



Thyroid function testing in primary care

A cross-sectional study at a single UK general practice found that only 2% of people who underwent thyroid function tests in primary care had thyroid disease. The study identified specific clinical characteristics, such as hair loss or constipation, that could possibly be used to target testing at people most likely to have hypothyroidism or hyperthyroidism.

Overview:

- A study at a single UK general practice found that only 2% of people who underwent thyroid function tests had results suggestive of thyroid disease.
- Further analyses suggested that thyroid function tests could possibly be targeted at people with constipation, hair loss, palpitations and diarrhoea, particularly if pregnant.
- However, a normal test result may reassure the patient and the doctor in a person with any clinical symptoms associated with possible thyroid disease.



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Background: Thyroid disease can occur when the thyroid gland produces too little or too much of the hormone thyroxine. Both underactive thyroid ([hypothyroidism](#)) and overactive thyroid ([hyperthyroidism](#)) have non-specific symptoms, which can make the disorders hard to diagnose.

Thyroid disease is diagnosed with a thyroid function test, which measures levels of circulating thyroid stimulating hormone (TSH) and free thyroxine (FT4). Approximately 10 million thyroid function tests are ordered each year in the UK, at an estimated cost of £30 million ([Beckett and Toft 2003](#)).

Current advice: The British Thyroid Association, the British Thyroid Foundation and the Association for Clinical Biochemistry have jointly produced [UK guidelines for the use of thyroid function tests](#).

The guidance states that people with type 1 diabetes should undergo thyroid function testing every 12 months, whereas thyroid function testing is required only at diagnosis in people with type 2 diabetes. The NICE guideline on [type 1 diabetes in adults](#) recommends that blood TSH levels should be measured at annual review in people with type 1 diabetes.

The UK guidelines for the use of thyroid function tests add that thyroid function should be tested in people with suspected goitre, atrial fibrillation, dyslipidaemia or osteoporosis. People with Down's syndrome and Turner's syndrome, and those receiving amiodarone or lithium, should also undergo regular thyroid function tests.

The NICE guideline on [fertility problems](#) advises that women with possible fertility problems are no more likely than the general population to have thyroid disease and the routine measurement of thyroid function should not be offered. Estimation of thyroid function should be confined to women with symptoms of thyroid disease. **New evidence:** [Werhun and Hamilton \(2015\)](#) did a cross-sectional study followed by a cohort study to assess the frequency of thyroid testing in primary care and whether testing could be better targeted.

The authors retrospectively identified people who had been tested for TSH levels over a 12-month period at a general practice in Devon. People who had a TSH concentration of more than 4.5 mU/l were categorised as having hypothyroidism, and those who had TSH levels of less than 0.01 mU/l were classified as having hyperthyroidism.

A total of 16,487 people were registered at the practice, and 2035 (12.3%) people underwent a thyroid function test during the study period and were included in this analysis. Of the people who had a test, 42 (2.1%) had thyroid disease: 35 (1.7%) had hypothyroidism and 7 (0.3%) had hyperthyroidism.

Four clinical features were present more frequently in people who tested positive for thyroid disease than in those who tested negative. These features were pregnancy (odds ratio [OR]=36, 95% confidence interval [CI] 8.3 to 159, $p<0.001$), constipation (OR=8.7, 95% CI 1.9 to 40, $p=0.005$), hair loss (OR=4.9, 95% CI 1.1 to 21, $p=0.037$) and palpitations (OR=3.5, 95% CI 1.2 to 10, $p=0.021$). Two further symptoms were associated with hyperthyroidism only: weight gain (OR=18, 95% CI 1.6 to 190, $p=0.018$) and diarrhoea (OR=13, 95% CI 1.2 to 130, $p=0.033$).

The authors then did a cohort study to evaluate the extent to which each of these 6 clinical features predicted whether a person was offered a thyroid test and diagnosed with thyroid disease. The authors retrospectively identified from the practice's records a random group of 100 people for each of 5 of the 6 features associated with thyroid disease (not enough data was available to assess weight gain). Five years' worth of follow-up data was then analysed for these people.

More than three-quarters of people with palpitations ($n=91$), constipation ($n=82$), diarrhoea ($n=79$) or hair loss ($n=80$) underwent a TSH test, but only about a third of pregnant women ($n=32$) had a test. Each of these 5 factors had a small positive predictive value for identifying thyroid disease in people who had been tested (range 3.9 to 21%).

This study is limited by the fact that it was conducted at a single general practice in an area with a small proportion of ethnic minorities, so the results may not be generalisable to elsewhere in the UK. In addition, both elements of this research were retrospective and relied on existing clinical records.

Commentary by Dr Brian Shine, Consultant Chemical Pathologist, John Radcliffe Hospital, Oxford:

"This study found that 12.3% of people without previously identified thyroid disease in a single general practice had thyroid function tests over a 12-month period. Overall, 2.1% of people tested had an abnormal TSH level.

"Females were more likely to have abnormal results, particularly in pregnancy, as were people with constipation, hair loss, palpitations, weight gain and diarrhoea. Other features traditionally thought to be signs of thyroid dysfunction, such as fatigue and dizziness, did not seem to be associated with abnormal TSH levels. Unexpectedly, hyperthyroidism was associated with weight gain in this study, when usually it is associated with weight loss.

“Of 100 people each with pregnancy, constipation, hair loss, palpitations and diarrhoea, 32–91% had a thyroid function test over 5 years. The test results were abnormal in 5.1% (for diarrhoea) to 17.5% (for hair loss, most with possible hypothyroidism). The authors suggest that the higher levels of abnormal results in these groups indicate that thyroid testing could be targeted in people with these clinical features.

“This study helps us understand why GPs request thyroid function tests. About a quarter of participants underwent a thyroid function test as ‘screening’ because of existing conditions, including type 2 diabetes and hypertension. The remainder were tested because of clinical symptoms associated with possible thyroid disease.

“The quarter of tests apparently requested because of existing conditions had a low yield (2.0% were abnormal), which is comparable to the yield in the overall population in this study. However, some authors have suggested routine thyroid screening of all people with type 2 diabetes (Perros et al. 1995).

“The authors believe that their study shows that thyroid function testing for screening and for some symptoms (such as fatigue) is not effective because of the low yield of abnormal test results. However, a normal test result may reassure the patient and the doctor. An abnormal test result is more likely for some specific symptoms, such as hair loss. More testing may lead to earlier diagnosis, and this may be cost effective.”

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