The impact of data source on global trends in AD prevalence

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Conflict of interest: None
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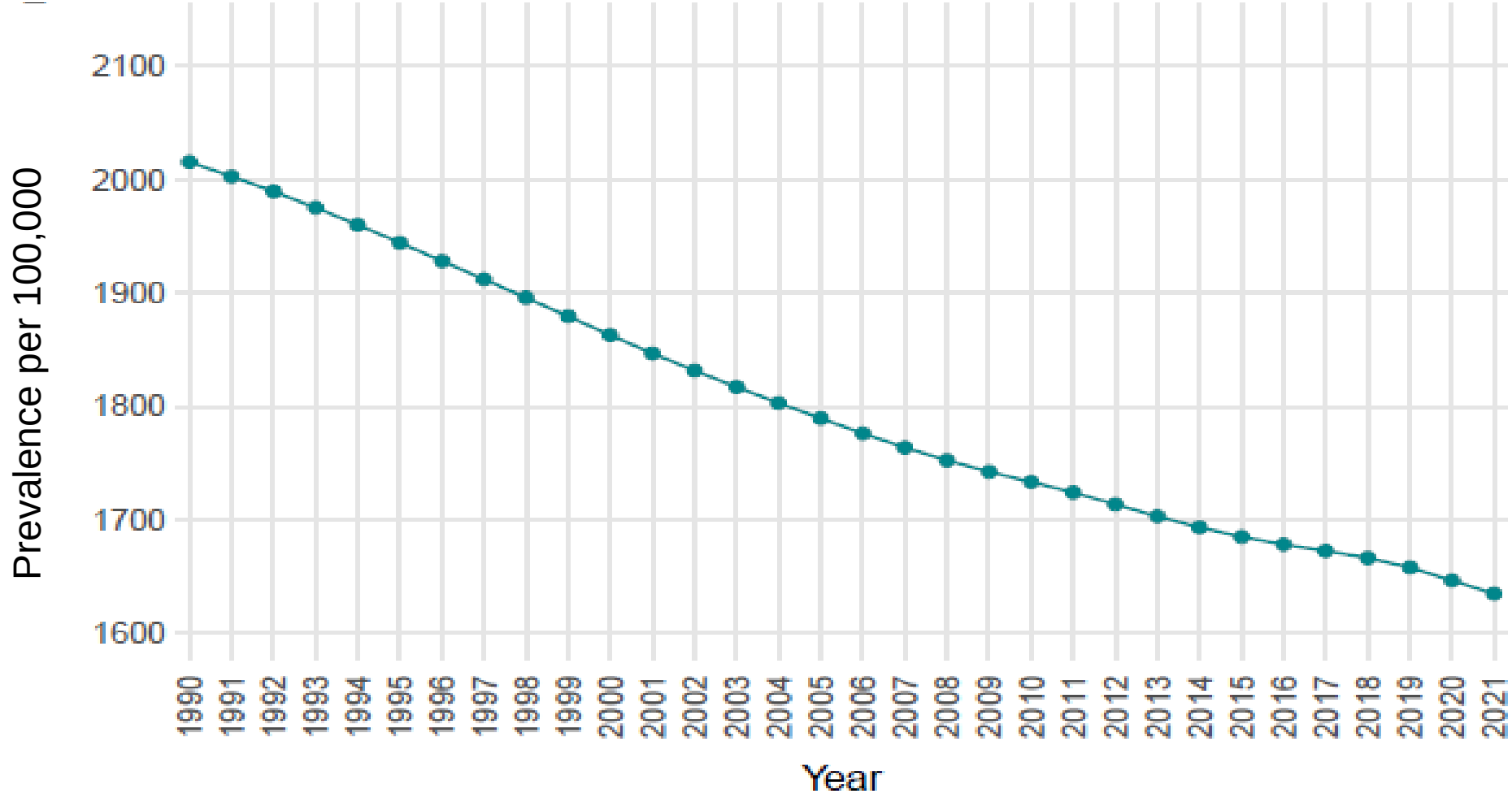
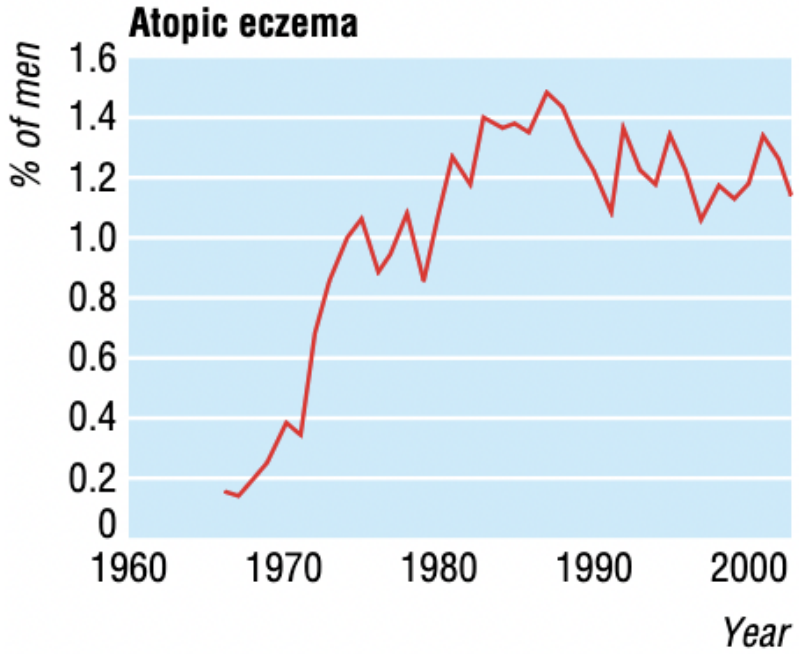
Global AD prevalence has dropped by 20% in 30 years, according to GBD2021

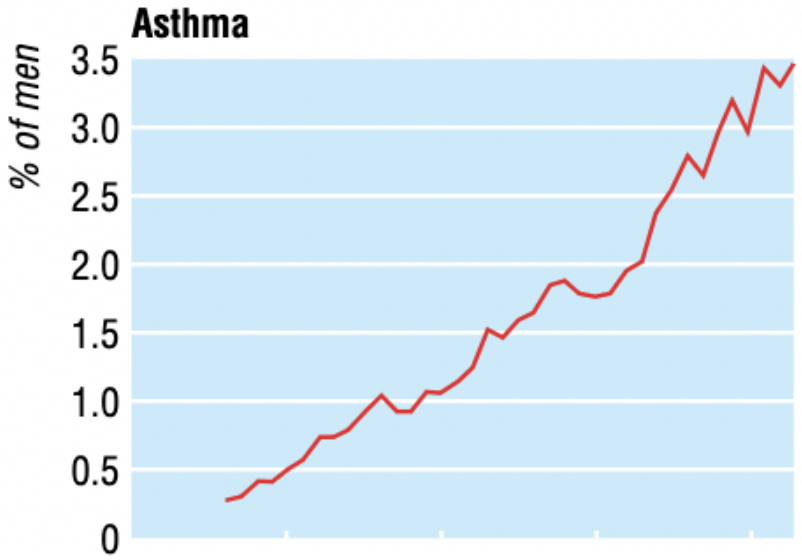


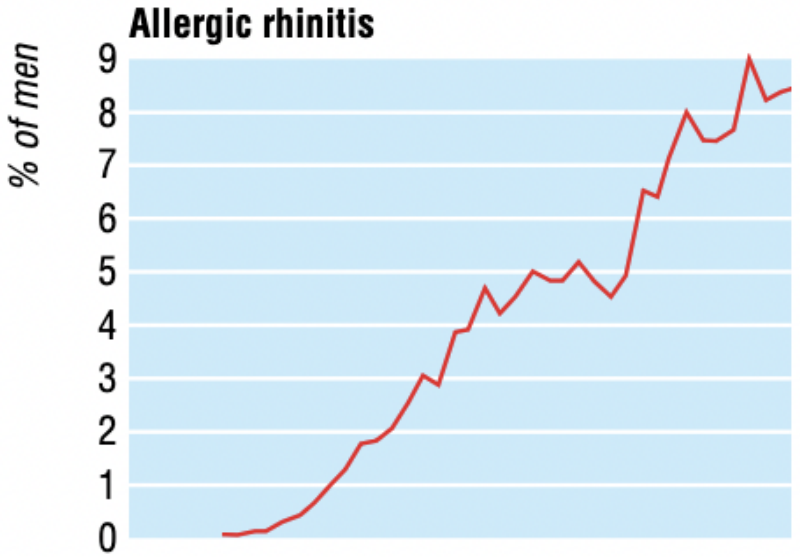
Global Burden of Disease. *IHME (2021)*

Wang, SP *et al*. 2025. *BJD*

6-7 folds of increase in AD in young Finnish men from 1960s to 2000

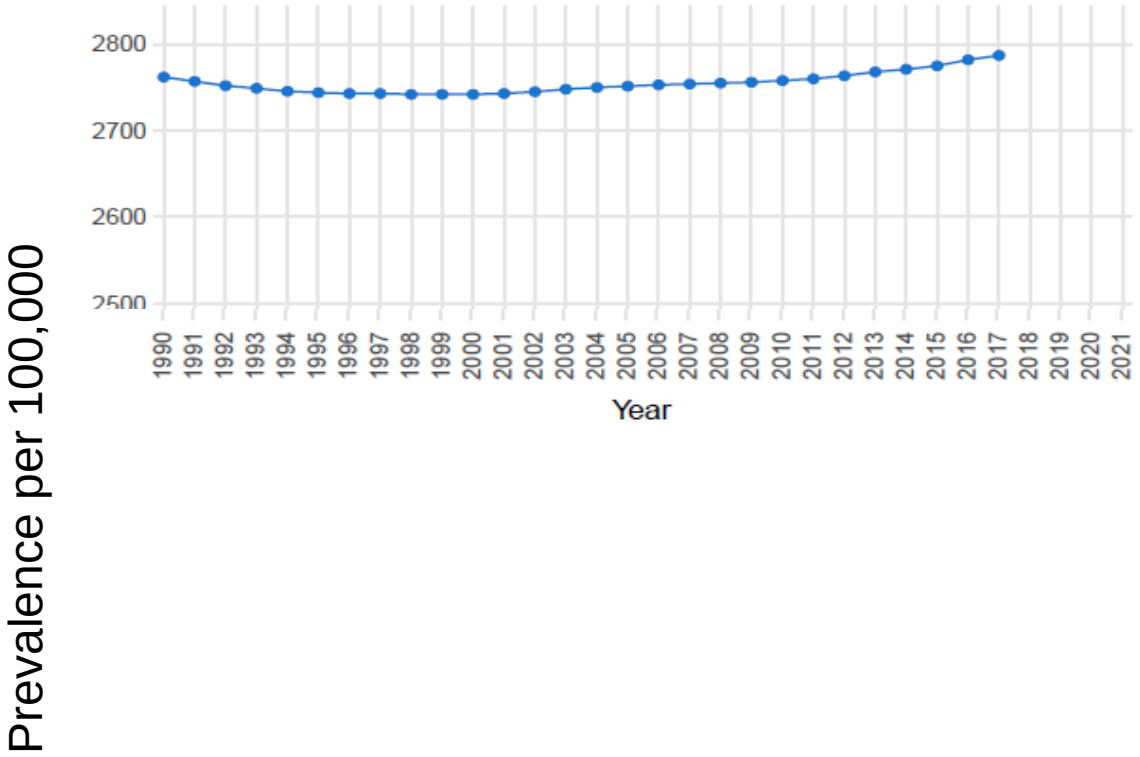






Latvala, J L *et al*. 2005. *BMJ*

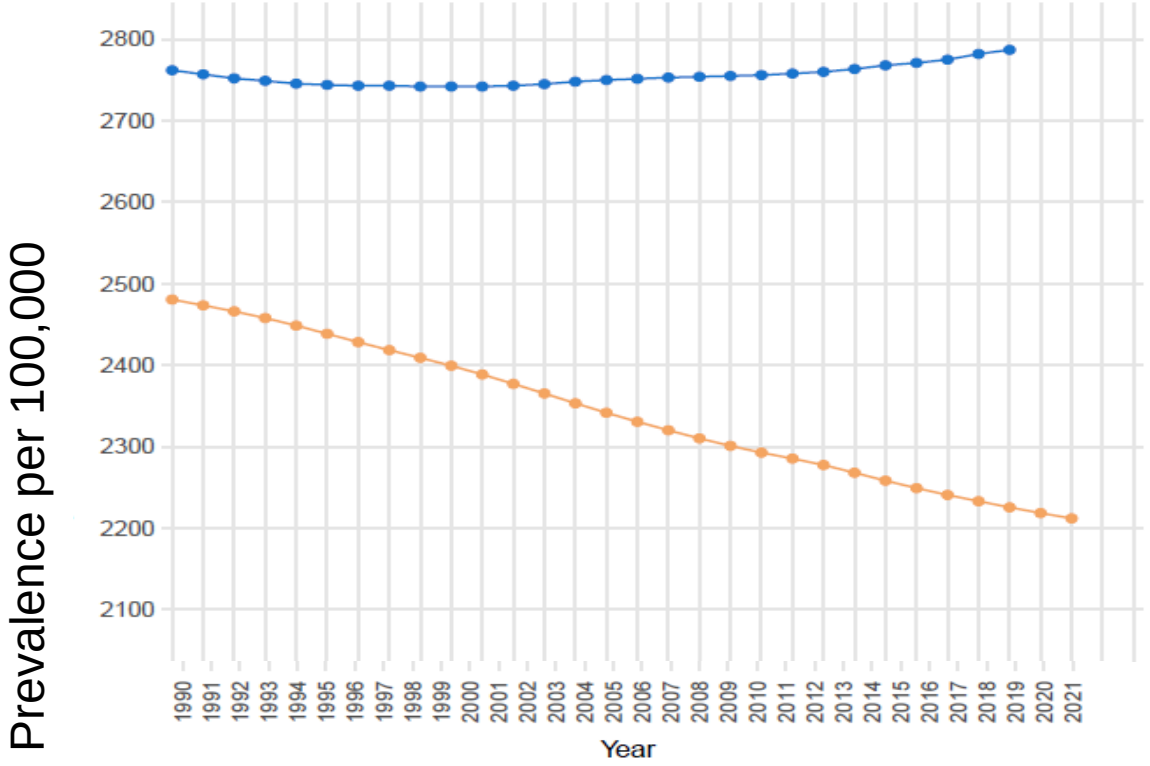
Different conclusions on the global prevalence of atopic dermatitis over the last 3 decades



2750 → 2800 per 100,000

Laughter MR, et al. *Br J Dermatol*. 2021.

Different conclusions on the global prevalence of atopic dermatitis over the last 3 decades



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2500 → 2200

Shin YH et al, *Allergy.* 2023.

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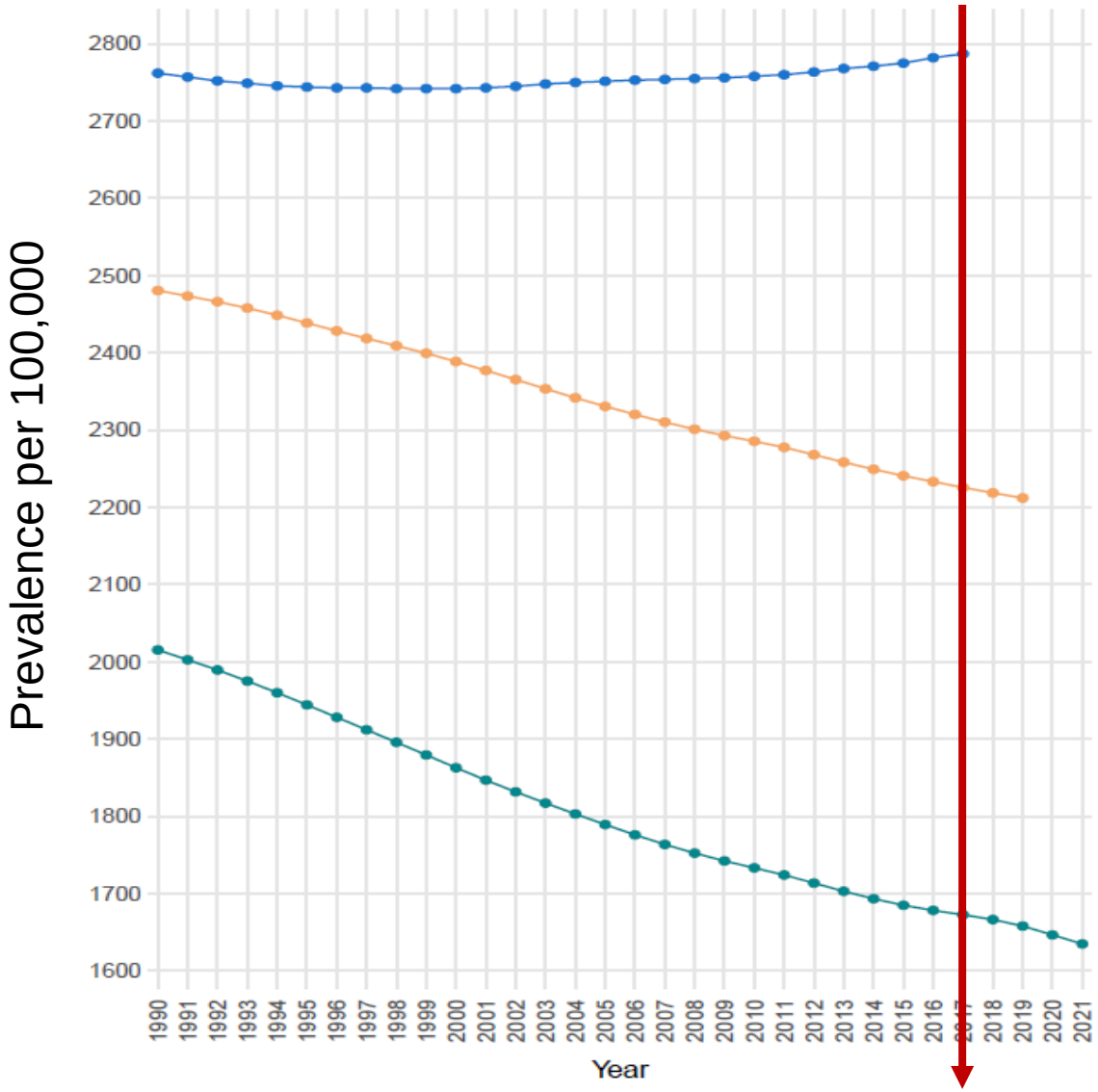

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2500 → 2200

Shin YH et al, *Allergy.* 2023.

2000 → 1600

Global Burden of Disease Collaborators. *Lancet Respir Med*. 2025.

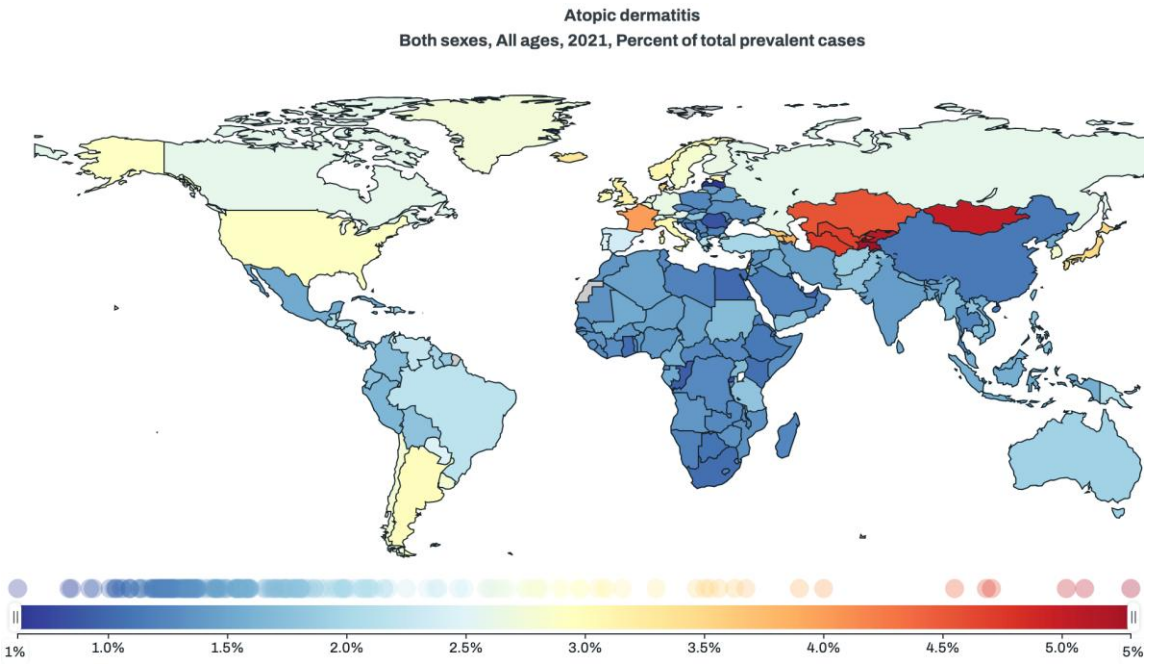
40% decrease

Global Burden of Disease (GBD)

The GBD study is the largest and most comprehensive effort to quantify health loss across places and over time, so health systems can be improved and disparities eliminated.

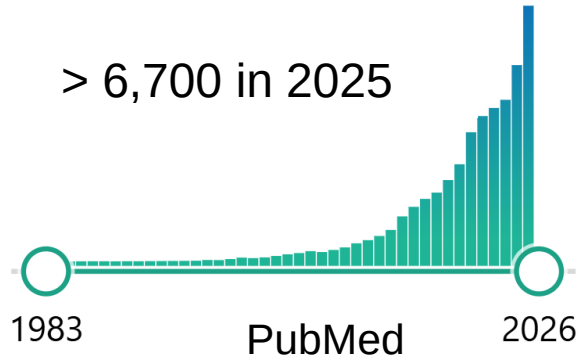
IHME

Atopic Dermatitis age-standardized prevalence, 2021

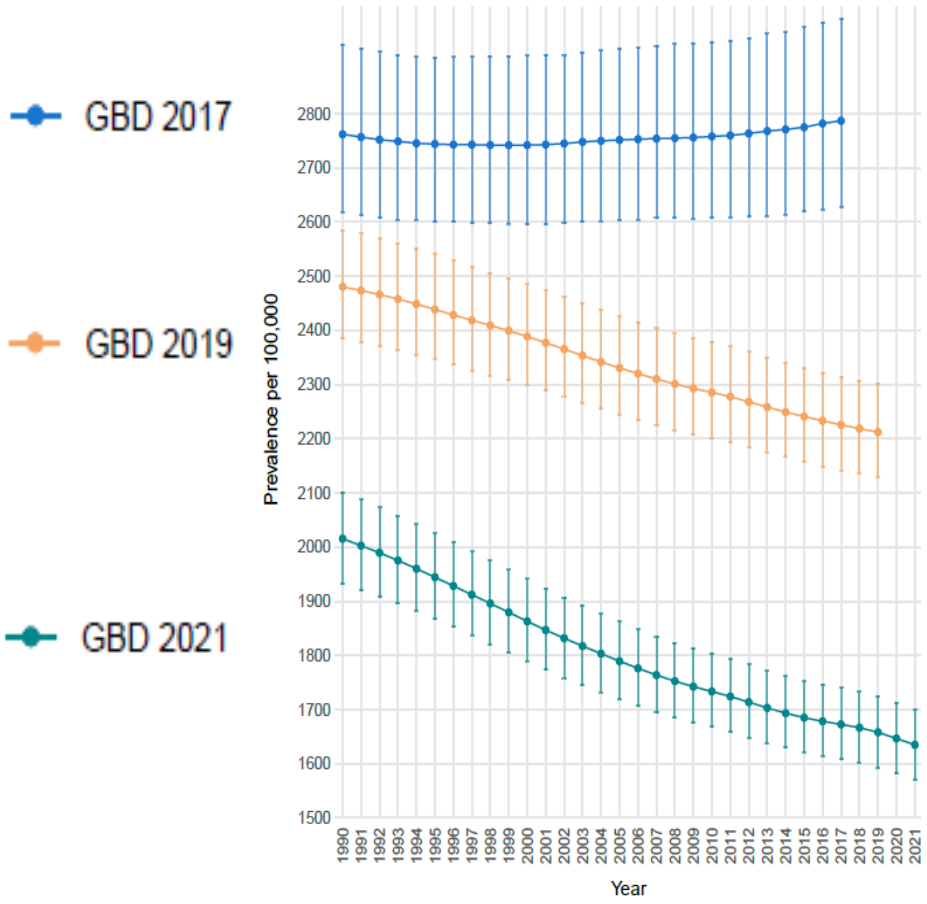


Global Burden of Disease. *IHME (2021)*

- Largest and most comprehensive database to quantify health losses
- “Living database” - estimates released biannually
- More than **39,000 scientific articles**, many of which focus on temporal trends



GBD uses a Bayesian model that updates historical estimates based on new data sources and fills in data gaps



Identify data sources -

last lit review in 2016, added large administrative claims data since GBD2019

Data extraction and harmonization

Estimation -

- Bayesian model generates estimates in sequence at five levels : global, super-region, region, country, and subnational location
- Countries without data sources were assigned imputed estimates

Hypothesis: Changes in the composition of input data are causing the apparent decreases in historical GBD prevalence estimates

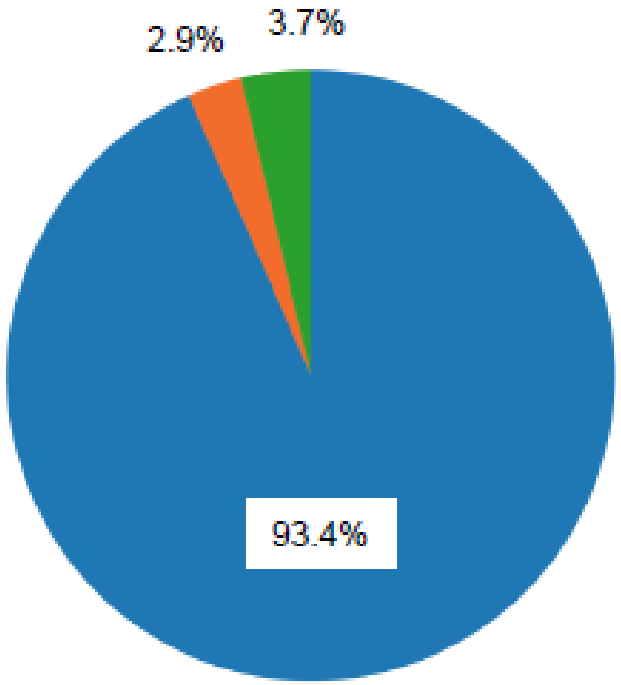
Methods:

1. Examined changes in the temporal and geographic composition of data sources for the GBD over time

2. Compared matched GBD prevalence estimates to reliable population-based estimates, ISAAC Phase 3

Changes in the composition of GBD input data

2017



(N = 272)

Data type

Administrative Claims Data

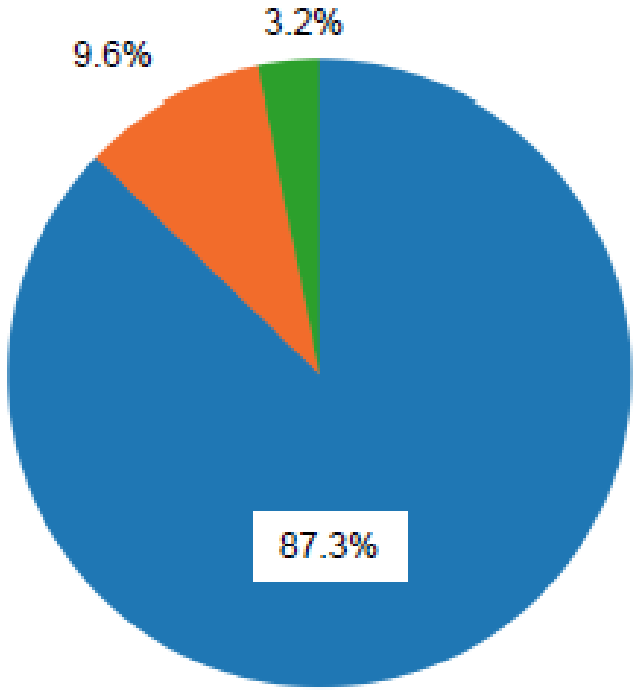
Population-Based Studies

Other

2.9% → 9.6%

93.4% → 87.3%

2021



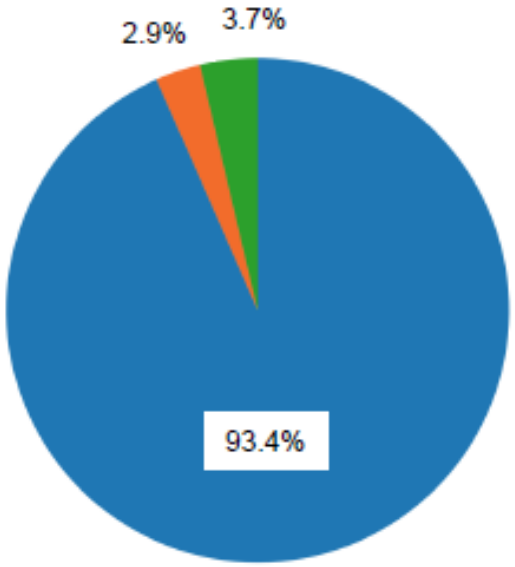
(N = 292)

- Large administrative claims data from **Russia, US, UK, Poland, and Taiwan**

(Unpublished data)

Changes in the composition of GBD input data

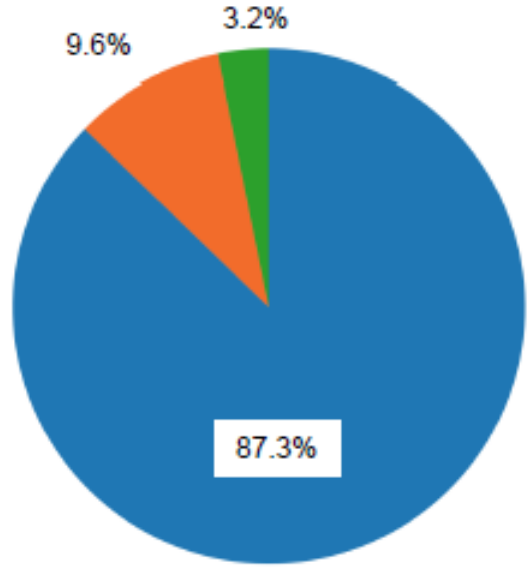
2017



Data type

- Administrative Claims Data
- Population-Based Studies
- Other

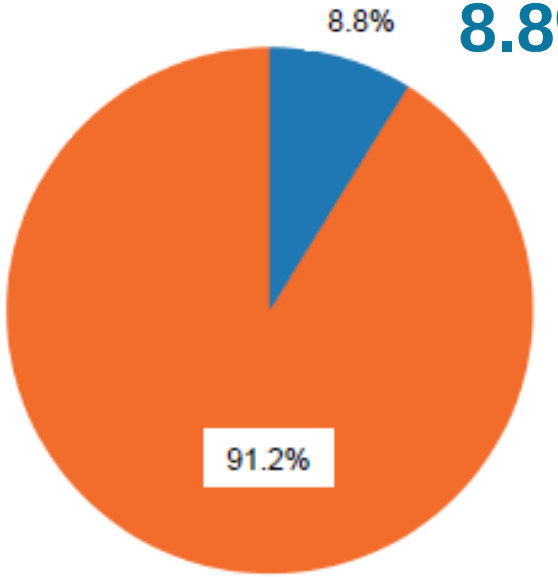
2021

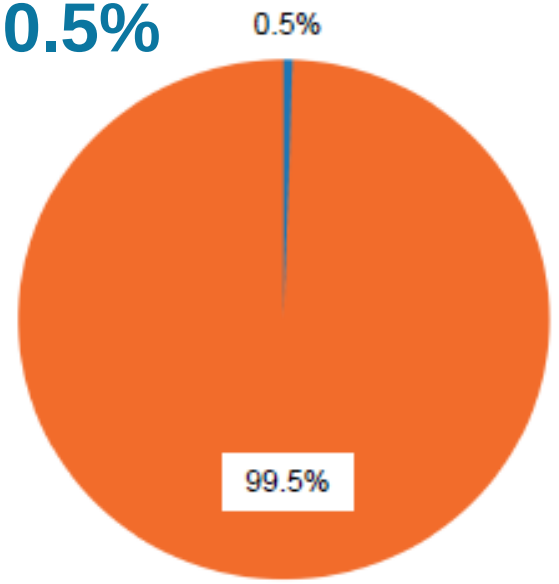


Sample size

8.8% → 0.5%

N = 93 millions

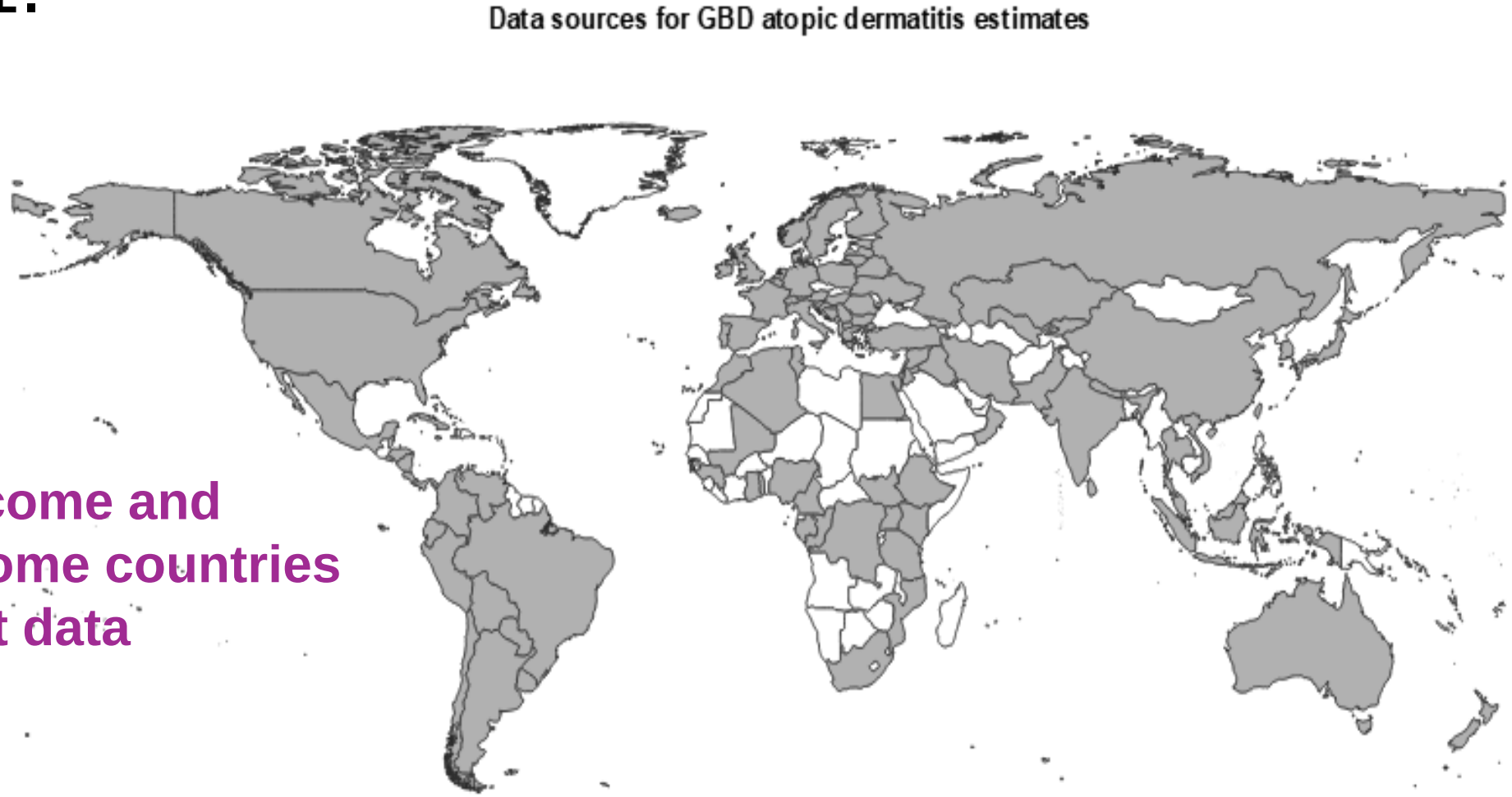




N = 1.7 billions

(Unpublished data)

No input data for 91/203 (45%) countries, especially in lower income countries, unchanged from GBD 2017 to GBD 2021.

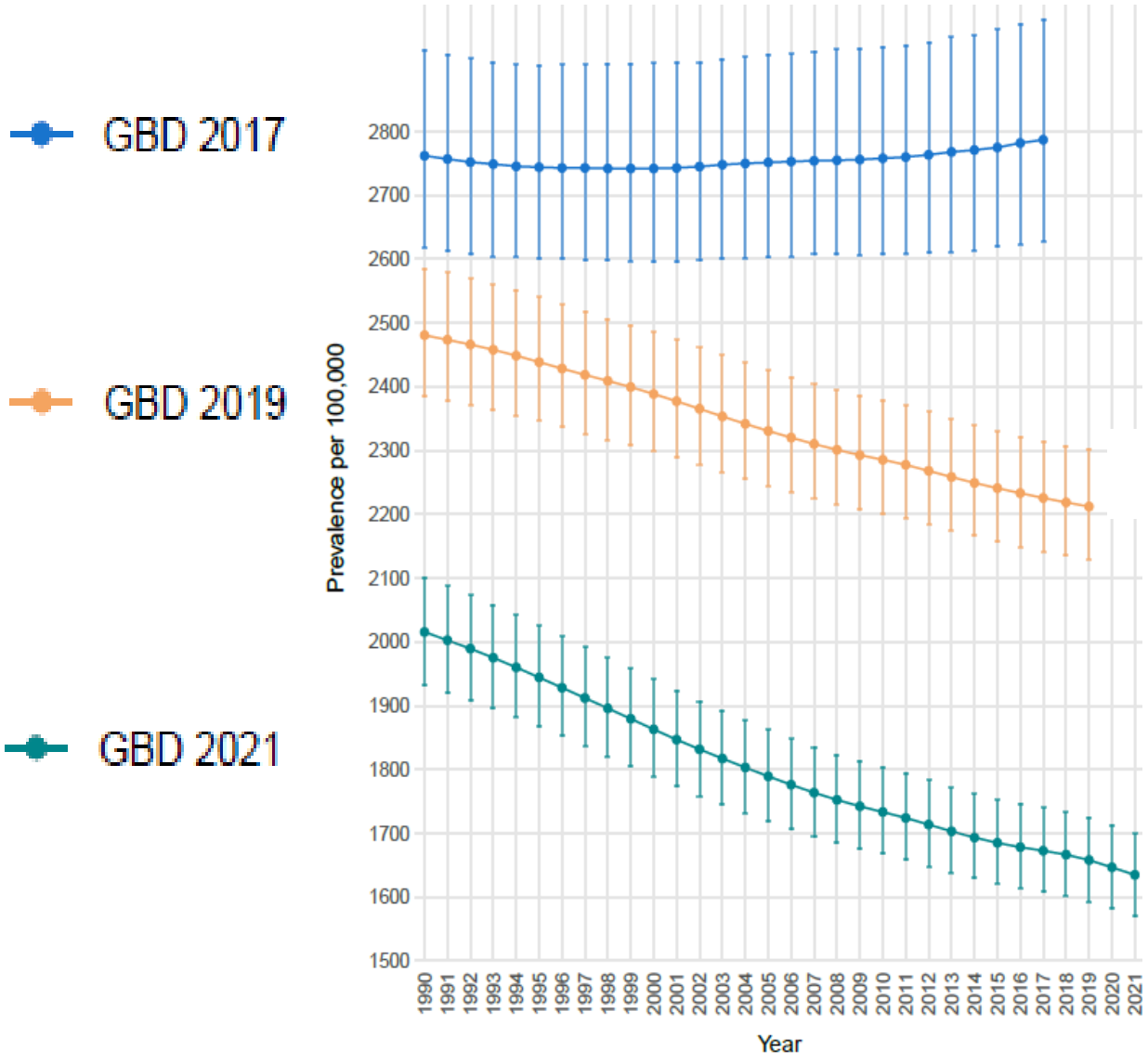


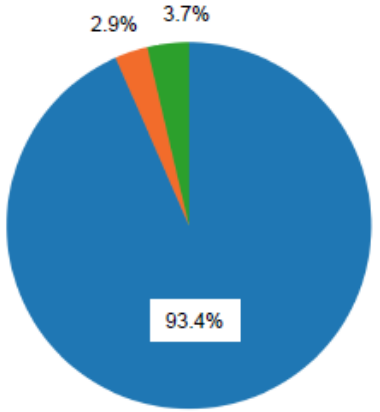
33% of higher income and
58% of lower income countries
do not have input data
(p = 0.0008)

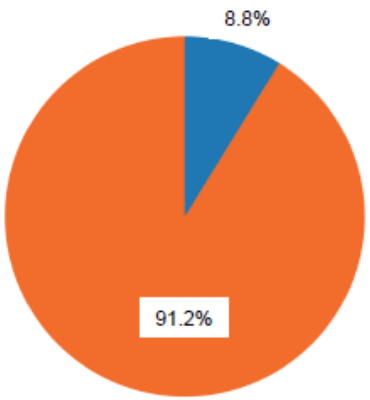
Global Burden of Disease. *IHME (2021)*

(Unpublished data)

Addition of very large administrative claims data is correlated with significant decrease in AD prevalence

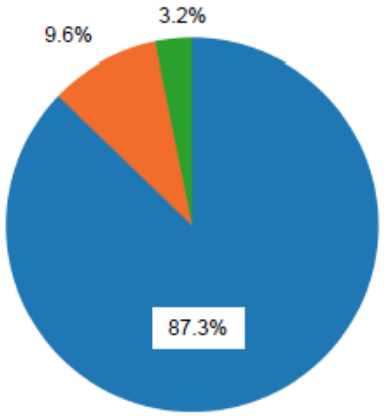


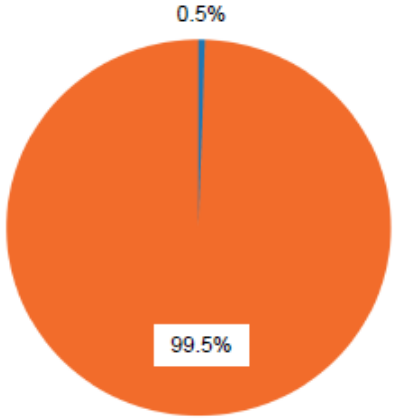




Data source

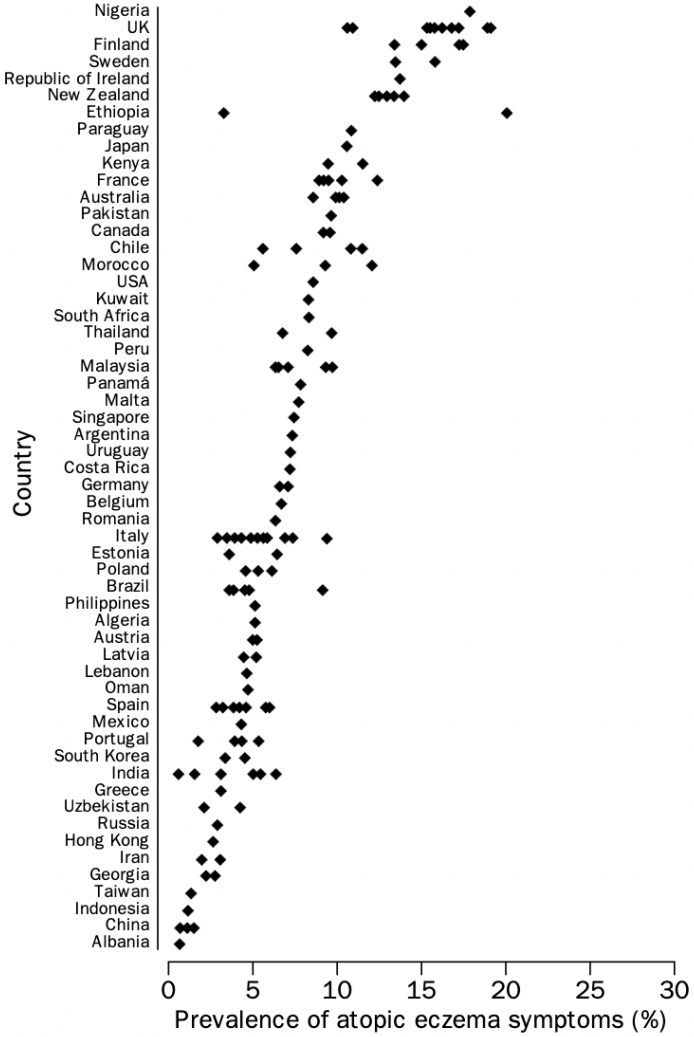
Sample size





Methods: Compared matched GBD2021 prevalence estimates to reliable population-based estimates, ISAAC Phase 3

- **ISAAC Phase 3** - Largest epidemiological study
- 1.2 million children from 245 centers in 97 countries in 2001-2003

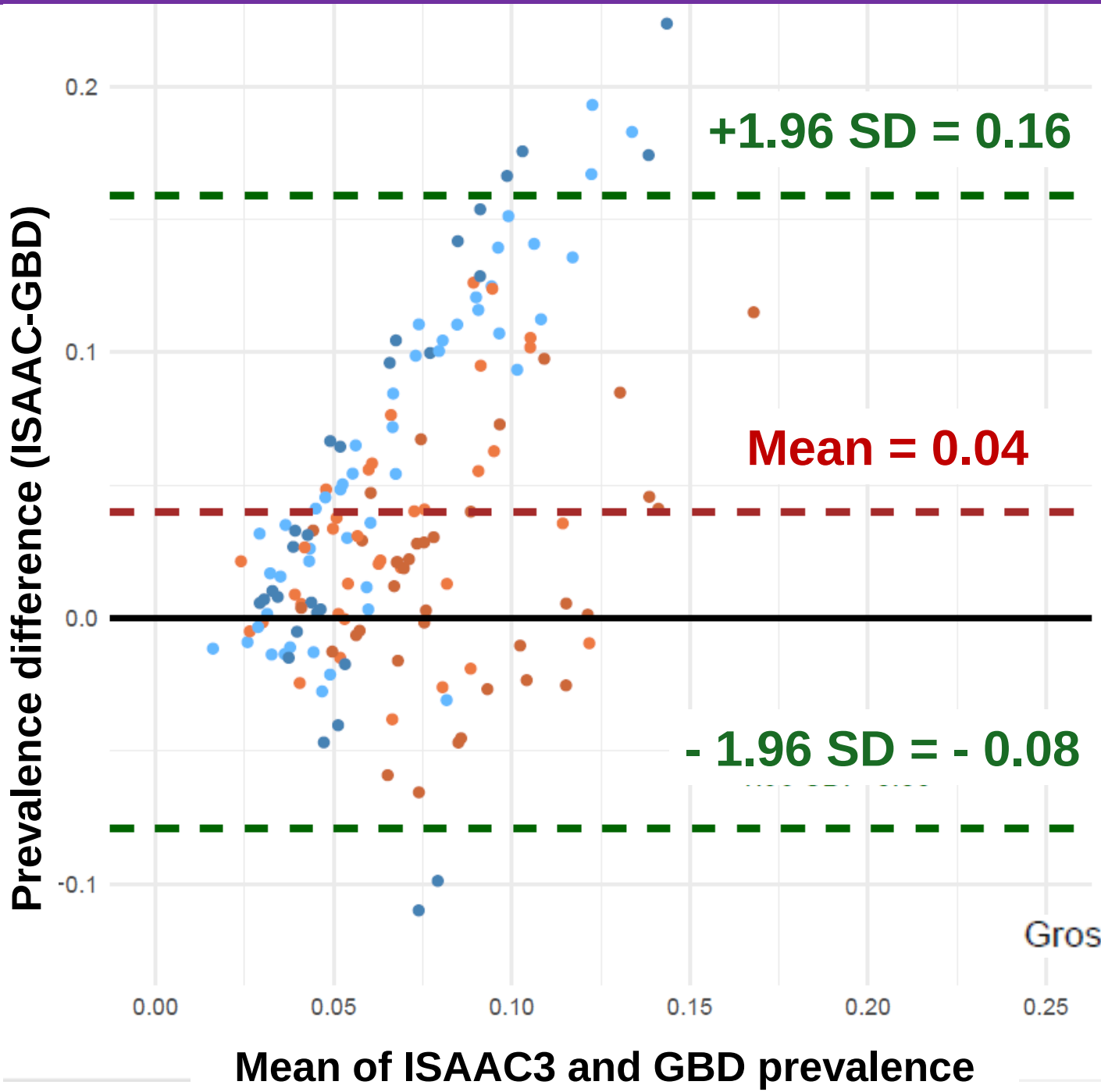


Childhood (ISAAC) Steering Committee, 1998. *The Lancet.*

Poor correlation between population-based and claims-based estimates, especially in lower income countries

Time-, age-, country-matched comparison in **89 countries**

	Pearson Correlation Coefficient (number of countries, p-value)
Overall	-0.133 (89, p = 0.21)
Gross National Income	
High/upper middle	0.203 (40, p = 0.21)
Low/ lower middle	-0.295 (49, p = 0.04)
Region	
Europe	0.494 (26, p = 0.01)
Non-Europe	-0.145 (63, p = 0.26)



- Higher AD prevalence estimates in ISAAC3

- Substantial variability

- GBD underestimates AD prevalence at higher prevalence rates if ISAAC3 is considered a reference standard

- All outliers beyond 2 SDs were from lower income countries

Potential biases by data type

- Population-based and claims-based estimates could ***over***estimate prevalence because of misclassification
- Claims-based estimates could also ***under***estimate prevalence due to access and reflect coding practices rather than population prevalence
- Under-coding may be particularly pronounced for AD

Claims data underestimate AD prevalence, especially in lower-income settings without primary data sources

- Claims-based estimates highly sensitive to the case definition used

US Estimates	Population-based*	Claims- based** (one ICD code)	Claims- based** (two ICD codes)
Children	10.8%	4.2%	1.20%
Adults	7.3%	1.4%	0.40%

- Using claims data from higher income countries to impute AD prevalence in lower-income settings risk masking increases in AD that have historically occurred with industrialization and urbanization

*National Center for Health Statistics Data Brief, CDC. Jan 2023
**Unpublished data from the MarketScan database

Limitations

- Incomplete visibility into GBD’s internal modeling
- Derivatives of country-level atopic dermatitis prevalence estimates from ISAAC3 may not be representative and could introduce selection bias
- Focused on children when examining the agreement between GBD and ISAAC3

Conclusions

- Interpret the trend data from GBD cautiously
- Greater methodological transparency
- Investment to fill data gaps
- Development of pragmatic validation studies to improve accurate adjustment of prevalence from administrative claims data
- Regular evidence synthesis

GADA GLOBAL ATOPIC DERMATITIS ATLAS

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