



AN INTERVIEW WITH SIKKA'S LEWIS GOLDMAN

I invited Lewis to do an interview for Hot Notes.

He agreed to do it...and the payoff is spectacular!

Which elements of dental history are most significant for higher mortality? Untreated periodontitis? Tooth count? Something else?

Interestingly, a variable importance analysis has determined the most statistically significant dental procedure to be a combination of diagnostic and surgical procedures. We've found that different factors can be important for different cohorts in a population. For example, the number of natural teeth is a historically powerful predictor for older patients, while substance abuse is a more common predictor for younger generations.

Sikka has also found that having a comprehensive view of mortality is a much more sound approach than narrowing in on any one dental procedure. For example, say we had multiple patients with a surgical or diagnostic procedure on their record, one who had a perfect dental record before this procedure, and one who's barely shown up for his cleaning for the past several years. In this situation, looking at any one condition would provide an inaccurate representation of the patient's risk profile. One interesting condition is periodontal disease, due to its correlation with so many other ailments and prevalence in the U.S. Studying the correlations between periodontal disease and other conditions have found evidence linking it to Alzheimer's, heart disease, diabetes, and many other conditions that can impact mortality as well as long term care needs. Sikka's database has the most comprehensive record of periodontal disease in the U.S. As the body of research surrounding periodontal disease and its impact on health and mortality

continues to grow, Sikka's periodontal disease indicator and score will become increasingly more valuable for carriers.

Briefly describe your scoring system. Has it been vetted by reinsurers, other service providers?

Sikka has two mortality risk scores for life insurance underwriting, the Life Expectancy at Current Age (LECA) score and the Periodontal Disease to Mortality risk score. The two scores are built using the same techniques and methodology but are quite different in terms of their respective markets and applications.

In Sikka's dental database, we have comprehensive data on the dental procedures a patient has had, which can include routine procedures such as a bi-annual cleaning or a complex surgical procedure like a dental crown lengthening. All in all, there are over 500 coded procedures a dentist could perform, with many having some correlation with mortality. These dental procedures are what powers Sikka's mortality risk scores while accounting for age and gender. Our data science team performed a variable importance analysis on the 500+ dental procedures at our disposal and narrowed it down to the 99 that had the most statistically significant correlation with mortality and used those to build the LECA score.

The Periodontal Disease to Mortality score was developed in the same way, but exclusively using periodontal procedure codes and the dentist's clinical notes. The Periodontal Disease to Mortality score, due to periodontal disease's correlation with Alzheimer's, cardiovascular disease, and diabetes, is best utilized in the disability and long-term care insurance markets. In terms of vetting, one of Sikka's highest priorities has been getting a carrier and reinsurer to collaborate with us on a whitepaper for both scores since their launch. We're currently doing a study to validate the efficacy of the LECA score which we hope to turn into a white paper with a reinsurer sometime over the next 6 months. In lieu of that, Sikka's team has worked with an actuarial consulting firm, Lewis

& Ellis, to validate our scores.

Does a dental questionnaire completed by the applicant suffice for smaller amounts of coverage and/or at younger ages, or are clinical dental records always needed?

While the dental clinical notes are a vital component of Sikka's indicators for pre-existing conditions, the questionnaire is a key contributing component as they reflect the patient's acknowledgement of certain conditions that can impact the course of dental treatment. For example, a key source of Sikka's Tobacco Oral Healthcare Indicator comes from the dental questionnaire, as tobacco stains often require unique cleaning procedures and thus it's in the patient's best interest to be truthful about their smoking or chewing tobacco habit. This contrasts with a life insurance application where the applicant has a strong incentive to misrepresent their use of tobacco as they likely know it will result in a higher premium or even a decline in coverage.

Several of Sikka's Oral Healthcare Indicators can and have been used for Simplified Issue Term (SIT) risk classification, which often offers an automated approval process in exchange for lower coverage amounts and slightly higher premiums than fully underwritten Term or Whole Life policies. These policies are often of interest to younger applicants, who may need less coverage given their stage in life and like the quick, online approval process that many carriers offer. Since Sikka's Oral Healthcare Indicators are delivered via a real-time API feed, they can be used to identify tobacco users, diabetics, people with high blood pressure, and several other major conditions which are often used to price applicants for SIT policies. Notably, Sikka often has data from both the patient's dental questionnaire as well as the clinical note observations by the dentist or hygienist that might not be available through other data sources such as the prescription drug database.

Because a typical patient will visit their dentist more frequently than their other healthcare providers, the questionnaires will have more up-to-date information than other health data sources, which can provide valuable primary or supplementary information to more traditional life underwriting data sources. In addition, because the information gained from questionnaires significantly impacts the course of treatment, being untruthful to one's dentist has tangible consequences. For example, smoking tobacco not only creates unique stains that require specific cleaning techniques, it also can make determining gum health more difficult which can be a predictor of a variety of diseases and conditions.

To be clear, Sikka makes sure that the source of the Oral Healthcare Indicator derived either from the clinical notes or the patient questionnaire is well-documented for the underwriter. In the PData portal and through our 3rd party distribution partners, the underwriter will be able to see if the results of the indicator are driven by a self-reported questionnaire or via dental clinical notes taken through the course of treatment, along with an extract from either source providing the details on the habit or condition.

What are some of the challenges to getting carriers to adopt new data sources and how have you addressed those challenges?

I've worked in the financial services and insurance industry for decades; while the industry at large is risk-averse, insurance has built a business model around hazard mitigation. When onboarding a new data source, carriers will do everything in their power to make sure the data has substantive predictive capabilities. As a result, it can take years to get widespread adoption of a new data source. For example, Milliman's IntelliScript product took 10 years

before it was widely adopted by the industry. We are finding that carriers and reinsurers are embracing new, automated data sources at a faster pace today, as the COVID-19 epidemic seems to have made carriers more open to testing and adopting data that provides support for accelerated underwriting. It helps that Sikka's dental data is health data, which has a well-known level of predictive power in terms of life insurance underwriting. Even so, carriers always want extensive industry validation before they change their workflows and modify their underwriting models, even for a data product with so much intuitive value like oral health data.

Since the launch of our life insurance products, we've been hard at work validating the power of Sikka's oral health data. Sikka has been conducting retrospective studies since the launch of our Tobacco Oral Healthcare Indicator in 2019, with match rates as high as 53% and the power & coverage of our indicators increasing substantially over time. We've done over 20 retrospective studies to date working with carriers, reinsurers, and data providers. Overall, these studies have had a particular focus on the Tobacco Oral Healthcare Indicator, as catching just one smoking mis-representer and pricing him or her correctly is worth an average of \$23,000 in lost premiums over the course of a typical Term Life policy.

In addition to these retrospective studies, an ExamOne cost-benefit analysis (done by leading biostatistician Brian Lanzrath) looked at the protective value and lift in the detection of smoking misrepresentation using Sikka's tobacco indicator. He found that based on the data from a typical carrier, using Sikka's data resulted in \$40.95 lift in protective value per matched record. Another study also done by Brian Lanzrath of ExamOne which looked at Sikka's data in production found that Sikka's Oral

Healthcare Indicators increased identification of pre-existing conditions versus the Rx database or lab results by 10 to 50%, with very high reliability and validity versus these more traditional data sources. The study analyzed two aspects of the indicators – 1) the correlation coefficient between Sikka's oral health flags relative to flags detected in laboratory or prescription data and 2) the confirmation rates of Sikka's indicators. ExamOne found that the correlation coefficients are right where a carrier would want them to be; not too high (too high would indicate that Sikka's data isn't providing incremental value) and not too low (indicating there is no protective value).

Sikka currently offers 14 Oral Healthcare Indicators ranging from Hypertension to Sleep Apnea to Dementia, and our data is currently being used on a daily basis by several carriers. Over years of iterations and improvements, Sikka's indicators have become a truly powerful and competitive product for the life underwriting industry, and we are working with reinsurers to develop whitepapers on their protective value to increase industry adoption.

In the findings of your data science and research teams, what makes Sikka's oral health data different from other health vendors? What protective value is in Sikka's oral health data that can't be found in other traditional data sources?

While most health data has a high level of predictive power and explainability, oral health data has several characteristics that make it both unique and powerful. First, in a general sense, oral health data is updated far more frequently than traditional health data sources used for life insurance underwriting. While options like the Medical Information Bureau, MVRs, and the Rx database all have well-established levels of power and credibility, they can potentially go years without any meaningful updates. However,



patients will visit their dentist twice a year; meaning a carrier could obtain a much higher level of granularity on the state of a patient's health over time than looking at periodic doctor's visits, tests, and new prescriptions, especially for younger applicants. Furthermore, even a lack of dental procedures for a life insurance applicant has powerful implications.

For example, if a particular patient only got their cleaning/checkup every other year, that information would contain powerful predictive effects that would be captured and reflected in the LECA score. Finally, there are unique data points that may only be available through dental records such as Periodontal disease (which over 20% of patients in Sikka's database have in some form) which are highly predictive of future health outcomes (as evidenced by Sikka's Periodontal Disease to Mortality Score). These unique data points provide incremental value in terms of predicting relative mortality risk for actuaries and underwriters, allowing for better risk classification and more appropriate pricing. Sikka's dental data is robust and readily available for younger life insurance applicants ranging in age from 20 to 45, many of whom may not be very active in other data sources including prescription drugs.



Lewis Goldman is the Business Leader of the Insurance division of sikka.ai's Sikka Insights. Prior to joining sikka.ai, he worked in insurance as the head of marketing and product for Global Life Distribution and the MetLife

direct to consumer life insurance business. Lewis utilizes his 25+ years of experience leveraging data for disruptive innovation within the insurance and financial industry to help bring sikka.ai to the forefront of alternative data sources for life insurance underwriting. He is a graduate of Harvard University and Columbia University Business School, and he also teaches marketing at Iona College.

THE HUMAN FACTOR IN SELECTING LIFE INSURANCE RISKS - INTERMISSION

**William M. Tilford, Certified
FALU, FLMI, CLU, Fellow of
ALUCA
Tilford Consulting**

One housekeeping item is in order – **Hot Notes** previously stated that my insurance career began at Bankers Life & Casualty, the correct company is Benefit Trust Life Insurance Company (now Trustmark). I went to BLC later on during my corporate period.

We will present Part II of this article series in the next edition of Hot Notes, but I had a very personal yet somewhat relevant interruption in my own life that inspired some other thoughts worth sharing separately.

Basically, I tried to be a "tough guy" for nearly three days with what turned out to be an incarcerated umbilical hernia that was strangling the small bowel. I was later told (and my medical records appear to corroborate this) that had I been stubborn about going to the ER for even a few more hours, the best case scenario would have included dialysis (my serum creatinine was pushing 4 on admission) if I had been savable at all (the small bowel was resected with a fair piece of gangrenous tissue removed). Now then, I am a card-carrying Mensa member, but all those IQ points failed to prevent a thought process that might have proven fatal, especially since yeah, I'm something of a tough guy (a prerequisite for surviving as an entrepreneur this