

Northern Ireland ACB Regional Audit Group:

Mark Lynch WHSCT

NI Audit Group

NI TFT Audit

National TFT Audit

All Ireland TFT Audit

Northern Ireland ACB Regional Audit Group:

- **Formed in 2002 from Regional Audit Group in Chemical Pathology**
- **Meets 2x per year**
- **BMS / Chemical Pathologists / Clinical Biochemists / Guests**
- **ACBI Observer – Olwyn Lanigan**
- **Chairperson – Liz McClean**
- **Secretary – Kirsty Spence**
- **Chairperson attends national ACB Audit group committee meetings**

Northern Ireland ACB Regional Audit Group:

Audit Standards:

National Guidelines

Sweat Testing, CSF Spectroscopy, Thyroid Function Tests, Toxicology, Iron overload (BHS, BC), Bilirubin, Pleural Fluid (BTS), Telephone limits, Tumour Markers (ACBI)

Other ACB audit groups

Wales / Thames

Recent published reviews – Regional standards

GI testing, Urine myoglobin, CRP, Porphyrin screening, Cryoglobulin testing

Response to Clinical Incidents

POCT pregnancy testing

Surveys of current best practice (lab harmonisation)

Bile acids, Faecal reducing substances, Preanalytics, Serum indices, Hypopacks

Cryoglobulin Audit Process:

Two published review papers

Discussion at regional meeting

Survey of current practice / Guidelines?

Formation of Standards Subcommittee

**Draft guidelines / Recommended
procedures for cryoglobulin sample
collection and processing**

----- Expert opinion

Audit against regional standards

Audit report – Website / Poster at National Meeting

Reaudit

Northern Ireland ACB Regional Audit Group:

Future Role??

New NI Pathology Network

**To report (via chair) to the Core Clinical Biochemistry
Specialist Network Team within the network**

Clinical outcome audits?

Cost Benefit?

Demand management?

Harmonisation / Test Rationalisation

Audit of TFTs in NI Labs:

- Reason:** To ascertain compliance with ACB, BTA and BTF *UK Guidelines for the Use of Thyroid Function Tests* (<http://www.acb.org.uk/site/guidelines.asp>) July 2006
- Methodology:** Detailed questionnaire enquired about current practice and those UK guidelines deemed directly relevant to labs. Colleagues were invited to comment on guidelines. Formal meeting held to discuss issues (Oct 2006).
- Sample Size:** 6 returns (all 11 labs offering TFTs in NI)
- Results / Discussion:**
- a) Guidelines not just for labs – CREST (GAIN).
 - b) 400,000 FT4 and TSH per year. 1 area FT3, Regional Endo lab TT3.
 - c) 1 lab had formal procedures for excluding retesting within 14 days.
 - d) 1 lab had TSH only as front line test.

Results / Discussion cont:

- e) 1 lab had specific TPO antibody reflex rules.**
- f) 1 area had age related reference ranges in place.**
- g) 1 area had formal trimester related ref ranges in use.**
- h) 1 lab had formally validated functional sensitivity. No labs regularly validated functional sensitivity.**
- i) 1 lab reported on free assay dilution studies**
 - No labs had equilibrium dialysis study data**
 - Sample storage - no data on stability of FT4 in whole blood at RT**
 - Reference ranges - only 2 labs quoted the same ranges**
 - manufacturer / consensus / in house /**
 - historical comparisons / combination**
 - 3 labs ran only 2 levels of IQC – no. ranged from 3 to ~10 per day**
- j) All labs had protocols for follow up of unusual results**

Practice Recommendations were agreed:

- 1) Labs to review their own practice.**
- 2) Frontline testing: TSH only OK, Cost impact?**
- 3) Reflex rules for auto-antibody testing**
- 4) Repeat testing: Clinician education.**
- 5) Age / Trimester related reference ranges.**
- 6) Functional sensitivity: Too impractical – manufacturers / EQA.
IQC / EQA / patient result validation sufficient.**
- 7) How free assay behaves when diluted: Pilot studies for own info**
- 8) Equilibrium dialysis comparison: ??if available - National approach required?**

Practice Recommendations cont:

9) Sample Stability: Unseparated RT studies required.

10) Reference ranges: National initiative. Sites with same assay should have the same reference interval.

11) Number of IQC pools: 3 levels for both TSH and FT4.

12) Follow up of unusual test results: Written SOPs for:

Referral for analysis on different analytical platforms

Dilution protocols for FT4 and TSH / PEG ppt / Recording the frequency and outcome

Regional Endocrine Laboratory to be responsible for HAMA tube protocols.

REAUDIT - ONGOING

Thyroid Function Testing in the UK: Results of a National Audit On Laboratory Practice

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INTRODUCTION

- ‘The UK Guidelines for the Use of Thyroid Function Tests’ were published in 2006.
 - collaboration between the ACB, the British Thyroid Association and the British Thyroid Foundation
- To ‘encourage a greater understanding of thyroid function testing... with a view to the widespread adoption of harmonised good practice’
 - to provide a basis for local and National Audit.
- audit was to determine the degree to which Clinical Biochemistry Laboratories in the United Kingdom are following the recommendations in the guidelines
 - with regard to section 7 of ‘ Laboratory aspects of thyroid function testing’.
- second survey, on the more clinical aspects of the guidelines is in preparation.

METHOD

- survey used an on-line form sited on the website of Birmingham Quality
- divided into 6 sections
 - accompanied by a guide to its completion
- designed with most answers as multiple choice check boxes or single option radio buttons
 - option for free text entry for some questions
- Invitations to participate in the survey
 - issued via the National Audit Group and its representatives
 - and the ACB mailbase that gave a link to the survey on the Birmingham Quality website.
- structured so that the responses could be downloaded directly to a spreadsheet without the need for further transcription.

RESULTS

74 completed questionnaires once duplicate responses were removed

SECTION A. Analytical measurement

Relevant guideline paragraphs: 7.4 and 7.5

SECTION B. Assay performance criteria

Relevant guidelines paragraphs: 7.3.1, 7.6.2, 7.6.1

SECTION C. Interpretative comments and interpretation

Relevant guideline paragraphs: 7.6.2 (in part) and 7.7.2g

SECTION D. Drug interference in assays

Relevant guideline paragraph: 7.7.2 h

SECTION E. Unusual thyroid function test results

Relevant Guideline paragraph: 7.8

SECTIONS F. Causes of thyroid dysfunction

Relevant Guideline paragraph: 7.9.1

SECTION A. Analytical measurement

Question 1

Relevant guideline paragraph: 7.4

a) Please indicate all the tests that you use for 'first-line' thyroid function testing

TSH only = 40 (54.1%)

TSH + fT4 = 34 (45.9%)

SECTION A. Analytical measurement

Question 2

2a) When do you use fT3 measurements?

low TSH	3	supp TSH + validator	2
suppressed TSH	3	validator + other	6
raised fT4	0	low TSH + validator	1
discretion of clinical validator	17	low TSH + validator + other	2
other	4	low + Supp TSH + validator	8
low TSH + other	2	low + Suppressed + validator + other	5
low + supp TSH	2	low + supp TSH + raised fT4 + other	1
low + supp TSH + other	2	Supp TSH + validator + other	4
supp TSH + validator	4	All 4	1
supp TSH other	1	All 4 + other	4
supp TSH + raised fT4	2		

SECTION A. Analytical measurement

Question 2

Q2 b/c State the TSH / fT4 level that triggers a fT3 request

No two laboratories gave the same responses for these questions,

- **4/74 use total T3,**
- **11/74 have no TSH based trigger**
- **21/74 no fT4 based one.**

Of those that did quote a TSH trigger

- **a result <0.01 mU/L was the commonest**
- **range was <0.01 to <0.4.**

Comments indicated a variety of non automatic triggers for fT3

- previous results,
- clinical history
- discretion of the clinical validator

SECTION A. Analytical measurement

Question 3

Relevant guideline paragraphs: 7.5

Q3a-c Are your TSH fT4 & fT3 reference ranges age related?

Q3d Do you have pregnancy reference ranges?

	TSH	fT4	fT3	Pregnancy
	Number (%)	Number (%)	Number (%)	Number (%)
Front line TSH	13 (32.5)	10 (25.0)	9 (22.5)	5 (12.5)
Front line TSH + fT4	10 (29.4)	12 (35.3)	6 (17.6)	12 (35.3)
Total	23 (31.1)	22 (29.7)	15 (20.3)	17 (30.0)

Guidelines recommend ranges are confirmed on local population and that labs have trimester related ranges available for use in pregnancy

- only one reply stated that ranges had been locally confirmed
- poor overall take-up of the recommendation for pregnancy related ranges

SECTION B. Assay performance criteria

Question 4

Q4a State the method you use for TSH

Abbott Architect	16	others	
Beckman Access	3	Roche E170	1
Roche Elecsys/Modular	20	Olympus AU 300i	1
Siemens Centaur	22	Roche COBAS 601	1
Siemens Immulite 2000/2500	9	TOSOH A1A	1

SECTION B. Assay performance criteria

Guideline paragraph 7.3.1 contains

- a good practice point that recommends local validation and regular monitoring of the manufacturers' data on functional sensitivity

Apparent compliance with this good practice point = 11/74 or 14.9%

- a recommendation that TSH methods should have a functional sensitivity of <0.02mU/L

Apparent compliance with this recommendation = 58/74 or 78.4%

SECTION B. Assay performance criteria

Questions 5 & 6

Q5 How often during a 24 hour period are internal QC samples run?

Recommendation is that the *minimum* frequency for IQC should be

- that recommended by the manufacturer
- at three clinically significant levels for each analyte.

Large variation in schedules

- responses with no clarification as to analyte levels, from
 - a simple 'daily' or 'once' (commonest response 26/74) to '4 hourly'
- responses indicating all three levels run several times per day

Breakdown by manufacturer shows no commonality between users

Q6 State minimum acceptance criteria and their source

Varied responses and comments

- majority state 'westgard' or 'within 2SDs'
- all replied that they routinely met the acceptance criteria
 - **100% compliance**

SECTION C. Interpretative comments and interpretation

Question 7

What grades of staff have responsibility for final (clinical) authorisation of thyroid function test results?

The guideline recommends that where interpretative comments are appended this should be done by an MRCPATH (would now be FRCPath) or someone under the supervision of such a person

- those responsible for *technical* validation have been included in many replies ?
- replies containing all options from BMS 6 to Consultant Clinical Scientists and Chemical Pathologists
- 3 responses only included the BMS 6s and 7s (one gave only a BMS 6)
implies a **non-compliance rate of 4.1%**

SECTION C. Interpretative comments and interpretation

Question 8

Do you generate significant numbers of repeat tests from borderline results?

Yes = 26/74 (35.1%)

No = 48/74 (64.9%)

Please give examples

- marginally raised TSH with a 'normal' fT4
- 'sub-clinical' disease

SECTION C. Interpretative comments and interpretation

Question 9

Relevant guideline paragraph: 7.7.2 g

How often do you encounter, due to non-thyroidal illness,

Q9a – partial suppression of TSH secretion (serum TSH <0.1 mU/L)?

Q9b – increased TSH in patients from acute wards or casualty ?

Table 6 Effects on TSH of non-thyroidal illness						
		Rarely	Sometimes	Frequently	Often	
TSH partially suppressed		27 (36.5)	41 (55.4%)	6 (8.1%)	0	
TSH increased		28 (37.8%)	41 (55.4%)	5 (6.7%)	0	
Estimates of percentage of results affected						
	No reply	no data / question unanswerable	≤ 1%	1.1 - 4.9 %	5.0 - 9.9%	≥ 10%
TSH partially suppressed	27	14	12	9	9	3
TSH increased	28	14	10	3	15	4

SECTION D. Drug interference in assays

Question 10

Relevant guideline paragraph: 7.7.2 h

Do you routinely find any drug interferences

Q10a ...in your assays?

Q10b .. in the absorption and metabolism of thyroid hormones?

	Rarely	Sometimes	Frequently	Often
In assays	62	10	2	0
on absorption and metabolism of thyroid hormones	50	21	3	0

SECTION D. Drug interference in assays

Guideline good practice point

- laboratories must be able to provide appropriate interpretative advice for patients taking drugs known to modify thyroid function tests.

Q10c-e Please name up to three drugs known to modify TFTs and describe the likely effect

- one named - 38/74
 - two named - 29/74
 - three named - 21/74
 - no response - 36/74
- an implied **non-compliance rate of 48.6%**

The most commonly named drugs were:

- amiodarone, 30/74
- lithium 19/74
- anticonvulsants 13/74
- 12 other drugs received at least one mention

SECTION E. Unusual thyroid function test results

Question 12

Relevant Guideline paragraph: 7.8

Does your laboratory have a protocol for
Q12a/b detection of heterophilic antibodies / HAMA,
Q12c) PEG removal of anti-thyroid antibodies,
Q12d) dilution,
Q12e) comparison with an alternative TFT method

A guideline good practice point recommends that laboratories have such protocols available

- minimum standard - comparison with an alternative assay

SECTION E. Unusual thyroid function test results

Table 8 Protocols for unusual thyroid function test results

	Heterophilic antibodies	HAMA	PEG	Dilution	Alternative method	None of these
Number of respondents (%)	39 (52.7)	40 (54.5)	12 (16.2)	33 (44.6)	52 (70.3)	14 (18.9)

These responses indicate a 18.9% non compliance rate

- reduces to 14.9% when those with 'informal' arrangements are excluded

SECTIONS F. Causes of thyroid dysfunction

Relevant Guideline paragraph: 7.9.1

Questions 13 & 14

Q13 Do you measure TPO routinely?

Q14 Do you have methods available for thyroglobulin and calcitonin?

Table 9 Assays available for causes of thyroid dysfunction

	TPO	TPO (in immunology)	Thyroglobulin	Calcitonin
Number of positive responses (%)	26 (35.1)	39 (52.7)	12 (16.2)	6 (8.1)

DISCUSSION

- The number of responses to the survey was a little disappointing
 - may be due to the method of requesting participation.
- Required information not obtained for all questions
 - may have been due to the format and the phrasing of the questions,
- Some respondents found some questions difficult to answer in terms of what was required.
- ? some of the 'non-compliances' may be due to lack of information on the part of the individual respondent
- Compliance with the recommendations of the guidelines not always intentional?
 - ?status of guidelines in individual laboratories

Still no clear consensus in the provision of thyroid function tests, and their reporting and follow up, despite the publication of the guidelines.

All Ireland TFT Audit Feb 2009:

Methodology: Web based, hosted on UK NEQAS site

Sample Size: 15 returns (? %of Irish labs)

Results / Discussion:

a) Frontline: 11 FT4 and TSH / 2 TSH alone / 1 FT4 and FT3

b) Ref ranges 6 age related / 2 pregnancy

Modular 0.27 - 4.2 / 0.4 - 4.0 / 0.4 - 3.8

Centaur 3x 0.35 - 5.5 / 0.3 - 4.0 / 0.5 - 4.7

Immulite 2x 0.4 - 4.0 / 0.2 - 4.0 / 0.1 - 4.0 / 0.15 - 3.2 / 0.1 - 5.0

Tosoh 0.5 - 3.5

c) IQC – 1 per day to 12 per day

Still no clear consensus in the provision of thyroid function tests, and their reporting and follow up, despite the publication of the guidelines.....