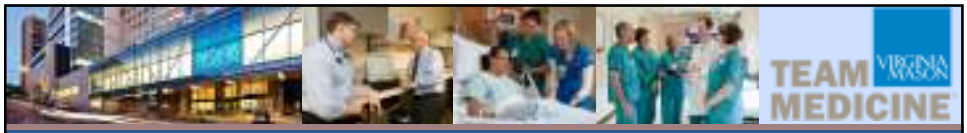

A Quality Improvement Initiative to Reduce Unnecessary Follow-up Imaging for Adnexal Lesions

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Our Strategic Plan

Disclosures

- C. Blackmore receives book royalties from Springer Publishing for "Evidence Based Imaging" textbook series.

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Purpose

- In female patients, cysts are common findings at pelvic ultrasound, but follow-up recommendations from our ultrasound section varied widely, with frequent recommendations for follow-up of physiologic or benign ovarian findings
- Lack of consistent management criteria may lead to:
  - Increased patient anxiety
  - Un-indicated additional imaging
  - Unnecessary gynecological referrals
  - Potentially unnecessary clinical or surgical treatment

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Purpose

The goal of this project was to improve the quality of our institution's radiology reports by decreasing the number of adnexal lesions inappropriately referred for follow-up imaging

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Methods

- The project was conducted at Virginia Mason Medical Center (VMMC), a 336-bed integrated health system in the Pacific Northwest
- We perform approximately 29,000 ultrasound studies/year and interpret approximately 250,000 total radiology studies/year
- Our practice is a multispecialty group comprised of 29 radiologists, 19 of whom interpret ultrasounds
- We are a fully accredited ACGME radiology residency program training 12 total residents

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Methods: Timeline

- Our study included 3 data collection periods separated by 2 improvement-oriented interventions
- Project duration of 5 years
  - The 19 ultrasound faculty was unchanged except for the addition of 1 radiologist in 2010

Methods: Outcome Measures

- We retrospectively reviewed pelvic ultrasound reports to identify all with an adnexal lesion included in the Impression
- For each patient with an adnexal lesion, we collected:
  - Ultrasound characterization
  - Follow-up and referral recommendations
  - Results of follow-up imaging
  - Outcomes of consultation or surgery

Methods: Outcome Measures

- Our primary outcome measure was the proportion of pelvic ultrasound reports in which follow-up imaging was recommended for an adnexal lesion
- Statistical analysis was performed using the chi-square statistic of sample proportions with a 95% confidence level considered statistically significant

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Methods: Intervention 1

- Two of the study authors initiated teaching sessions with the sonographers at the quarterly ultrasound section meeting
  - Case examples of normal corpus luteum cysts and collapsed corpus luteum were provided
  - The pelvic ultrasound protocol was modified to exclude formal measurement of physiologic cystic lesions less than 2.5 cm in diameter
- Teaching examples were saved to a PACS folder to facilitate review by all radiologists

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Methods: Intervention 1

- Additionally, 3 fellowship trained ultrasound radiologists conducted expert review of the cases to determine if follow-up recommendations were appropriate
- A set of adnexal cyst "quiz" cases was distributed to the ultrasound radiologists
  - Radiologists were quizzed on which lesions were physiologic, benign, probably benign but warranted follow up imaging, or required gynecologic referral
  - Answers were distributed based on expert review and follow-up imaging confirmation

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Methods: Intervention 1

- Following Intervention 1, the continued variability in adnexal lesion characterization necessitated further improvement
- Radiologists were still hesitant to characterize adnexal lesions as appropriately physiologic or benign without accepted consensus criteria

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Methods: Intervention 2

- In Intervention 2, the VMMC ultrasound section accepted the Society of Radiologists in Ultrasound (SRU) Consensus Conference Statement whitepaper (2010) *Management of Asymptomatic Ovarian and Other Adnexal Cysts Imaged at Ultrasound* as the standard for characterizing and reporting ovarian cysts and other adnexal lesions
- The whitepaper provided several image-rich charts with examples of various adnexal lesions and suggested follow-up recommendations, if necessary

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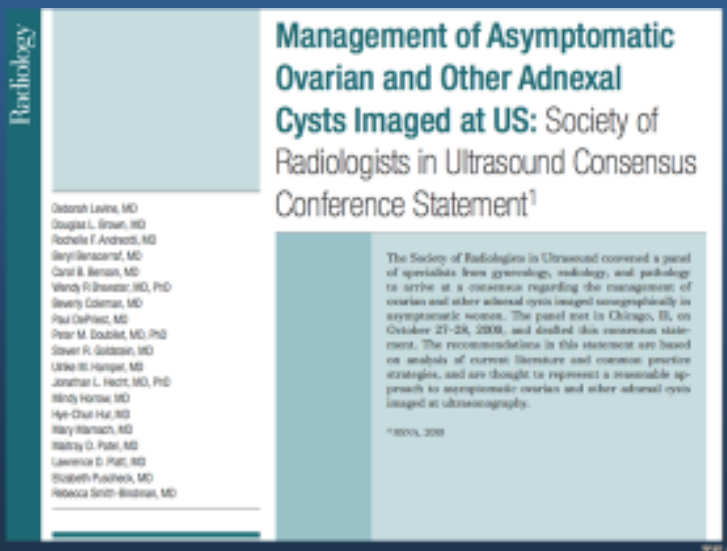
Methods: Intervention 2


Radiology

Management of Asymptomatic Ovarian and Other Adnexal Cysts Imaged at US: Society of Radiologists in Ultrasound Consensus Conference Statement[1]

Deborah Levine, MD
Douglas L. Brown, MD
Rochelle F. Andreotti, MD
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Jonathan L. Hecht, MD, PhD
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Mary Mannach, MD
Maitray D. Patel, MD
Lawrence D. Platt, MD
Elizabeth Pyeritz, MD
Rebecca Smith-Bindman, MD

The Society of Radiologists in Ultrasound convened a panel of specialists from gynecology, radiology, and pathology to arrive at a consensus regarding the management of ovarian and other adnexal cysts imaged sonographically in asymptomatic women. The panel met in Chicago, Ill, on October 27–28, 2008, and drafted this consensus statement. The recommendations in this statement are based on analysis of current literature and common practice strategies, and are thought to represent a reasonable approach to asymptomatic ovarian and other adnexal cysts imaged at ultrasonography.

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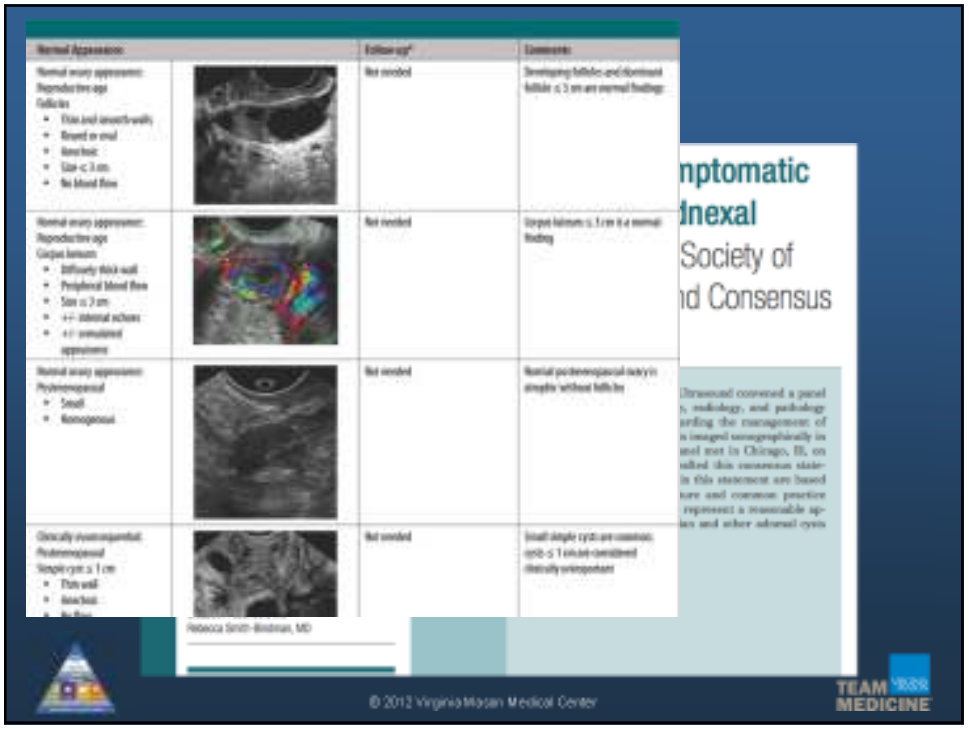
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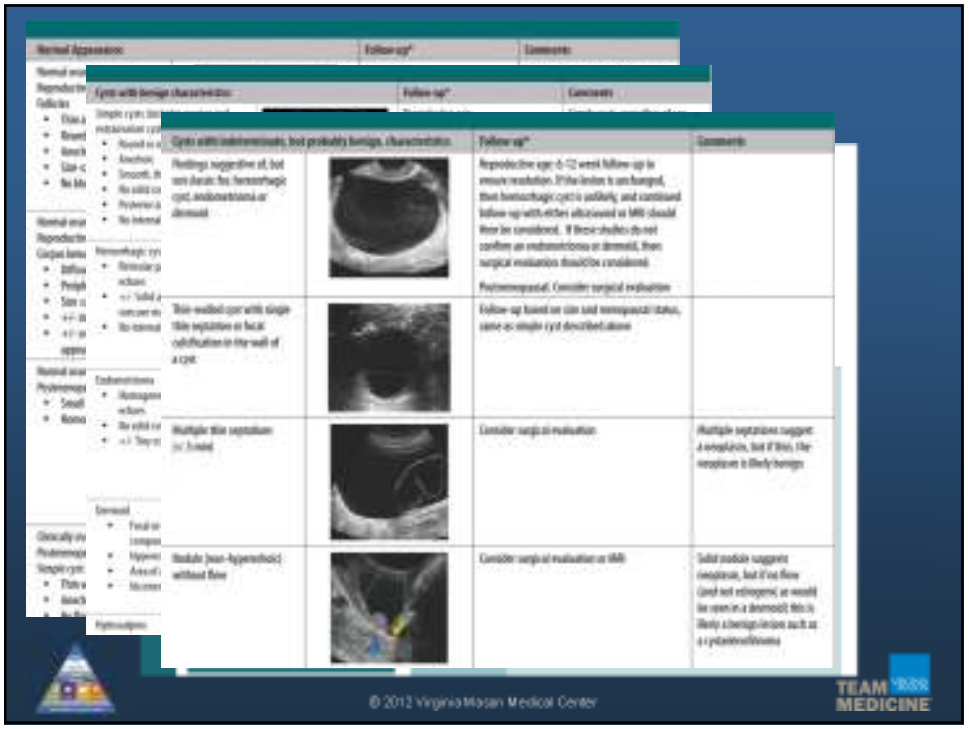
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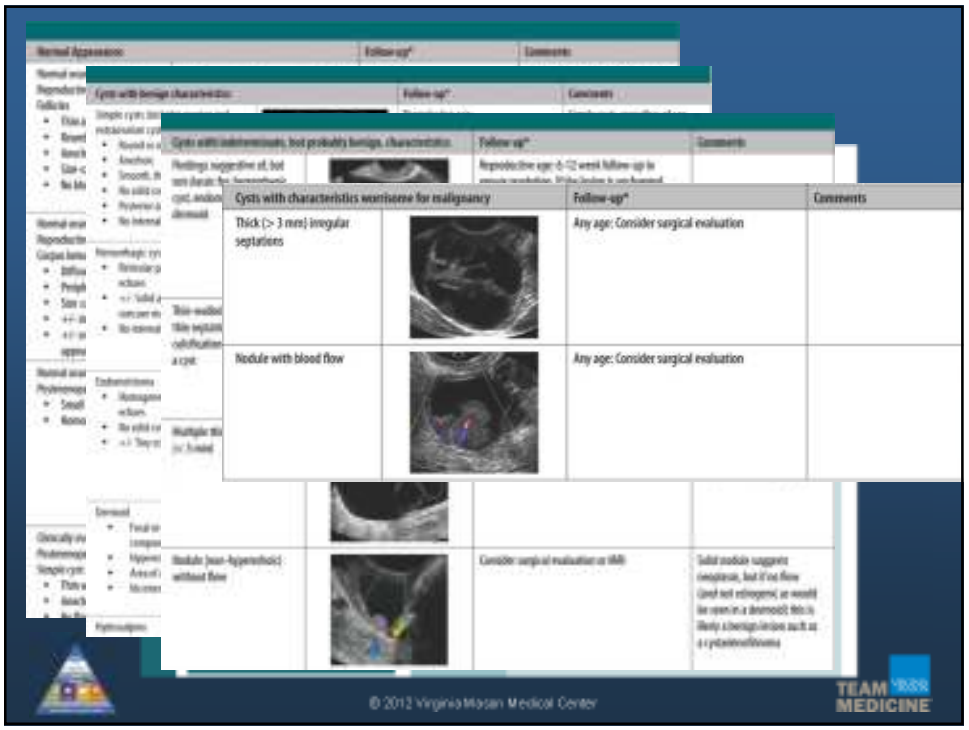
Cysts with characteristics worrisome for malignancy
Follow-up*
Comments
Thick (> 3 mm) irregular septations
Any age: Consider surgical evaluation
Nodule with blood flow
Any age: Consider surgical evaluation
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Methods: Intervention 2

- The SRU whitepaper was distributed department-wide to all attending radiologists, residents, and sonographers
- Education was reinforced at the quarterly ultrasound section meeting and resident noon conferences
- Radiologists were asked to save the whitepaper to their desktops for quick reference

Results: Timeline

- Our study included 3 data collection periods with each data collection separated by an improvement-oriented intervention

Results: Baseline Data Collection 1

	Total pelvic ultrasounds	Number of ultrasound reports documenting an adnexal lesion	Number of patients recommended for follow-up imaging
Baseline Data Collection 1	252	58 (23%)	31 (12%)

- We reviewed 252 pelvic ultrasounds
  - 58 (23%) reported an adnexal mass
  - Follow-up ultrasound was recommended in 31 (12% of total)

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Results: Baseline Data Collection 1

- Expert review revealed that 16 of the ultrasound cases (28%) were misclassified as indeterminate or concerning, rather than as benign or physiologic
- Of the 31 patients for whom follow-up was recommended, 13 patients (42%) failed to undergo recommended follow-up or had the follow-up recommendation overturned at the time of gynecologic consultation

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Results: Data Collection 2

	Total pelvic ultrasounds	Number of ultrasound reports documenting an adnexal lesion	Number of patients recommended for follow-up imaging
Baseline Data Collection 1	252	58 (23%)	31 (12%)
Data Collection 2 (Following Intervention 1)	214	59 (27%)	18 (8%)

- Following Intervention 1, we reviewed 214 pelvic ultrasounds
  - No significant change in reporting of adnexal lesions (23% v 27%, p=0.26) or follow-up recommendations (12% v 8%, p=0.17)

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Results: Data Collection 3

	Total pelvic ultrasounds	Number of ultrasound reports documenting an adnexal lesion	Number of patients recommended for follow-up imaging
Baseline Data Collection 1	252	58 (23%)	31 (12%)
Data Collection 2 (Following Intervention 1)	214	59 (27%)	18 (8%)
Data Collection 3 (Following Intervention 2)	296	64 (22%)	16 (5%)

- Following Intervention 2, we reviewed 296 pelvic ultrasounds
  - 64 (22% of total) reported an adnexal lesion, not statistically different compared to baseline (23% v 22%, p=0.70)
  - However, follow-up was recommended in 16 patients (5% of total), significantly decreased compared to baseline (12% v 5%, p=0.004)

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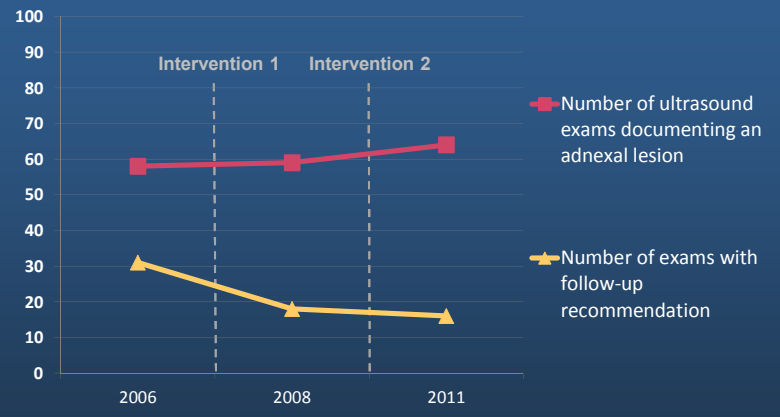
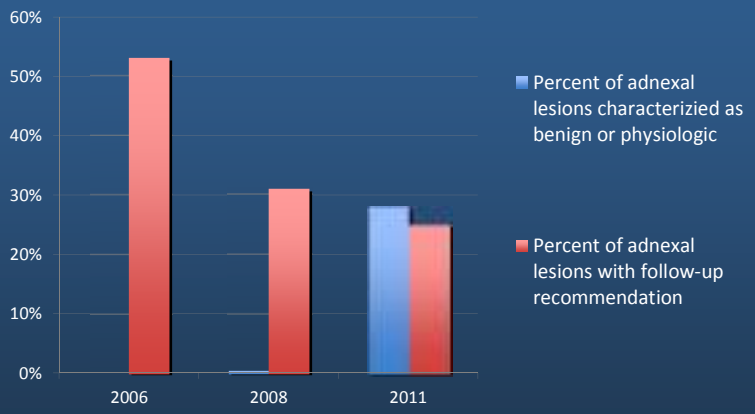
Figure 1: Number of documented adnexal lesions and follow-up recommendations



While the number of adnexal lesions documented on ultrasound remained relatively stable during each data collection phase, the number of exams with follow-up recommended decreased significantly following Intervention 2

Figure 2: Percent of adnexal lesions described as physiologic or benign in the radiology report compared to percent of lesions with follow-up recommended



Following the implementation of educational intervention and SRU guidelines (Intervention 2), there was an increase in adnexal lesions described as physiologic or benign and corresponding decrease in adnexal lesions with follow-up recommended

Conclusions

- Through implementation of SRU consensus guidelines with radiologist buy-in, and radiologist and sonographer education, we reduced unnecessary follow-up imaging at VMMC and increased confidence in characterizing certain lesions as physiologic or benign

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Conclusions

- Lessons learned:
  - Acceptance of a consensus guideline was important for consistent reporting
  - Guidelines created by an expert consensus committee added more credibility of reference
  - Image-rich charts served as invaluable examples for radiologist reporting
  - Posting of guidelines at point of use in the reading room and workstation desktop was helpful
  - Successful implementation required active engagement of radiology attendings, residents, and sonographers

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Conclusions

- Elimination of some unnecessary imaging is under the control of the radiologist through the reporting of radiologic findings and recommendations made

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Conclusions

- We reduced variability through acceptance of a standard process of reporting in ultrasound studies
- Additionally, we hope to have reduced unnecessary patient anxiety, work-up, and cost

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