

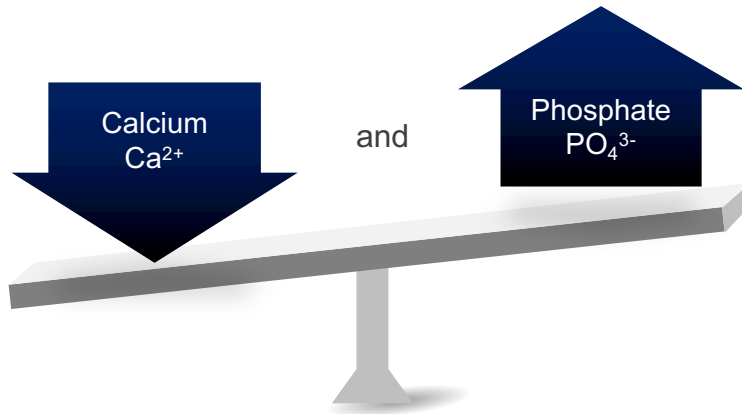
A Closer Look Into Hypoparathyroidism

What Is Hypoparathyroidism?

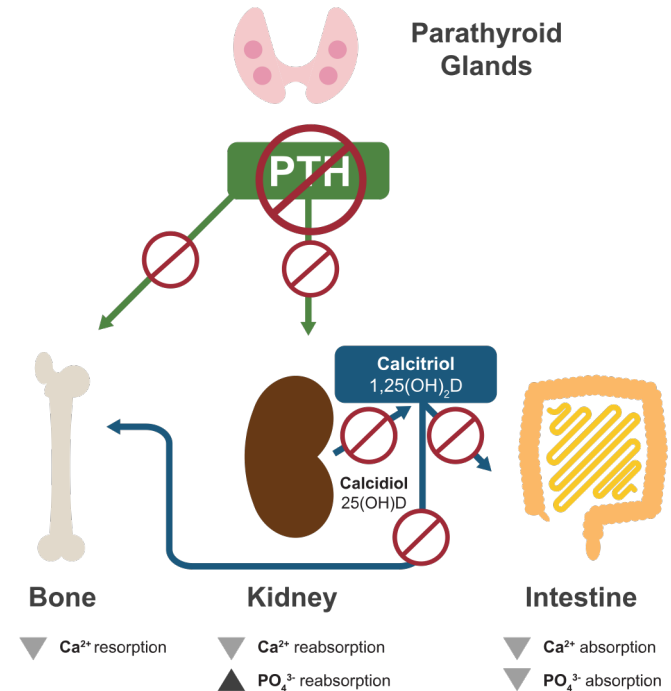
Definition

An **endocrine** disease characterized by an absent or inappropriately **low concentration of circulating parathyroid hormone (PTH)**¹⁻³

Leads to...



Pathophysiology of Hypoparathyroidism at a Glance^{1,4}

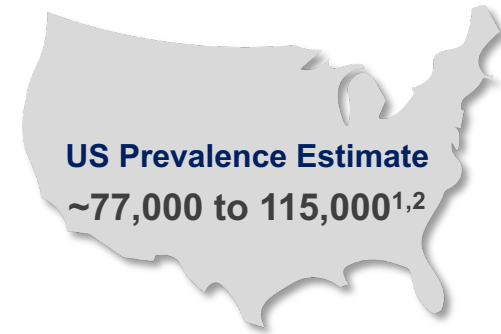
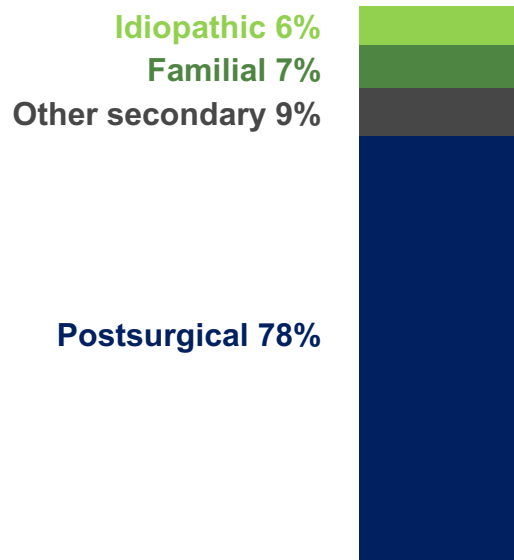


Ca^{2+} = calcium; PO_4^{3-} = phosphate.

References: 1. Mannstadt M, et al. *Nat Rev Dis Primers*. 2017;3:17055. 2. Bilezikian JP, et al. *J Bone Miner Res*. 2011;26(10):2317-2337. 3. Brandi ML, et al. *J Clin Endocrinol Metab*. 2016;101(6):2273-2283. 4. Gafni RI, et al. *N Engl J Med*. 2019;380(18):1738-1747. 5. Brod M, et al. *Qual Life Res*. 2021;30(1):277-291.

Prevalence and Etiology: By the Numbers

Causes of hypoparathyroidism based on the Rochester Epidemiology Project¹



Causes of hypoparathyroidism can be divided into^{1,3}:

Primary

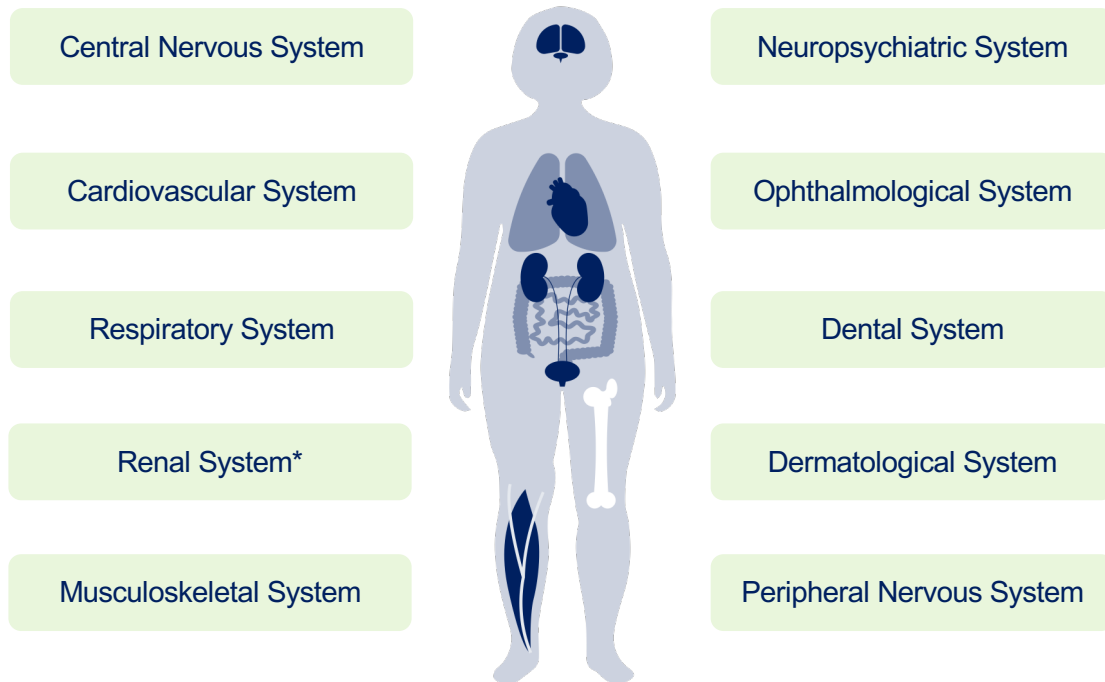
Genetic causes resulting in defects within the parathyroid gland

Secondary

Anterior neck surgery sequelae, autoimmune disease, other infiltrative disorders that affect parathyroid function

Patients With Chronic Hypoparathyroidism May Experience a Wide Range of Symptoms^{1,2}

Hypoparathyroidism Impacts¹



- Disturbances in mineral homeostasis are associated with a risk of short-term symptoms and long-term complications in patients with hypoparathyroidism³
- Seizures, cardiac arrhythmias, laryngospasm, and tetany are among the potentially life-threatening consequences of hypoparathyroidism^{1,4-6}

*These manifestations are mostly the result of treatment with calcium and activated vitamin D rather than of the disorder itself.

Figure adapted from Mannstadt M, et al. *Nat Rev Dis Primers*. 2017;3:17055.

References: 1. Mannstadt M, et al. *Nat Rev Dis Primers*. 2017;3:17055. 2. Shoback DM, et al. *J Clin Endocrinol Metab*. 2016;101(6):2300-2312. 3. Hadker N, et al. *Endocr Pract*. 2014;20(7):671-679. 4. Bilezikian JP, et al. *J Bone Miner Res*. 2011;26(10):2317-2337. 5. Bilezikian JP, et al. *J Clin Endocrinol Metab*. 2016;101(6):2313-2324. 6. Brandi ML, et al. *J Clin Endocrinol Metab*. 2016;101(6):2273-2283. 4

Current Treatment Options May Lead to Burden of Illness and Poor Disease Management¹

374 Participants with hypoparathyroidism from the United States

85% Women; mean age = 49 years

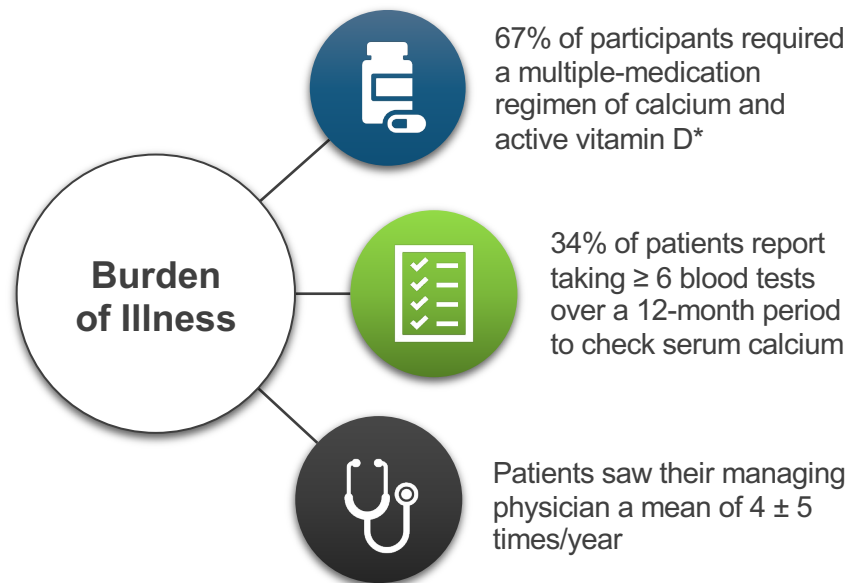
21% Were diagnosed for ≥ 20 years

Poor Disease Management

72% Of patients experienced > 10 symptoms in the last year despite management regimens. Symptoms were reported to last a mean of **13 ± 9 hours per day**

79% Of patients required hospital stays or emergency department visits due to hypoparathyroidism. The lifetime average for days spent in hospital was 8 ± 16.5 days

75% Of patients felt concerned about their current medications for managing hypoparathyroidism



*0.5% of patients were not taking any medications.

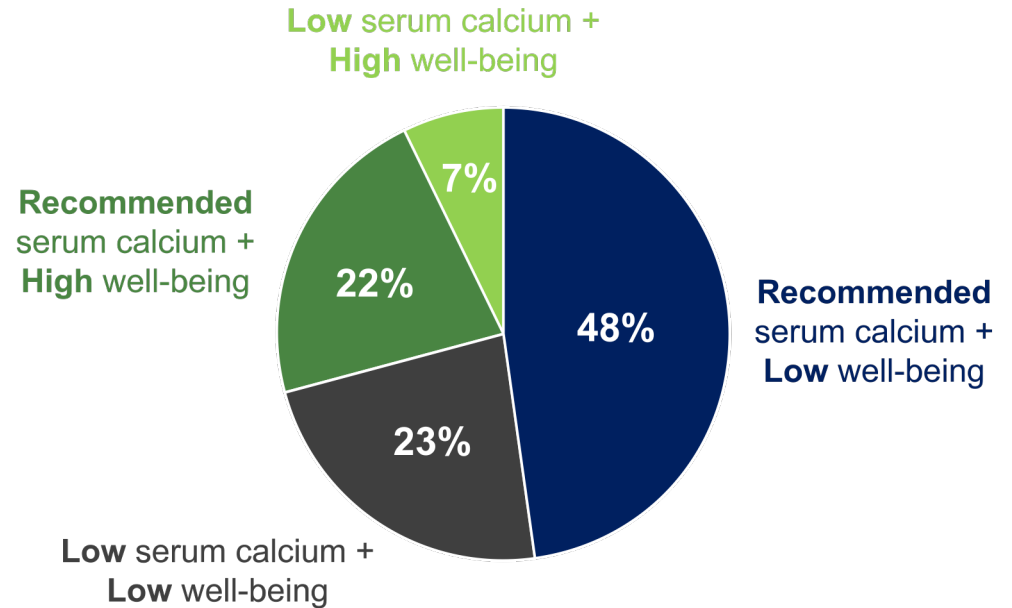
Study design: Participants aged ≥ 18 years with hypoparathyroidism for ≥ 6 months utilized a web-based instrument developed with input from the Hypoparathyroidism Association, patients, and clinical experts.

Reference: 1. Hadker N, et al. *Endocr Pract.* 2014;20(7):671-679.

Patient QoL Impacts Due to Hypoparathyroidism — Serum Calcium and EQ5D-VAS¹

Hypoparathyroidism Negatively Impacts Patient Well-Being

70% of hypoparathyroidism patients had serum calcium within the recommended range yet only 22% scored above the threshold for high well-being



Study design: Patients with hypoparathyroidism were categorized based on a combination of their biochemical serum calcium levels (recommended or low, where low was considered total serum calcium < 2.10 mmol/L, or serum ionized calcium < 1.10 mmol/L) and their well-being using the EQ5D-VAS (high or low well-being, where low was defined as < 80 using a 0 to 100 score).¹

EQ5D-VAS = EuroQoL-5 Dimensions Visual Analogue Scale; QoL = quality of life.

Reference: 1. Kontogeorgos G, et al. *Endocr Connect.* 2022;11(1):e210379.

Goals for Managing Hypoparathyroidism: European Society of Endocrinology (ESE) Guidelines¹

Therapeutic Goal	Parameter to Monitor	Frequency
Serum calcium in the low-normal range to prevent symptoms of hypocalcemia ¹ (tetany, mental impacts) ² and hypercalcemia (dehydration, mental impacts, renal dysfunction) ²	Albumin-corrected total serum calcium: 8.0 to 8.5 mg/dL (2.0 to 2.12 mM) ² Serum-ionized calcium levels in the lower part of reference range*	During dose adjustment period, monitor weekly or every other week Once stabilized, every 3 to 6 months
Address urinary calcium levels to prevent hypercalciuria (leads to renal insufficiency, kidney stones) ^{1,2}	Urinary calcium levels (corrected for BSA) below normal range: women: < 250 mg/day , men: < 300 mg/day , both: < 4 mg/kg²	Every year or every other year ¹
Address serum phosphate levels to prevent extra-skeletal calcifications ^{1,2}	Serum phosphate levels within or close to age-adjusted reference range ^{2*}	During dose-adjustment period, monitor weekly or every other week Once stabilized, every 3 to 6 months
Address calcium-phosphate product levels to prevent extra-skeletal calcifications	Serum calcium-phosphate levels of < 55 mg²/dL² (< 4.4 mmol²/L²)¹	During dose-adjustment period, monitor weekly or every other week Once stabilized, every 3 to 6 months
Serum magnesium levels maintained to prevent hypomagnesemia ^{1,2}	Serum magnesium levels within reference range*	Every 3 to 6 months

*Reference ranges may differ between laboratories.

BSA = body surface area.

References: 1. Bollerslev J, et al. *Eur J Endocrinol.* 2015;173(2):G1-G20. 2. Mannstadt M, et al. *Nat Rev Dis Primers.* 2017;3:17055.

Goals for Managing Hypoparathyroidism: European Society of Endocrinology (ESE) Guidelines (cont'd)¹

Therapeutic Goal	Parameter to Monitor	Frequency
eGFR within reference range to prevent renal insufficiency	Creatinine levels in serum and urine Aim for an eGFR of 90 to 120 mL/min/1.73 m²	Monitor weekly or every other week after a change in treatment ² Every 3 to 6 months ¹
Vitamin D adequacy to prevent nonskeletal effects of vitamin D deficiency, including myopathy	Serum 25(OH)D of > 20 ng/mL (> 50 nmol/L)	Yearly
Nephrocalcinosis prevention. Prevents flank pain, infection, and renal insufficiency	Urine levels of kidney stone risk markers and renal imaging (mainly ultrasonography)	If symptoms or kidney stones occur, or if serum creatinine levels start to increase ¹
Improve QoL and absence of symptoms of hypocalcemia	Patient's QoL, well-being, and symptoms	Every 3 to 6 months
Provide information/education that enables patients to recognize symptoms of hypo- or hypercalcemia, and potential complications ¹	N/A	N/A

25(OH)D = 25-dihydroxyvitamin D; eGFR = estimated glomerular filtration rate; N/A = not applicable; QoL = quality of life.

References: 1. Bollerslev J, et al. *Eur J Endocrinol.* 2015;173(2):G1-G20. 2. Mannstadt M, et al. *Nat Rev Dis Primers.* 2017;3:17055.