WHITE PAPER

ZS

# Quantifying inequity: Developing ZS's Health Inequity Treatment Index

A method to inform practical health equity goals for life sciences companies

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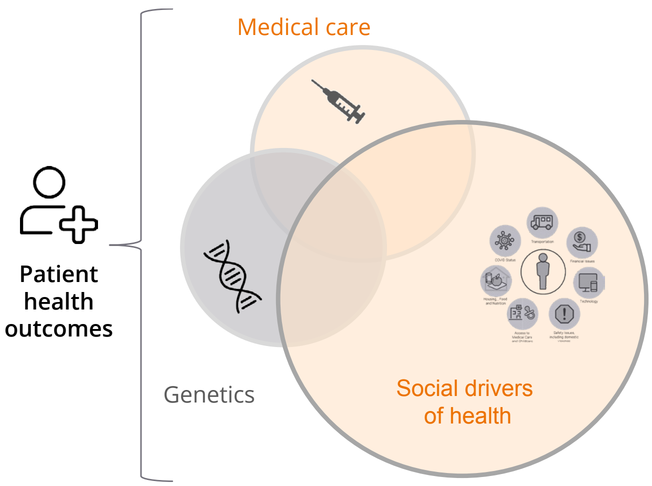
Health equity has become a prominent topic in the life sciences. While its significance has long been recognized in policy making and population health management, pharmaceutical and biotech companies are now adopting more "outcome-focused portfolio strategies" to maximize access and delivery of care. Recent evidence highlights that social drivers of health (SDOH) play a more substantial role in patient outcomes than medical care and genetics alone. As a result, pharmaceutical companies are increasingly integrating health equity strategies into their operational planning to enhance access to medications and improve patient outcomes.

FIGURE 1:

## Despite belief that patient outcomes are mostly determined by medical care and genetics alone, SDOH account for 80% of patient outcomes




**Social drivers of health (SDOH) account for 80% of patient outcomes**

Underserved minorities have been shown to have suboptimal care and higher disease burden across many studies.

**And different SDOH impact different patients differently**

Example: the effects of aging and smoking accumulate over time, but a lack of transportation may cause an immediate impact on a patient's journey.

Sources: Linguamatics, MDPI

Life sciences companies are increasingly incorporating health equity into their operating strategies and investing significantly to drive this momentum. Some examples of successful health equity programs by companies are:

- **Health Equity Innovation Challenge (J&J):** Provides $100 million in funding over the next five years to invest and promote health equity solutions. The program's focus also includes preventing and treating illnesses that disproportionately affect Black and Hispanic communities through new screening and diagnostic technology platforms.

- **COMPASS Initiative (Gilead):** Promotes evidence-based solutions and knowledge sharing on capacity building, addressing the impact of mental illness, building awareness, education and anti-HIV stigma campaigns. The initiative is a 10-year, $100+ million partnership.

- **c-CARE (BMS):** Provides a grant of $1.74 million to the project, which identifies community healthcare workers and trains them to be facilitators of educational modules on cancer education, prevention, early detection through screening, available community resources and navigation to proper screenings and care if needed.

## Why the life sciences need a health equity index

Many life sciences companies have generated insights and quantified health equity gaps. These insights help them focus their efforts to advance health equity. But most companies still don't have a threshold for what "good" looks like and are struggling to establish consistent benchmarks. ZS has developed a Health Inequity Treatment Index (HITI) to define a consistent methodology for quantifying inequities in treatment across various therapy areas to help set tangible and practical health equity goals for life sciences companies. The HITI incorporates the following nuances:

- **Therapy area and product class specificity:** It's tailored to specific therapy areas and product classes, providing life sciences companies with a clear view of care inequities within their own domains.
- **Comparability across diseases and drug classes:** It ensures comparability across different diseases and drug classes, helping life sciences companies understand how equitable their treatment is relative to other drug classes and therapy areas.
- **Geographical differentiation:** It includes differentiation by geographies, enabling life sciences companies to develop highly targeted strategies.

This approach aims to help life sciences companies establish a benchmark for equitable care and create actionable plans to address treatment inequities.

## How ZS's HITI is different from other health equity indices

There are several indices that measure health equity as well as SDOH-related indices that are currently used across public health organizations and healthcare companies. Some independent research suggests that the number of such indices can reach into the hundreds. Some of the most commonly used indices include:

- **Area Deprivation Index (ADI):** This measure assesses the level of socioeconomic disadvantage in a given geographic area by combining various indicators that reflect economic, social and housing conditions. ADI is often used in public health and social science research to identify areas that may require additional resources and interventions to address disparities and improve overall well-being.
- **Health Equity Summary Score:** Assesses the extent to which care provided through Medicare Advantage contracts was equitable based on race, ethnicity and dual- or low-income subsidy eligibility status.

- **Healthy Places Index or Social Deprivation Index (SDI):** Similar to ADI, the SDI considers various socioeconomic factors, but focuses more on the social aspects of deprivation. The SDI aims to identify and measure the social challenges and disadvantages faced by populations in different areas.

- **Neighborhood Deprivation Index (NDI):** This measure evaluates the level of deprivation in specific neighborhoods by combining various socioeconomic indicators to assess overall well-being and quality of life in different areas.

Despite the abundance of indices in the industry, they do not give insight into the direct issues that the life sciences sector faces in advancing health equity, specifically:

- **Lack of disease area specificity:** Common health equity indices often fail to reflect the needs of specific patient cohorts; they discuss populations broadly. Life sciences companies largely operate within specific disease areas and would benefit from a direct line of sight into equity metrics by disease.

- **Lack of product and product class specificity:** There may be additional inequities across product or product classes in a therapy area. Differences in life cycle (branded or generic), insurance coverage, route of administration and awareness among patients and HCPs may drive these inequities. The ability to zoom into product classes and products allows more apt comparisons.

These considerations informed the need to develop a life sciences-specific HITI. The ZS HITI is based on specific patient cohorts (informed by healthcare claims data), their treatment (by product groups and classes), specific demographic information and their geographic locations. ZS developed health equity indices for the following therapy areas: heart failure, type 2 diabetes, HIV treatment, obesity, non-small cell lung cancer, multiple sclerosis and rheumatoid arthritis.

# Answering the question ‘How are treatments distributed among groups of patients?’

The HITI is a treatment-specific version of the well-established Gini Index in economics, usually used to measure income inequity within countries. The HITI is calculated based on the **inequality of treatment use among sociodemographic patient cohorts.** At a high level, we compare how many diagnosed patients are in each cohort versus the treated patients in those cohorts. The sociodemographic factors that we use to define the patient cohorts are:

- Age: Older (≥65 years) and younger (<65 years)
- Income: Above $75K household income and below $75K household income
- Race: White, Black and Hispanic
- Gender: Men and women

These factors combine to form 24 unique patient groups, for example:

- Black, below $75k income, men, above the age of 65 years
- White, below $75k income, men, above the age of 65 years
- Hispanic, above $75k income, women, below the age of 65 years

A key consideration is that the HITI considers the **variations in treatment** between patient cohorts, but **not the overall magnitude in treatment** itself. The HITI makes an evaluation of the disparity between groups, but not a comment on overall care access within the therapy area. (See appendix for more details on the calculation methodology.)

# What the HITI can tell the life sciences

The HITI creates a common standard that measures treatment inequities across patient, diseases and medicines. We will share some common trends below. However, each patient population, disease, therapy area and even drug class will have its own nuances and disparities by different populations, and it’s important to investigate each situation separately.

1. **HITI varies significantly by disease.** Heart failure (HF) and rheumatoid arthritis (RA) show lower inequities, whereas obesity and multiple sclerosis (MS) show much higher levels of inequities. Generally, diseases where broadly available treatments exist (for example, beta blockers for HF and methotrexate for RA) show lower levels of inequities.

FIGURE 2:

## HITI ranges from 11.1 with heart failure showing lower inequities to 324.0 with MS showing much higher levels of inequities

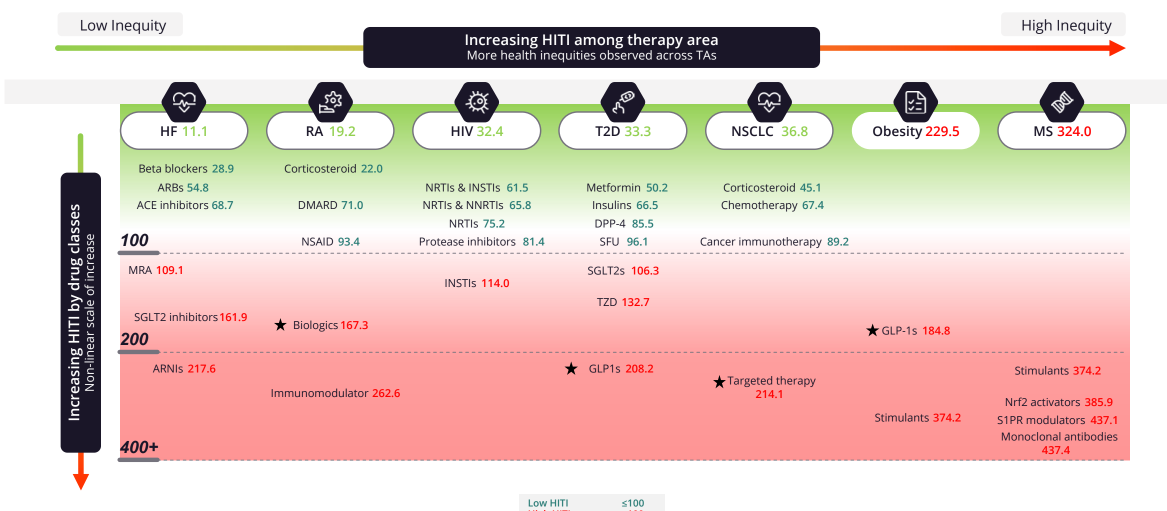

2. **Within a disease, HITI varies by drug classes.** We see higher HITI for more novel and expensive medications that are often the standard of care (for example, GLP-1s in obesity, biologics in rheumatoid arthritis, etc.). Even very equitable disease areas—diseases with low HITI—can exhibit high inequities in how high-quality treatments are used.

Note: We recognize that some variations in the treatment for different sociodemographic factors (age, gender, income, race or ethnicity) are clinically relevant. The decision to add and remove specific factors is a disease-level exercise that can be easily incorporated into HITI. For example, multiple sclerosis, a disease with a high HITI of 324, shows lower HITI when split by age:

- HITI (<65 years) 31.0
- HITI (65+ years) 102.6

FIGURE 3:

## Obesity and MS show the highest inequities in treatment (high HITI), with further inequities observed within targeted medications and standards of care like GLP-1s in T2D

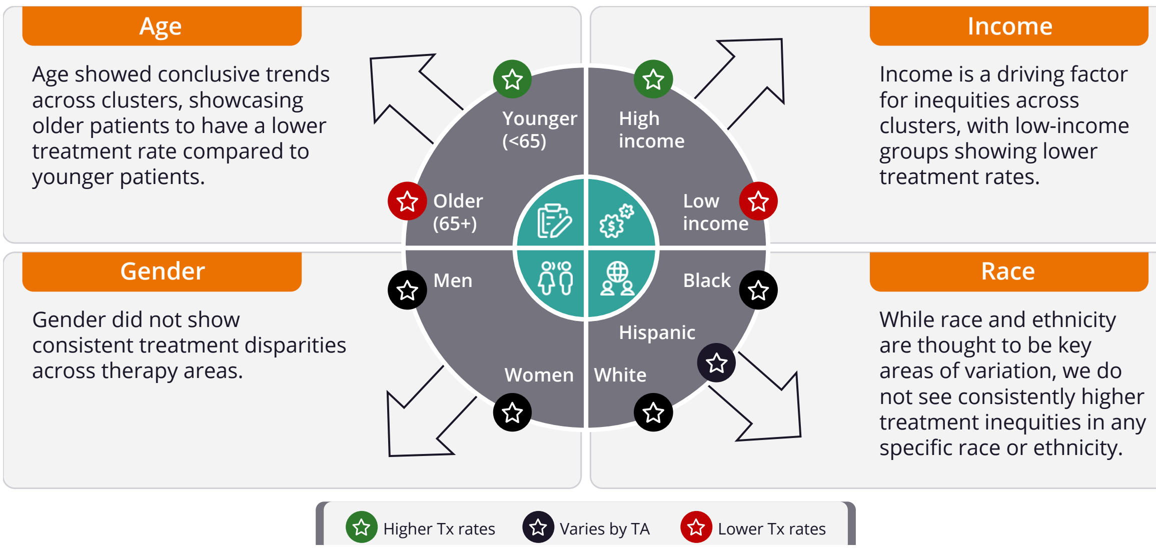



*HITI for drug classes between TAs are not comparable

3. **Key social factors contribute to variations in HITI.** Age and income were the biggest drivers of increasing HITI across therapy areas, with patients of older age (>65 years) and lower income (<$75K household income) having consistently lower treatment rates across the disease areas. Gender and race do contribute to differences in HITI, but to different degrees and directions across disease areas. For example, female patients had higher treatment rates in MS, but lower treatment rates in HIV.

FIGURE 4:

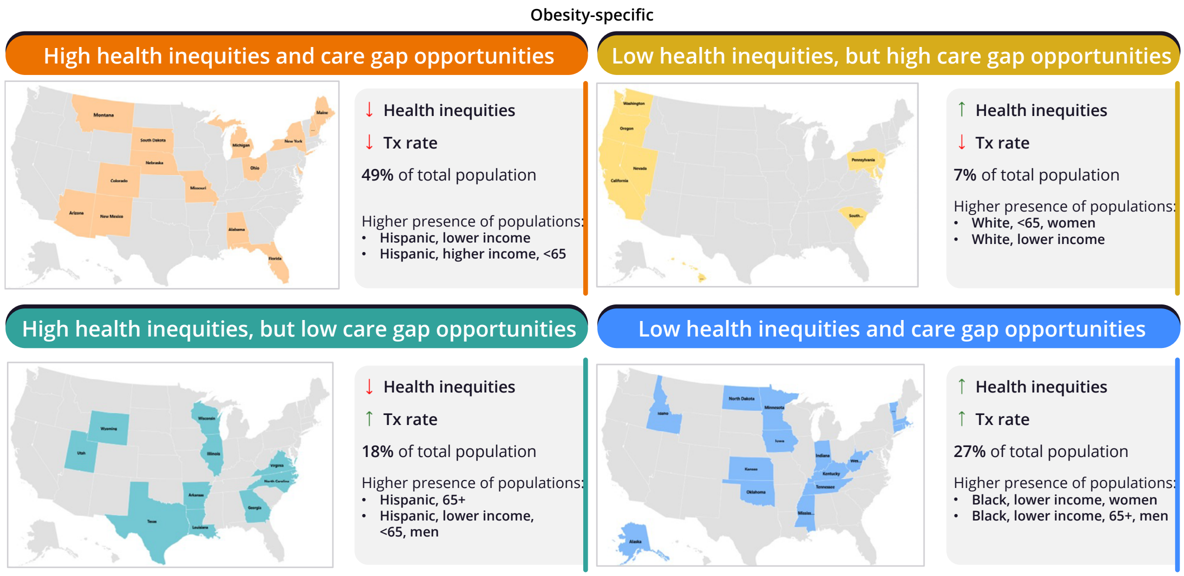
### Age and income exhibit consistent disparities across diseases, but identifying race and gender disparities requires investigation of the specific disease in question




4. **Geographic variations in HITI.** When we look at HITI by geography, we are looking through a different lens—patient cohorts within a particular geography (in our example, the U.S.). As described above, the HITI is designed to measure treatment inequities, but not the overall treatment rate. Therefore, it is instructive to look at both HITI and treatment rate simultaneously to understand the issues in a geographic area.

FIGURE 5:

## Each archetype has a specific health equity or care gap strategy that can be implemented to improve patient outcomes




The combined HITI and treatment rate approach provides a framework for life sciences companies to prioritize geographies. Health equity-focused programs should be deployed in geographies with high treatment inequities, whereas standard marketing and sales tactics may be more appropriate in geographies with low treatment rates overall. Note that standard tactics may create inequities and should be approached with a patient-inclusive mindset.

In the example above for obesity, we see that certain states, such as Florida and Texas, show high inequities in obesity and GLP-1 treatment and should be targeted for health equity programming. In other states such as California and Pennsylvania, marketing and population health management tactics with an equity mindset may be more appropriate. As a result, the HITI can be used as a directional guide to life sciences companies on how they may want to think about approaching different geographies and implementing different health equity-focused programs dependent on the therapy area or product of interest.

APPENDIX

# Developing the HITI methodology

To quantify inequities, Gini Indices are calculated for individual therapy areas, product classes and geographies based on differences in treatment rates. The Gini Index, also known as the Gini Coefficient, is a measure of statistical dispersion used to represent the income or wealth inequality within a nation or social group. Economists and policymakers use the Gini Index to understand economic disparities, compare different countries or regions and develop strategies to address income inequality.

The Gini Index is a number between zero and one, such that:

- **Zero** represents perfect equality, where everyone has the same income
- **One** represents perfect inequality, where a single individual earns all the income

The Gini Index is calculated based on the Lorenz Curve, which plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. In practical terms, lower Gini Index values indicate more equal income distribution and higher Gini Index values indicate more unequal income distribution.

Application of Gini Index to calculate HITI: Applying this methodology with a health equity lens allows us to identify and address disparities in treatment access and outcomes. A similar general application of the Gini Index to calculate income inequality was used to calculate HITI based on the equal or unequal treatment rates observed across the 24 patient cohorts described above. Figure 6 shows more information on the HITI calculation. To amplify the differentiation in indices, they have been multiplied by 1,000.

FIGURE 6:

## Principles and applications of Gini Index were used to quantify the HITI to better understand inequities both across and within therapy areas

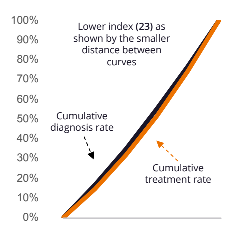
We used the Gini Index1 methodology (summary measure of inequality of outcomes) to create an HIT Index (HITI).

The Gini Index ranges from 0 to 1: 0 ← Gini index → 1

0: Perfect equality — 1: Perfect inequality

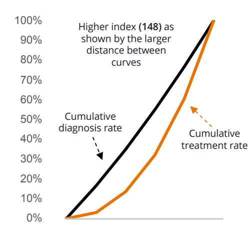
**Lower inequity example**
HITI= 23

| Cluster | Diagnosed patients | Treated patients |
|---|---|---|
| A | 10,000 | 30% |
| B | 11,000 | 32% |
| C | 12,000 | 34% |
| D | 13,000 | 36% |
| E | 14,000 | 38% |




**Higher inequity example**
HITI= 148

| Cluster | Diagnosed patients | Treated patients |
|---|---|---|
| A | 10,000 | 10% |
| B | 11,000 | 35% |
| C | 12,000 | 50% |
| D | 13,000 | 75% |
| E | 14,000 | 90% |




**Actual calculations of HITI have been multiplied by 1,000 to showcase clear distinctions.**

## About the data

**Data attribution:**

- Symphony health data source: Symphony Health, Integrated Dataverse (IDV)®
- Time period of data extract: Overall data extracted for January 1, 2016, through June 30, 2023, with the analysis focusing on January 2021 through December 2022
- Caveats or notations: Unprojected deidentified patient Rx and medical claims
- Date that data is being reported: February 2024

The data set included patients who were diagnosed with at least one of the seven therapy areas based on a series of diagnosis, procedure and treatment codes from January 2021 to December 2022. Follow-up analyses requiring a lookback period used data from a four-year time period (January 2016 to December 2020) and analyses requiring a look-forward period used data from January 2023 to June 2023 for the same set of patients. The SDOH metrics (race, education, gender, income and age) that were used for this analysis were also found within the Symphony Health claims database at a patient level.

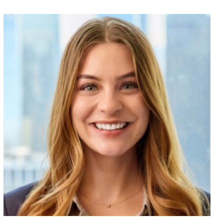
**Imputation:** The data set had multiple patients without complete SDOH identifiers (~40% of patients had at least one missing SDOH identifier). To this end, the Faiss imputation technique was used to impute the values for the missing SDOH field(s). The model was trained on a set of "gold standard" patients (patients with complete SDOH data) and tested on another set of "gold standard" patients with intentionally hidden SDOH values (for the purpose of testing the accuracy of the imputations) with high degree of accuracy (~82% in the "test" gold standard patients). The model then was used to impute the missing values for the 40% of patients with missing SDOH values. For the variables where Faiss did not have high rates of imputations, county averages were used.

# About the authors

**Vaibhav Bansal** is a leader on the Real-World Data & Insights (RWD&I) capability team at ZS. He has been working with global life sciences companies for more than 14 years, helping design and deploy innovative solutions to bring sales and marketing excellence. Vaibhav has a unique capability of identifying the unmet patient need across the disease and treatment journey and helping develop strategies to mitigate them. Over the years he has developed RWD&I and AI-driven transformations around go-to-market strategy, customer engagement and patient service for life sciences companies across the globe.

**Nan Gu** is a member of ZS's patient health and equity team, focusing on health equity research and partnerships across healthcare. He is also a member of the healthcare ecosystem team, where he helps to create innovative solutions to address the evolving healthcare landscape. Recently he has focused on health equity and the role life sciences companies can play in addressing these issues. Nan has extensive experience in oncology, rheumatology and other specialty therapeutics. He has also helped companies better understand organized customers, such as payers and providers, and has designed and implemented customer engagement models.

**Saptarshi Mukherjee** has helped drive advanced analytical problem solving across multiple global clients. He has been responsible for designing and leading innovations using patient analytics and AI and machine learning and currently leads multiple engagements onshore as a manager in the RWD&I capability team at ZS. Saptarshi has a blend of deep analytics and healthcare domain expertise and has been a key driver of health equity and care gap-focused analytics, outcome and cost of care assessment, patient identification and patient journey analytics. Saptarshi has also helped teams with sales and marketing strategies.



**Britney Mazzetta** is a member of the RWD&I capability team within the broader business insights and analytics space at ZS. Britney has focused on generating patient insights using real-world data, AI and machine learning and other analytics techniques to answer business questions. Through her health equity work, she has used analytics to help organizations and product-specific teams understand where there may be gaps in care, which patients may be underserved and how we can use analytics to create a more equitable opportunity for patients.

# About ZS

ZS is a management consulting and technology firm that partners with companies to improve life and how we live it. We transform ideas into impact by bringing together data, science, technology and human ingenuity to deliver better outcomes for all. Founded in 1983, ZS has more than 13,000 employees in over 35 offices worldwide.

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