## APPENDIX A

## EVIDENCE-BASED BENEFITS
## THYROID FUNCTION TESTING

[Evidence-Based Benefits Thyroid Function Testing [Guidelines].

*SAMJ* 2003; **93**:210]

# Evidence-Based Benefits

## Thyroid Function Testing

Discovery Institute

### Thyroid Function Testing:

Hyper- and hypothyroidism together account for considerable morbidity, with the estimated prevalence of these two disorders being between one and four percent of the adult and adolescent population. Testing for disorders of thyroid function should be performed when there are clinical findings suggestive of thyroid disease and when monitoring the effects of treatment of known thyroid disease. In addition, there are certain circumstances under which there is an increased risk of developing thyroid disease and screening is therefore appropriate. Various test options exist and it is the role of the treating clinician to choose the most clinically appropriate test.

### Issue under Review:

In this article we review the funding of thyroid function tests with specific reference to the appropriateness of batched (single tick box for a group of different thyroid function tests) versus individually selected thyroid function testing.

### Analysis:

Please refer to the evidence-based table on the next page, which evaluates the clinical and financial appropriateness of batched versus individually selected thyroid function tests.

### Clinical Filter:

The evidence indicates that in the diagnostic and monitoring phases of thyroid disease the following guidelines are widely accepted when choosing the most appropriate thyroid testing:

1. Screening for thyroid disease

- Mass screening of the general population is not indicated
- In certain high risk population groups a low threshold for screening is indicated, for example:
  - Women over the age of 60
  - Previous hyperthyroidism
  - Down's syndrome
  - Treatment with certain drugs

  A TSH test is the investigation of choice in these cases and if normal no further testing is indicated for 5 years. An abnormal TSH should be followed by a T4 measure.
- In a subgroup initial testing should consist of a TSH and T4, for example:
  - Sick in-hospital patients
  - Psychiatric patients
  - Suspected pituitary dysfunction
  - Pregnant patients

2. Follow-up of hypothyroid patients on thyroxine therapy:

- TSH measurement should be done yearly
- TSH should only be performed 6 weeks after initiating or changing the dose of thyroxine therapy
- T4 should be measured in this scenario in pregnancy and in pituitary disease

3. Follow-up of patients with hyperthyroidism:

- T4 testing every few weeks is indicated in the monitoring of treatment progress in hyperthyroidism since TSH levels remain low for some time after normalisation of the T4
- TSH should be measured if T4 falls to below normal, the thyroid gland enlarges or symptoms suggest hypothyroidism.

4. T3 measurements:

- Reserved for those cases where other thyroid tests are not diagnostic of hyperthyroidism
- T3 measurement is not indicated in hypothyroidism
- If sick euthyroid syndrome is suspected, T3 measurement is indicated

5. Thyroid antibody testing:

- Should be reserved for specialists in the field
- Thyroid peroxidase or microsomal antibody testing is indicated in hypothyroidism, goiter or a solitary thyroid nodule thyroid stimulating antibody testing is performed in the assessment of ocular symptoms of Grave's disease

### Financial Filter:

Thyroid function testing is a significant driver of total pathology spend, with thyroid antibodies and T3 being the most costly. Some 75% of thyroid function tests are funded from the member's Medical Savings Account. Unnecessary and inappropriate testing (e.g. requesting multiple or too frequent tests) will therefore deplete these funds, which could more appropriately be allocated to other events, such as doctor consultations and acute medication. Providing doctors with the appropriate information and members with the appropriate education is an important part of ensuring that the patient's savings account is allocated in the most clinical and cost effective manner.

### Funding Policy:

The majority of thyroid function testing is appropriately funded from the Medical Savings Account portion of the benefit. The following initiatives will empower the treating doctor and the member to optimally manage the cost and quality of the care provided:

- The introduction of laboratory request forms containing individual tick boxes as opposed to batched tests, to facilitate practitioners choosing the most appropriate test(s) for the individual patient.
- Providing practitioners with profiles of their thyroid function test ordering patterns, with guidelines as to how these can be brought into line with current best practice, if appropriate.
- For those practitioners who feel that it would be of benefit, a pathology refresher course, accredited for 10 CPD points is available through the Discovery Institute.
- Providing members with relevant information to enable them to have an informed discussion with their treating practitioner.

Through this process, we aim to support the requesting of thyroid testing in line with the evidence-based guidelines, which will facilitate the appropriate utilisation of the Medical Savings Account funds, ensuring sustained availability of funds for required doctor consultations and treatment.


### References:

*American College of Physicians. Screening for thyroid disease. Annals of internal medicine 1998 July, 129:141-143.*

*Dayan C M. Interpretation of thyroid function tests. The Lancet 2001; 357: 619-24.*

*Finnish Medical Society. Thyroid function tests. Evidence Based Medicine Guidelines. 2001.*

*Helfand M et al. Clinical guideline, part 2: screening for thyroid disease: an update. The Cochrane Library, Issue 3, 2002.*

*Medicare Protocol Steering Committee. Protocol for the use of thyroid function tests in the diagnosis and monitoring of patients with thyroid disease. 1999.*

*Ross DS. Serum thyroid-stimulating hormone measurement for assessment of thyroid function and disease. Endocrinol Metab Clin North Am 200' June; 30(2): 245-64,vii.*

*The institute of laboratory medicine. St Vincent's hospital Sydney, Australia. Thyroid function tests. 2000.*

*U.S. Preventive Services Task Force. Screening for thyroid disease. 2002.*


### Individually selected thyroid tests, as opposed to standardised, batched thyroid tests

| Source | Comments | Rating |
|---|---|---|
| *Knowledgebases* | | |
| Cochrane, Helfand M et al. 1998 | S: Systemic review of controlled trials<br>M: Utilising a TSH test to screen for symptomatic but unsuspected overt thyroid dysfunction will have a positive pick-up rate with the highest yield in women over the age of 60 years.<br>P: Primary care screening with a TSH test alone in women over the age of 60 years of age maybe indicated; a free thyroxine level should only be done if the screening TSH level is abnormal. | A |
| *Journals* | | |
| Dayan C M, The Lancet, 2001 | S: Systemic Review<br>M: Using a TSH test alone for initial screening is satisfactory as long as the limitations of this approach is appreciated; conditions in which TSH alone can be misleading include:<br>- Recent treatment of thyrotoxicosis<br>- Pituitary disease<br>- Non-thyroid illness<br>- Thyroid hormone resistance<br>C: Addition of a single measurement of total or free thyroid hormone can address the limitations of performing a TSH test alone, but will add an increased cost to testing.<br>P: TSH assays performed alone are widely used and financially justifiable as first-line screening tests. | A |
| Ross D, Endocrinol Metab Clin North America, 2001 | S: Systemic Review<br>M: Thyroid stimulating hormone (TSH) assays have emerged as the single most useful test of thyroid function and are used widely and appropriately as a screening test.<br>P: Subclinical hyperthyroidism is associated with adverse effects on the skeleton and heart and is best assessed by measurement of serum TSH. | A |
| American College of Physicians, Annals of Internal Medicine, 1998 | S: Clinical Guideline<br>M: 1 in 71 women older than 50 years of age has unsuspected but symptomatic overt hypo- or hyperthyroidism that will respond to treatment and can in most cases be detected with a TSH test. Screening younger women and men is not warranted because of the low prevalence of unsuspected but symptomatic thyroid dysfunction among these persons. The guidelines recommends against mass screening of the asymptomatic general population.<br>P: It is reasonable to screen women older than 50 years of age for unsuspected but symptomatic thyroid disease. The preferred screening method is a TSH test. A free thyroxine test should be done only when the TSH level is abnormal. | B |
| *Associations* | | |
| U.S. Preventive Services Task Force, 2002 | • Routine screening for thyroid disease is not recommended for asymptomatic children or adults.<br>• Thyroid functions should be monitored in patients with previous thyroid disease.<br>• In high risk patients (the elderly, postpartum and Down syndrome), clinicians should remain alert for subtle symptoms of thyroid dysfunction; if thyroid screening is performed, the preferred test is measurement of thyroid-stimulating hormone (TSH). | |
| Finnish medical Society, 2001 | • The primary examinations (in screening for and follow-up of thyroid dysfunction) are a clinical examination and TSH test.<br>• If the serum TSH level is abnormal, serum T4 should be determined. | |
| The Institute of Laboratory Medicine, Australia, 2000 | • In most circumstances, the initial test of choice is TSH alone when performing thyroid diagnostic testing.<br>• In certain conditions the relationship between TSH and T4 may be disrupted and it is necessary to measure TSH and T4. If any of the conditions below is present, the details must be written on the laboratory request form:<br>- Hospital inpatients<br>- Suspected pituitary dysfunction<br>- Treatment with drugs likely to affect thyroid function e.g. amiodarone, lithium.<br>• If the TSH test is normal: thyroid disease is unlikely and no further testing is required and it is unnecessary to test for another 5 years.<br>• If the TSH levels is abnormal, a T4 should also be measured and certain common patterns are likely to emerge which can then be interpreted.<br>• TSH measurement is the mainstay for monitoring thyroxine replacement therapy in hypothyroid individuals; measurements should not be made for at least 6 weeks after initiating or changing the dose of therapy as it takes this long to achieve a steady state.; once a stable dose has been achieved, in this group of patients TSH measurement should be performed twice a year (South African experts recommend once a year).<br>• T4 testing every few weeks is indicated in the monitoring of treatment progress in hyperthyroidism since TSH levels remains low for some time after normalisation of the T4, in this scenario TSH should be measured if T4 falls to below normal, the thyroid gland enlarges or symptoms suggest hypothyroidism. | |
| Medicare Protocol Steering Committee, 1999 | • Thyroid function testing is not recommended in asymptomatic adults.<br>• In most clinical situations a single test of thyroid functions, usually TSH or free T4, is adequate to diagnose thyroid disease. A second test should be reserved for situations where there is a discrepancy between the patient's clinical findings and the result of the initial test or for special cases when medically required.<br>• TSH is the preferred test when monitoring patients receiving thyroxine replacement therapy for primary hypothyroidism. TSH in this scenario should only be performed 6-8 weeks after initiating therapy or changing dosage and once the appropriate dose is determined it should only be repeated annually.<br>• Measurement of free T3 should be reserved for those cases where other thyroid tests are not diagnostic of hyperthyroidism; measuring these indices are not necessary in hypothyroidism. | |
| Conclusion | • The above evidence supports the use of individual tick boxes for each of the specific thyroid tests on laboratory request forms in order to afford treating clinicians the opportunity to individualise requests for thyroid function testing. | A |

# APPENDIX B

DATA REPORTING FORM

| PATIENT NO | DEPENDANT NO | BEFORE/AFTER MARCH 2003 | SPECIFIC ANTIBODY TITER | FREE T4 | TSH | FREE T3 | Total |
|---|---|---|---|---|---|---|---|
| 1 | 1 | Before March 2003 | | | 1 | | 1 |
| 2 | 1 | After | | | 1 | | 1 |
| 3 | 1 | After | | | 1 | | 1 |
| 4 | 0 | After | | 4 | 4 | 3 | 11 |
| 5 | 0 | Before March 2003 | | 1 | 1 | | 2 |
| 6 | 0 | After | | 2 | 1 | | 3 |
| 7 | 0 | After | | | 1 | | 1 |
| 8 | 2 | After | | 1 | 1 | | 2 |
| 9 | 0 | After | | | 1 | | 1 |
| 10 | 1 | After | | | 2 | | 2 |
| 11 | 0 | Before March 2003 | | | 1 | | 1 |
| 12 | 0 | After | 2 | 1 | 1 | | 4 |
| 13 | 0 | After | | 1 | 1 | | 2 |
| 14 | 0 | Before March 2003 | | 1 | 1 | | 2 |
| 15 | 1 | Before March 2003 | | | | 1 | 1 |
| 16 | 1 | After | | 2 | 2 | | 4 |
| 17 | 1 | After | | 1 | 2 | | 3 |
| 18 | 0 | After | | | 1 | | 1 |
| 19 | 1 | After | | | 3 | | 3 |
| 20 | 0 | After | | 1 | 1 | | 2 |
| 21 | 0 | Before March 2003 | | 1 | 1 | | 2 |
| 22 | 1 | After | | 1 | 1 | | 2 |
| 23 | 1 | Before March 2003 | 1 | | | | 1 |
| 24 | 6 | After | 1 | | 1 | | 2 |
| 25 | 1 | After | 1 | | 1 | | 2 |
| 26 | 1 | Before March 2003 | | | 1 | | 1 |
| 27 | 3 | After | 1 | | | | 1 |
| 28 | 0 | Before March 2003 | | 1 | 1 | | 2 |
| 29 | 1 | Before March 2003 | 1 | | | | 1 |
| 30 | 0 | After | | | 1 | | 1 |
| 31 | 1 | After | | | 1 | | 1 |
| 32 | 0 | After | | | 1 | | 1 |
| 33 | 0 | Before March 2003 | | 1 | | 1 | 2 |
| 34 | 1 | After | | | 1 | | 1 |
| 35 | 1 | Before March 2003 | 2 | | | | 2 |
| 36 | 1 | Before March 2003 | | 1 | 1 | | 2 |
| 37 | 3 | Before March 2003 | | | | 1 | 1 |
| 38 | 1 | After | | 1 | 1 | | 2 |
| 39 | 0 | Before March 2003 | 1 | | | | 1 |
| 40 | 3 | Before March 2003 | 1 | | | | 1 |
| 41 | 0 | Before March 2003 | | | 1 | | 1 |
| 42 | 1 | After | | 1 | 1 | | 2 |
| 43 | 0 | Before March 2003 | | 1 | 1 | 1 | 3 |
| 44 | 0 | After | | | 1 | | 1 |
| 45 | 0 | After | | 1 | 1 | | 2 |