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Health care data analytics: true meaning, actionability and value

In order to better understand bringing meaningful use to data, it all begins with the question "What is driving costs or risk?" And the second question is: "What can I do about it?"

By **Richard Kersh and Chris Caramanico** | June 04, 2018

Today's benefits consultant has been tasked with bringing innovation to their clients that can reduce risk or reduce costs associated with their client employer's health care expense (https://www.benefitspro.com/2018/05/29/this-is-how-a-health-care-premium-dollar-is-spent/). An employer's historical and present-day data will contain evidentiary information that can drive future risk management strategies; however, many analytics platforms do not necessarily yield detailed instructions concerning actionable items found within the data analysis. Many platforms can add numbers and rank cost drivers but deriving the pearls of actionability from the data platform oftentimes requires expertise in various disciplines (i.e., epidemiology, wellness, insurance, etc.). Based on this fact, how can a benefits consultant become familiar with navigating and deriving risk management innovations through the use of advanced data analytics?   It all begins with developing an understanding of the evolution of risk and potential solutions that can be paired with this risk for amelioration.

In order to better understand bringing meaningful use to data, it all begins with the question "What is driving costs or risk?" And the second question is: "What can I do about it?"

Below is a simple analysis (Table 1) that segments a large employer's medical spend into 10 separate spending ranges. At first glance, in 2014 and 2015, approximately 60 percent of the population spent less than $900 annually, yet only accounted for less than 4 percent of the overall expenditures. The portion of the population that is driving the overall costs are the groups spending between $5,000 and greater than $50,000. These groups accounted for 85 percent of the overall expenditure in 2014, and only 16.8 percent of the population in 2014 accounted for this major expenditure. The trend holds fairly steady in 2015.

(Table 1)

Example Employer Data	2014				2015			
Amount Paid Range	Amount Paid	% of Total	n	%	Amount Paid	% of Total	n	%
$0-$999	$ 27,818,672.57	3.0%	118,079	59.7%	$ 33,536,627.80	3.8%	127,254	60.1%
$1000-$1999	$ 31,735,184.06	3.4%	22,077	11.2%	$ 36,283,947.39	4.1%	25,245	11.9%
$2000-$2999	$ 28,861,370.31	3.1%	11,704	5.9%	$ 31,287,902.51	3.5%	12,735	6.0%
$3000-$3999	$ 25,951,972.32	2.8%	7,471	3.8%	$ 27,800,626.48	3.1%	8,017	3.8%
$4000-$4999	$ 23,306,429.24	2.5%	5,206	2.6%	$ 24,397,540.41	2.7%	5,447	2.6%
$5000-$9999	$ 96,743,364.80	10.4%	13,639	6.9%	$ 96,495,541.18	10.8%	13,635	6.4%
$10000-$14999	$ 74,308,537.23	8.0%	6,062	3.1%	$ 74,869,357.97	8.4%	6,111	2.9%
$15000-$24999	$ 114,790,625.88	12.4%	5,956	3.0%	$ 116,934,939.71	13.1%	6,070	2.9%
$25000-$49999	$ 158,206,057.66	17.1%	4,583	2.3%	$ 151,048,779.61	16.9%	4,585	2.1%
>$50000	$ 344,942,654.92	37.2%	2,953	1.5%	$ 298,958,462.28	33.3%	2,760	1.3%
Total	$ 926,671,069.39		197,869		$ 891,502,725.34		211,699	

What variable best explains the aforementioned stratification of medical spend in Table 1? Hypothetically, costs follow risk, so what would be a good definition of risk to test our hypothesis? Based on a recent study that was featured in the Journal of the American Medical Association (i.e., JAMA. 2016:316 (24): 2627-2646), health care spending in the United States from 1996 to 2013 increased significantly. The conclusion of this analysis revealed that health care spend was driven by seven conditions: diabetes, hypertension, hyperlipidemia, low back and neck pain, depressive disorders, other neurological disorders and falls. Essentially, it seems that health care spend is mainly driven by chronic disease and, most importantly,

the combinations of chronic diseases (https://www.benefitspro.com/2018/05/02/4-important-aspects-of-a-proactive-disability-insu/). When a chronic disease pairs with another chronic disease, this is defined as a co-morbidity.

These combinations and pairings of chronic diseases can increase health care expenditures for an individual and organization. If we use the number or frequency of co-morbidities as our definition of risk (see Table 2), you will observe a direct correlation between co-morbidity count and health care expenditures. If we looked further into the data, we would find that the major co-morbidities correlate with the findings from the aforementioned JAMA article, (e.g., diabetes, hypertension, hyperlipidemia, etc.). And, there would be direct correlation between primary care physician visits, medical expenditures and co-morbidity count. The formula would look something like: (Primary Care visits as co-morbidity count = medical spend). However, if an employer got ahead of this migration of risk by incentivizing employees to go to their primary care physicians prior to co-morbidity developments, this migration to higher risk levels would be abated.

(Table 2)

Connecting the dots: risk and medical spend

The interpretation of medical and pharmacy data can be confusing without some basic rules and understanding to give us a better perspective. When we identify and tally the amount paid for various diseases (e.g., heart disease, cancer, musculoskeletal disorders (https://www.benefitspro.com/2018/05/24/how-to-save-25-to-35-on-musculoskeletal-claims-wit/), etc.), does this give us insight? In reality, this is only a transactional interpretation of the data; it really says nothing about

how this occurred or what we can do about it. Essentially, from our past analysis of medical spending, we have learned that the vast majority of an employer's medical and pharmacy spend is related to chronic disease. We also understand that a relatively small proportion of a population will spend the majority of the overall health care spend (i.e., 15 percent to 18 percent of any given population = 80 percent to 85 percent of overall spend).

Here are some simple facts to understand when looking at health care and pharmacy data:

- Chronic disease drives the majority of health care spending.
- Chronic disease development has a strong correlation with poor lifestyle (i.e., sedentary, obesity, poor nutrition, high stress levels) and gaps in care.
- Diabetes will account for the majority of spending related to chronic diseases. Diabetes is increasing at a pandemic rate.
- Risk is migratory: low risk à medium risk à high risk.
- Chronic diseases can pair with other chronic diseases, which has a linear relationship with spend.
- Stable chronic disease, singular chronic diseases with no co-morbidities can equate to average spend for any group (i.e., average, meaning not high or low).
- Chronic disease exacerbation oftentimes has a direct correlation with age; exacerbation begins in the late 40s and early 50s.
- Chronic disease does not have to be a product of the aging process. The Framingham study demonstrated that, for example, high blood pressure is not a consequence of aging.
- Normally the top three diagnostic categories related to spending are cardiovascular, musculoskeletal and cancer
- Assume for a typical population, the average person will fill 10 scripts of medication over a year's period of time. For example, a 1,000-life group will fill 10,000 prescriptions.
- Pharmacy typically accounts for 20 percent of overall medical spend. For example, a medical spend of $5 million dollars would have a pharmacy spend of $1 million dollars annually.

However, pharmacy costs can rise to 30 percent of overall medical spend through the use of expensive specialty drugs (e.g., autoimmune medications, biologics, etc.).

Weaponize data to yield targeted solutions

The health care industry is flooded with various data sets; however, data is only useful to the point that it is used. Based on our aforementioned definition of risk and medical spend, we now have a basic knowledge of what is driving health care cost. So, what do we know about the solutions to mitigate or prevent risk? Solutions can and should utilize strategies around therapeutic lifestyle change (i.e., exercise, weight management, proper nutrition and stress management). However, these solutions require behavioral change and sometimes take years to become ingrained into a culture. What are some data-derived solutions that can lead to presumptive outcomes? The best way to derive targeted solutions from the data is to have an understanding of evidence-based medicine. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research. Many sources can provide simple tools to understand evidence-based rules to serve as a road map (e.g.., NCQA-HEDIS quality measures, Choosing Wisely-ABIM Foundation, etc.).

All evidence-based guidelines understand that there is an etiology or causation associated with most disease states, and there is an exact way to treat and prevent the disease from worsening. A simple example of this can be an explanation of normal blood pressure versus high blood pressure. An individual with normal blood pressure has laminar blood flow; blood flows in a flat and consistent manner. An individual with high blood pressure will have turbulent blood flow; think of blood flow that mimics a breaking ocean wave. If high blood pressure goes untreated, the turbulent blood flow can eventually etch the blood vessel walls, thus setting up the perfect environment for cholesterol to form plaques or adhesions and lead to heart disease. A few data-driven risk management strategies would be:

- Increase medication compliance associated with various chronic diseases.
- Increase compliance to age/gender preventive screenings (e.g., mammograms, colon cancer screening, cervical cancer screening, etc.).
- Ensure persons with diabetes are screened for neuropathies and have eye exams.
- Ensure that persons with low back pain limit the use of expensive modalities like MRIs and CAT scans, until absolutely necessary.
- Ensure that people are not taking medications in combination with other

medications that can cause contraindications.
- Ensure that people engage with a primary care physician; reduction in gaps in care helps expedite proper treatment protocols.
- Ensure that people are not engaging in avoidable emergency department visits.

Actionability

Key findings from the data analysis can gain actionability through various modes of communication (e.g., phone apps, telephonically, via-computer, etc.). Imagine the ability to deliver individualized medical "to do suggestions" to a given population. This strategy helps connect the individual with a primary care physician, creates wise consumers of health care and reduces the risk of a population. Data analytics will continue to be a driving force for health care risk management. An employer's archival and current data always has a robust risk management story, and many solutions can be linked to the story that the data unfolds. Outcomes-based benefits plan design strategies will maximize learnings from data analytics by using plan design to incentivize participants to engage in individualized risk management strategies. And through robust data analytics (https://www.benefitspro.com/2018/05/07/three-reasons-to-integrate-hr-into-benefits-tech/), outcomes can be measured on a year to year basis.