Health Equity from an Actuarial Perspective
Managing Population Health

Rebecca Sheppard, MAAA, FSA, MHS, Co-Chairperson, Health Equity Committee
Cori Uccello, MAAA, FSA, FCA, MPP, Senior Health Fellow

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About the Academy

- The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues.
- The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

For more information, please visit:

www.actuary.org

Why actuaries care about health equity

- Key health decision-makers rely on actuaries for advice
- Unique skillset to quantify costs of health disparities to the health care system
- Commitment to identifying and addressing issues on behalf of the public interest
- Desire to explore and understand whether any actuarial practices inadvertently lead to or exacerbate health disparities and inefficient use of health care dollars
- Potential to use actuarial principles to reduce health disparities and improve health outcomes

American Academy of Actuaries
Health Equity Committee

- Created to contribute actuarial perspective to health equity
- Focus:
  - Evaluate actuarial practices in the context of health equity
  - Educate actuaries and other stakeholders on health equity issues
  - Apply an equity lens when considering the impact of current or proposed health care policies

Definitions used by the Health Equity Committee

Health Equity: Everyone has a fair and just opportunity to be as healthy as possible. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care.

Health Disparities: Differences in health or its key determinants that adversely affect marginalized or excluded groups. Disparities in health and in the key determinants of health are the metric for assessing progress toward health equity.

Social Determinants of Health: Nonmedical factors such as employment, income, housing, transportation, child care, education, discrimination, and the quality of the places where people live, work, learn, and play, which influence health.

Source: Braveman P, Arkin E, Orleans T, Proctor D, and Plough A, *What Is Health Equity And What Difference Does a Definition Make?* Princeton, N.J.: Robert Wood Johnson Foundation, 2017.

Initial phase—Discussion brief developed a list of questions and topics to explore further

MARCH 2021

Health Equity from an Actuarial Perspective
QUESTIONS TO EXPLORE

Actuaries are adding their voices to the national conversation on health equity. The American Academy of Actuaries Health Practice Council has formed the Health Equity Work Group, whose goal is to contribute to efforts to reduce health disparities and improve health equity. The work group will examine health actuarial practices and methods to assess the extent to which they may affect health disparities and recommend changes when appropriate, educate actuaries and other stakeholders on health equity issues, and apply an equity lens to the Academy's health policy work.

This discussion brief acts as a framework to introduce the first phase of the work group's work—identifying areas in which health actuaries are involved that may affect health equity, and developing a list of questions and topics to explore further. While through its exploration and analysis the work group may find that some actuarial methods and practices help mitigate health disparities, it may find that others —no matter how well-intentioned —could be perpetuating long-standing health inequities and inadvertently leading to poor health outcomes and an inefficient use of health care dollars. In general, actuaries focus primarily on identifying and managing financial risk. The questions below help broaden the scope of the work group's considerations to include non-financial outcomes, such as health outcomes and health disparities, when considering the effects of actuarial practices. By sharing information on the work group's process, including on these initial questions and the efforts to start to answer them, the aim is to initiate a more focused health equity dialogue from an actuarial perspective, and deepen the understanding of this complex issue, which could eventually lead to effective solutions.

The Health Equity Work Group has found it instructive to refer to the following definitions in its work:

Health equity means that everyone has a fair and just opportunity to be as healthy as possible. This requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care.

Health disparities are differences in health or its key determinants that adversely affect marginalized or excluded groups. Disparities in health and in the key determinants of health are the metric for assessing progress toward health equity.

Social determinants of health are nonmedical factors such as employment, income, housing, transportation, child care, education, discrimination, and the quality of the places where people live, work, learn, and play that influence health.

Source: Braveman P., Arkin E., Orleans T., Proctor D., and Plough A. What Is Health Equity? And What Difference Does a Definition Make? Princeton, NJ: Robert Wood Johnson Foundation, 2017.

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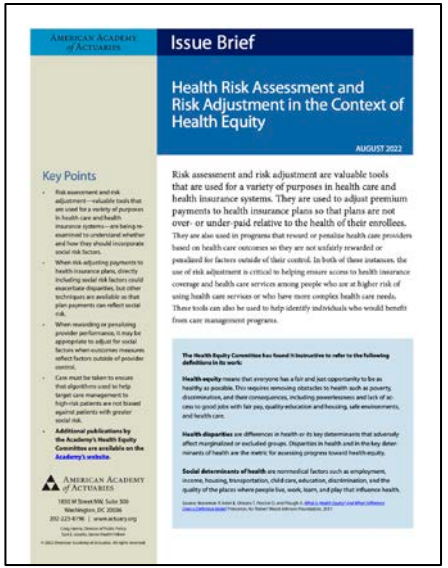
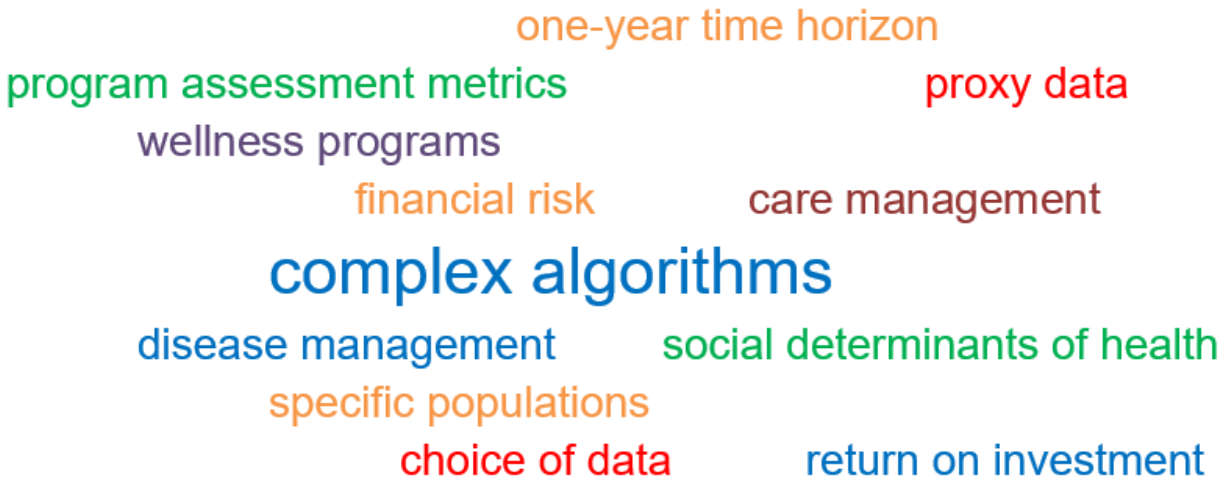
- Comprehensive list served as starting point for further analysis
- Four areas of focus:
  - Health plan pricing
  - Health plan benefit design
  - Provider contracting and network development
  - Population health management

Subsequent papers explored issues in more detail



Health equity and managing population health

In what ways can efforts to assess health risks and efforts to address these risks affect health disparities?



Population health definitions

- Population health: health outcomes of a defined group of individuals, including the distribution of such outcomes within the group
- Population health management: the processes used to improve health outcomes of a population

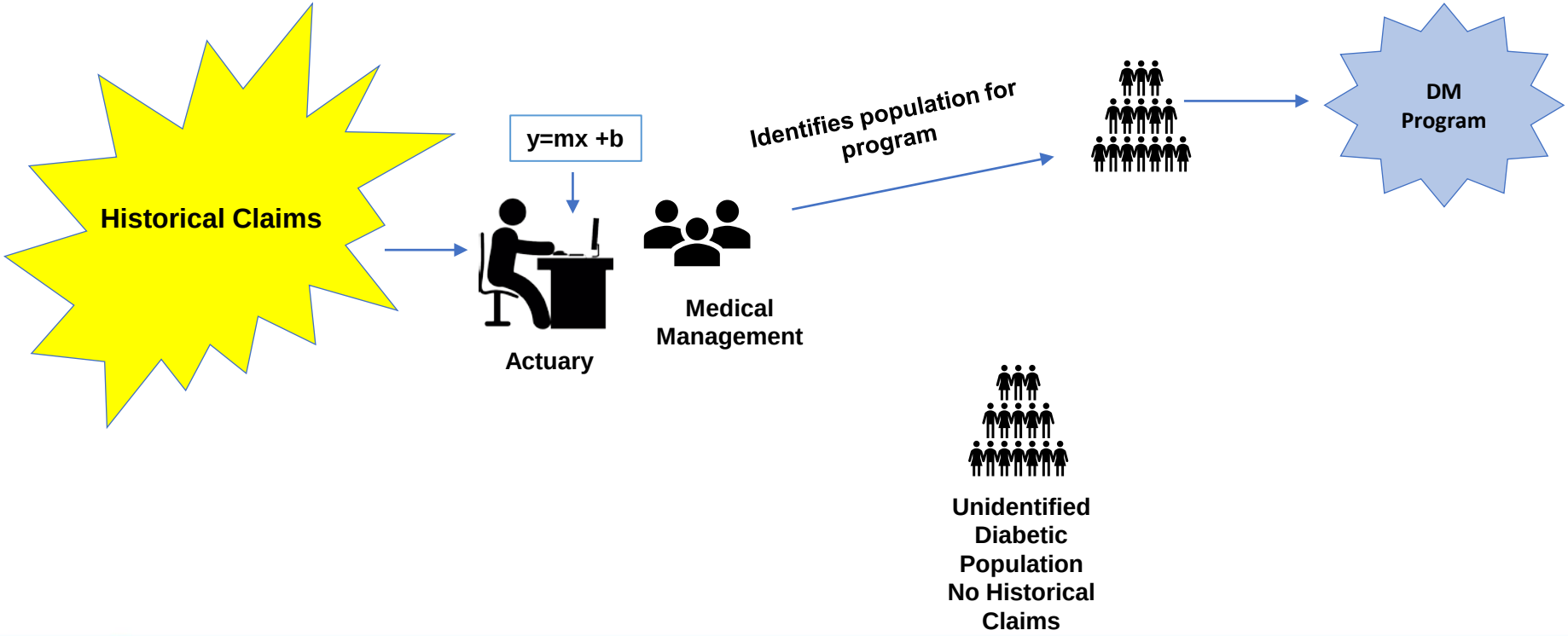
Actuarial considerations in managing population health

- Defining the population and determining outcome measures
- Interpreting large data sets
- Developing and managing complex algorithms
- Collaborating with cross-functional teams
- Measuring financial risk
- Conducting cost/benefit analyses

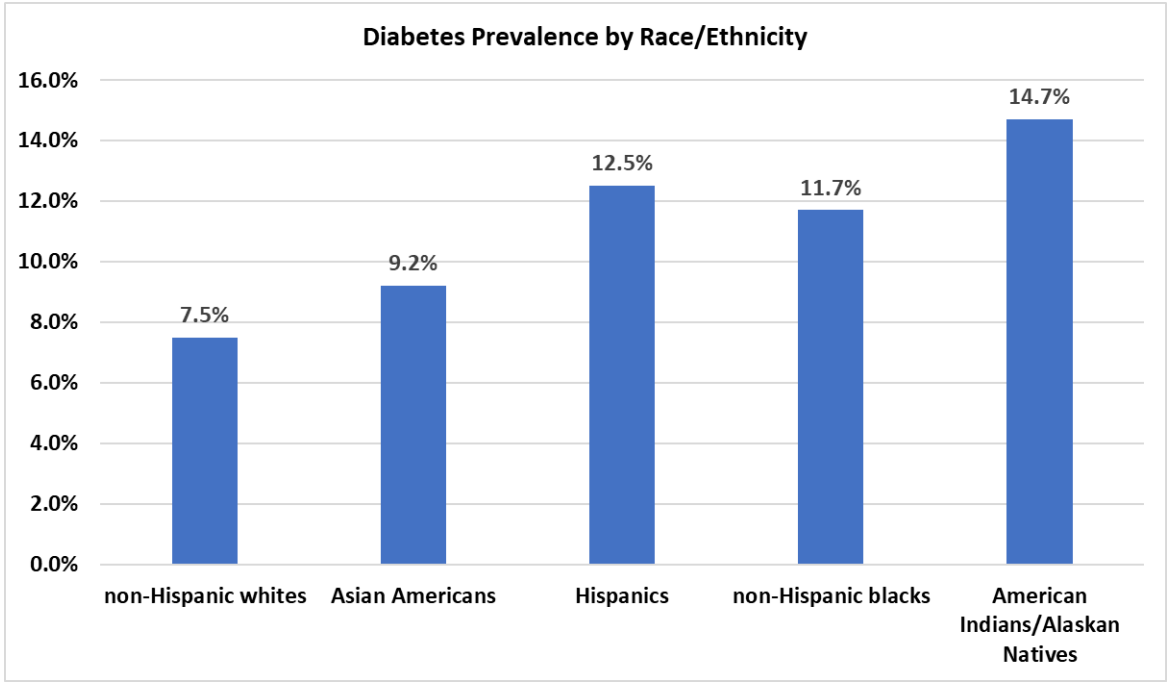
Algorithms and proxy data

- Used to identify individuals who are eligible for the intervention
  - Interventions may be wellness based or disease focused
- Claims data is generally used but does not necessarily reflect need
  - Can lead to bias by de-prioritizing individuals with lower claim cost even if they would benefit from the intervention
- Testing algorithms could identify racial, gender, or other types of bias (may require collecting demographic data)

Population Health Example: Diabetes Management Program



Population Health: Diabetes Management Program(cont.)



https://www.diabetes.org/resources/statistics/statistics-about-diabetes

Addressing Social Determinants of Health (SDOH)

- Predictive analytics and data mining can be used to identify individuals needing SDOH support
  - Can help overcome some limitations of claims data
- Interventions to improve health outcomes may not be directly related to healthcare, e.g.,:
  - Renovating public housing to address asthma
  - Building supermarket in a “food desert”
  - Investing in transportation services
- SDOH interventions may not be as easily implemented in the context of a health plan
- Legal/regulatory hurdles may impede the design of care management programs
- “One size fits all” may not work when designing solutions to address SDOH needs

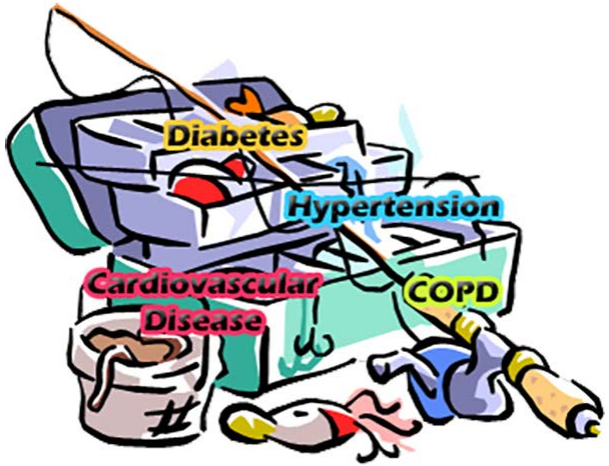
Time horizon

- Cost/benefits of interventions are often measured over a one-year time horizon
  - Most insurance plans reset on an annual basis and members/employees may turnover
- This short time horizon could undervalue benefits that take longer to materialize
  - For populations with lower utilization, this may exacerbate real or perceived disparities

Measuring outcomes

- Return on Investment (ROI) is often used to make decisions about programs but it may focus too heavily on financial results
- Looking at average results over an entire population may not show the benefit for specific marginalized populations
- Including quality metrics, in addition to financial outcomes, may be a way to highlight and ultimately reduce health disparities

Using Risk Assessment to Target Disease Management and Care Management Programs



Goal:

To identify patients who would most benefit from these programs

Identifying Patients for Disease and Care Management Programs

- Eligible plan members can be identified through:
  - claims-based algorithms
  - risk stratification based on risk assessments of underlying conditions and whether outcomes can be improved through interventions
- If predicting costs is part of the identification process, could deprioritize members with lower costs, even if they have higher needs
  - Lower costs may indicate lower access to care rather than lower health care needs

Example of Algorithmic Bias

RESEARCH ARTICLE

ECONOMICS

Dissecting racial bias in an algorithm used to manage the health of populations

Ziad Obermeyer[1,2]*, Brian Powers[3], Christine Vogeli[4], Sendhil Mullainathan[5]*†

Health systems rely on commercial prediction algorithms to identify and help patients with complex health needs. We show that a widely used algorithm, typical of this industry-wide approach and affecting millions of patients, exhibits significant racial bias: At a given risk score, Black patients are considerably sicker than White patients, as evidenced by signs of uncontrolled illnesses. Remedying this disparity would increase the percentage of Black patients receiving additional help from 17.7 to 46.5%. The bias arises because the algorithm predicts health care costs rather than illness, but unequal access to care means that we spend less money caring for Black patients than for White patients. Thus, despite health care cost appearing to be an effective proxy for health by some measures of predictive accuracy, large racial biases arise. We suggest that the choice of convenient, seemingly effective proxies for ground truth can be an important source of algorithmic bias in many contexts.

https://www.science.org/doi/10.1126/science.aax2342

- Algorithm used to identify patients with complex care needs
- At a given risk score, Black patients are sicker than white patients
- Bias arises because algorithm predicts health costs rather than illness
- Authors estimate that eliminating the bias could nearly double the Black patients selected

Options to Address Bias

- Rather than using health care costs, base algorithms on other predictors of need (e.g., avoidable costs, chronic conditions)
- Adjust spending data to better reflect health care needs
- Use constrained regressions
- Incorporate social risk factors when appropriate

Additional Resources

- Algorithmic Bias Playbook (Obermeyer, et al.)
  https://www.chicagobooth.edu/research/center-for-applied-artificial-intelligence/research/algorithmic-bias

Area-Level Social Risk Measures

Goal:

- Help measure and understand how the social determinants of health at the community level affect health-related social needs at the individual level

Potential Uses of Area-Level Risk Measures

- Target funding for health-related social needs
- Adjust payments to health insurance plans
- Adjust payments to providers
- Incorporate into risk assessments

Selected Area-Level Indices

- **Area Deprivation Index**
- **Social Vulnerability Index**
- **Social Deprivation Index**
- AHRQ Socioeconomic Status Index
- Baseline Resilience Indicators for Communities
- California Healthy Places Index
- Census Bureau Community Resilience Estimates
- Child Opportunity Index 2.0
- Community Need Index
- Community Resilience Indicator Analysis
- COVID-19 Vaccine Coverage Index
- COVID-19 Community Vulnerability Index
- Distressed Communities Index
- Healthiest Communities
- Material Community Deprivation Index
- Modified Darden-Kamel Composite Socioeconomic Index
- Multidimensional Deprivation Index
- Multidimensional SDOH Index
- National Risk Index
- Neighborhood Concentrated Disadvantage Index
- Neighborhood Deprivation Index
- Neighborhood Socioeconomic Status
- Neighborhood Stress Score
- Opportunity Index
- Social Capital Index
- Social Vulnerability to Environmental Hazards Index
- Townsend Deprivation Index
- U.S. Prosperity Index

Indices Vary in Many Important Ways

- Domains included (e.g., socioeconomic position, race, gender, residential context, social needs)
- Specific indicators within domains
- How indicators are weighted
- Unit of analysis (e.g., census block group, census tract, ZIP code, county)
- Data source, update frequency, and most recent year available
- Availability; cost to access

➢When contemplating the use of an index, it's important to understand how the index was developed and its appropriateness to the specific project and goal

Some Key Issues With Using Area-Level Measures

- The population represented in the index often differs from the population being risk adjusted.
- For many indices, the geographic unit of analysis is large enough that many cells won't be homogeneous.
  - Variance of characteristics within a cell will affect appropriateness of applying the index at an individual level

Additional Resources

- Landscape of Area-Level Deprivation Measures and Other Approaches to Account for Social Risk and Social Determinants of Health in Health Care Payments (RAND/ASPE) https://aspe.hhs.gov/reports/area-level-measures-account-sdoh
- Social Determinants of Health: A Review of Publicly Available Indices (Hinnant et al., RTI) https://rtipress.scholasticahq.com/article/55734
- Assessment of Population-Level Disadvantage Indices to Inform Equitable Health Policy (Kaalund et al.) https://www.milbank.org/quarterly/articles/assessment-of-population-level-disadvantage-indices-to-inform-equitable-health-policy/
- Use of Area-Based Socioeconomic Deprivation Indices: A Scoping Review and Qualitative Analysis (Trinidad et al.) https://www.healthaffairs.org/doi/10.1377/hlthaff.2022.00482

Academy Resources

- Health Equity from an Actuarial Perspective: Managing Population Health https://www.actuary.org/sites/default/files/2021-10/Health_Equity_Population_Health_10.2021.pdf

- Health Risk Assessment and Risk Adjustment in the Context of Health Equity https://www.actuary.org/sites/default/files/2022-08/RiskAdjust.8.22.pdf

Questions?

Thank You

For more information contact:

Matthew Williams, JD, MA
Senior Policy Analyst, Health
American Academy of Actuaries
Email: williams@actuary.org