

## METHODS

- MUSIC-KIDNEY registry queried between 9/2017 and 5/2021
- Data abstraction performed at least 4 months after initial office visit to capture clinical characteristics and management strategy.
- Proportion of lesions categorized as indeterminate and proportion of patients undergoing subsequent imaging in practices then captured at follow-up intervals

## RESULTS

- Identified a total of 21.1 % (444/2,109) patients recorded as having an indeterminate renal lesion at initial imaging study between 9/2017 and 5/2021 at 14 MUSIC-KIDNEY practices.

Variable	Suspicious	Indeterminate	Benign	p
No. patients	1554	444	111	
Age, median (IQR)	65.0 (54.0-73.0)	66.0 (57.0-75.0)	64.0 (56.0-70.0)	0.034
Gender	1011 (59.7%)	267 (57.2%)	57 (43.2%)	0.001
Male	930 (59.8%)	253 (57.0%)	48 (43.2%)	0.002
Female	624 (40.2%)	191 (43.0%)	63 (56.8%)	
Race				
White	1208 (77.7%)	369 (83.1%)	83 (74.8%)	<0.001
AA	184 (11.8%)	59 (13.3%)	18 (16.2%)	
Other/Unknown	162 (10.4%)	16 (3.6%)	10 (9.0%)	
Initial imaging type				
Non-contrast CT	110 (7.1%)	74 (16.7%)	18 (16.2%)	<0.001
Contrast CT	1005 (64.7%)	240 (54.1%)	43 (38.7%)	
Non-contrast MRI	37 (2.4%)	17 (3.8%)	2 (1.8%)	
Contrast MRI	232 (14.9%)	43 (9.7%)	9 (8.1%)	
Non-axial imaging (ultrasound)	170 (10.9%)	70 (15.8%)	39 (35.1%)	
Tumor size, median (IQR)	2.7 (1.8-4.1)	2.2 (1.5-3.2)	2.1 (1.5-3.9)	<0.001
Tumor size				
<=1cm	62 (4.0%)	38 (8.6%)	14 (12.6%)	<0.001
1.1-2cm	429 (27.6%)	174 (39.2%)	40 (36.0%)	
2.1-3cm	400 (25.7%)	117 (26.4%)	21 (18.9%)	
3.1-4cm	265 (17.1%)	52 (11.7%)	13 (11.7%)	
4.1-5cm	189 (12.2%)	32 (7.2%)	15 (13.5%)	
5.1-6cm	134 (8.6%)	18 (4.1%)	5 (4.5%)	
6.1-7cm	75 (4.8%)	13 (2.9%)	3 (2.7%)	

Figure 1. Baseline clinical characteristics of cT1 renal masses referred for management in a MUSIC urology practice stratified by classification at initial imaging

Initial imaging study, n (%)	Subsequent imaging study*	
	Type	n (%)
Non-axial imaging (ultrasound), 70 (15.8%)	None	56 (80.0%)
	Non-contrast CT	
	Contrast CT	9 (12.9%)
	Contrast MRI	5 (6.6%)
Non-contrast CT, 74 (16.7%)	None	51 (68.9%)
	Non-axial imaging (ultrasound)	3 (4.1%)
	Contrast CT	12 (16.2%)
	Contrast MRI	2 (2.7%)
Contrast CT, 240 (54.1%)	None	6 (8.1%)
	Non-axial imaging (ultrasound)	179 (74.6%)
	Non-contrast CT	5 (2.1%)
	Contrast CT	2 (0.8%)
Non-contrast MRI, 17 (3.8%)	None	21 (8.8%)
	Non-contrast MRI	33 (13.8%)
	Non-axial imaging (ultrasound)	14 (82.4%)
	Contrast CT	3 (17.6%)
Contrast MRI, 43 (9.7%)	None	39 (90.7%)
	Non-axial imaging (ultrasound)	2 (4.7%)
	Non-contrast CT	2 (4.7%)
	Contrast MRI	2 (4.7%)

\*Indicated are the most expensive / rigorous subsequent test when >1 was performed.

**a.**

Total patients undergoing additional imaging	105
Reclassified as solid	61
Reclassified as benign	22
Stayed indeterminate	22

**b.**

Pathology	No subsequent imaging	>=1 subsequent imaging	Total
Benign	8	1	9
Favor benign	2	0	2
Indeterminate	2	1	3
Favor malignancy	2	0	2
Malignant	23	14	37
Total	37	16	53

Figure 2. Effect of subsequent imaging (a) and biopsy (b) on reclassification of indeterminate lesions

	All	No subsequent imaging	>=1 subsequent imaging	p-value
No. patients	444	339	105	
Treatment distribution				
AS/Observation	287 (64.6%)	214 (63.1%)	73 (69.5%)	
Ablation	14 (3.2%)	13 (3.8%)	1 (1.0%)	
MIPN	84 (18.9%)	65 (19.2%)	19 (18.1%)	
OPN	4 (0.9%)	3 (0.9%)	1 (1.0%)	
MIRN	41 (9.2%)	32 (9.4%)	9 (8.6%)	
ORN	2 (0.5%)	1 (0.3%)	1 (1.0%)	
Other	12 (2.7%)	11 (3.2%)	1 (1.0%)	
Total patients undergoing surgery	131 (29.5%)	101 (29.8%)	30 (28.5%)	
Malignant surgical pathology	119 (90.8%)	91 (90.1%)	28 (93.3%)	0.590
Positive surgical margin	10 (7.6%)	6 (5.9%)	4 (13.3%)	0.181

Figure 3. Treatment associated with indeterminate lesions

## CONCLUSIONS

- About 1 in 5 renal masses in MUSIC-KIDNEY registry were considered “indeterminate” on initial imaging study
- Subsequent and appropriate imaging plays an important role in management of these lesions and characterized the lesion as suspicious or benign in >80% of cases.
- Biopsy leads to a definitive pathologic diagnosis (malignant or benign neoplasm) in 87% (46/53) of patients with indeterminate lesions.
- Significant proportion of patients went to treatment with out imaging or biopsy and this presents a QI opportunity.
- The use of multi-phase axial imaging and consideration of biopsy leads to better characterization of an indeterminate renal lesion, and often affects subsequent management.

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