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Quality Initiative Project assessing the impact of TIRADS on net number of thyroid biopsies and adherence of TIRADS-reporting by radiologists

Tetyana Maniuk BSc,
Ania Kielar MD, FRCPC
Joseph O'Sullivan MD, FRCPC
Michael Odell MD, FRCS

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Disclosures

- Dr. Kielar receives grants from General Electric for MRI research
- Dr. Kielar is the chair of the research and educational abstracts committee
- No other disclosures

- Level of training: 3rd year Medical student
- Principal location of audit: University based practice

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Outline

1. The background
2. What we did
3. How we did it
4. Findings and outcomes

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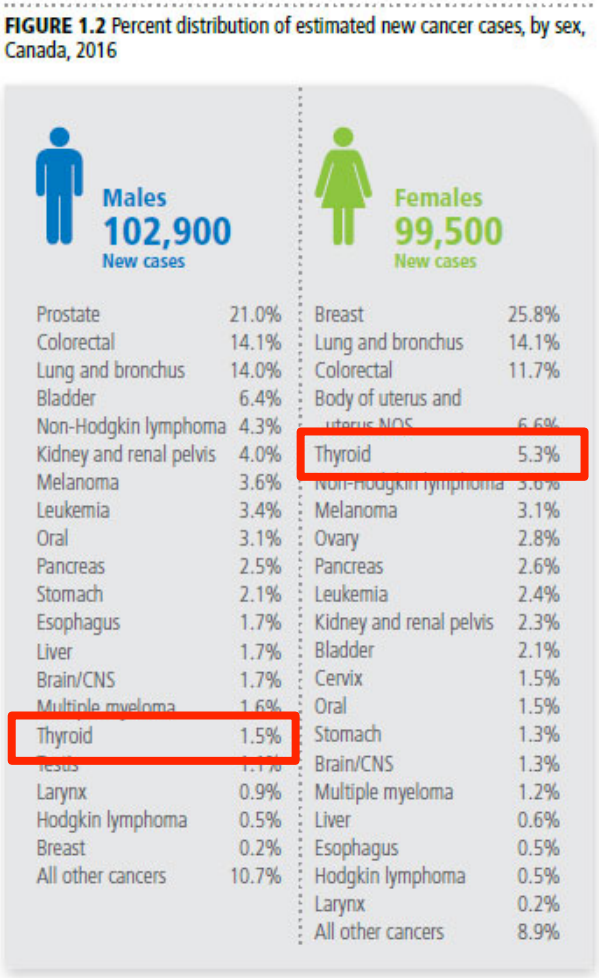
Background of the audit

- High prevalence of thyroid nodules in the general population
- 5-15% of these will be malignant
- 2.4x increase in thyroid cancer detection in the past 30 years

FIGURE 1.2 Percent distribution of estimated new cancer cases, by sex, Canada, 2016



Males 102,900 New cases		Females 99,500 New cases	
Prostate	21.0%	Breast	25.8%
Colorectal	14.1%	Lung and bronchus	14.1%
Lung and bronchus	14.0%	Colorectal	11.7%
Bladder	6.4%	Body of uterus and uterus NOS	6.6%
Non-Hodgkin lymphoma	4.3%	Thyroid	5.3%
Kidney and renal pelvis	4.0%	Non-Hodgkin lymphoma	3.6%
Melanoma	3.6%	Melanoma	3.1%
Leukemia	3.4%	Ovary	2.8%
Oral	3.1%	Pancreas	2.6%
Pancreas	2.5%	Leukemia	2.4%
Stomach	2.1%	Kidney and renal pelvis	2.3%
Esophagus	1.7%	Bladder	2.1%
Liver	1.7%	Cervix	1.5%
Brain/CNS	1.7%	Oral	1.5%
Multiple myeloma	1.6%	Stomach	1.3%
Thyroid	1.5%	Brain/CNS	1.3%
Testis	1.1%	Multiple myeloma	1.2%
Larynx	0.9%	Liver	0.6%
Hodgkin lymphoma	0.5%	Esophagus	0.5%
Breast	0.2%	Hodgkin lymphoma	0.5%
All other cancers	10.7%	Larynx	0.2%
		All other cancers	8.9%

CNS=central nervous system, NOS=not otherwise specified

Note: The complete definition of the specific cancers listed here can be found in Table A8.

Analysis by: Surveillance and Epidemiology Division, CCDP, Public Health Agency of Canada
Data sources: Canadian Cancer Registry and National Cancer Incidence Reporting System databases at Statistics Canada

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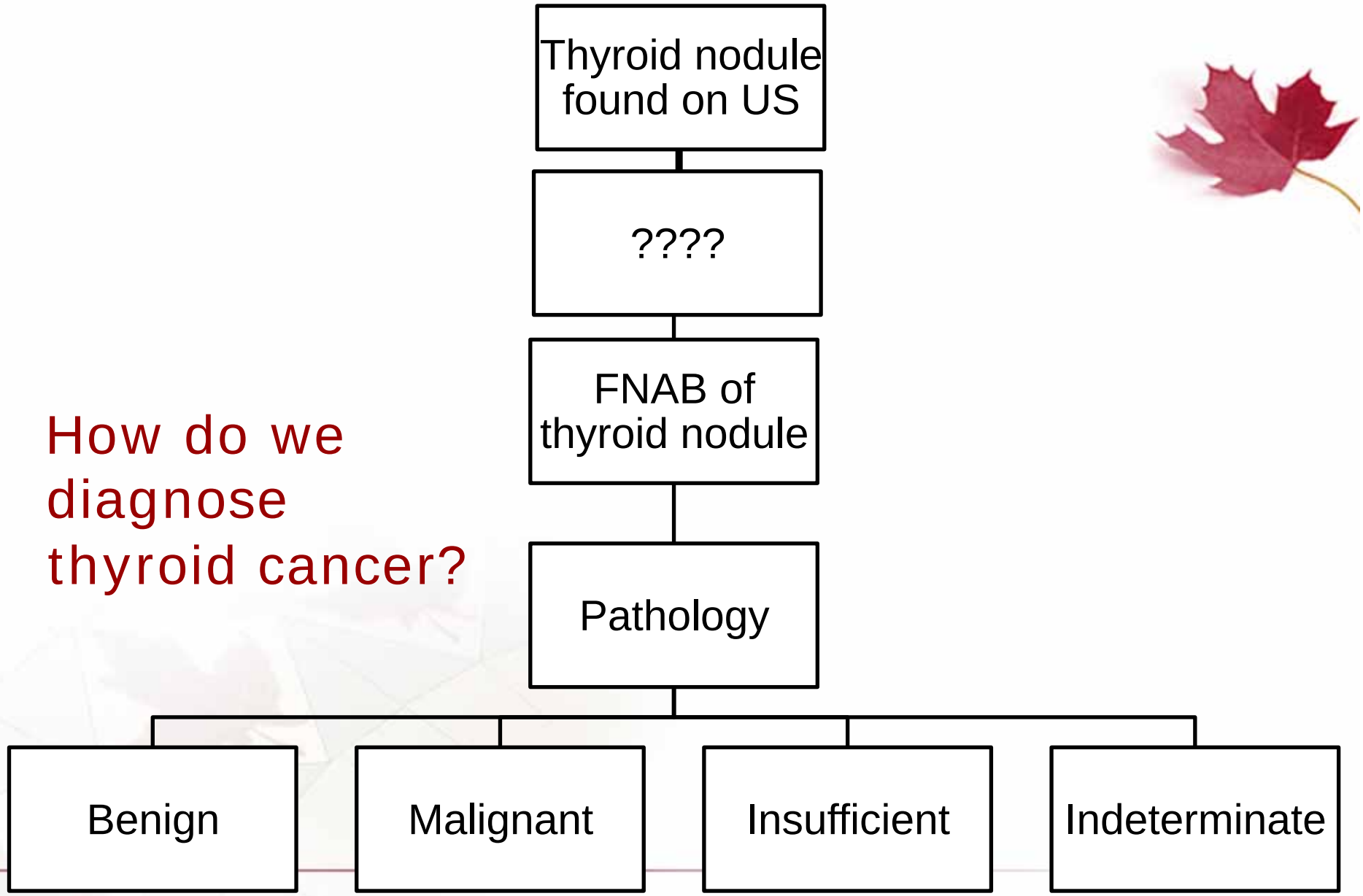
The good news

- Likely due to better ultrasound technology, we are better at detecting small, occult tumors

The ?bad news

- The five-year mortality for thyroid cancer has been stable at around 5% for women, and 7% for men since 2005

How do we diagnose thyroid cancer?



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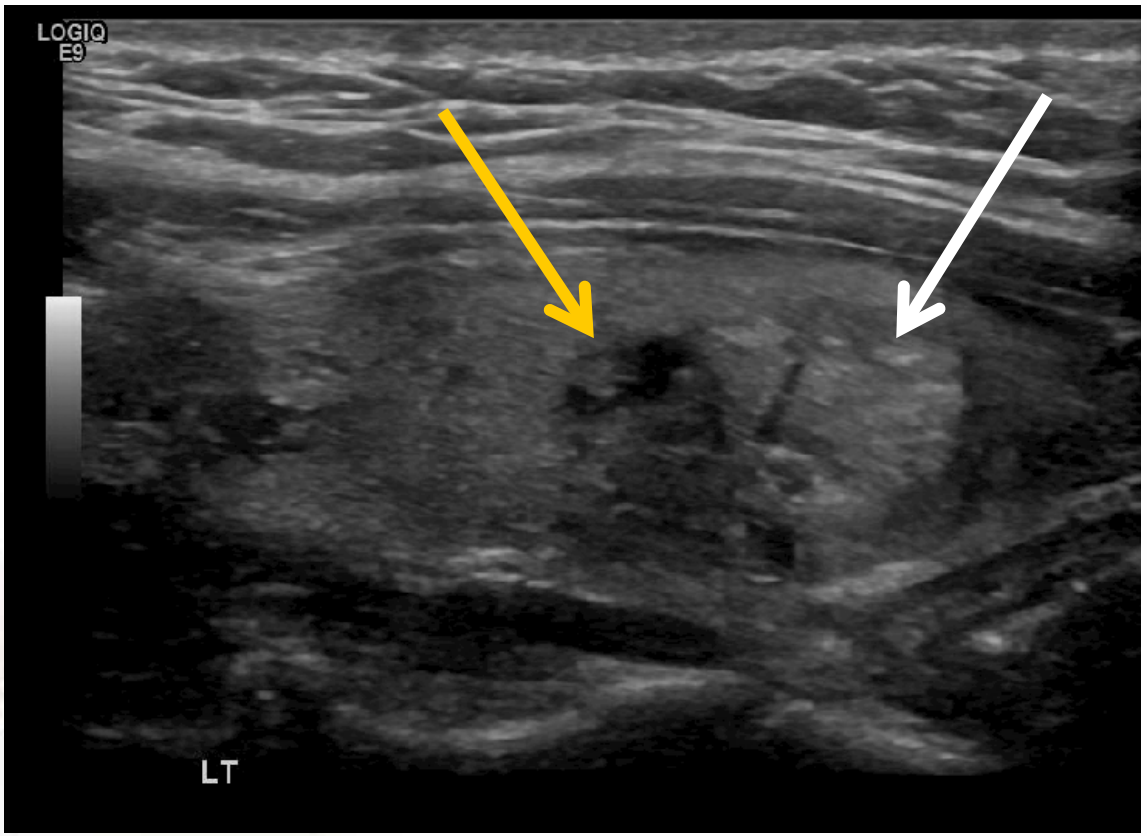
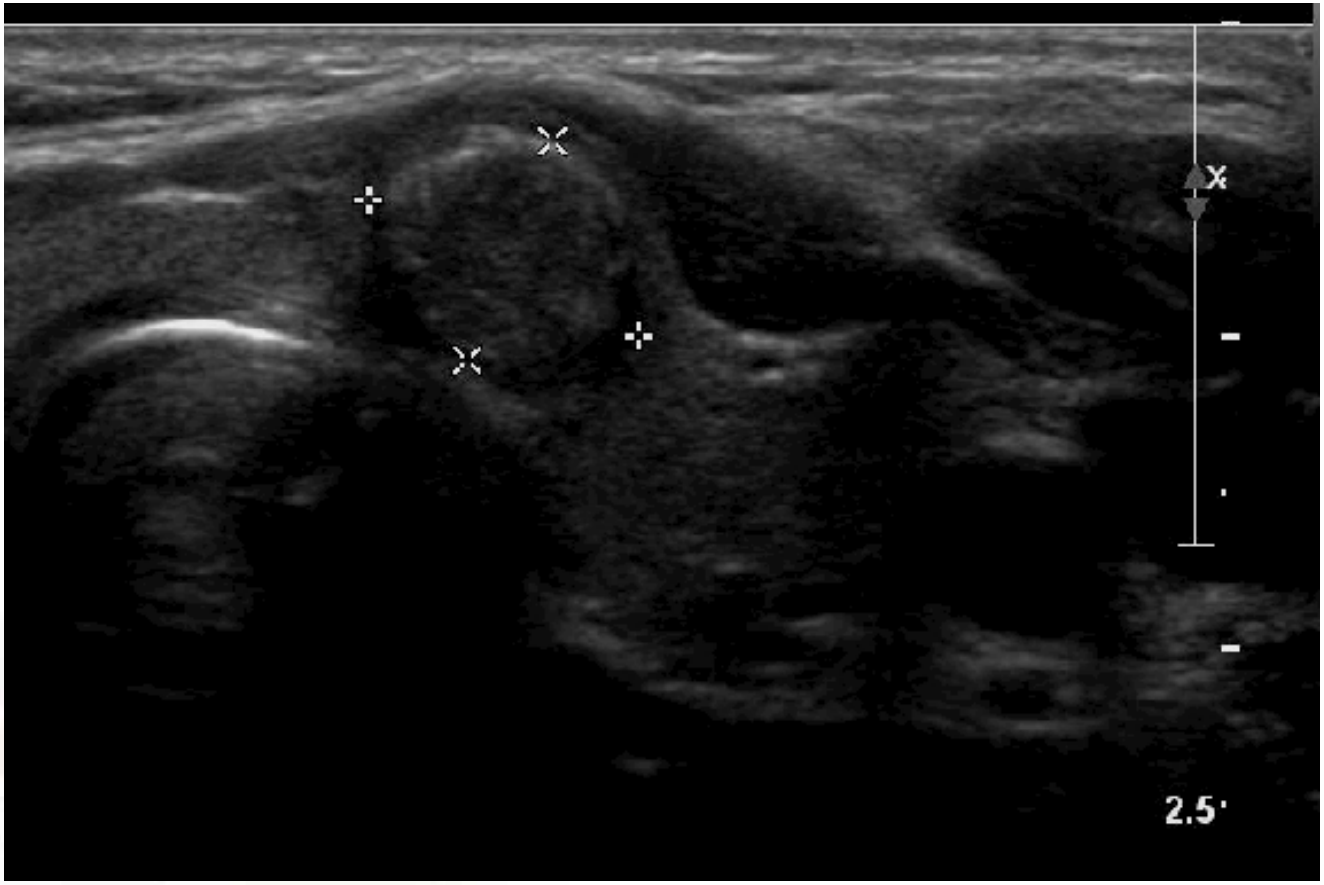
Should this one be biopsied? Which part?



Or this one?



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Which nodule do we worry about?

- Similar to BIRADS, TIRADS was created to help with this problem by Kwak et al, in 2011

- TIRADS outlines a set of 5 characteristics which stratifies nodules into separate categories of risk of malignancy

- Currently, many versions in the literature

Description	TI-RADS classification		Number of suspicious characteristics *	Size requirement (mm)	Management at TOH	Risk of malignancy (%)
Normal thyroid gland	1		0	-------	None	-------
Benign lesion	2		0	-------	None	0
Probably benign lesion	3		0	-------	None	<5
Suspicious lesion	4	A	1	>10	Follow-up	5-10
		B*	2 (solid and hypoechoic to thyroid parenchyma)	>15	FNA	No specific data (around 10%)
		B	2 (solid and any other one "suspicious" feature)	>10	FNA	10-80
		C	3 or 4	>10	FNA	10-80
		F	>1	<10	Follow-up	No specific data
Probably malignant lesion	5		5		Total or partial thyroidectomy	>80

An outline of TI-RADS classification (as per Kwak et al), management of nodules as per class at The Ottawa Hospital (TOH) and the risk of malignancy per TI-RADS class.
Note, TOH has added in a classification of 4F and 4B which does not exist in the original TI-RADS.

Our aim

- Reduce the net number of thyroid biopsies
- Get a near 100% adherence rate by radiologists

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WHAT WE DID / METHODS

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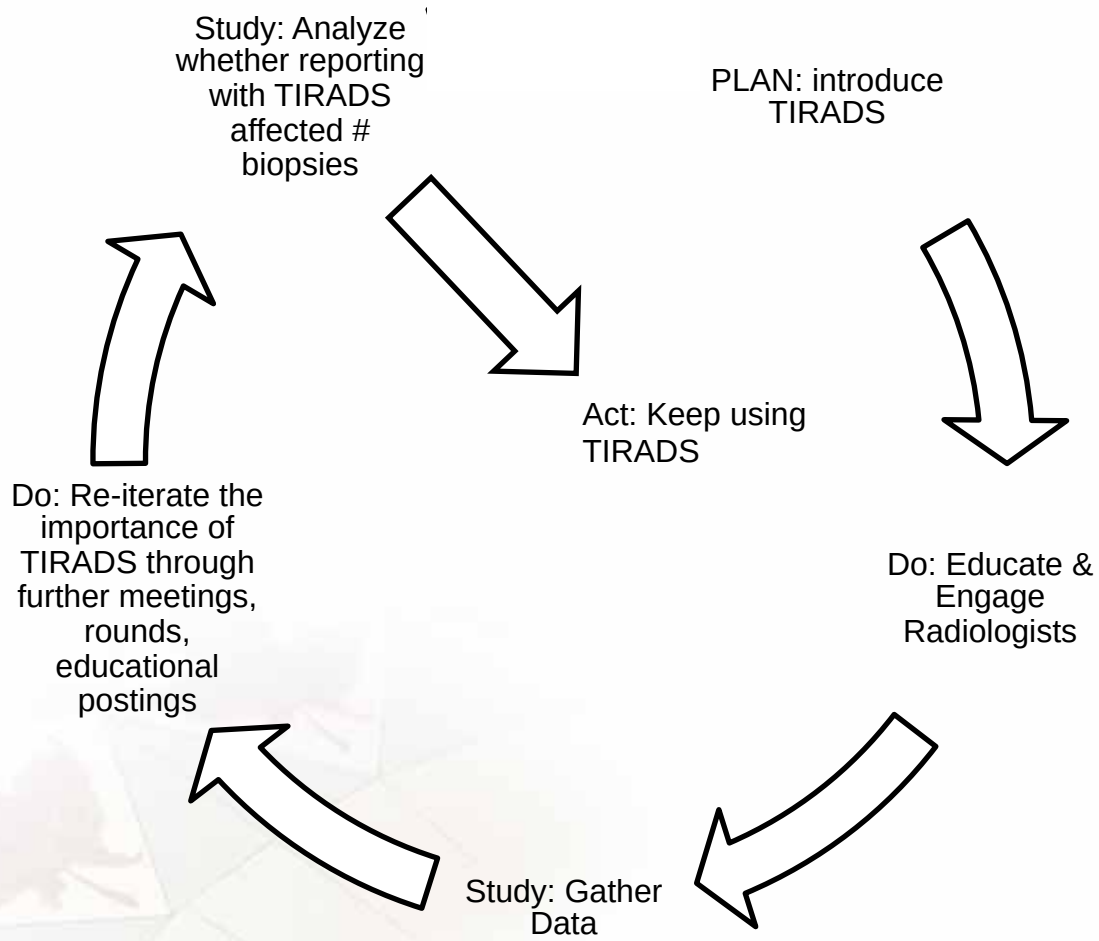

Study: Analyze whether reporting with TIRADS affected # biopsies
PLAN: introduce TIRADS
Act: Keep using TIRADS
Do: Educate & Engage Radiologists
Study: Gather Data
Do: Re-iterate the importance of TIRADS through further meetings, rounds, educational postings

Introduce TIRADS

- Rounds and meetings were held around the education of TIRADS
  - Separate ones for radiologists, residents/fellows and technologists
- An atlas was made detailing every TIRADS characteristic and distributed amongst the department
- Radiologists received personal reports and updates on their adherence to TIRADS

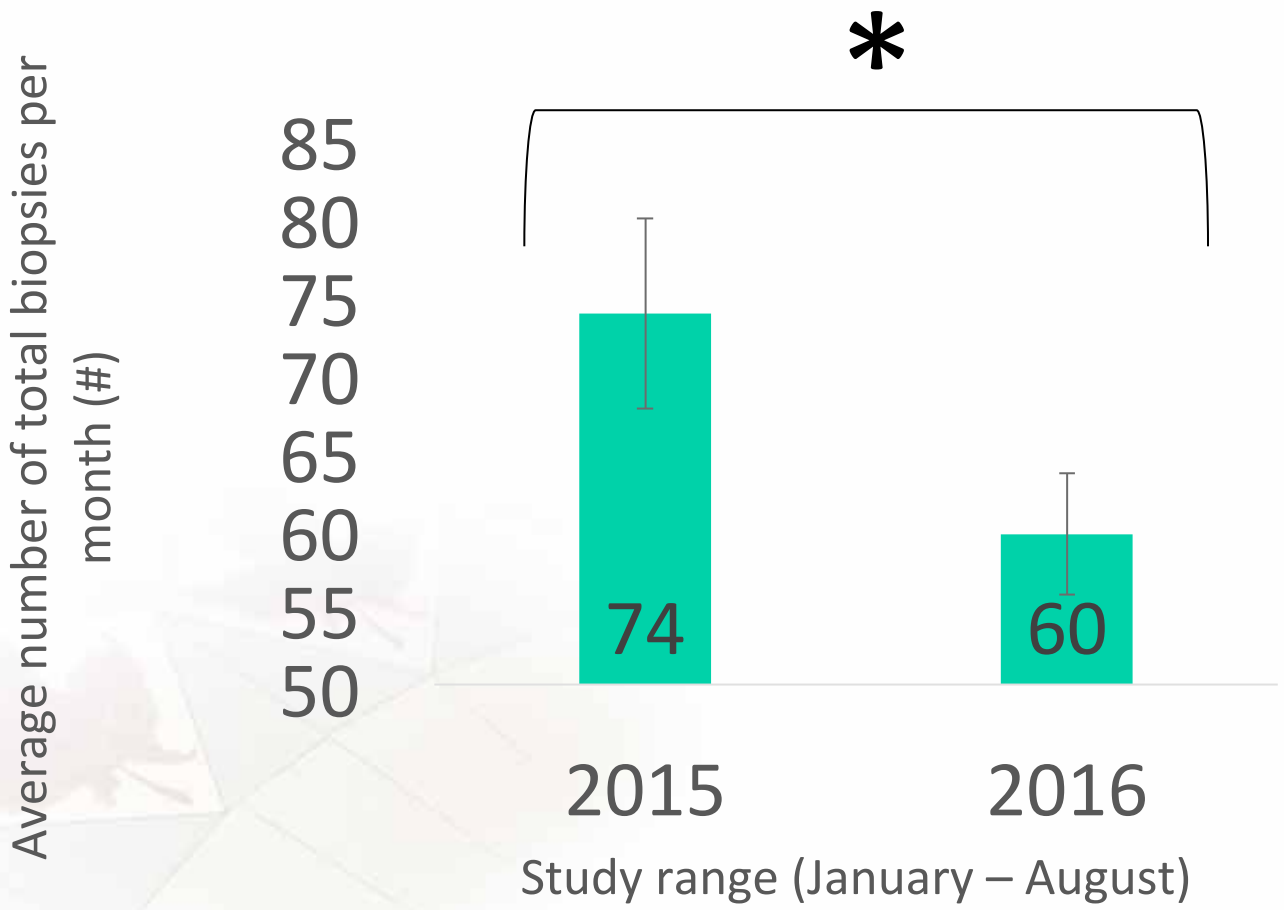
Get a data-gatherer

- That's me!
- Data was gathered about radiological and pathological results of every single thyroid FNA done for two distinct time periods: before and after TIRADS implementation
- As well, they will keep tabs on how often TIRADS was being used per month in diagnostic imaging reports
- Biopsies: 1063
- Hours involved: 350
- Time period:
  - January – August 2015 vs January – August 2016

Results: Adherence to TIRADS

- We evaluated adherence rate of radiologists to TIRADS
- Adherence:
  - January 2016 11%
  - April 2016 72%
  - August 2016 86%

Results: net number of biopsies



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In summary: How TIRADS benefited our institution

- Provided an objective and standardized decision making tool
- Cut down the net number of biopsies per month
- Cut down wait times for thyroid biopsies

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Weaknesses

- The agreement rate between radiologists was not assessed
- Some biopsies done based on CT or PET (no ultrasound follow up)
- 36% insufficient / indeterminant

Future steps

- Integration of other guidelines (e.g., ATA) that focus on clinical aspects of thyroid cancer detection (e.g., family history, radiation exposure) rather than solely on radiological findings
- Can look into the insufficient rates of thyroid biopsies and address these with further training
- Continue working with multi-disciplinary community of practice members
- TIRADS makes for easier data mining in the future

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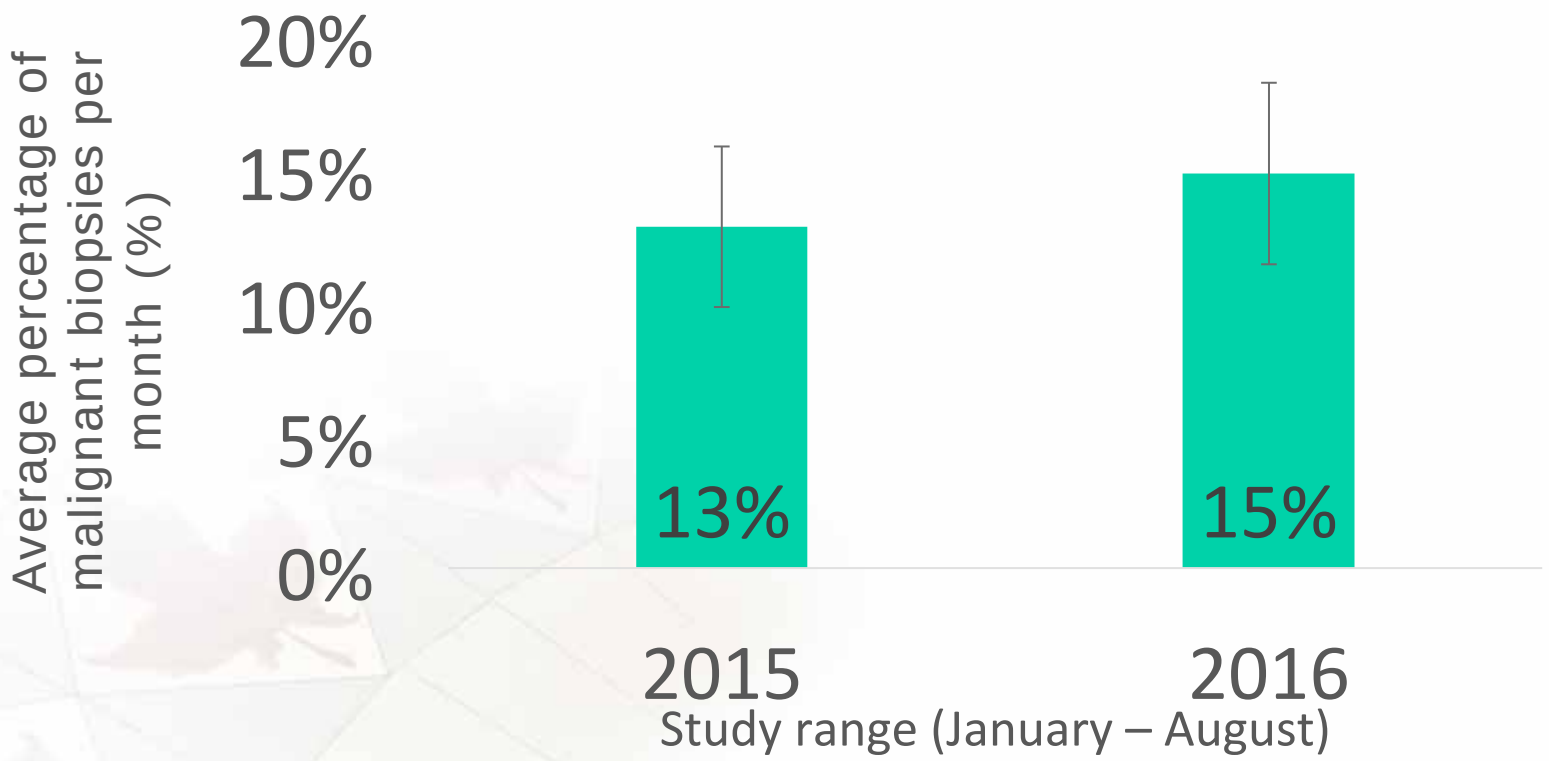
(could be technique related, not big enough sample size etc)



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How many would we have missed?

- In 2015, we would have missed ~1 malignant nodule / month if we had used TIRADS
  - Studies indicate that ~50% of thyroid cancer will remain indolent for the duration of a patients life

TIRADS characteristics

- SOLID
- HYPOECHOIC
- MICROLUBULATED MARGINS
- TALLER THAN WIDE
- MICROCALCIFICATIONS

Plan: Introduce TIRADS

Do: Educate & Engage Radiologists

Divisional meetings, Departmental Grand rounds and email reminders

Study: Gather Data

Compare 2 distinct time periods: before and after TIRADS implementation

Do: Re-iterate the importance of TIRADS through further meetings, rounds, educational postings

Study: Analyze whether reporting with TIRADS affected # biopsies

Act: … continue using TIRADS standardized reporting