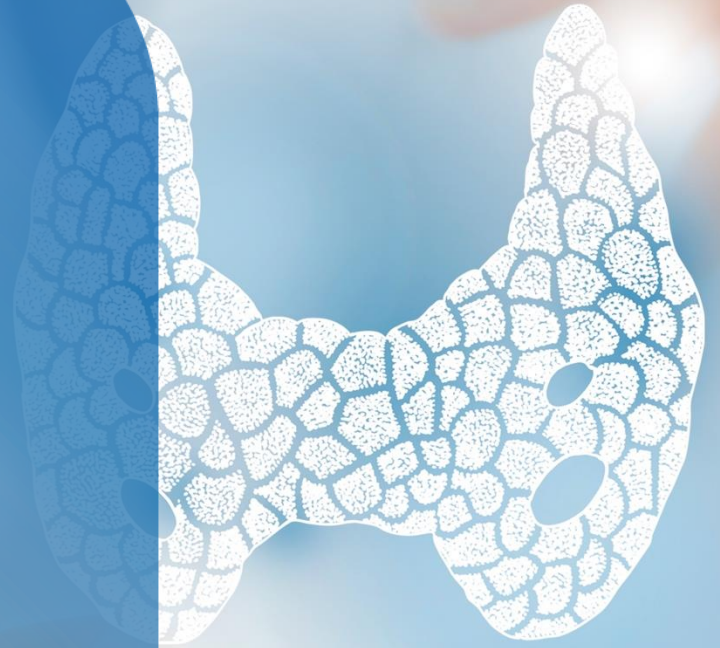


EJADA Program

Hyper and Hypo
Thyroidism

KPIs and
Recommendations

2024



Content

Introduction	3
Scope	4
List of Abbreviations	5
Hyper & Hypothyroidism (Thyroid Dysfunction) KPIs & Measuring Parameters	6
Algorithms for the Management of Hyperthyroidism and Hypothyroidism	7
KPI Cards	9
References	16

Introduction

Thyroid disorders, encompassing hyperthyroidism and hypothyroidism, are among the most prevalent endocrine conditions worldwide, significantly impacting the health and well-being of affected individuals. Hyperthyroidism, results from excessive thyroid hormone production by the thyroid gland. Hypothyroidism, characterized by insufficient thyroid hormone production, is often referred to as an underactive thyroid. Both conditions disrupt the delicate balance of thyroid hormones, affecting various body systems, including metabolism, cardiovascular function, and mood regulation. The risk factors for hyperthyroidism may include autoimmune diseases like Graves' disease, genetic predisposition, iodine-rich diets, and, in some cases, radiation exposure. Hypothyroidism can be caused by autoimmune thyroiditis (Hashimoto's disease), thyroid surgery, radiation therapy, or certain medications. Importantly, iodine deficiency can also lead to hypothyroidism in some regions.

Pharmacotherapy plays a central role in managing thyroid disorders. Hyperthyroidism is often treated with antithyroid drugs, radioactive iodine therapy, or in some cases, surgery, each with its own benefits and risks . Hypothyroidism is commonly managed with synthetic thyroid hormone replacement therapy, effectively restoring hormone levels to normal and alleviating symptoms .Despite the availability of treatments, significant unmet needs persist in the field of thyroid disorders. Patients often face challenges related to medication side effects, incomplete symptom relief, or difficulty in achieving optimal hormone levels. Additionally, fine-tuning treatments for individual patients remains a complex task, and achieving a balance that minimizes the risk of overtreatment or undertreatment can be elusive. While current pharmacotherapies offer substantial relief, there remains a pressing need for more precise and patient-tailored approaches to optimize management, reduce side effects, and improve overall outcomes for individuals living with these conditions .

Fortunately, recent advances in hyperthyroidism and hypothyroidism treatment are transforming the management of these conditions. Targeted therapies and immune modulators show promise in addressing hyperthyroidism's autoimmune roots. Medications like tyrosine kinase inhibitors and monoclonal antibodies effectively curb abnormal immune responses , providing safer and more precise alternatives to traditional treatments. On the other hand, hypothyroidism management benefits from precision medicine. Tailoring thyroid hormone replacement based on genetic and pharmacogenomic data optimizes dosages, leading to symptom relief without adverse effects. These developments signify ongoing progress in endocrinology, offering more effective, safer, and personalized options for thyroid disorder management

Scope

The Ejada KPIs are quality indicators and ratings for physicians, facilities and insurance companies based on information collected by DHA systems from providers, payers and patients.

The hyper & hypothyroidism KPIs and Recommendations are based on UAE and International guidelines. The KPIs are designed for healthcare practitioners and providers to follow international best practices in the management of hyper & hypothyroidism patients.

The hyper & hypothyroidism KPIs cover the following aspects of hyper & hypothyroidism management:

- Radiodiagnosis to exclude secondary causes of hyper and hypothyroidism
- Pharmacological management of hyper & hypothyroidism
- Referral to endocrinologists
- Monitoring hormone levels for thyroid function

The KPIs and recommendations have been reviewed by leading experts in the country.

List of Abbreviations

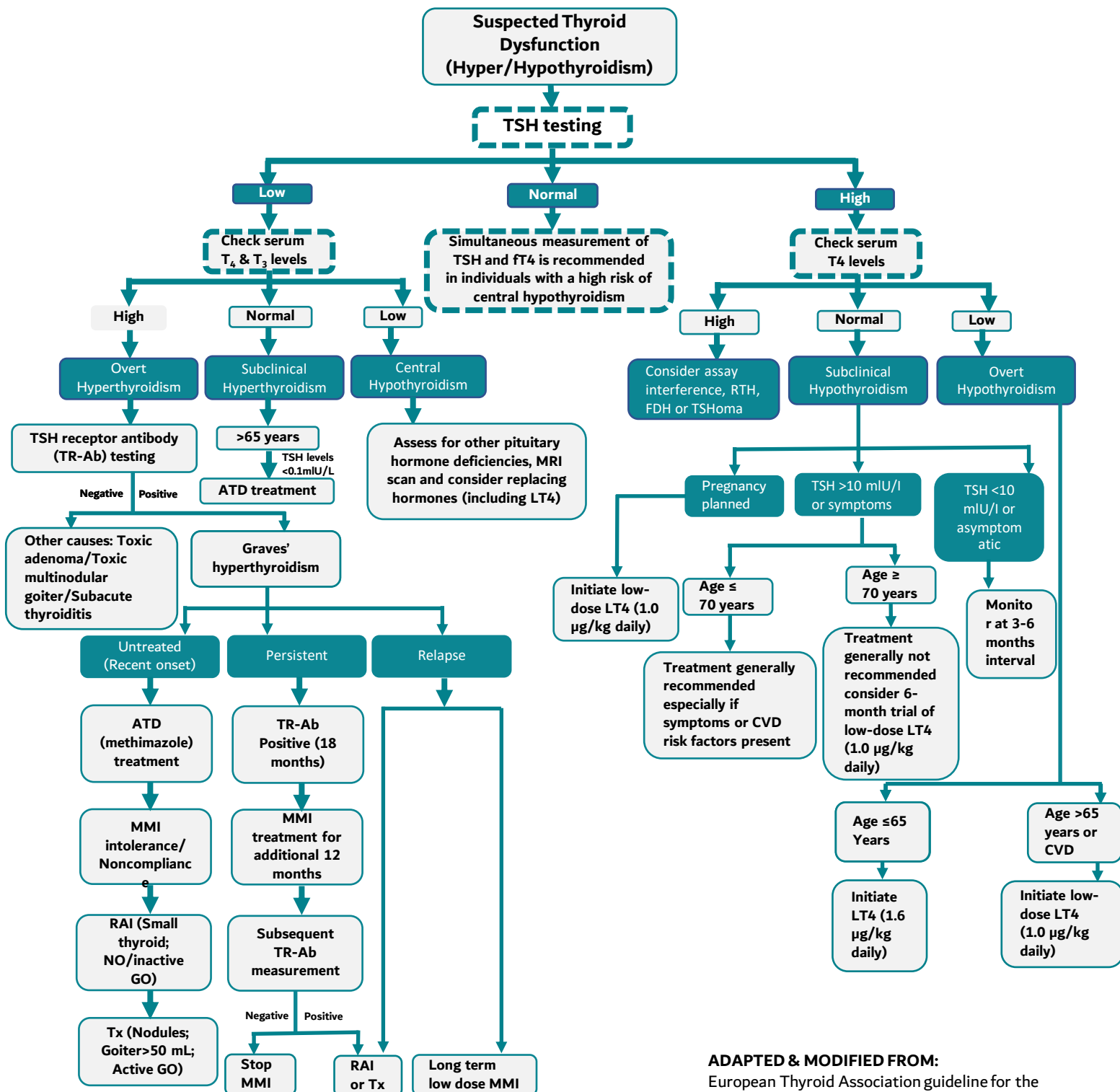
S.No.	Abbreviation	Full form
1	ATD	Antithyroid Drug
2	CBZ	Carbimazole
3	CVD	Cardiovascular Risk
4	DDC	Dubai Drug Code
5	FNA	Fine Needle Aspiration
6	GD	Graves' disease
7	GO	Graves' Orbitopathy
8	Kg	Kilogram
9	KOL	Key Opinion Leader
10	KPI	Key Performance Indicators
11	LT4	Levothyroxine
12	MMI	Methimazole
13	RAI	Radioactive Iodine
14	RAI	Radioactive Iodine
15	TSH	Thyroid Stimulating Hormone
16	T4	Thyroxine
17	T3	Triiodothyronine
18	Tx	Total Thyroidectomy
19	TR-Ab	TSH Receptor Antibody
20	TPO-Ab	Thyroid Peroxidase Antibody
21	TG-Ab	Thyroglobulin aAntibody
22	UAE	United Arab Emirates

KPIs and their Measuring Parameters

Reporting Frequency: Monthly

S.No.	KPIs	Measuring Parameters
1	Thyroid Function Tests for Patients with Suspected Thyroid Dysfunction	TSH, T3, T4
2	Thyroid Function Testing in Pregnant Women	TSH, T3, T4
3	TSH Receptor Antibody (TRAb) Test For the Confirmatory Diagnosis of Grave's Hyperthyroidism	TRAb
4	Thyroid Autoantibody Tests for the Diagnosis of Hypothyroidism Due to Autoimmunity	TPO-Ab, TG-Ab
5	Color-flow Doppler Ultrasonography For the Differential Diagnosis of Grave's Hyperthyroidism and Thyroiditis	Doppler Ultrasonography
6	Radionuclide Scintigraphy (Thyroid Scan) For Hyperthyroidism Patients with Suspected Overt or Subclinical Hyperthyroidism	Radionuclide Scintigraphy, Thyroid Scan
7	Levothyroxine therapy For Patients with Hypothyroidism	DDC list of drugs
8	Antithyroid Drug (ATD) Treatment with Thionamides For Grave's Hyperthyroidism Patients	DDC list of drugs
9	Radioactive Iodine Therapy For Patients with Recurrent Hyperthyroidism	DDC list of drugs
10	Thyroidectomy For Patients with Grave's Hyperthyroidism	Thyroidectomy
11	Hospitalization of Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) with Underlying Conditions	Hospitalization
12	Referral of Thyroid Dysfunction Patients (Hyperthyroidism/Hypothyroidism) to Endocrinologist	Number of referral visits to endocrinologist
13	Cost of Hospitalization in Thyroid Dysfunction Patients (Hyperthyroidism/Hypothyroidism) Due to Underlying Conditions	Healthcare cost for hospitalization

Algorithm for the Diagnosis and Management of Patients with Thyroid Dysfunction (Hyper/Hypothyroidism)



ADAPTED & MODIFIED FROM:
European Thyroid Association guideline for the management of Graves' hyperthyroidism - 2018
<https://doi.org/10.1159/000490384>
Hypothyroidism - 2022. Nat Rev Dis Primers
<https://doi.org/10.1038/s41572-022-00357-7>

Abbreviation: GD, Graves' disease; MMI, methimazole; CBZ, carbimazole; CVD, cardiovascular risk; GO, Graves' orbitopathy; LT4, Levothyroxine; RAI, radioactive iodine; TSH, thyroid stimulating hormone; T4, Thyroxine, T3, Triiodothyronine, Tx, total thyroidectomy; TR-Ab, TSH Receptor Antibody; TPO-Ab, Thyroid peroxidase antibody; TG-Ab, Thyroglobulin antibody; Kg, kilogram

Health Outcomes Indicators

Thyroid Function Tests for Patients with Suspected Thyroid Dysfunction

Description Title	Thyroid Function Tests [Thyroid-Stimulating Hormone (TSH, thyrotropin) and Thyroxine (T4), and Triiodothyronine (T3)] for Patients with Suspected Thyroid Dysfunction
Definition	Percentage of patients with suspected thyroid dysfunction (hyperthyroidism/hypothyroidism) who underwent thyroid function tests [thyroid-stimulating hormone (TSH, thyrotropin) and thyroxine (T4), and triiodothyronine (T3)] during the measurement year
Numerator	Number of patients with suspected thyroid dysfunction (hyperthyroidism/hypothyroidism) who underwent thyroid function tests [thyroid-stimulating hormone (TSH, thyrotropin) and thyroxine (T4), and triiodothyronine (T3)] during the measurement year
Denominator	Total number of patients suspected thyroid dysfunction during the measurement year
Exclusion criteria	Euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility, thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	The ability of the thyroid gland to produce and regulate thyroid hormone production could be assessed using thyroid function test (TFT) that measures thyroid stimulating hormone (TSH) and circulating thyroid hormones in serum. TFTs are used for diagnosis and to monitor treatment of common thyroid gland disorders. TSH (thyrotropin) is often increased in hypothyroidism and decreased in hyperthyroidism, making it the most critical test for early identification of both diseases. Additional testing of thyroid hormones (T3/T4) and comparing the results with TSH would aid the confirming the accuracy of diagnosis. Risk factors for thyroid dysfunction include female sex, advancing age, type 1 diabetes, Down syndrome, personal/family history of thyroid disease, external-beam radiation in the head/neck area and low iodine intake etc.,

Thyroid Function Testing in Pregnant Women

Description Title	Thyroid Function Testing [Thyroid-Stimulating Hormone (TSH, thyrotropin) and Thyroxine (T4), and Triiodothyronine (T3)] in Pregnant Women
Definition	Percentage of pregnant women who underwent thyroid function tests [thyroid-stimulating hormone (TSH, thyrotropin) and thyroxine (T4), and triiodothyronine (T3)] during the measurement year
Numerator	Number of pregnant women who underwent thyroid function tests [thyroid-stimulating hormone (TSH, thyrotropin) and thyroxine (T4), and triiodothyronine (T3)] during the measurement year
Denominator	Total number of pregnant women during the measurement year
Exclusion criteria	Non-pregnant women
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	The thyroid is hyperstimulated during pregnancy resulting in alterations in thyroid hormone levels. Hence it is crucial to accurately assess the thyroid function during pregnancy that could aid in initiating thyroid hormone therapy and adjusting thyroid hormone dose in those already receiving thyroid hormone. Trimester-specific intervals are particularly critical during pregnancy, when thyroid insufficiency has been linked to poor obstetric outcomes and foetal neurodevelopmental impairments. Thyroid function assays now provide gestational age-specific reference intervals.

TSH Receptor Antibody (TR-Ab) Test For the Confirmatory Diagnosis of Grave's Hyperthyroidism

Description Title	TSH Receptor Antibody (TR-Ab) Test For the Confirmatory Diagnosis of Grave's Hyperthyroidism
Definition	Percentage of patients with hyperthyroidism who underwent TR-Ab test for the confirmatory diagnosis of Grave's hyperthyroidism during the measurement year
Numerator	Number of patients with hyperthyroidism who underwent TR-Ab test for the confirmatory diagnosis of Grave's hyperthyroidism during the measurement year
Denominator	Total number of patients with hyperthyroidism during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Graves' disease is the most common type of hyperthyroidism (in around 50% to 80% of hyperthyroidism patients) caused as a result of autoimmune disorder of the thyroid where the body produces auto-antibodies that are specific to a self-protein (i.e., the TSH receptor). The measurement of TSH receptor antibody (TR-Ab) is a sensitive and specific tool for rapid and accurate diagnosis and differential diagnosis of Graves' hyperthyroidism. This test can help reduce the number of incorrect or unknown diagnoses in the initial clinical assessment of patients presenting with hyperthyroidism.

Thyroid Autoantibody Tests for the Diagnosis of Hypothyroidism Due to Autoimmunity

Description Title	Thyroid Autoantibody Tests [Thyroid peroxidase antibody (TPO-Ab) and Thyroglobulin antibody (TG-Ab)] for the Diagnosis of Hypothyroidism Due to Autoimmunity
Definition	Percentage of suspected autoimmune hypothyroidism patients who underwent thyroid autoantibody tests (TPO-Ab and TG-Ab) during the measurement year
Numerator	Number of suspected autoimmune hypothyroidism patients who underwent thyroid autoantibody tests (TPO-Ab and TG-Ab) during the measurement year
Denominator	Total number of patients with suspected autoimmune hypothyroidism during the measurement year
Exclusion criteria	Euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	The presence of circulating thyroid antibodies is the most frequent cause of hypothyroidism due to autoimmunity. In order to confirm autoimmunity as the underlying cause in a patient with hypothyroidism, testing for thyroid autoantibodies, such as Thyroid peroxidase antibody (TPO-Ab) and Thyroglobulin antibody (TG-Ab), may be helpful. Furthermore, the development of overt hypothyroidism is more likely to occur in individuals with subclinical hypothyroidism who have thyroid antibodies, particularly TPO-Ab.

Color-flow Doppler Ultrasonography For the Differential Diagnosis of Grave's Hyperthyroidism and Thyroiditis in Thyrotoxicosis

Description Title	Color-flow Doppler Ultrasonography For the Differential Diagnosis of Grave's Hyperthyroidism and Thyroiditis in Thyrotoxicosis
Definition	Percentage of patients with thyrotoxicosis who underwent color-flow doppler ultrasonography for the differential diagnosis of Grave's hyperthyroidism and thyroiditis during the measurement year
Numerator	Number of patients with thyrotoxicosis who underwent color-flow doppler ultrasonography for the differential diagnosis of Grave's hyperthyroidism and thyroiditis during the measurement year
Denominator	Total number of patients with thyrotoxicosis during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Inferior thyroid artery blood flow which is determined using color-flow doppler ultrasonography is a useful parameter in the differential diagnosis of thyrotoxicosis. It has a sensitivity of 88.9% with a specificity of 87.5% in the differentiation between Graves' disease and other forms of autoimmune thyroiditis. It is an acceptable alternative to radioisotope scans, especially when there is a contraindication to nuclear imaging of the thyroid. It is recommended that measurement of thyroid blood flow by doppler as an essential part of initial investigations of thyrotoxicosis.

Radionuclide Scintigraphy (Thyroid Scan) For Hyperthyroidism Patients with Suspected Overt or Subclinical Hyperthyroidism

Description Title	Radionuclide Scintigraphy (Thyroid Scan) For Hyperthyroidism Patients with Suspected Overt or Subclinical Hyperthyroidism
Definition	Percentage of hyperthyroidism patients who underwent radionuclide scintigraphy (thyroid scan) to diagnose overt or subclinical hyperthyroidism was carried out during the measurement year
Numerator	Number of hyperthyroidism patients who underwent radionuclide scintigraphy (thyroid scan) to diagnose overt or subclinical hyperthyroidism was carried out during the measurement year
Denominator	Total number of hyperthyroidism patients with suspected overt or subclinical hyperthyroidism during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Radionuclide thyroid scan/scintigraphy is recommended in patients with thyroid nodule and a low serum TSH, suggesting overt or subclinical hyperthyroidism, to determine if the nodule is autonomously functioning. Thyroid scintigraphy is useful to determine the functional status of a nodule. Scintigraphy, a diagnostic test used in nuclear medicine, utilizing iodine radioisotopes (^{123}I) or technetium pertechnetate (^{99}Tc), measures timed radioisotope uptake by the thyroid gland. The uptake of the radioisotopes will be greater in hyperfunctioning nodule and will be lower in most benign and virtually all malignant thyroid nodules than adjacent normal thyroid tissue.

Levothyroxine Therapy For Patients with Hypothyroidism

Description Title	Levothyroxine Therapy For Patients with Hypothyroidism
Definition	Percentage of adult patients with hypothyroidism who were prescribed with levothyroxine therapy (1.6 $\mu\text{g}/\text{kg}$ bodyweight) during the measurement year
Numerator	Number of adult patients with hypothyroidism who were prescribed with levothyroxine therapy (1.6 $\mu\text{g}/\text{kg}$ bodyweight) during the measurement year
Denominator	Total number of patients with hypothyroidism during the measurement year
Exclusion criteria	Euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Levothyroxine, a synthetic form of T4 that is the mainstay of treatment for hypothyroidism. Levothyroxine treatment restores TSH concentrations to normal. For elderly patients, a starting dose of 5–50 $\mu\text{g}/\text{day}$ is recommended and can be raised by 25 μg every 1–2 weeks until full dose is reached. About 30% increase in dose required for pregnant women and TSH measurement should be repeated after 4–12 weeks and then every 6 months when stable. Pediatric patients should be treated according to the age (Neonate to 6 months: 10–15 $\mu\text{g}/\text{kg}/\text{day}$; 6–12 months: 8–10 $\mu\text{g}/\text{kg}/\text{day}$; 1–2 years: 6–8 $\mu\text{g}/\text{kg}/\text{day}$; 2 years: 5–6 $\mu\text{g}/\text{kg}/\text{day}$).

Antithyroid Drug (ATD) Treatment with Thionamides For Grave's Hyperthyroidism Patients

Description Title	Antithyroid Drug (ATD) Treatment with Thionamides For Grave's Hyperthyroidism Patients
Definition	Percentage of patients with Grave's hyperthyroidism who were prescribed with antithyroid drug (ATD) treatment with thionamides (propylthiouracil /carbimazole/methimazole) during the measurement year
Numerator	Number of patients with Grave's hyperthyroidism who were prescribed with antithyroid drug (ATD) treatment during the measurement year
Denominator	Total number of patients with Grave's hyperthyroidism during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Higher is better
Rationale	Patients with newly diagnosed Graves' hyperthyroidism should be treated with ATD (thionamides) that reduce hormone production by blocking the coupling of iodothyronines. ATD is considered as the first-line treatment for Graves' hyperthyroidism due to some advantages including normalizing thyroid function in a short time, hardly causing hypothyroidism, and ameliorating immune disorder while avoiding radiation exposure and invasive procedures. However, the relatively high recurrence rate is a major concern for ATD treatment, which is associated with multiple influencing factors like clinical characteristics, treatment strategies, and genetic and environmental factors.

Radioactive Iodine Therapy For Patients with Recurrent Hyperthyroidism

Description Title	Radioactive Iodine Therapy For Patients with Recurrent Hyperthyroidism
Definition	Percentage of patients with recurrent hyperthyroidism who were prescribed with radioactive iodine therapy during the measurement year
Numerator	Number of patients with recurrent hyperthyroidism who were prescribed with radioactive iodine therapy during the measurement year
Denominator	Total number of patients with hyperthyroidism during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Radioiodine is an effective therapy for hyperthyroidism with few complications. It is indicated for patients with recurrent hyperthyroidism after antithyroid treatment or surgery, intolerance to antithyroid therapy due to side-effects, toxic nodules, and patient preference. Most patients achieve remission with a single dose. Those who require a second dose are more likely to have higher TSH receptor antibody titers at diagnosis. If a patient with GD becomes hyperthyroid after completing a first course of ATD, definitive treatment with RAI is recommended.

Thyroidectomy For Patients with Grave's Hyperthyroidism

Description Title	Thyroidectomy For Patients with Grave's Hyperthyroidism
Definition	Percentage of patients with Grave's hyperthyroidism who were underwent thyroidectomy during the measurement year
Numerator	Number of patients with Grave's hyperthyroidism who were underwent thyroidectomy during the measurement year
Denominator	Total number of patients with Grave's hyperthyroidism during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, and struma ovarii
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Surgery (thyroidectomy) is preferred in the hyperthyroidism treatment for patients with large obstructing goiter, pregnancy, breastfeeding, moderate to severe ophthalmopathy, persistent hyperthyroidism after radio-ablation and ATD therapy, inability to tolerate RAI or ATDs, or a nodule with abnormal cytology on FNA. In most cases, total thyroidectomy is a definitive treatment of Graves' hyperthyroidism with the added benefits of rapid treatment, avoidance of RAI and ATD side effects, and an equally low risk of disease recurrence.

Hospitalization of Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) with Underlying Conditions

Description Title	Hospitalization of Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) with Underlying Conditions
Definition	Percentage of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) who were hospitalized due to underlying conditions (old age, paralysis, weight loss, pulmonary circulation disorders, fluid and electrolyte disorders, neurological disorders, coagulopathy, psychosis & cardiovascular diseases) during the measurement year
Numerator	Number of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) who were hospitalized due to underlying conditions (old age, paralysis, weight loss, pulmonary circulation disorders, fluid and electrolyte disorders, neurological disorders, coagulopathy, psychosis & cardiovascular diseases) during the measurement year
Denominator	Total number of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, struma ovarii, euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	There are several risk factors/underlying conditions/comorbidities associated with hospitalization and length of stay in thyroid dysfunction patients (hyperthyroidism/hypothyroidism) such as old age, paralysis, weight loss, pulmonary circulation disorders, fluid and electrolyte disorders, neurological disorders, coagulopathy, psychosis, & cardiovascular diseases.

Referral of Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) to Endocrinologist

Description Title	Referral of Thyroid Dysfunction Patients (Hyperthyroidism/Hypothyroidism) to Endocrinologist
Definition	Percentage of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) who were referred to endocrinologist during the measurement year
Numerator	Number of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) who were referred to endocrinologist during the measurement year
Denominator	Total number thyroid dysfunction patients (hyperthyroidism/hypothyroidism) during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, struma ovarii, euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Referral of thyroid dysfunction patients (hyperthyroidism/hypothyroidism) to endocrinologist is recommended in patients experiencing elusive euthyroid state, thyroid storm, thionamide-induced agranulocytosis or hepatotoxicity, amiodarone-induced hyperthyroidism, suspected myxedema coma, pregnancy, simultaneous presence of another endocrinopathy, structural change in thyroid gland (e.g., goiter, nodule), symptoms do not improve or worsen after therapy, and unstable ischemic heart disease.

Cost of Hospitalization in Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) Due to Underlying Conditions

Description Title	Cost of Hospitalization in Thyroid Dysfunction Patients (Hyperthyroidism/ Hypothyroidism) Due to Underlying Conditions
Definition	Average Cost Incurred for hospitalization in thyroid dysfunction patients (hyperthyroidism/hypothyroidism)
Numerator	Total Cost Incurred for hospitalization in thyroid dysfunction patients (hyperthyroidism/hypothyroidism)
Denominator	Total number of in thyroid dysfunction patients (hyperthyroidism/hypothyroidism) during the measurement year
Exclusion criteria	Thyroid adenoma, euthyroid hyperthyroxinemia, struma ovarii, euthyroid sick syndrome, thyroid lymphoma, iodine deficiency, Addison disease, chronic fatigue syndrome, depression, dysmenorrhea, erectile dysfunction, familial hypercholesterolemia, infertility
Unit of measure	Percentage (Numerator/Denominator x 100)
Measure target and/or threshold	Lower is better
Rationale	Comorbidities in hyperthyroidism patients such as old age, paralysis, weight loss, pulmonary circulation disorders, fluid and electrolyte disorders, neurological disorders, coagulopathy, psychosis, & cardiovascular diseases can increase treatment cost and mortality, which are serious risks for patient outcomes.

References

1. Kahaly GJ, Bartalena L, Hegedüs L, Leenhardt L, Poppe K, Pearce SH. 2018 European Thyroid Association guideline for the management of Graves' hyperthyroidism. *European thyroid journal*. 2018 Aug 1;7(4):167-86. <https://doi.org/10.1159/000490384>
2. RossDouglas S, BurchHenry B, CooperDavid S, Carol G, Luiza M, RivkeesScott A, Ann S, StanMarius N, WalterMartin A. 2016 American Thyroid Association guidelines for diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. *Thyroid*. 2016 Oct 1. <https://www.liebertpub.com/doi/epdf/10.1089/thy.2016.0229>
3. Chaker L, Razvi S, Bensenor IM, Azizi F, Pearce EN, Peeters RP. Hypothyroidism. *Nature Reviews Disease Primers*. 2022;8(1):30. <https://doi.org/10.1038/s41572-022-00357-7>
4. Alzahrani AS, Al Mourad M, Hafez K, Almaghamsy AM, Alamri FA, Al Juhani NR, Alhazmi AS, Saeedi MY, Alsefiri S, Alzahrani MD, Al Ali N. Diagnosis and management of hypothyroidism in Gulf Cooperation Council (GCC) countries. *Advances in therapy*. 2020 Jul;37:3097-111. <https://link.springer.com/article/10.1007/s12325-020-01382-2>
5. Wilson SA, Stem LA, Bruehlman RD. Hypothyroidism: Diagnosis and treatment. *American family physician*. 2021 May 15;103(10):605-13. <https://www.aafp.org/pubs/afp/issues/2021/0515/p605.html>

