MILLIMAN WHITE PAPER

Socioeconomics and morbidity

What can consumer data tell us about social risk factors?

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A significant amount of information can be gleaned from non-healthcare-specific data sources.

A number of academic, policy research, and medical studies have linked socioeconomic and lifestyle factors to both mortality and morbidity.[1] There is also a growing recognition that social risk factors (also commonly referred to as social determinants) are significant drivers of health and healthcare utilization patterns.[2]

Think about the proportion of time an average individual is consuming healthcare services and compare it to the volume of consumption of all other goods and services. For instance, only about 5% of the commercially insured population is admitted to the hospital in a given year. While medical claim data is extremely valuable and predictive once it becomes available, its footprint is limited.

A significant amount of information about an individual can be gleaned from non-healthcare-specific data sources, and in the age of big data, cloud computing, and data science, it would be limiting to ignore this information. A vast amount of information is readily available to supplement more traditional administrative claim data, medical records, and health risk assessment surveys. Care management programs can be customized and directed toward members in a particular life stage and/or socioeconomic profile, facing a particular barrier to health improvement. Plans can be designed with preferred cost sharing for services relevant to particular members, or marketing campaigns can be implemented to influence the composition of the covered members. For organizations with social goals in mind, such information can provide valuable insight as to what social services (e.g., help with affordable housing, transportation) could enhance access, compliance with recommended care, and avoid unnecessary care.

Health insurance companies and several state agencies[4] have begun supplementing existing information about their members with lifestyle and socioeconomic data in order to better understand their insured populations and offer products or structure payments accordingly. In this paper, we explore relationships between lifestyle factors and morbidity that we have encountered in our experience working with consumer and administrative claims data. It is important to note that in our work, no attempt has been made at establishing causation between various socioeconomic elements and health status, nor do we aim to explain why a particular relationship is observed.

Income and health status

Several studies have examined the relationship between affluence and morbidity, with results commonly showing that low household income is linked to poor health. Low-income beneficiaries tend to have higher hospital admission, readmission, and mortality rates, in addition to experiencing worse outcomes from outpatient care programs.[5]

This relationship has also been examined at the community level, finding that individuals from socioeconomically disadvantaged neighborhoods have higher readmission rates than those in more advantaged neighborhoods, independent of social risk factors of the individual.[6]

For women, household income is inversely correlated with health status.

For men, however, this relationship is not always observed.

In our experience, we have also observed an interesting distinction in relationship between income and health status by gender.

[1] Schroeder, S.A. (Sep. 2007). We can do better – Improving the Health of the American People. The New England Journal of Medicine 357:1221-8.

[2] U.S. Department of Health and Human Services (December 2016). Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs. Retrieved January 11, 2018, from https://aspe.hhs.gov/system/files/pdf/253971/ASPESESRTCfull.pdf.

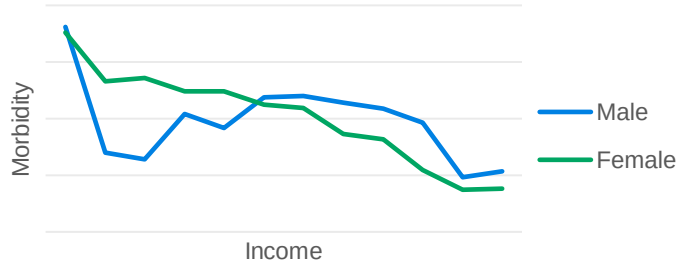
[3] Breslin, E. & Lambertino, A. (July 2017). Medicaid and Social Determinants of Health: Adjusting Payment and Measuring Health Outcomes. Retrieved January 11, 2018, from http://www.statenetwork.org/wp-content/uploads/2017/07/SHVS_SocialDeterminants_HMA_July2017.pdf.

[4] Breslin, E. & Lambertino, A. (July 2017). Medicaid and Social Determinants of Health: Adjusting Payment and Measuring Health Outcomes. Retrieved January 11, 2018, from http://www.statenetwork.org/wp-content/uploads/2017/07/SHVS_SocialDeterminants_HMA_July2017.pdf.

[5] U.S. Department of Health and Human Services (December 2016). Report to Congress: Social Risk Factors and Performance Under Medicare's Value-Based Purchasing Programs. Retrieved January 11, 2018, from https://aspe.hhs.gov/system/files/pdf/253971/ASPESESRTCfull.pdf.

[6] Kind AJ, Jencks S, Brock J, et al. Neighborhood socioeconomic disadvantage and 30-day rehospitalization: a retrospective cohort study. Retrieved February 6, 2018, from https://www.ncbi.nlm.nih.gov/pubmed/25437404.

FIGURE 1: MORBIDITY VS. INCOME



For women, household income tends to be inversely correlated with health status.[7] As one might expect, as household income increases, health risk decreases. For men, however, this relationship is not always observed – for some income ranges, the higher the household income, the higher the risk.

In low and high income ranges for men, the relationship between health status and income is typically as expected: health risk decreases as household income increases. For middle income ranges, however, we have seen health risk for men worsen as income increases. Additionally, men in the lowest income brackets often show a disproportionate share of extremely high-risk individuals compared to women.

Lifestyle behaviors and health status

Lifestyle and consumer purchasing behaviors can also provide useful information about individual health status. In our experience, we have noted several relationships:

1. Individuals who purchase plus size or big and tall clothing tend to be less healthy than average.
2. Presence of diet concerns, interest in low-fat cooking, and reading of health materials are associated with higher than average health risk.
3. Individuals who indicate running as a hobby tend to be healthier than average.
4. Purchasers of home goods are healthier than average, which may be correlated with household income.

Individuals that indicate purchasing plus size or big and tall clothing, and those reporting bankruptcy, are less healthy than average. Individuals that indicate running as a hobby/activity are healthier than average. Diet concerns, interest in low-fat cooking, and reading of health materials are all associated with higher-than-average risk. Hypothetically, this finding could suggest that individuals who have these health-related interests are in fact trying to address health issues. Another study suggests that impulsive purchasing and unhealthy eating are correlated,[8] which may in turn be associated with higher than average health risk.

Interestingly, purchasers of home goods also tend to be healthier than average, which may be correlated with household income (which as discussed earlier, is typically associated with better health).

Conclusion

What do we take away from all of this? Valuable relationships exist between non-healthcare data and health status. These relationships are distinct from the demographic characteristics of a member, and they offer an ability to see a more complete picture of an individual's health profile, which is a lot more than can be gleaned from two inpatient visits and a prescription refill found in claim data (more on this here[9]). We hope readers gain confidence to look beyond diagnosis codes and claim costs to consider social environmental factors.

Health actuaries are generally most concerned with being able to predict health care costs, and whether or not there is a causal relationship between socioeconomic indicators and costs is a secondary question to the predictive power. However, any attempt to decrease rising health costs must necessarily both determine and address root causes in order to improve health outcomes and have a lasting impact.

There is a significant opportunity to make use of the available socioeconomic and lifestyle information to achieve not only better financial outcomes, but better health outcomes as well. Stakeholders in all areas of the healthcare industry are trying to learn more about the populations they are serving and the risks they are accepting. Access to such information can facilitate more refined and well-informed population health management, member outreach, and health engagement strategies, ultimately benefiting consumers, providers, and payers in the healthcare industry.

[7] Health risk in this paper has been quantified using Milliman Advanced Risk Adjuster (MARA) and has been normalized for age-gender distribution differences.

[8] Verplanken, Bas, et al. Consumer Style and Health: The Role of Impulsive Buying in Unhealthy Eating. Psychology and Health, 5 Feb. 2018, www.tandfonline.com/doi/full/10.1080/08870440412331337084?scroll=top&needAccess=true.

[9] Sarkar, Sonia et al. (Jan. 2018). When Social Needs Are Medical Needs. Retried March 2 2018, from https://slate.com/technology/2018/01/want-to-improve-health-care-make-investments-in-addressing-patients-social-needs-too.html

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