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# Associations of Systemic Conditions with Severity of Dry Eye Signs and Symptoms in the Dry Eye Assessment and Management (DREAM) Study

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# Disclosures

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## No Personal Financial Disclosures

## Contributions/ Discounts/ Assistance to the DREAM Study

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# Dry Eye Disease

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- Inflammation → Tear Film Disorder → Ocular Surface Damage
- Potential risk factors for presence of dry eye
  - DEWS II Report (The Ocular Surface, 2017)
    - Consistent: Age, Female sex, Asian race, MGD, Sjögren's syndrome (SS), Rheumatoid arthritis (RA)
    - Probable: Diabetes (DM), Rosacea, Thyroid disease
    - Inconclusive: Smoking
  - Other studies
    - Peripheral artery disease (PAD), dyslipidemias, hypertension (HTN), irritable bowel syndrome (IBS), osteoarthritis (OA)

# Study Objective

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- To determine whether systemic conditions reported as dry eye disease risk factors are associated with the severity of dry eye signs and symptoms

# Subjects

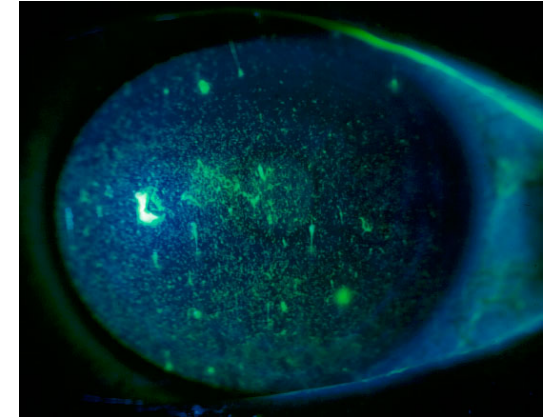
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- **535 adult patients** with moderate-to-severe dry eye from 27 U.S. centers
  - From the **Dry Eye Assessment and Management (DREAM) study\***, a large-scale multi-center RCT to evaluate the effectiveness and safety of  $\omega$ 3 fatty acids for the treatment of dry eye
- Evaluated uniformly for dry eye signs and symptoms at baseline, 6 months, and 12 months
- Reported medical history at baseline

\*Dry Eye Assessment Management Study Research Group. N-3 fatty acid supplementation for the treatment of dry eye disease. *N Engl J Med* 2018;378(18):1681-90.

# Outcome Measures

- Dry eye signs:
  - Tear break-up time (TBUT) (secs)
  - Anesthetized Schirmer testing (mm/5min)
  - Corneal fluorescein staining (0-15)
  - Conjunctival lissamine green staining (0-6)
  - Tear osmolarity (mOsm/L) (275-400)
  - Meibomian gland dysfunction (MGD) (0-3)
  - **Composite signs severity score (0.0-1.0)**
- Dry eye symptoms:
  - Ocular Surface Disease Index (OSDI) (0-100)



# Statistical Analysis

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- Secondary analysis of DREAM data
- Evaluated associations of systemic conditions with the outcome measures using multivariable generalized linear regression models
  - Adjusted by age, sex, race, and visit

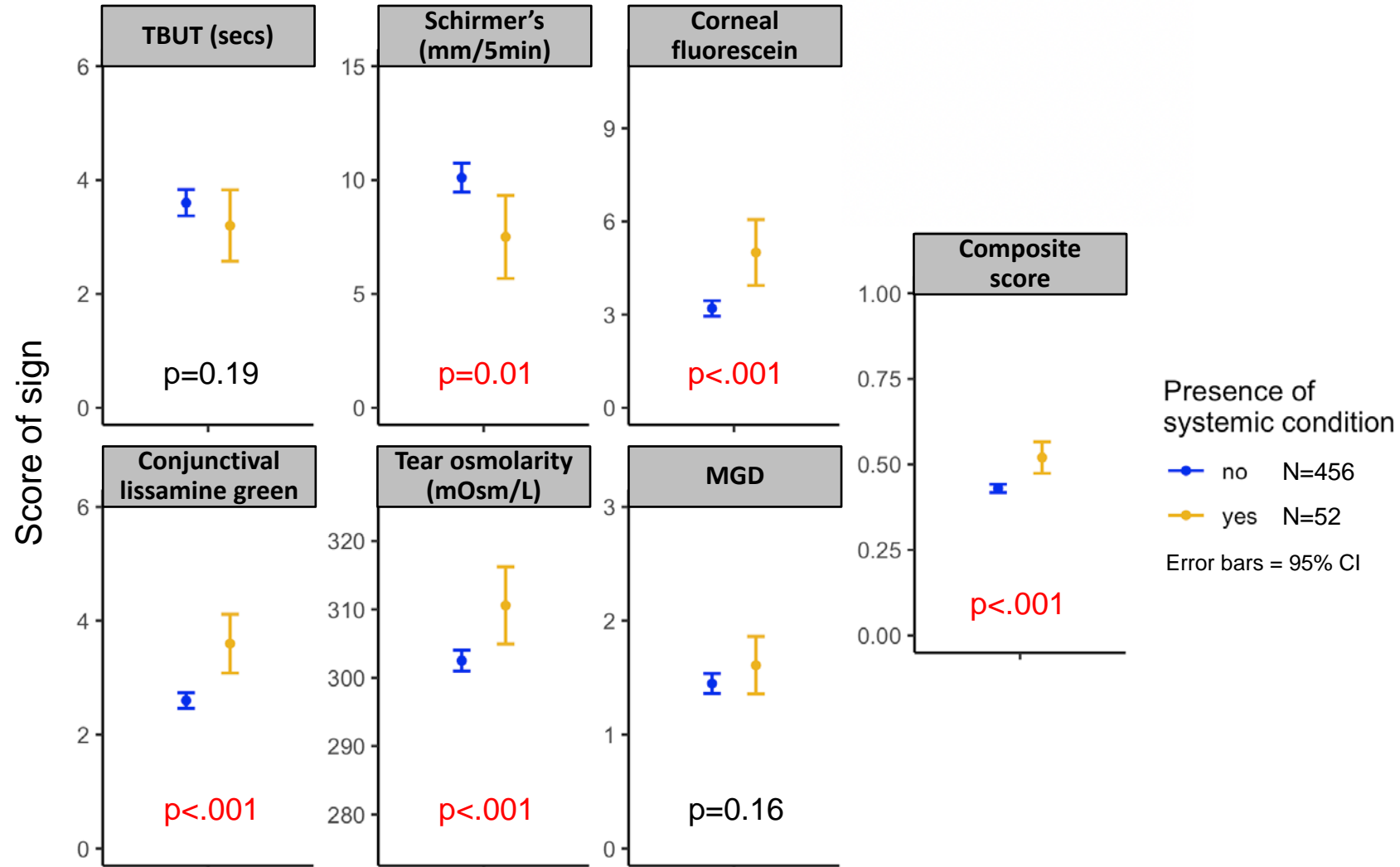
# Baseline characteristics

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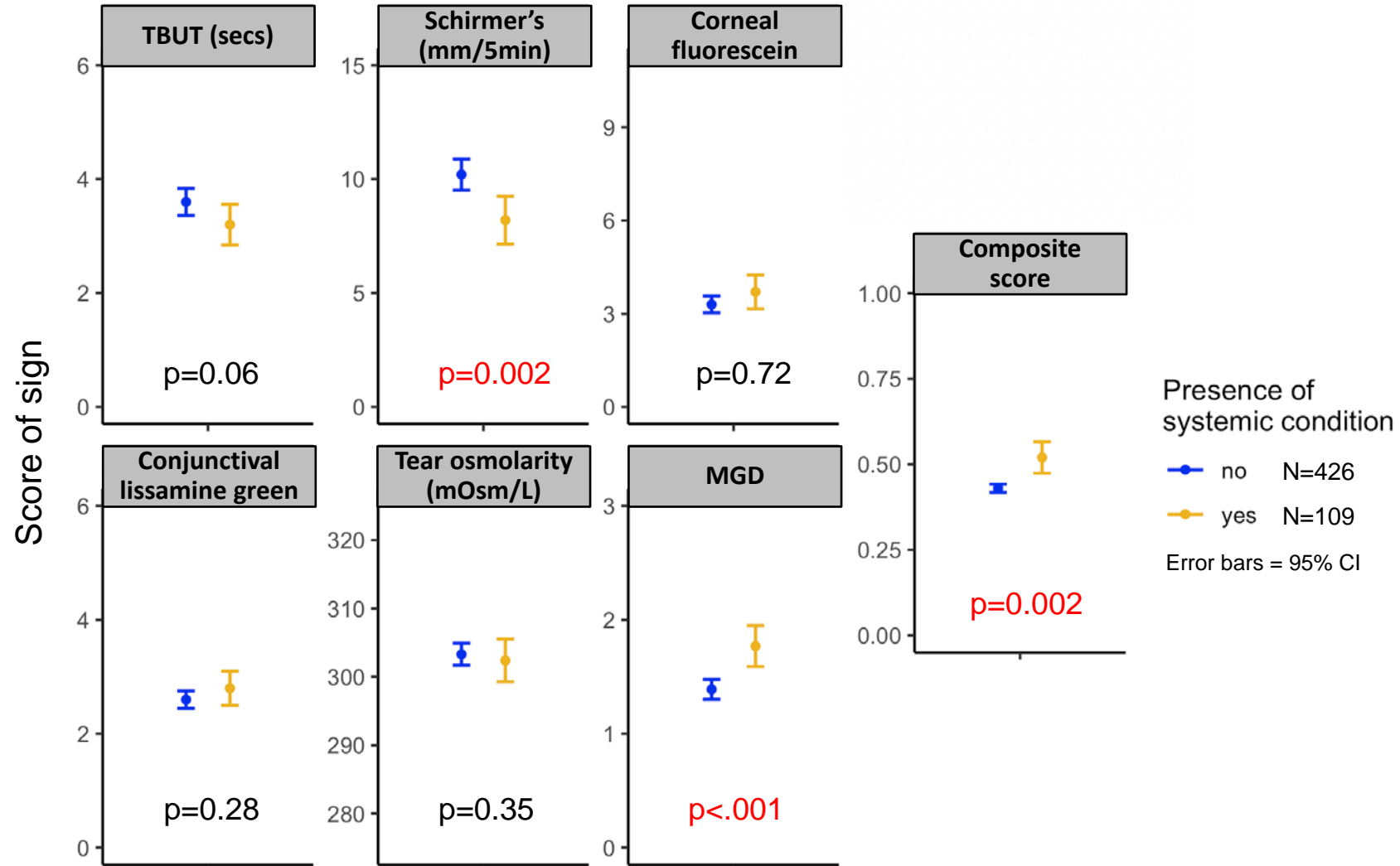
- Mean age: 58 ± 13 years
- 81% female
- 74% White, 12% Black, 4% Asian, 10% Other



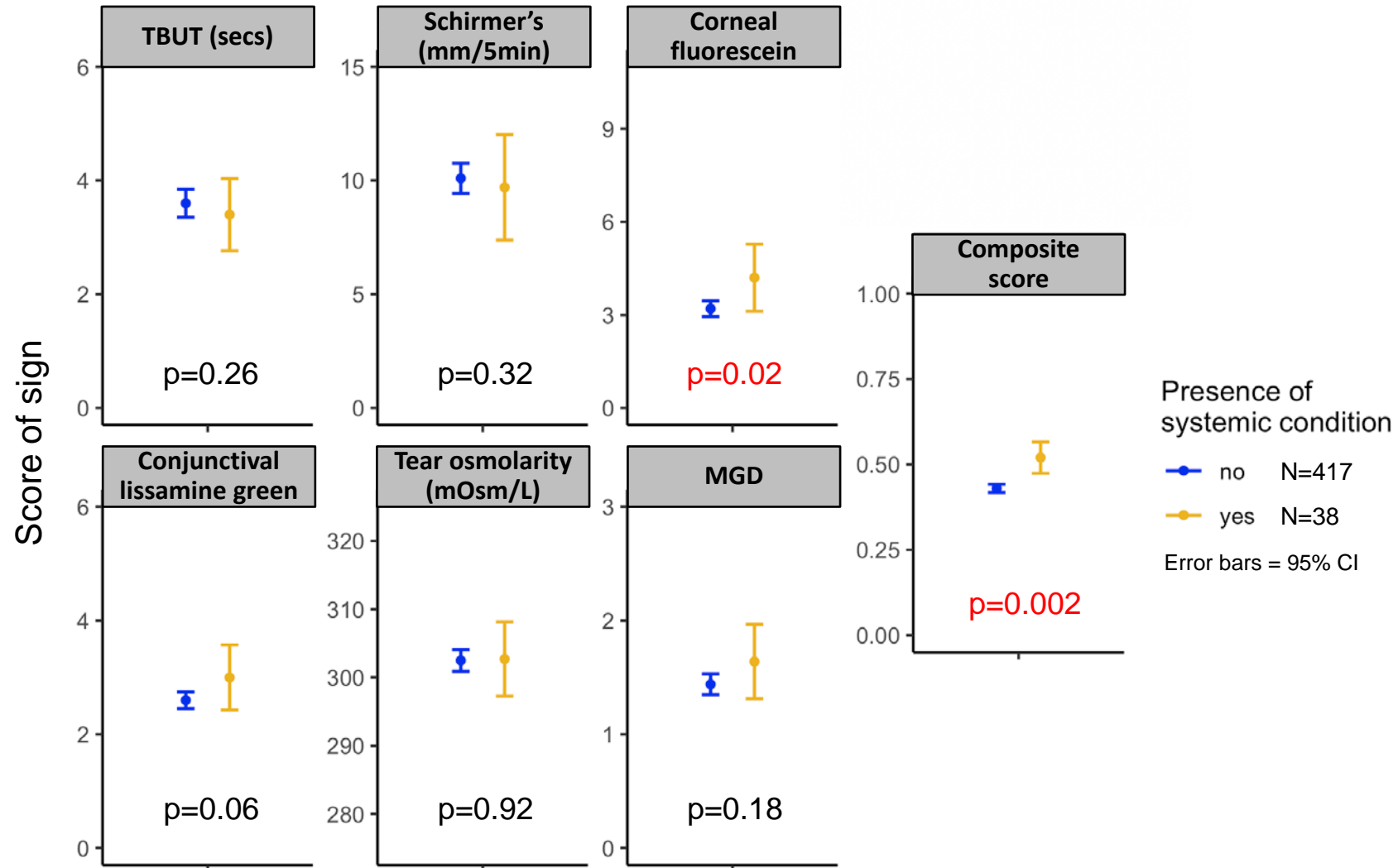
# Dry eye signs for Sjögren's syndrome



# Dry eye signs for Rosacea

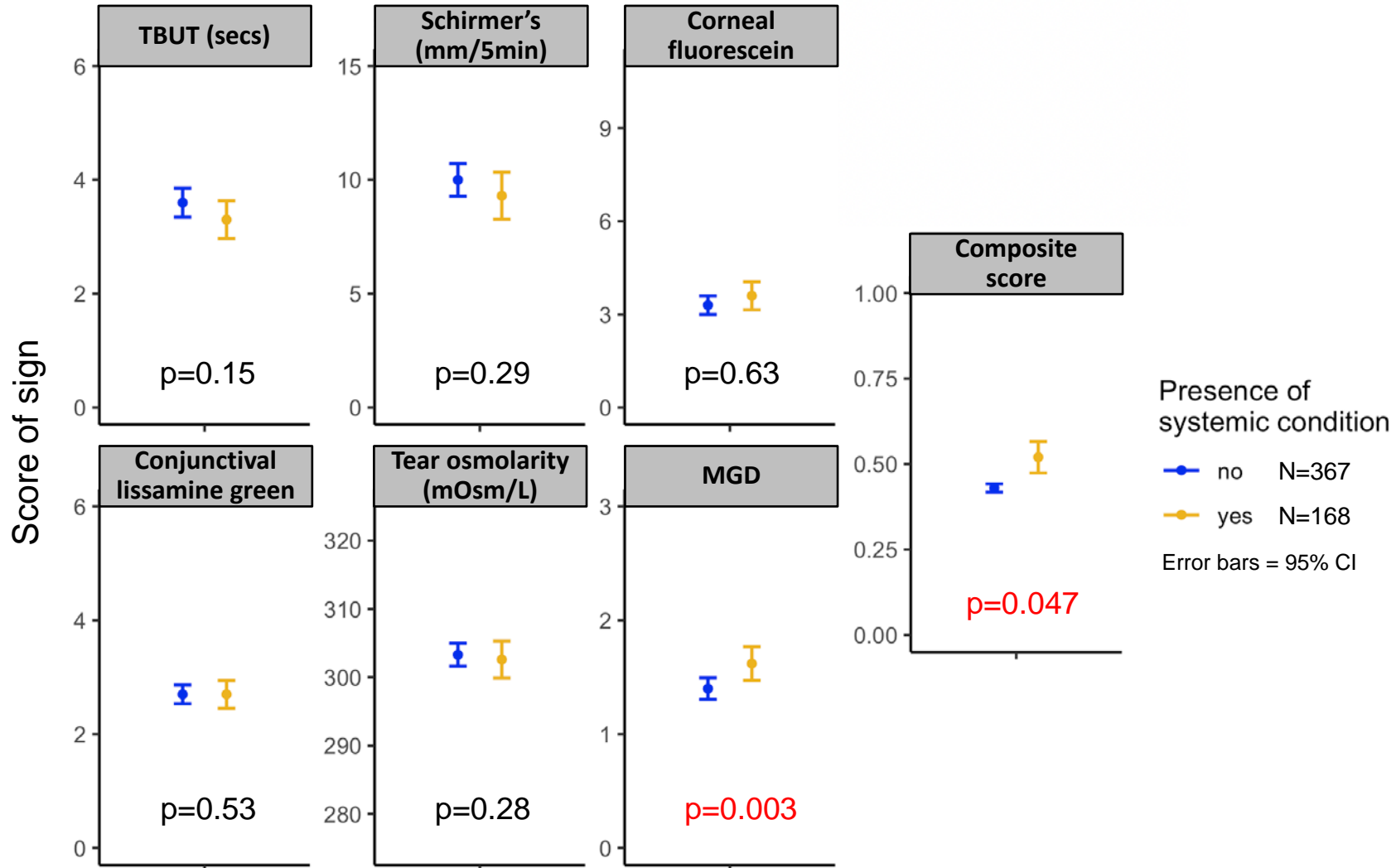


# Dry eye signs for Rheumatoid Arthritis†

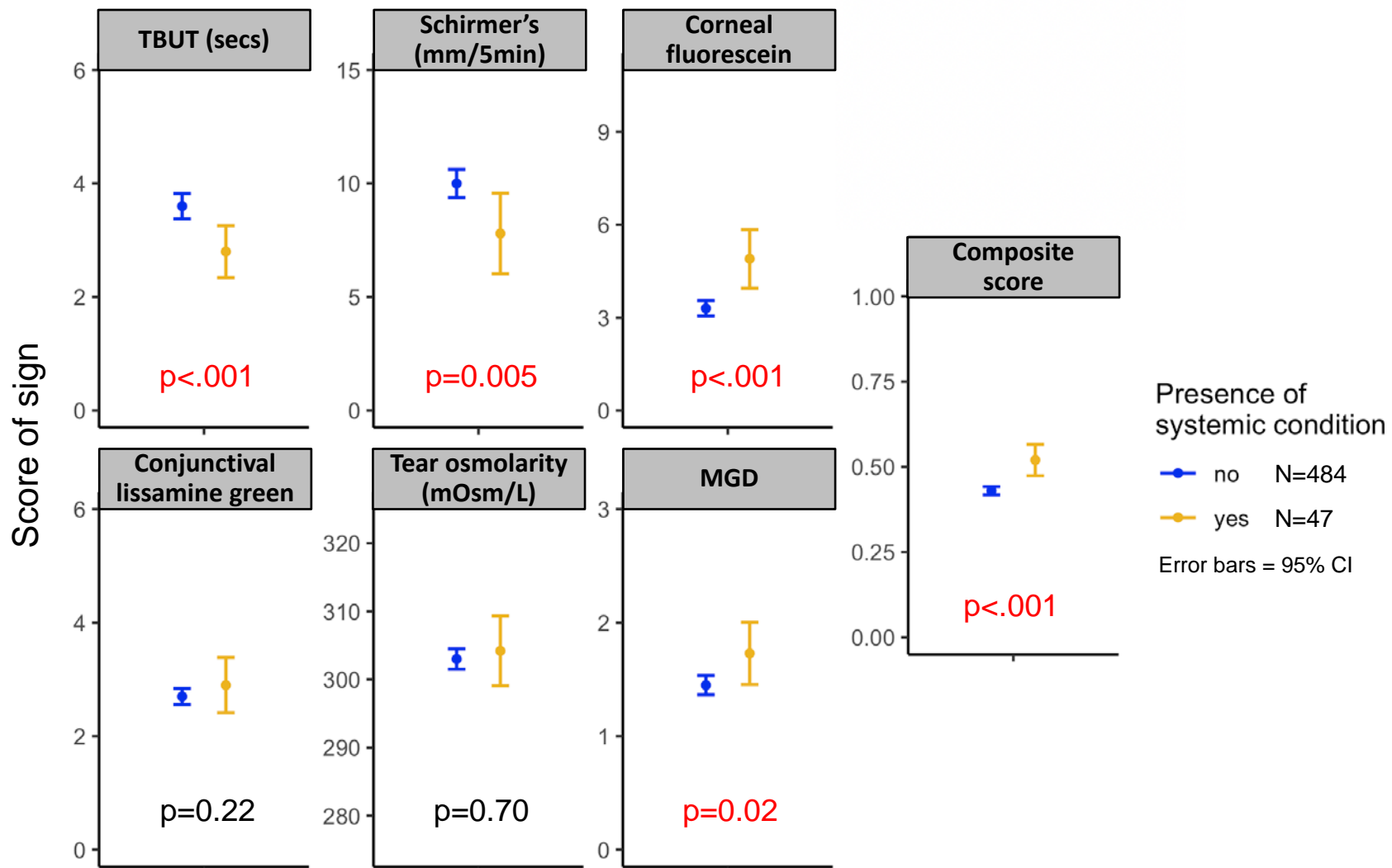


†Excluding patients meeting 2012 ACR criteria for Sjögren's syndrome.

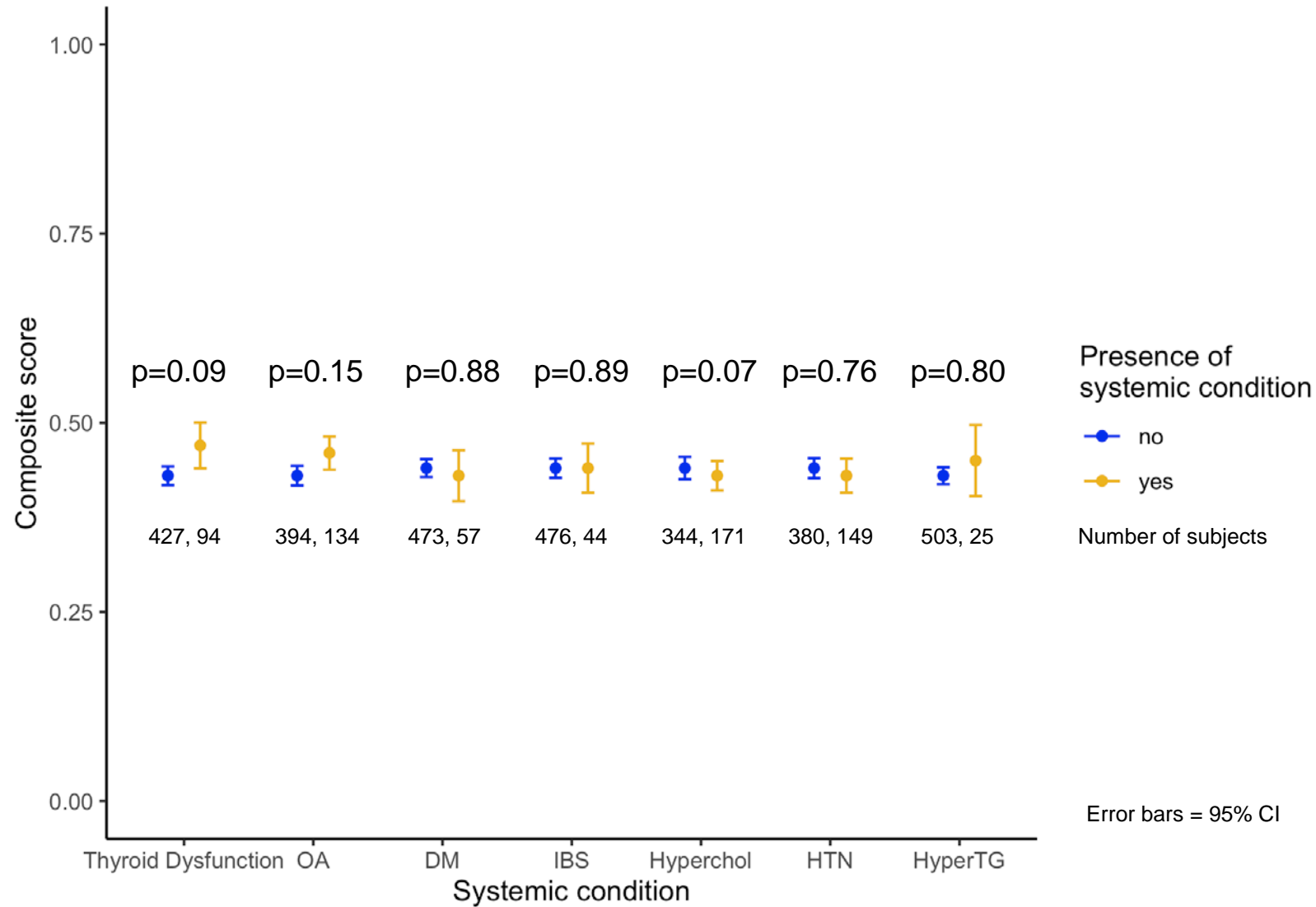
# Dry eye signs for Daily Smoking History



# Dry eye signs for Peripheral Artery Disease



# Systemic conditions not significantly associated with severity of dry eye signs



# Dry eye symptoms

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- No systemic conditions were significantly associated with OSDI

# Conclusions

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- Patients with SS, rosacea, RA, daily smoking history, and PAD had more severe dry eye signs than patients without the condition of interest.
- No significant associations for thyroid dysfunction, OA, DM, IBS, hypercholesterolemia, HTN, and hypertriglyceridemia.
- Profile of significant dry eye signs varied by systemic condition, reflecting different dry eye disease etiologies (eg aqueous tear deficient vs evaporative dry eye).
  - Ex. Rosacea-associated MGD is variant of MGD



# Acknowledgements

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- Vatinee Bunya, MD MSCE<sup>1</sup>
- Maureen Maguire, PhD<sup>1</sup>
- Penny Asbell, MD<sup>2</sup>
- DREAM Study Research Group

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<sup>2</sup>*Department of Ophthalmology, University of Tennessee Health Science Center, Memphis, Tennessee*

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