Human Factor ANALYTICS

Evidence-Based Population Health Management through Analytics

Presented to:

Arkansas State and Public School Life and Health Insurance Program Legislative Task Force

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Human Factor Analytics – History

Human Factor Analytics (HFA) is an analytics consulting company that provides data analysis and data warehousing for self-insured employers, healthcare benefits brokers, and wellness providers in order to analyze risk and identify what is driving present and future cost. HFA analyzes disparate data sets, including healthcare utilization data, biometric data, pharmacy data, health risk appraisal data, workers comp data, and absenteeism and productivity data. From the analysis, HFA suggests solutions to mitigate risk and reduce cost. These solutions are backed by empirical evidence derived from statistical analyses of the data.

Human Factor Analytics is based on more than 25 years of experience at the design and implementation of wellness programs and risk management solutions for employers throughout the United States. Our previous organization, Kersh Risk Management, created patent-pending software for measuring the financial efficacy of a wellness program or risk intervention. Over the past 25 years, we engaged in various risk management contracts and population health management studies with corporations such as Union Pacific Railroad, Anheuser Busch, Bemis Corporation, Arkansas Baptist Health System, Tyson Foods, etc.

The experience of analyzing multiple employers' healthcare utilization data provided the necessary industry knowledge for the development of our current analytics capabilities.

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HFA Milestone Projects

- ★ Currently serving as population health and analytics consultant for Florida Department of State Group Insurance. HFA has developed a 5-year plan for implementing population health management strategies within the State of Florida insured population (approx. 360,000 lives).
- ★ HFA has served as population health management and analytics consultant for several large insurance benefits administrators.
- ★ Analytics provider for Arkansas Employers' Health Coalition.
- ★ Analytics partner for Institute of Health & Productivity Management (IHPM), both domestic and international.
- ★ Beginning in 2015, HFA will serve as analytics partner for a large Accountable Care Organization (ACO) in the State of Arkansas.
- ★ Engaged to evaluate pre/post results for several Fortune 500 corporations' population health management programs.
- ★ Innovate Arkansas client since 2011

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Understanding Population Health Management

- ★ 70% of all illness is related to lifestyle modifiable risk factors (e.g., lack of exercise, obesity, poor nutrition, etc.) (Reference: American College of Preventive Medicine, 2009)
- ★ The ROI associated with standard wellness programming methodology is questionable.
- ★ Population health management strategies that utilize prescriptive methodologies (i.e., content to the specific employer) are much more successful at reducing risk within the population.
- ★ Population health management strategies must be sensitive to the employer's culture in order to be effective.
- ★ Population health management strategies should have components that positively impact employee productivity and reduce absenteeism and turnover. This is sometimes a forgotten loss center that is not addressed.
- ★ Population health management programs create vast amounts of data (i.e., biometric, health risk appraisal, and healthcare data, etc.). The employer must have systems in place to make meaningful use of the data.

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Solutions for Consideration

Human Factor Analytics proposes to provide the following services to the State of Arkansas, with the goal to reduce health risk among State employees and improve quality of life:

- ★ Conduct a preliminary analysis of archival healthcare-related data to inferentially determine best-fit interventional strategies for population health management.
- ★ Report key findings and suggested solutions that are validated through relevant statistical analysis and empirical evidence.
- ★ Develop 5-year plan for population health management, based upon the findings of the aforementioned preliminary data analysis.
- ★ Warehouse State of Arkansas healthcare data and conduct ongoing pre/post analyses to measure the success of the proposed solutions and to hold potential vendors accountable.

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Our Process and System for Creating Meaningful Use of Data and Improving Outcomes

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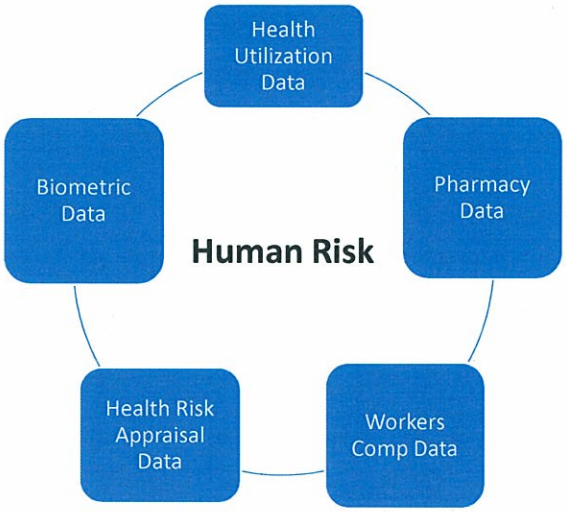
Data-Driven Decision Making



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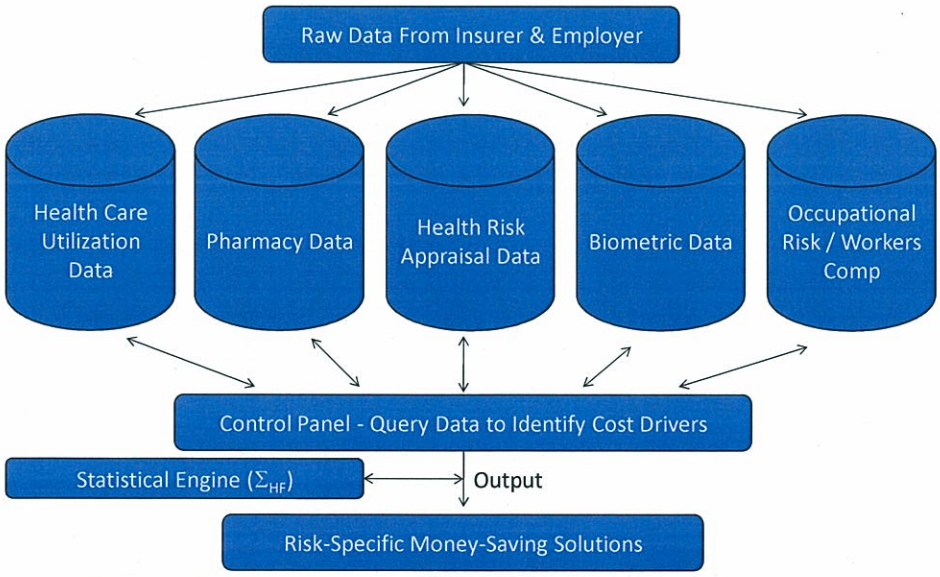
Relational Database



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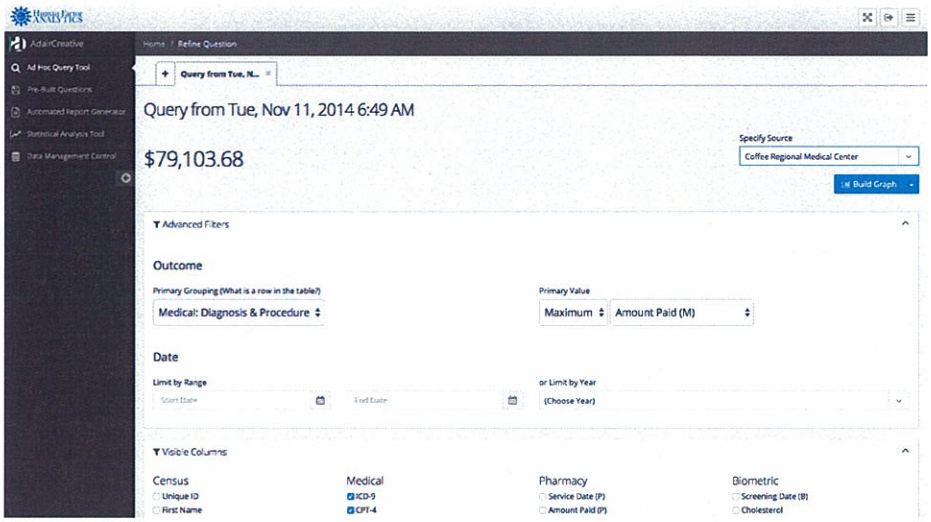
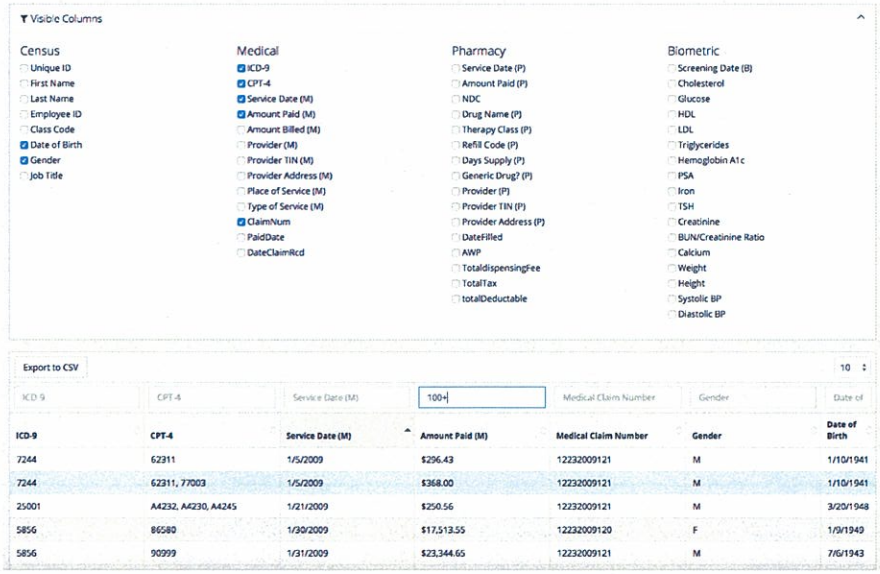
HFA Analytics System



HFA Analytics System (cont.)



Meaningful Use of Data

Biometric variables used within the gold group criteria only explained 1% of an individual's overall spending (i.e., Glucose, Triglycerides, HDL Cholesterol, Waistline, Blood Pressure, Tobacco Use).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.105[a]	.011	.003	4596.26459

a. Predictors: (Constant), TobaccoUse, Waist Size Group, BldPressBelow130over85, GlucoseOver100, HDLCholesterolLow, TrigylceridesOver150

Amount of future spending variance explained by risk factor criteria

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.790E8	6	29840906.133	1.413	.207[a]
	Residual	1.601E10	758	21125648.147		
	Total	1.619E10	764			

a. Predictors: (Constant), TobaccoUse, Waist Size Group, BldPressBelow130over85, GlucoseOver100, HDLCholesterolLow, TrigylceridesOver150

b. Dependent Variable: AmountPaid_post.self

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	635.947	617.438		1.030	.303
	GlucoseOver100	549.484	346.973	.059	1.584	.114
	TrigylceridesOver150	477.702	373.036	.051	1.281	.201
	HDLCholesterolLow	-41.526	359.207	-.004	-.116	.908
	Waist Size Group	274.779	354.112	.029	.776	.438
	BldPressBelow130over85	53.795	341.745	.006	.157	.875
	TobaccoUse	-525.747	341.712	-.057	-1.539	.124

a. Dependent Variable: AmountPaid_post.self

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.282[a]	.080	.065	4541.06845

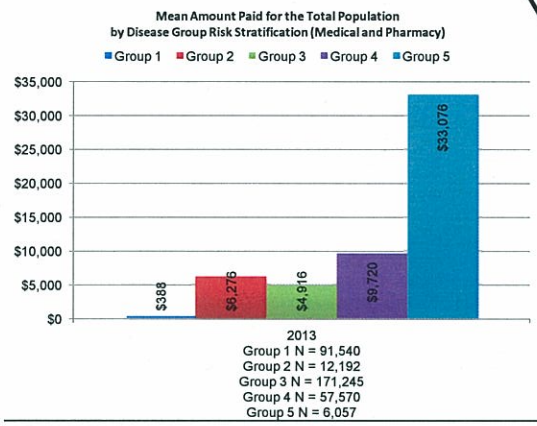
a. Predictors: (Constant), iCarePlus, Age Group, LDL Cholesterol Group, BMI Group, Glucose Group, Blood Pressure Group (Systolic), Female, Waist Size Group, nDiagsGp2010, TrigylceridesOver150, HDL Cholesterol Group, Tobacco.self, iCare

Increased explanation of future spending when contributing variables are included in analysis

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1890.724	1406.508		-1.344	.179
	Age Group	519.892	219.026	.088	2.374	.018
	Female	515.413	584.294	.034	.882	.378
	nDiagsGp2010	898.270	155.738	.223	5.768	.000
	Tobacco.self	-.840	390.765	.000	-.002	.998
	BMI Group	1.116	136.300	.000	.008	.993
	Blood Pressure Group (Systolic)	86.108	224.453	.014	.384	.701
	LDL Cholesterol Group	-156.993	162.364	-.034	-.967	.334
	HDL Cholesterol Group	-243.867	275.091	-.035	-.886	.376
	Glucose Group	711.739	419.643	.061	1.696	.090
	Waist Size Group	28.960	358.856	.003	.081	.936
	TrigylceridesOver150	314.549	374.673	.033	.840	.401
	iCare	314.548	892.894	.030	.352	.725
	iCarePlus	345.939	983.628	.032	.352	.725

Disease Group Risk Stratification

Group	Description
1	No Chronic disease and less than $1,500 medical expenditures per 12 months
2	No Chronic disease and $1,500 or more medical expenditures per 12 months
3	Chronic disease with no co-morbidities
4	Chronic disease with co-morbidities
5	Chronic disease with co-morbidities and complications



Random combination of acute events, low predictability

More costly random combination of acute events, low predictability

Stabilized individuals with chronic disease

More costly group with chronic disease in combination with one or more co-morbidity

Most costly group, impacting a small percentage of the population, extremely difficult to move from Group 5 to other groups, best chance is to stabilize the population

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