

Including Social Determinants of Health (SDH) in Health Care

Risk Adjustment

Sicker people cost more in health care resources. How do we equitably pay for their care? It would be immoral (not to mention illegal in many places) to charge people premiums based on their actual costs.¹ One solution is using risk adjustment (see box) so payments reflect costs more closely; **risk adjustment (RA)** can be used by the government (paying insurers) or by an insurance company (paying medical providers).

In Switzerland, mandatory health insurance (MHI/Grundversicherung) companies with higher-risk members receive money from a fund paid into by companies with lower-risk populations. However, the **risk adjustment calculation** used to redistribute the money is based on only a few factors: age, gender, stays in a hospital or nursing facility and pharmaceutical cost group (PCG) for issues such as diabetes, depression, and cancer.² The latter two factors, added only in the past few years, begin to address cost differences between patients. Certainly medical conditions, whether identified by disease diagnosis code or services provided, help predict future costs: Someone who had a heart attack may need long-term, expensive services such as bypass surgery or a pacemaker, while someone who broke a leg is unlikely to have a repeat hospital visit. A 2013 National Council report acknowledged that costs for outpatient (ambulatory) services are currently missing from the risk adjustment formula³ to which a 2016 report responded by recommending that hospital stays be improved via inclusion of diagnostic related groups (DRGs) or length of stay.⁴

However, there is another set of factors that impact a person's health care costs and health outcomes: **social determinants of health (SDH)**.

What's risk adjustment (RA)?

Risk adjustment takes into account how healthy or sick various patients are, and thus what their projected health care costs will be for the year, that is, the financial risk of patient populations.

Say an insurance company charges **premiums** of CHF 100/year. A young, healthy member has annual medical costs of CHF 15—a net profit of CHF 85 for the insurer. The costs for someone who is middle-aged, has diabetes, cancer, and depression total CHF 1,000 – meaning the insurer spends CHF 900 more than the premium it received from that member. The company can use its profits from approximately 10 healthier members (CHF 850) to cover the costs of this more expensive member.

But if an insurance company (or doctor's office) has a disproportionately high number of elderly, sick, or otherwise expensive members, the "profits" may not cover all the costs, e.g., if there are only 8 healthier people for every 1 person who is sicker.

The solution is to adjust the funding by weighting high-need patients more than lower-need ones. Organizations (insurance companies or medical providers) receive more money if they have a higher-than-average-cost population. RA helps prevent sicker patients from being discriminated against, since insurance companies and providers will have a net financial loss when serving those members.

What factors should be included in the risk adjustment is an ongoing debate in the health insurance industry.

¹ Which is why we have group insurance: a person with cancer or a heart attack probably can't afford to pay for their treatments, but when spread among a large group, the cost per person becomes affordable.

² Risikoausgleich: KVG 832-10 Articles 16-18

³ Kommission für soziale Sicherheit und Gesundheit des Nationalrates, Parlamentarische Initiativen Risikoausgleich / Wirksamen Risikoausgleich schnell einführen, 6.13

⁴ Bundesamt für Gesundheit, Verordnung über den Risikoausgleich in der Krankenversicherung (VORA); Totalrevision, 9.16

Social Determinants of Health

Health is impacted by several inter-related drivers, each of which can have a positive or negative (or neutral) effect (see **Figure 1**). A person’s biology (genes), access to medical care and lifestyle choices obviously help determine their health status. But so do their physical environments and social/economic characteristics, or SDHs.

Figure 1: Determinants of Health

Health Driver	Examples (positive and negative)
genes/biology	predisposition to diabetes fetal alcohol syndrome
behaviors	exercising, smoking, eating low-fat food
medical care	doctors do not speak patient’s native language access to prenatal care free primary care visits
environment	housing has cockroaches and mice fresh fruit and vegetables available in local supermarket need a car to get to pharmacy being read to as a child robust public transportation system
social and economic characteristics	low education level going through a divorce strong support network

Research and anecdotes have proven the efficacy of learning about and addressing SDHs. Many years ago, doctors at a city clinic noticed many of their patients with asthma lived in the same set of buildings—which were infested with cockroaches and rodents (known to worsen asthma). These patients were not sick due to moral failings or poor lifestyle choices, but because their poverty limited the type of housing they could afford. Tenant complaints had been ineffective, but when the doctors wrote to the landlords, threatening them with lawsuits, the landlords cleaned up the buildings—and the patients had astounding improvements in their health. Now called medical-legal partnerships, practices serving vulnerable groups find it beneficial to employ legal staff to improve patients’ living conditions, and consequently their health. One such example is the Children’s Law Center in Washington, D.C., USA, which collaborates with local health centers “to inform upstream solutions to the issues that impact children and families in DC.”⁵

“However, since social determinants of health (SDH) such as poverty and limited education also affect the ability to seek medical care, adhere to medical recommendations and achieve good outcomes, risk formulas should consider SDH.”⁶

Arlene Ash, Eric Mick, et al “Social Determinants of Health in Managed Care Payment Formulas”

Studies have shown the impact of social determinants on everything from single diseases or illnesses (gonorrhea rates in the United States⁷) to infant mortality⁸ to health costs and outcomes for disadvantaged

⁵ <https://www.childrenslawcenter.org/article/build-blog-data-sharing-and-analysis-medical-legal-model-national-success>

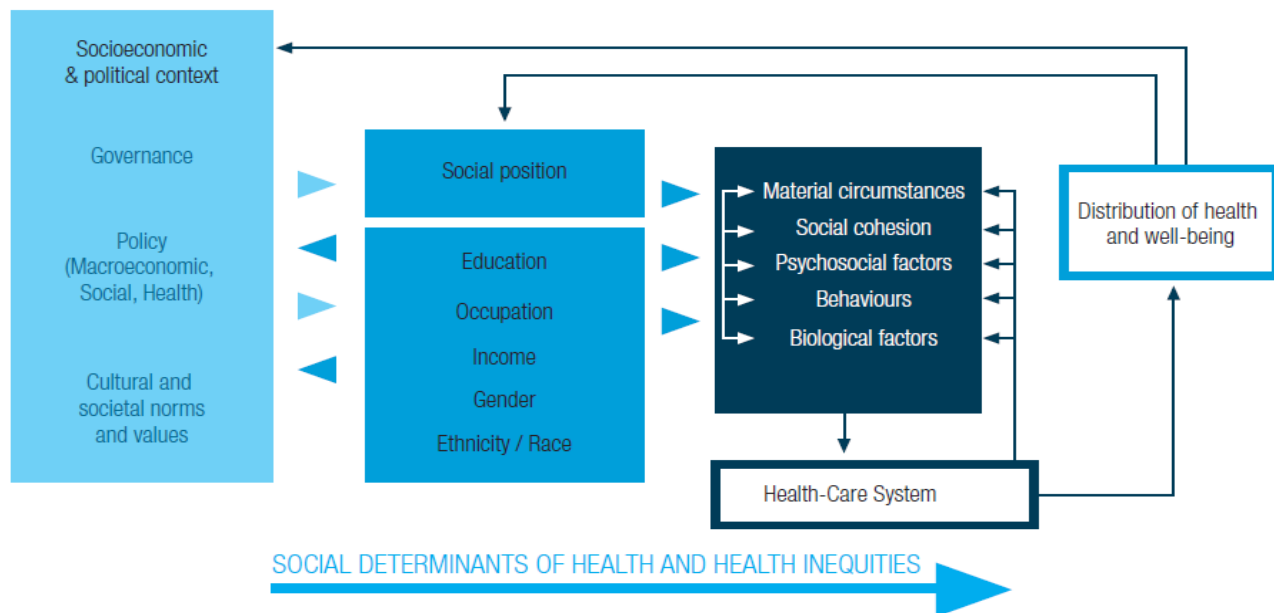
⁶ Ash, A. and Mick, E. et al <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5710209/>

⁷ Moonesinghe, R., Fleming, E. et al www.mdpi.com/journal/ijerph

⁸ Kim, D. <https://www.mdpi.com/1660-4601/10/6/2296>

populations (immigrants in Switzerland⁹). The World Health Organization (WHO) has made SDHs a key focus area (see **Figure 2**) to improve health equity worldwide. The University of Bern's Institute for Social and Preventive Medicine (ISPM) social determinant research on young men found differences in the health behaviors of people from the Swiss, French, and Italian parts of Switzerland; for example, men in the German-speaking regions were more physically active than men in the Italian- and French-speaking regions while men in French-speaking Romandy were more likely to engage in risky drinking than men in the German-speaking regions. The study also found men with less education, lower incomes and whose parents had lower education levels were more likely to smoke, be overweight, and engage in less physical fitness.¹⁰

Figure 2: World Health Organization – Closing the gap in a generation



Using SDHs in Risk Adjustment Calculations

Around the world, **government agencies**, private **insurers**, **accountable care organizations (ACOs)** and even individual medical practices are beginning to include social determinants of health in their assessments of patients. The goal is to serve these patients better, improving their health outcomes and quality of life, while also (hopefully but not necessarily) lowering costs.

In America, the state of Massachusetts' public health insurance agency, MassHealth¹¹, began incorporating SDHs into their risk adjustment strategy in 2016, the first state Medicaid agency to do so. The formula to incorporate SDHs was developed by University of Massachusetts Medical School researcher Arlene Ash.¹² Dr. Ash's research identified social factors that impact the cost of care: unstable housing, disability, relationships with other state agencies, serious mental illness (SMI), and substance use disorders. In addition, she and her

⁹ Gasser, K. and Guggisberg, J. <https://www.suchtschweiz.ch/forschung/fachzeitschrift-abhaengigkeiten/2011/20112012-n-31/>

¹⁰ Abel, T., Hofmann, K. et al <https://smw.ch/article/doi/smw.2013.13901>

¹¹ Medicaid is the federal public health insurance program for people with low-incomes, which is then implemented independently in each state

¹² Full disclosure: I worked for the University of Massachusetts Medical School, but not with Dr. Ash

colleagues determined a way to calculate neighborhood stress based on the patient's census region. This formula is used to calculate the relative cost of individuals, so that insurance plans with sicker, higher-need patients receive more money than plans with average lower-risk member populations. MassHealth also, of course, includes medical factors, including diagnoses (based on DxCG-HCC) and the existence of serious medical conditions.

In all, the risk adjustment calculations predicted 38% of costs ($R^2=.38$), making it one of the best models in the Medicaid industry. See **Figure 3** for an example of the cost breakdown for a homeless woman from a relatively distressed neighborhood with three major medical issues. The SDH model was particularly effective in predicting costs for people who are homeless and people who need long-term services and supports.

Figure 3: Cost Breakdown	Unit cost	# units	Total cost
Base cost	\$299	1	\$299
Unstable housing	\$596	1	\$596
Medical diagnoses	\$3582	3	\$10'746
Distressed neighborhood	\$46	2	\$92
Total Cost			\$11'733
source: 10.1001/jamainternmed.2017.3317			

Provider practices and organizations that assume financial risk for their patients' outcomes and costs via alternative payment methods (APMs) have also found SDHs vital to both serving their clients better and reducing costs.

“Treating homelessness as a combined health and social issue is critical to improving the abysmal health outcomes of people experiencing homelessness. In addition the enormous economic costs of hospital care for people who are homeless can be reduced when housing and other social determinants are taken into account.”¹³

Amanda Stafford and Lisa Wood, “Tackling Health Disparities for People Who Are Homeless? Start with Social Determinants”

Recording SDH Information

Coding social issues is critical. You need data in order to be able to act on the data.

In the WHO's International Classification of Diseases version 10 (**ICD-10**), Chapter XXI includes codes for factors influencing health status¹⁴, or social determinants of health. See **Figure 4** for a partial list. These so called “**Z codes**” cover topics ranging from problems related to education and literacy, employment, pollution in the physical environment, occupational hazards, housing, income, social environment and prejudice, childhood abuse or upbringing, involvement with the criminal justice system, and exposure to war.

¹³ Stafford, A. and Wood, L. <https://www.mdpi.com/1660-4601/14/12/1535>

¹⁴ Found in Ch. 24 in ICD-11, which will come into effect in 2022

Figure 4: Partial List of ICD-10 Codes for Social Determinants of Health

ICD-10 Code	Description	ICD-10 Code	Description
Z55.0	Illiteracy and low-level literacy	Z59.2	Discord with neighbors, lodgers, landlord
Z55.1	Schooling unavailable/unattainable	Z59.5	Extreme poverty
Z55.2	Failed school examinations	Z59.6	Low income
Z56.0	Unemployment, unspecified	Z59.7	Insufficient social insurance and welfare support
Z56.1	Change of job	Z60.5	Target of perceived adverse discrimination
Z56.2	Threat of job loss	Z65.1	Imprisonment and other incarceration
Z59.0	Homelessness	Z65.2	Problems related to release from prison
Z59.1	Inadequate housing	Z65.4	Victim of crime and terrorism
Z65.5	Exposure to disaster, war, hostilities	<i>Source: https://icd.who.int/browse10/2016/en</i>	

Gathering and Using SDH Data

One way to gather social and environmental data is through a tool called the **Protocol for Responding to and Assessing patients’ Assets, Risks, and Experiences (PRAPARE)**, developed by the U.S. National Association of Community Health Centers.¹⁵ PRAPARE gathers data on the measures in **Figure 5**, as well as optional measures on domestic violence, safety, incarceration, and refugee status. PRAPARE works with multiple electronic patient dossier (EPD) systems, including Epic and NextGen, and can be entered using ICD-10 codes.

A key component of PRAPARE is using the data to serve patients. Atrius Health, in Massachusetts, USA, enthusiastically uses PRAPARE, according to Dr. Dan Slater, Chair of Pediatrics at Atrius Health and medical Director of Atrius’ MassHealth (public insurance) ACO. Proactively gathering and reviewing social determinant data has enabled Atrius to identify high-need patients. For example, Atrius determined that patients with low healthcare confidence (answering 1-3 on a scale of 10) used emergency room services twice as often as patients with more healthcare confidence; those patients were then offered high touch services such as care facilitation (case management) and community health worker (CHW) visits.¹⁶

Figure 5: PRAPARE Core Measures

Race	Education
Ethnicity	Employment
Veteran Status	Insurance
Migrant/Seasonal	Address/
Farm Work	Neighborhood
Income	Material Security
Housing Status	Transportation
Housing Stability	Language
Social Integration	Stress
and Support	

SDHs are not commonly integrated into care in Switzerland, but the **Swiss Smarter Healthcare National Research Programme (74 NRP)**, part of the **Swiss National Science Foundation (SNSF)**, is funding new research into the social inequalities in the provision of in-patient care. The research study aims to link medical and socio-economic data so that determinants can be identified regarding use of inpatient care for chronic diseases as well as health outcomes. The goal is to improve care for disadvantaged groups, such as elders living alone, by improving their movement through the health system.¹⁷

While SDHs should not be used to penalize patients, e.g., by rejecting their applications for insurance, looking at people’s social and economic environments can help medical practitioners better tailor treatments and

¹⁵ <http://www.nachc.org/research-and-data/prapare/about-the-prapare-assessment-tool/>

¹⁶ Health Care Transformation Task Force, <https://vimeo.com/369931693>

¹⁷ Bayer-Oglesby, L. www.nfp74.ch/SiteCollectionDocuments/Bayer_Oglesby_Project_4%20.pdf

follow-up care. For instance, which heart attack patients are more likely to return to the hospital? Those who don't eat low-salt meals, which may occur because they do not know how to cook, their culture's food is high in salt, or they cannot afford healthier ingredients. Hospitals have found that paying for home-delivered meals or cooking classes can help reduce their readmission rates.

Getting started

You may not be able to implement a full SDH data collection system. But you can start taking steps towards including SDH in your assessment of patients' medical needs. Ask yourself:

- **What are your patients' biggest social/environmental needs?** Poverty? Trauma from war? Low education levels/low employment opportunities? Seniors at risk of falling or family abuse? Ask those questions or focus on one or two target populations, even if you lack capacity to cover more topics.
- **What community relationships can you build?** What community organizations, NGOs, and other groups address those social issues? What experts and existing networks can you tap into?
- **What is your vision for addressing SDHs?** Knowing your patient is homeless may make you more compassionate but it will not improve their outcomes unless you use that information. Determine what you want to do for your patients: Refer them to relevant community resources? Provide them with additional support from your practice, such as case management or community health worker visits? Have a social service NGO send staff to your office weekly to help patients? Open a small food or clothing bank at your practice?
- **Where will you store the information?** If you use electronic patient dossiers (EPDs¹⁸) but you do not want to ask the vendor to add SDH fields, are there existing text fields you can use? Can practices approach the vendor as a group? If using paper charts, can you make an SDH registry? (It can just be an Excel spreadsheet.)
- **How will you train and use staff?** Can nurses, medical assistants, or social workers gather information to save the doctor's time? Where will the information be gathered? (Not in the public waiting room!)
- **How can you analyze the data?** Compare outcomes for patients with and without a particular SDH to see where system weaknesses lie. Your community networks may help you solve some of those problems, such as providing a safe place for a homeless person to store their medication.

Of course, using SDHs is not necessarily a cure, as researchers recently found— to their surprise. As reported in the *New England Journal of Medicine*, a hospital program that sent a team of nurses, social workers and community health workers to “superutilizers” after their discharge resulted in a hospital readmission rate (62.3%) not statistically different from that of the control group (61.7%).¹⁹

Nevertheless, SDHs are a powerful tool to address underlying causes of people's health problems. By capturing and using social determinant data, medical providers have the opportunity to improve their patients' health and quality of life. When health care costs consequently decrease, that is an even better win-win outcome.

¹⁸ For useful examples of how three health care systems began using their EHRs to collect SDH information, see: Trinacty, C., LaWall, E. et al <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6603884/>

¹⁹ Finkelstein, A., Zhou, A. et al <https://www.nejm.org/doi/full/10.1056/NEJMsa1906848>