Clinical audit of thyroid biopsy adequacy

Michael Kozoriz, D. Keer, P. Tiwari and P. Vos.
St. Paul's Hospital, Department of Radiology, Vancouver, BC
University of British Columbia Department of Radiology

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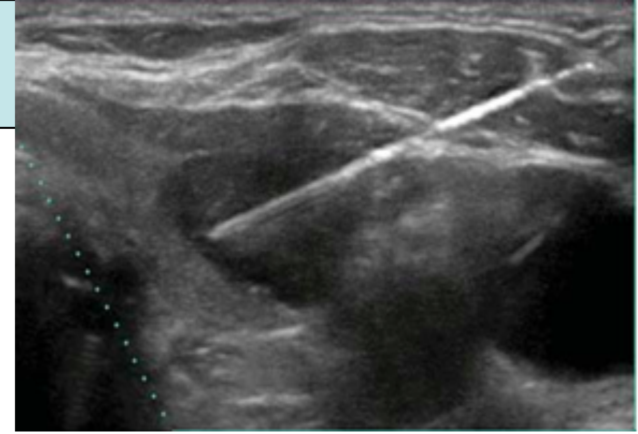
Conflict of interest statement:

- No disclosures

Introduction:



- Thyroid nodule prevalence ~4–8%

- Fine Needle Aspiration (FNA) cytology is the principal method for diagnosis.

- Superior to clinical, radionucleotide or thyroid US alone.

- FNA can be performed freehand or under US guidance.

- The Bethesda system is used to classify thyroid cytology.

Thyroid cytology classification:

The Bethesda System for Reporting Thyroid Cytopathology: Recommended Diagnostic Categories*

I. Nondiagnostic or Unsatisfactory
- Cyst fluid only
- Virtually acellular specimen
- Other (obscuring blood, clotting artifact, etc)

II. Benign
- Consistent with a benign follicular nodule (includes adenomatoid nodule, colloid nodule, etc)
- Consistent with lymphocytic (Hashimoto) thyroiditis in the proper clinical context
- Consistent with granulomatous (subacute) thyroiditis
- Other

III. Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance

IV. Follicular Neoplasm or Suspicious for a Follicular Neoplasm
- Specify if Hürthle cell (oncocytic) type

V. Suspicious for Malignancy
- Suspicious for papillary carcinoma
- Suspicious for medullary carcinoma
- Suspicious for metastatic carcinoma
- Suspicious for lymphoma
- Other

VI. Malignant
- Papillary thyroid carcinoma
- Poorly differentiated carcinoma
- Medullary thyroid carcinoma
- Undifferentiated (anaplastic) carcinoma
- Squamous cell carcinoma
- Carcinoma with mixed features (specify)
- Metastatic carcinoma
- Non-Hodgkin lymphoma
- Other

Cibas, ES and Ali, SZ. *American Journal of Clinical Pathology* (2009) 132, 658-665.

The problem: Inadequate thyroid biopsy.

<u>Non-diagnostic and unsatisfactory reports:</u>

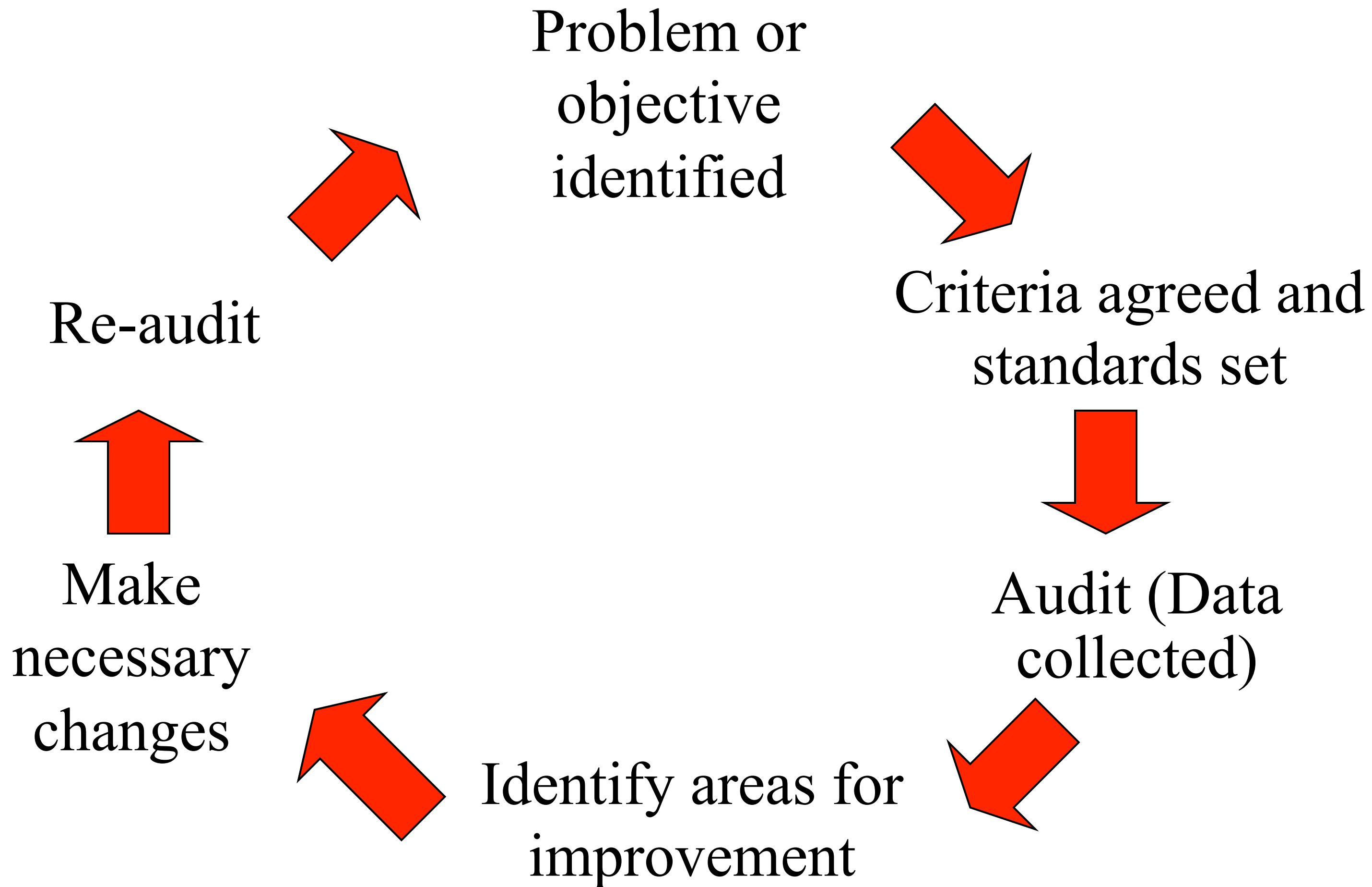
- Frustration for referring clinician, patient, radiologist and pathologist.

- Added costs to health care system for repeat testing.

- Strain on radiology department resources.

- Patient anxiety.

The audit cycle:



The standards: literature review

Diagnostic category	Nayar and Ivanovic [9]	Theoharis et al. [10]	Marchevsky et al. [11]	Jo et al. [12]	Renshaw [13]	Luu et al. [14] (C+TP)	Luu et al. [14] (TP)	Range	Mean ± SD
UNS/ND	5	11.1	12.9	18.6	24	8.7	8.2	5–24	12.6 ± 6.1
Benign	64	73.8	71.6	59	54	71.1	77.4	54–77.4	67.3 ± 7.9
AUS/FLUS	18	3.0	9.8	3.4	8[a]	3.8	0.7	0.7–18	6.7 ± 5.5
FN/SFN	6	5.5	1.5	9.7	9	9.2	6.5	1.5–9.7	6.8 ± 2.7
SFM	2	1.3	2.3	2.3	2	2.9	4.4	1.3–4.4	2.5 ± 0.9
Malignant	5	5.2	2.0	7	4	4.4	2.7	2–7	4.3 ± 1.5

Values are expressed as percentages. C+TP = FNA specimens processed by conventional smears and ThinPrep; TP = FNA specimens processed by ThinPrep only.

[a] Correct value reported in erratum published in Cancer Cytopathol 2010;118:303.

The standard inadequacy rate ~13%

Ohori NP, Schoedel KE. *Acta Cytol 2011;55:492–8.*

Audit: Pre-intervention results

All thyroid FNA preformed at SPH from Jan 2012 to March 2012 (n = 178).

	Samples	**Percent**
Non-diagnostic/unsatisfactory	57	32%
Satisfactory	121	68%
Total	178	100%

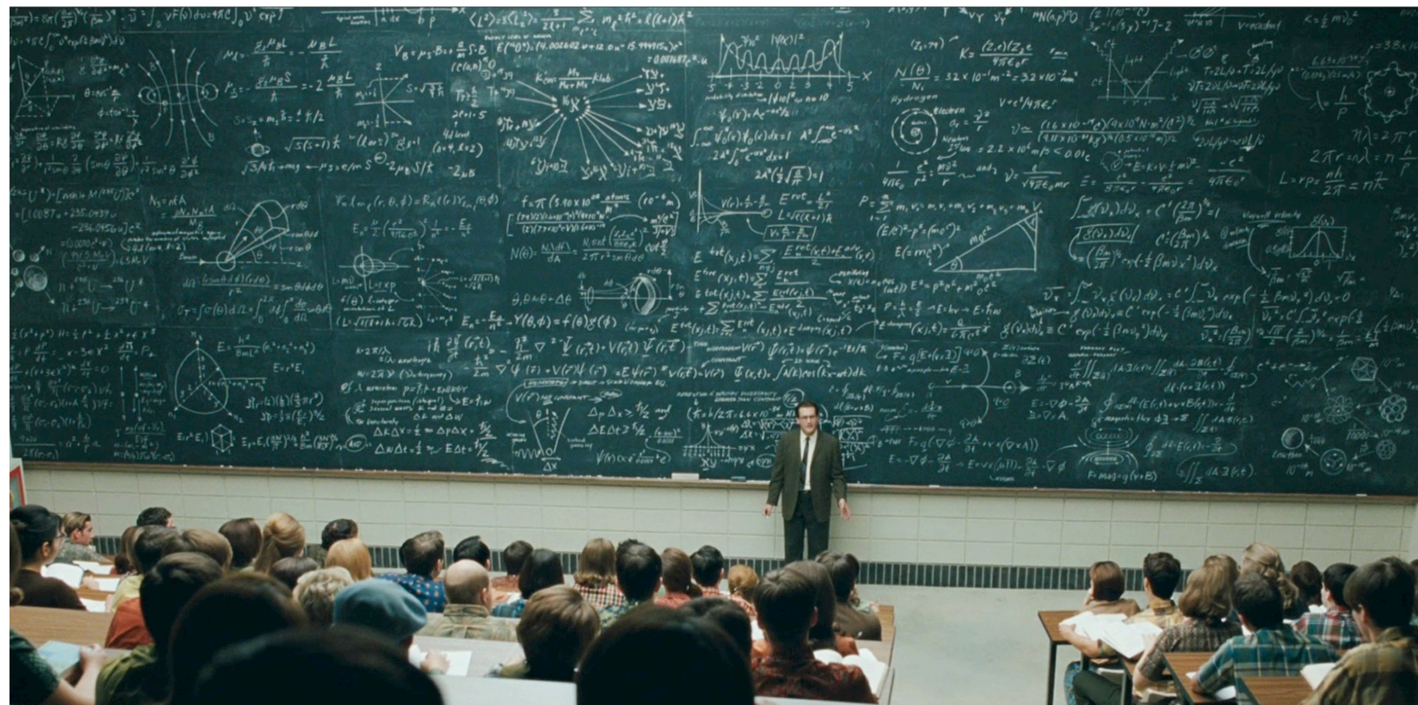
The standard ~13%

Problem analysis:

Different Radiologists*
- Experience
- Nodule selection
- Sampling techniques
- Volume aspirated

Different Pathologists*
- Sample interpretation
- Bethesda terminology

Sample processing
- Needle selection
- Solutions/fixatives
- Cytology technician present*
- Timing



Implemented change: May-June 2013

Sample processing:

- Change from Normosol buffer to Cytolyt fixative.

Communication from the radiologist to pathologist:

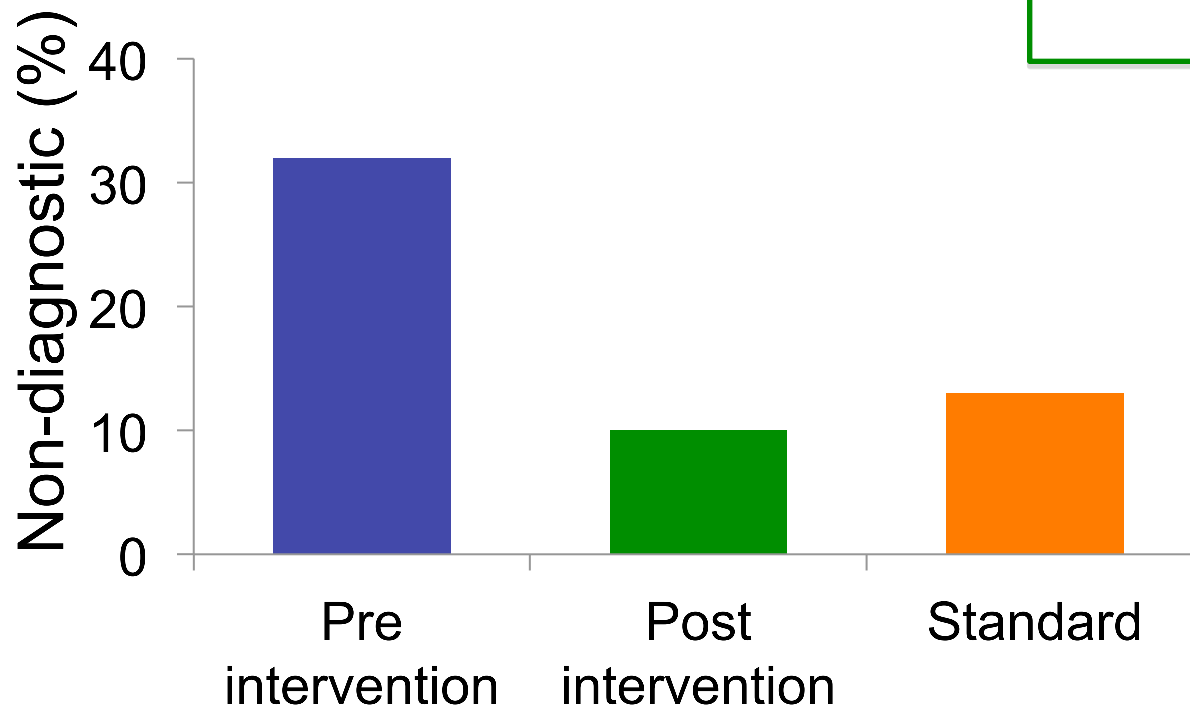
- The pathologist is informed if the aspirated sample is from a sonographically benign cyst.

Change in pathology report language for cysts:

- Reported as "cyst fluid only, no evidence of thyroid malignancy" rather than "inadequate or unsatisfactory"

Re-Audit: Pre vs post intervention

	PRE	POST (samples)
Non-diagnostic/unsatisfactory	32%	10% (10)
Satisfactory	68%	90% (94)
Total	100%	100% (104)



Recommendations:

- Collaborate with pathology.

- Optimize buffer/fixative selection.

- Develop a standard protocol to alert the pathologist when cyst fluid has been aspirated.

- For cysts, report to the referring clinician "cyst fluid only, no evidence of thyroid malignancy".

Problem areas: resistance to deviating from the Bethesda system, slightly increased cost of Cytolyt.

Conclusion and future directions:

- With our interventions we decreased the "non-diagnostic and unsatisfactory" sample rate from 32% to 10%.

- Potential positive impact on clinicians and patients.

- Further cycles: needle selection, nodule selection, specific training, cytology tech present ……………………………

References:

Cibas, ES and Ali, SZ. The Bethesda System for Reporting Thyroid Cytopathology. *American Journal of Clinical Pathology* (2009) 132, 658-665.

Ohori NP, Schoedel KE*. Variability in the atypia of undetermined significance/ follicular lesion of undetermined significance diagnosis in the Bethesda system for reporting thyroid cytopathology: sources and recommendations. Acta Cytol 2011;55:492–8.*

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