

2019 Predictive Analytics Symposium

Session 27: ALL - Epigenetics - the Superset of All Things Genomic - How It Will Change Our Lives

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GENETICS AND EPIGENETICS – THE SUPERSET OF ALL THINGS GENOMIC – HOW IT WILL CHANGE OUR INDUSTRY

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HOW GENETICS PROMOTES LONGEVITY AND GOOD HEALTH

- Disease prevention
 - By being informed on heightened risk for disease, a consumer gets the chance to take preventative steps that might not otherwise be embraced. E.g. more frequent cancer screenings that detect cancer at earlier stages when it is more treatable; smoking cessation; statin usage etc.
- Guiding treatment of disease
 - Pharmacogenomics
 - Multi-panel cancer genomic screening

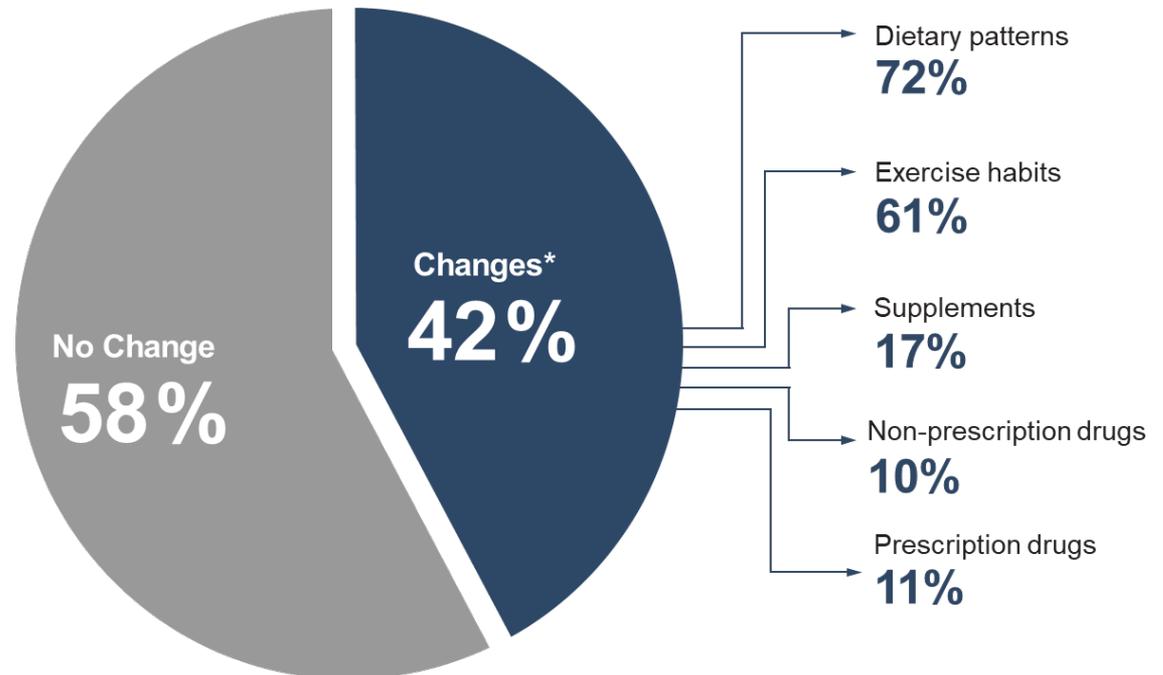
CANCER AND HEART DISEASE/STROKE – THE TWO LARGEST CAUSES OF DEATH CLAIMS

- Understanding proclivity for developing these conditions allows the consumer to take immediate action to ensure prevention and better outcome
 - Earlier and more frequent usage of cancer screening v. current standard of care
 - Earlier and more aggressive treatment of biomarker risk factors

THE VALUE OF A GENOMIC TEST

Taking Action

After receiving genomic test results, 42% of 1,051 surveyed people reported positive changes in their health behavior.



*Many respondents reported more than one change, so percentages total more than 100%
Source: *The Impact of Personal Genomics (PGen) Study (R01 HG005092)*. Robert C. Green and Scott Roberts

GENOMIC PROFILING GUIDING TREATMENT

- Importance of pharmacogenomic testing prior to surgery or long term medication usage.
 - Opioids
 - Statins
- Importance of cancer genomic profiling in advanced stage cancer
 - Only 15% of advanced stage cancer patients receive it.
 - Results in positive change in longevity in 8-9% of advanced cancer cases

TRADITIONAL UNDERWRITING

- Unlike heart disease and stroke, traditional underwriting for life insurance policies offers little protective value for future initial cancer incidence.
- Typically, 30% of life insurance claims are cancer related. That percentage is predicted to increase as the insured population's average attained-age increases.

CANCER INCIDENCE

Population cancer incidence in a single year is just over .5%. An individual alive today has about a 30-40% chance of a cancer diagnosis over their lifetime.

As an individual ages, the cancer incidence rate, in a given year, increases quite a bit. It is .1% at age 30, 1.1% at age 60, and 2% at age 70.

This sample assumes 10% of each group is a smoker. A block of business with a higher percentage of smokers might see these annual incidence rates go up by as much as 50%.

Approximately 35% of cancer diagnoses are stage 3 or 4 cancers, where the survival rate is most problematic.

CANCER GUARDIAN™

Comprehensive Cancer Support

- Cancer Guardian is a comprehensive set of cancer support services that enable THE CANCER PATIENT with the information they and their treating oncologist need to make the most effective treatment decision with respect to their disease.
- Cancer Genomic Profiling isolates the specific genetic mutation(s) which are driving the development and spread of their cancer. This test searches for over 350 different cancer mutations and uses that information to match the patient to a treatment or clinical trial which targets their cancer.
- Recent research shows that these results match a stage 3 or 4 cancer patient with a targeted therapy, immunotherapy or clinical trial 25% of the time, and these patients on average survive an extra 10 months. These results are improving each year as the volume of cancer genetic research and the number of available matched therapies increase.

WHAT THIS MEANS FOR THE LIFE INSURANCE INDUSTRY

- It is estimated that the U.S. life insurance industry has reaped over \$6 billion of benefit from advances in immunotherapy that are not genetically matched. We believe the benefit to be derived from genetically matched therapies will at least equal that amount, but the gateway to realizing that benefit is the availability of multi-panel cancer genomic profiling testing. Today only about 15% of advanced stage cancer patients get these tests. Health insurers generally do not cover these costs. A test typically retails at over \$6,000.
- There are select blocks of life insurance business where the benefits of a life insurer providing its insured with Cancer Guardian, including these tests, produces a positive financial benefit to the insurer well in excess of its costs.

CHOOSING THE RIGHT BLOCK OF BUSINESS

- The key characteristics to use in identifying an appropriate block of business are:
 - Age, male/female split and smoker prevalence. These are used to determine an annual cancer incidence assumption.
 - Average un-reinsured face amount (determines the majority of the financial benefit to the insurer)
 - Average annual premium (second most important element of the insurer's benefit)

CALCULATING THE BENEFIT

- Insurer portfolio return over increased survival period, multiplied by policy reserve, plus...
- Insurer weighted average cost of capital over the increased survival period, multiplied by the un-reinsured net amount at risk, plus...
- Premium/policy charges collected over the increased survival period

ROI CALCULATION

| Data Inputs | | Calculated Outputs: | |
|---------------------------------|--------------|---------------------|---------------|
| # of Insureds: | 100,000 | Total Benefit: | \$ 10,789,100 |
| Incidence Rate: | 0.80% | Total Cost: | \$ 5,420,000 |
| Number of Tests: | 280 | Rate of Return: | 25.79% |
| Monthly Survival Rate Increase: | 10 | | |
| AVERAGE NARR | \$ 1,778,000 | | |
| Average Annual Premium/Annual | \$ 3,000 | | |
| Duration of Study: | 3 | | |
| Gating Fee: | \$ 4,200,000 | | |
| Testing Fee: | \$ 4,500 | | |
| WGA/Foundation Share of Benefit | 0% | | |

Insurer pays a \$3 per month charge on each covered insured plus a one time payment of \$750 on each insured diagnosed with cancer

CANCER IS THE TIP OF THE ICEBERG IN TERMS OF POTENTIAL MORTALITY IMPROVEMENT

- Prevalence of gene therapy, gene silencing RNA and mRNA therapy development.
 - Alzheimer's
 - Neurological diseases
 - Psychiatric illness

ACCESS TO GENETIC TESTING AND CUTTING EDGE HEALTH CARE CONSUMER DISCONTENT AND DISTRUST OF THE U.S. BIOPHARMA AND HEALTH INSURANCE INDUSTRIES

- Consumer frustration has reached new highs when it comes to access to cutting edge medical breakthroughs due to:
 - High cost exacerbated by financial strains of terminal/serious illness on patients and their families
 - Lack of health insurance/Medicare coverage; and
 - medical community reliance on current standard of care because of cost, insurance/Medicare coverage concerns

WHO IS GOING TO STEP IN AND SOLVE THE CONSUMER NEED?

CONSUMER INTEREST ALIGNMENT

- Who financially benefits from better medical outcomes and increased longevity?
 - Health Insurers – NO
 - Government – NO
 - Drug Companies – To some extent
 - Hospitals/MDs – NO
 - Life Insurers - YES

A WORD OF CAUTION

- Consumers will only rally behind a solution when their medical privacy is respected:
 - Insurers cannot use the data/results of such a program to underwrite and limit access to insurance.
 - Need for a third-party administrator
 - Results reported only in aggregate – no PII medical information leaves the TPA and testing company
 - Mortality studies performed by TPA and testing company based on criteria set by insurance company clients