

# Thyroid Eye Disease

**ICD-10 Coordination and Maintenance Committee Meeting  
March 19-20, 2024**

**Paola Mina-Osorio, MD, PhD  
VP, Medical Affairs  
Immunovant, Inc.**

# Thyroid eye disease is a heterogeneous condition that presents with a variety of clinical symptoms

## UNDERSTANDING TED:

- Also known as Graves' orbitopathy (GO), Graves; ophthalmopathy, or thyroid orbitopathy
- Progressive disease marked by inflammation that can lead to fibrosis
- Clinical features are variable, including but not limited to<sup>1</sup>:
  - Eye bulging (“proptosis”)      • Swollen/red eyes
  - Eye pain      • Impaired visual ability
  - Double vision (“diplopia”)
- May become sight-threatening if under-treated<sup>2</sup>



Bahn, 2010<sup>3</sup>

Figure 1. Patients with Thyroid Eye Disease

Panel A shows a 59-year-old woman with excess proptosis, moderate eyelid edema, and erythema with moderate eyelid retraction affecting all four eyelids. Conjunctival chemosis (edema) and erythema with bilateral edema of the caruncles, with prolapse of the right caruncle, are evident. Panel B shows a 40-year-old woman with excess proptosis, minimal bilateral injection, and chemosis with slight erythema of the eyelids. She also had evidence, on slit-lamp examination, of moderate superior limbic keratoconjunctivitis.

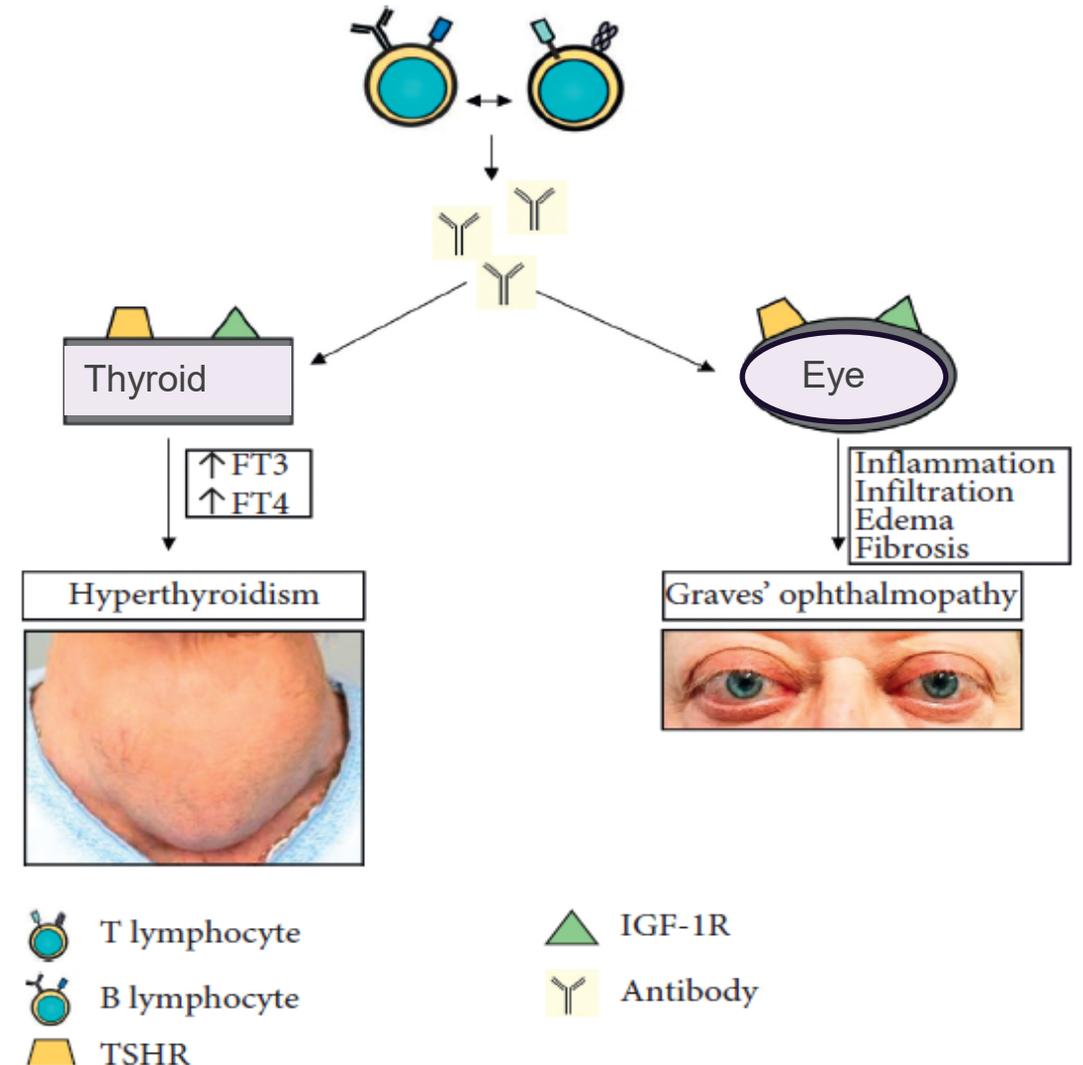
1. Davies T. and Burch H.B. Clinical features and diagnosis of Graves' orbitopathy (ophthalmopathy), *UpToDate*, 2018.

2. McAlinden C. An overview of thyroid eye disease. *Eye and Vision*, 2014.

3. Bahn RS. Graves' ophthalmopathy. *N Engl J Med*. 2010;362:726-38.

# TED is the most common extrathyroidal manifestation of Graves' Disease

- TED is an autoimmune disease associated with Graves' disease.<sup>1</sup>
- Approximately 30% to 50% of patients with GD develop TED.<sup>1,2</sup>
- TED presents simultaneously or within several months of GD onset in up to 66% of cases.<sup>3</sup>



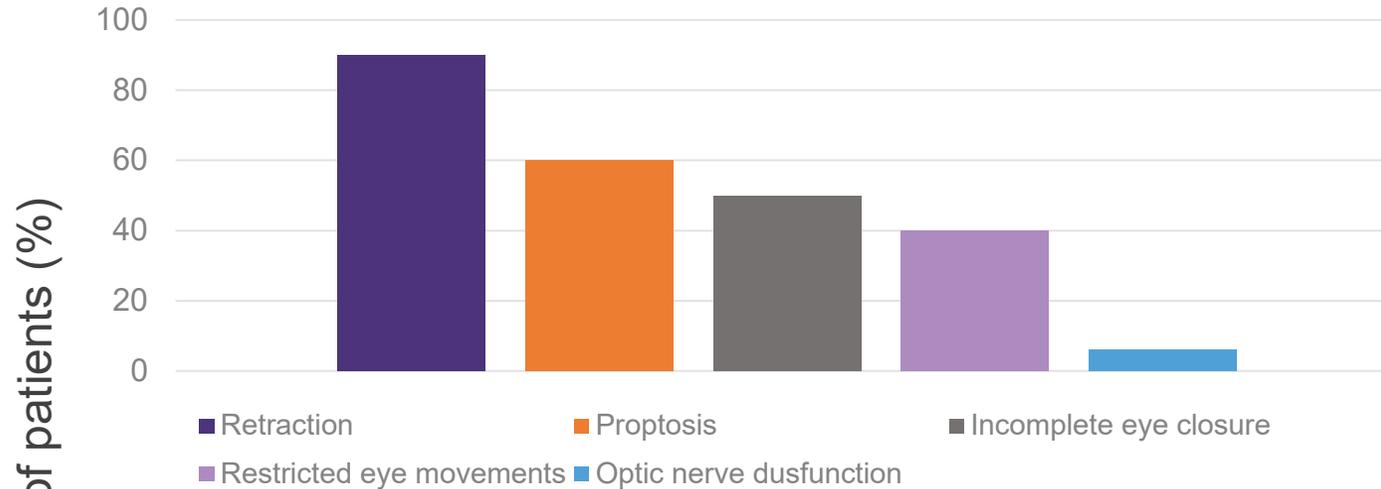
1. Łacheta D, Miśkiewicz P, Głuszko A, et al. Biomed Res Int. 2019;2019:7453260

2. Kashkouli MB, Pakdel F, Kiavash V, Heidari I, Heirati A, Jam S. Eye (Lond). 2011;25(11):1442-1446.

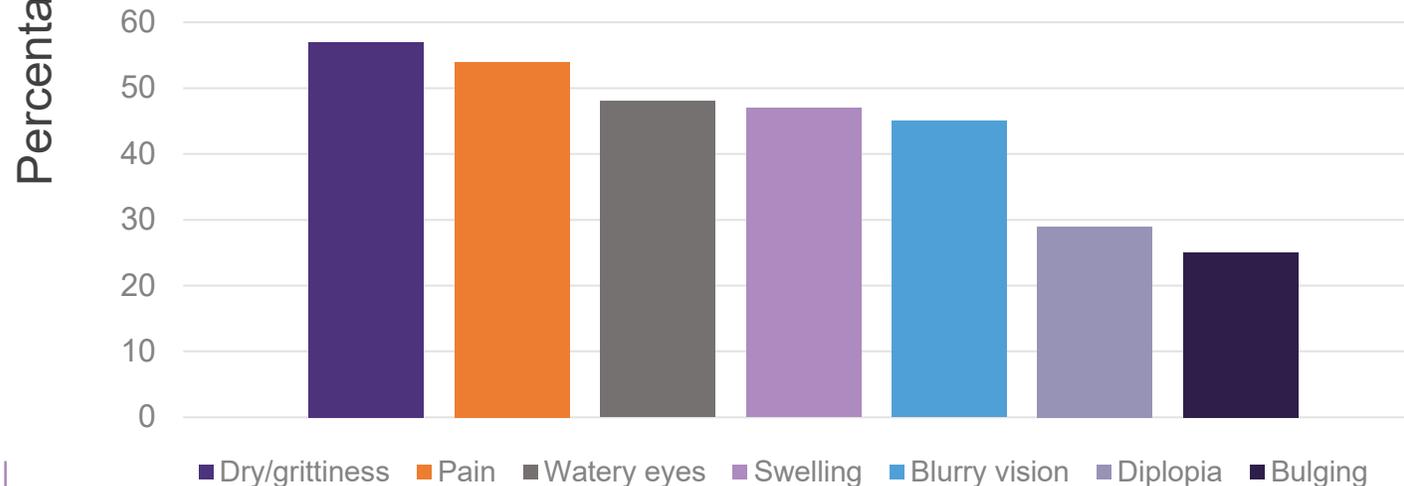
3. Lazarus JH. Best Pract Res Clin Endocrinol Metab. 2012;26(3):273-279.

# TED diagnosis is based on a medical history, presenting symptoms, radiographic imaging, and laboratory results

### Clinical signs<sup>1</sup>



### Patient-reported symptoms<sup>2</sup>

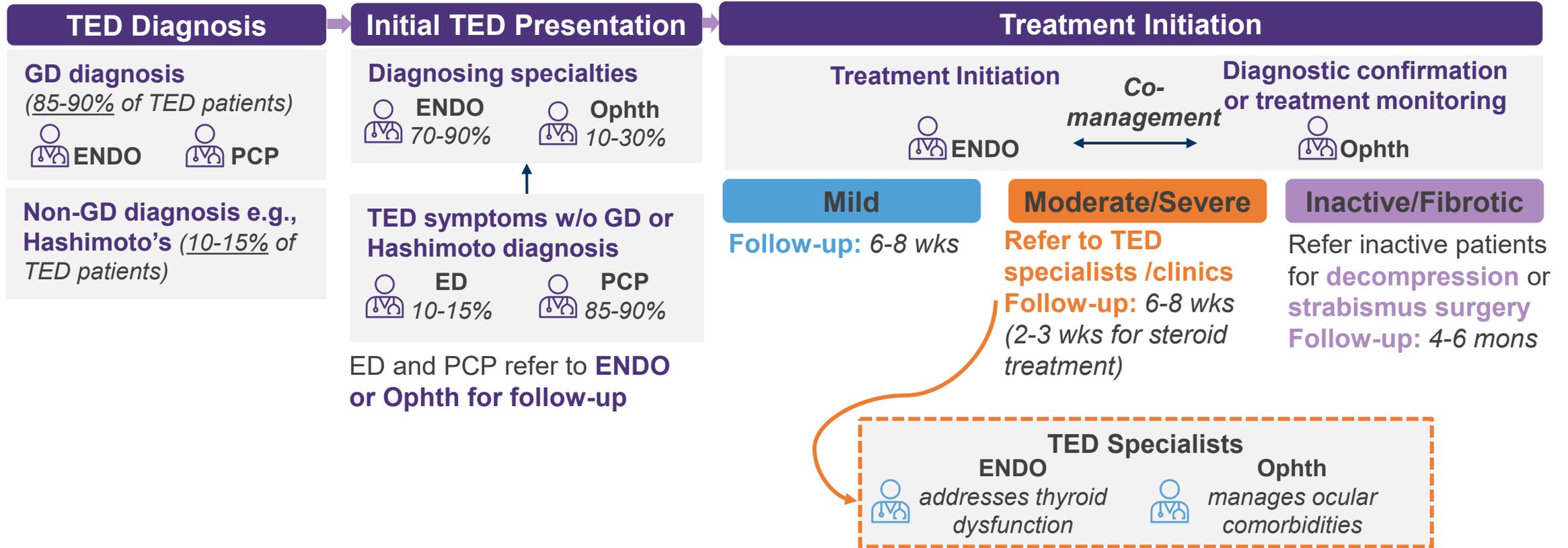


### CT Scan<sup>3</sup>



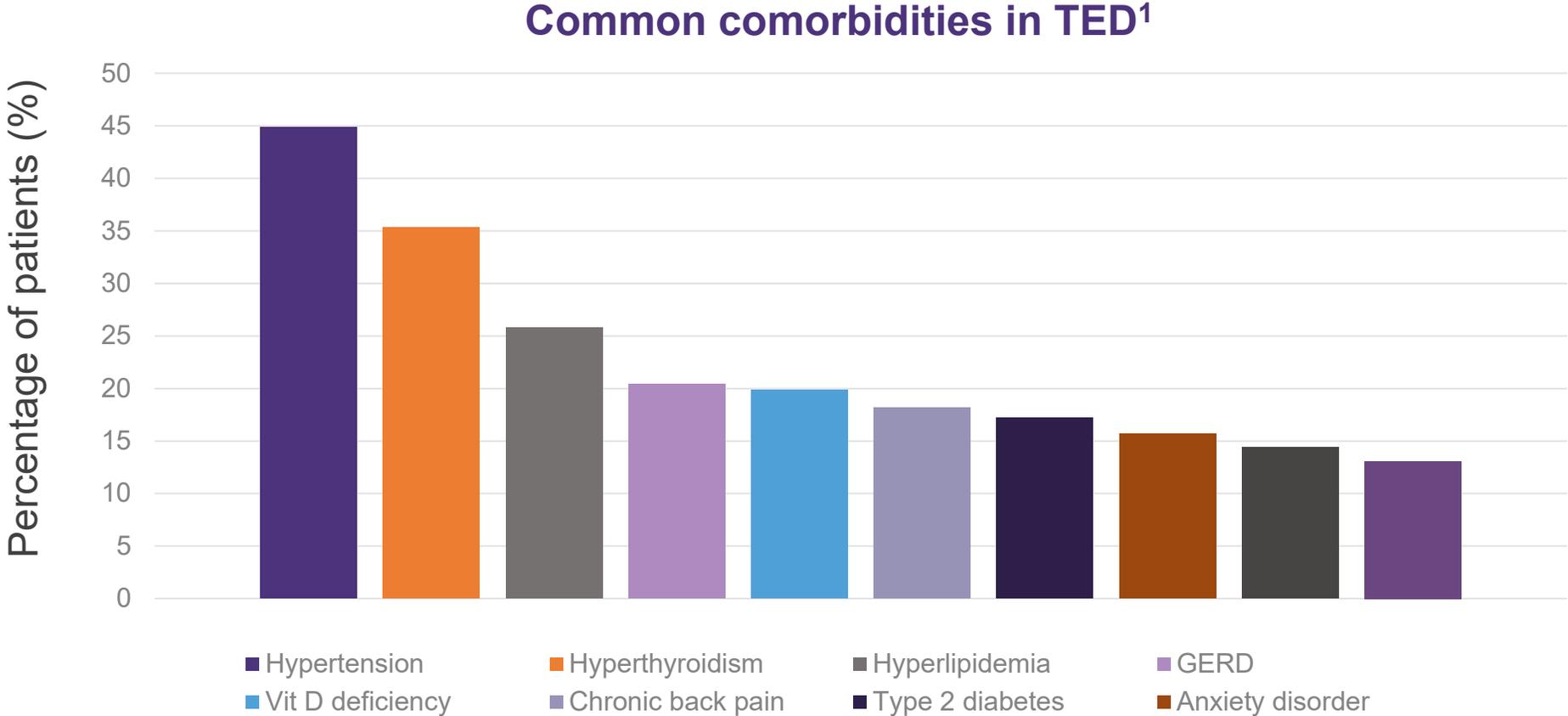
1. Szelog J, Swanson H, Sniegowski MC, Lyon DB. Mo Med. 2022;119(4):343-50.  
2. Cockerham KP, Padnick-Silber, Noel Stuetz. Ophthalmol Ther. 2021;10:975-987.  
3. Kahaly GJ, Dolman PJ, Wolf J, et al. J Clin Endocrinol Metab. 2023;108(12):3122-3134.

# Management of TED requires multiple specialists



Management of TED requires several specialist referrals, care visits, and follow-ups

# Comorbidities can further complicate patient identification in absence of a specific TED code



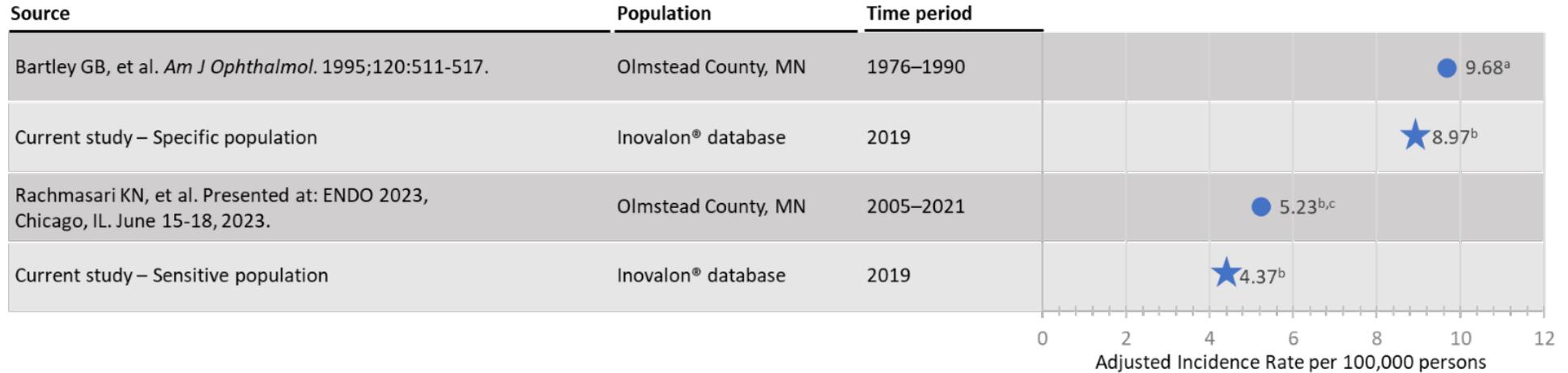
The presence of comorbidities further complicates the identification of TED patients due to the increased number of providers and treatments they receive for diseases other than TED

1. Stan M, Wagner L, Rachmasari K, et al. Presented at: American Thyroid Association Annual Meeting; September 27-October 1, 2023; Washington, DC.

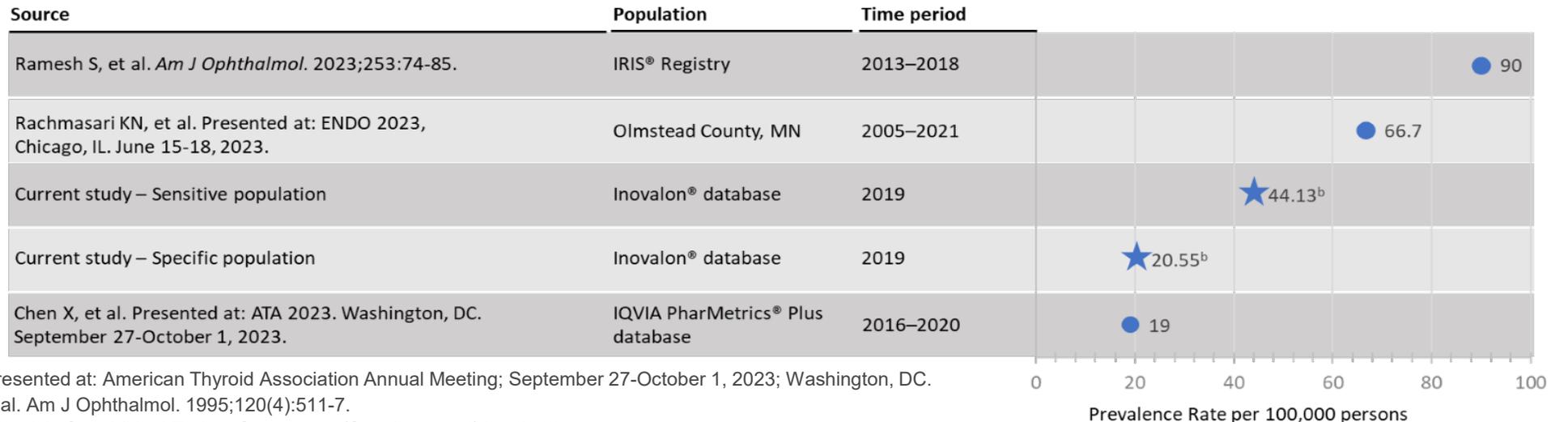
# Incidence and prevalence estimates vary

The lack of a specific ICD code for TED makes identification of this patient population difficult, and current estimates utilize a broad range of methods

## Incidence estimates<sup>1-3</sup>



## Prevalence estimates<sup>1,3-5</sup>



1. Stan M, Wagner L, Rachmasari K, et al. Presented at: American Thyroid Association Annual Meeting; September 27-October 1, 2023; Washington, DC.

2. Bartley GB, Fatourechi V, Kadmas EF, et al. *Am J Ophthalmol.* 1995;120(4):511-7.

3. Rachmasari KN, Thapa P, Sighoko D, Jabbar LA, Stan MN. *J Endocr Soc.* 2023;7(Supplement\_1):bvad114.1886.

4. Ramesh S, Zhang Q (ED), Sharpe J, et al. *Am J Ophthalmol.* 2023;253:74-85.

5. Chen X, Silkiss R, Idowu O, Haskova Z, Adesanya L, Dayal P. Presented at: American Thyroid Association Annual Meeting; September 27-October 1, 2023; Washington, DC.

# Identifying TED patients in large databases requires algorithm development

- We utilized 5 medical codes and 8 procedure codes to develop a narrow algorithm and an additional 25 medical codes and 11 procedure codes to develop a broader algorithm

Inclusion criteria	Specific Population, n	Sensitive Population, n
Patients with any enrollment in 2018 or 2019	90,114,713	90,114,713
Patients with continuous enrollment for all of 2018–2019	41,689,682	41,689,682
Patients with two codes for Graves' disease or post-radiation hypothyroidism at any point between 2016 and 2020 separated by $\geq 30$ days	366,515	366,515
Patients with $\geq 1$ <i>narrow</i> TED-related diagnosis or procedure code in or before 2019	8,018	
Patients with $\geq 1$ <i>narrow</i> TED-related diagnosis or procedure code in 2019 and no prior history of a TED related diagnosis before 2019	1,730	
Patients with $\geq 1$ <i>narrow or broad</i> TED-related diagnosis or procedure code in or before 2019		16,310
Patients with $\geq 1$ <i>narrow or broad</i> code in 2019 and no prior history of a TED related diagnosis before 2019		3,364

# Treatment of TED is an area of increasing research

## Current Treatment Paradigm<sup>1</sup>

Based on EUGOGO guidelines 2021

### Active Mild TED

- Local measures (*prisms, artificial tears, ophthalmic gels*)
- Selenium (*6 months*)

### Active Moderate-to-Severe

- Corticosteroids
- Immunosuppressive agents
- Orbital radiotherapy
- Rituximab
- Tocilizumab
- Teprotumumab\*

### Active Sight Threatening

- Corticosteroids (1st line) OR emergency orbital decompression surgery

### Inactive Fibrotic

- Rehabilitative surgery: decompression surgery, eyelid surgery, strabismus surgery OR teprotumumab

## Emerging research<sup>1-4</sup>

Principle	Mechanism
TSHR inhibition <sup>2,3</sup>	Blocks TSHR
IGF-1R inhibition <sup>1</sup>	Blocks IGF-1R
FcRn inhibition <sup>1</sup>	TRAb depletion
TSHR desensitization <sup>4</sup>	Restore TSHR tolerance
CAR T-cell therapy <sup>5</sup>	Deep depletion of CD19+ lymphocytes

1. Bartalena L, Kahaly GJ, Baldeschi L, et al. *Eur J Endocrinol.* 2021;185(4):G43-G67.

2. Furmaniak J et al. *Clin Endocrinol (Oxf).* 2022;96(6):878-887.

3. Neumann S et al. *Endocrinology.* 2014;155:310-314.

4. Pearce SHS et al. *Thyroid.* 2019;29(7):1003-1011.

5. Muzes G, Sipos F. *Cells.* 2023;12(11):1534.

# Need for an ICD-10-CM code

---

- Lack of a specific code to identify TED patients significantly complicates their identification.
- Current methodologies to classify TED patients differ widely and lack validation, potentially misidentifying TED patients, misrepresenting their medical journey, and impairing longitudinal follow-up.
- Creation of a new ICD-10-CM code for TED will:
  - Improve identification of individuals with TED and longitudinal follow-up via EHR
  - Allow coding specificity for research, tracking, and trending
  - Offer a consistent and clear means of classifying the disease, ensuring continuity of care
  - Enable focused research of TED and its morbidities and outcomes
  - Provide a robust framework for monitoring and analyzing the burden of the disease, thereby offering invaluable insights into TED's impact on public health
- Immunovant, Inc. and Dr. Marius Stan (Associate Professor and Chair, Thyroid Core Group, Division of Endocrinology, Diabetes, Metabolism, and Nutrition at Mayo Clinic) are requesting the tabular modifications.

# Discussion