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somewhat different

Transparency of data use and preventing bias in the outcomes of algorithms are hugely important.

Data-driven insurance

From data delusion to data solution (part 2)

This two-part article aims to review some of the important concepts and considerations for insurers wishing to use data and technology to become a partner rather than just a payer for their policyholders. These include ethical considerations, understanding exactly what data is, the implications of data misuse and of ethical intelligent data use, and the importance of integrating data from various sources, ultimately enabling us to grasp the true potential of data.
Please **click here** to access part one or continue reading.

The technology is out there, ready for use, but also evolving

From an insurance perspective, the confluence of technology and data present incredible opportunities to redefine our offering and the customer experience.

Digital health devices as described in part 1 are classified as Internet of Things (IoT) devices, which simply means they are embedded with sensors, software, network connectivity and the capability to collect and exchange data.[1]

McKinsey notes that over the coming years we will see a substantial increase in the number of connected consumer devices. "The penetration of existing devices (such as cars, fitness trackers, home assistants, smartphones, and smart watches) will continue to increase rapidly, joined by new, growing categories such as clothing, eyewear, home appliances, medical devices, and shoes."[2]

They also note that "the resulting avalanche of new data created by these devices will allow carriers to understand their clients more deeply, resulting in new product categories, more personalized pricing, and increasingly real-time service delivery".

However, at Hannover Re we believe that this is only possible if life insurers can collect the correct data, having first asked themselves what problem(s) they are trying to solve.

Data needs to speak the same language, or have a translator, and it must flow

The following is an extract from the article "Death by 1,000 clicks: where electronic health records (EHR) went wrong" published in Fortune Magazine, March 2019.[3]
"For two days, the young lawyer had been suffering from severe headaches while a disorienting fever left him struggling to tell the 911 operator his address.

[1] See https://internetofthingswiki.com/internet-of-things-definition/ Accessed 28 October 2019
[2] See Balasubramanian, R., et al., McKinsey & Company, New York, NY, USA. Insurance 2030 – The impact of AI on the future of insurance. , Apr.2018
[3] See Schulte F., Fry E., Death by 1,000 Clicks: Where Electronic Health Records Went Wrong, March 18 2019

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Suspecting meningitis, a doctor at the hospital performed a spinal tap, and the next day an infectious disease specialist typed in an order for a critical lab test — a check of the spinal fluid for viruses, including herpes simplex — into the hospital's EHR.

Although the order appeared on the Epic EHR's screen, it was not sent to the lab. It turned out, Epic's software didn't fully "interface" with the lab's software, according to a lawsuit Ronisky filed in February 2017 in Los Angeles County Superior Court. His results and diagnosis were delayed — by days, he claimed — during which time he suffered irreversible brain damage from herpes encephalitis."

An important consideration is that as data sources proliferate, we run the risk of data silos being generated where valuable data is inaccessible for use outside of the purpose for which it was created. For example, while continuous glucose monitoring apps may record data and provide visualisations for clinical utility, accessing that data for other purposes such as insurance needs to be enabled.

The above example of electronic health records (EHR) highlights the importance of data. The idea with EHR is that any health care provider can, with your permission, access your health records because they exist in an accessible electronic format. EHR platforms can also be used to order blood tests, review different investigations such as X-rays etc. The purpose is to deliver efficient, cost-effective care. While in theory this is an excellent development, problems can and have arisen.

Apart from being complex platforms to build, EHRs have been built by different companies, with seemingly little input from the doctors who need to use them. Consequently, in addition to having variations by manufacturer, they have ended up with flaws and offer a poor user experience. Examples of serious problems include lab tests that have been ordered not reaching the lab and medications being prescribed at the wrong doses or for the wrong period of time.

This should draw your attention to the importance of having a very clear plan for the acquisition and use of data that improves the process for our clients rather than making things worse.

Getting different platforms and systems to communicate and share information is called interoperability and refers to "the ability of different information systems, devices and applications ('systems') to access, exchange, integrate and cooperatively use data in a coordinated manner, within and across organizational, regional and national boundaries, to provide timely and seamless portability of information and optimize the health of individuals and populations globally".[4]

What we can expect from interoperability is that problems such as the one highlighted will be alleviated and also IoT healthcare devices will soon become data inputs into EHRs, hence enabling more holistic care.

Again, this has the potential to provide life insurers with opportunity but it also highlights the digital manner in which medical data is being created nowadays.

Life insurers have long been users of medical information; in the past, medical data was created and stored on paper, and hence we accessed it in the format in which it was created. To some extent it is already the case now, and certainly will be in the future, that medical data (regardless of type or source) will be created and stored digitally and as an industry we need to access it in the way in which it was created.

Looking forward 10 to 15 years, the population that will be buying the bulk of insurance products as well as the population with policies in force of significant durations will be millennials and Gen Z; for these digital natives, interaction in a digital world is really the only way they know. This means that because these people interact digitally, the granting of access to data will be based on a company's ability to provide them with a useful product as well as its reputation as a trusted custodian of personal data.

The purpose of data

Ultimately, data must serve a purpose, and in the insurance setting that could broadly be described as enabling insurance coverage at the best (risk-appropriate) price to those who need it (even though they may not realise it) in an automated (i.e. with the least friction possible) manner.

In order to achieve this outcome, data must be used in such a way as to enable artificial intelligence to play its role. I have refrained from specifically mentioning artificial intelligence up until this point because an understanding of data was paramount.

A few key concepts are defined in the following (there is no single definition) based on how they resonate with the purpose of life insurers.

[4] See HIMSS What is Interoperability, Health information Management Systems Society

Artificial Intelligence (AI): "the field of computer science dedicated to solving cognitive problems commonly associated with human intelligence, such as learning, problem solving, and pattern recognition."[5]

Machine Learning (ML): "machine learning (a sub-group of AI) seeks to provide knowledge to computers through data, observations and interacting with the world. That acquired knowledge allows computers to correctly generalize to new settings." Machine learning can be supervised or unsupervised.[6]

Deep Learning (DL): deep learning is a subset of ML where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data. Similar to how we learn from experience, the deep learning algorithm would perform a task repeatedly, each time tweaking it a little to improve the outcome.[7]

Based on the definitions above I will only refer to AI; the term does, however, through its hierarchy refer also to ML and DL.

Most people have heard the adage "garbage in, garbage out" and this is especially true of AI, which is not a magic factory that can take just any data and return intelligent, meaningful and actionable insights.

In fact, even good data can display bias and produce undesirable outcomes. This was highlighted in a recent article in Science magazine where a health algorithm used by a health insurer disadvantaged black patients over white patients with the same health risk scores. "The bias arises because the algorithm predicts health care costs rather than illness, but unequal access to care means that we spend less money caring for black patients than for white patients. Thus, despite health care cost appearing to be an effective proxy for health by some measures of predictive accuracy, large racial biases arise."[8]

While this is an example of the use of data for making clinical decisions, it highlights the effects of bias that could easily affect a risk assessment algorithm in life insurance if that algorithm were not adequately constructed.

We need to be cognisant of the attention economy and the potentially devastating effects that the incorrect use of data or use of incorrect data could have on the industry, despite our best intentions. Considering the vast array of different types and sources of data, identifying the right data from the right source is paramount to insurers' ability to take someone's data and return it to them as a useful product. We should also not forget that we aim to achieve this in an automated manner which – for the purposes of the GDPR – needs to be accurate and fair.

According to data regulations such as the GDPR, an insurance applicant has the right to not be subject to an automated decision. Linked to this – and reflecting something that we firmly believe at Hannover Re – is the fact that we should never arrive at an automated decision that cannot be explained. The only way to ensure the latter is if, firstly, you understand the data that is being used to build your AI insurance model and, secondly, you understand what your AI model is doing with that data.

Summary

Given the rapid expansion of external data sources, it will not always be easy to identify quality data that has a genuine use case for insurance, hence making it even more important to ask the right questions about what data is needed to solve which problem. It is also important to realise that accessing digital health data opens up possibilities for longitudinal health use, information which has the potential to solve the VIP.

As McKinsey correctly says, "Generating value from the AI use cases of the future will require carriers to integrate skills, technology, and insights from around the organization to deliver unique, holistic customer experiences." For insurers, it is paramount that our unique industry knowledge and experience is coupled with the correct in-house data skills, but we must also recognise when external expertise is needed to ensure the development of AI solutions that are accurate, fair, and explainable.

Pursuing the correct data source that allows the correct problem to be solved, bearing in mind the complexities of how that data can be acquired and curated in order to return it as a valuable product to your policyholders, will become a key ability of life insurers.

Transparency of data use and preventing bias in the outcomes of algorithms are hugely important, especially in the context of data protection and usage regulations but also because – as insurers looking to provide people with the

[5] See Marr B., Forbes, February 14 2018, The Key Definitions of Artificial Intelligence That Explain Its Importance
[6] See Faggella D., The Rise of Neural Networks and Deep Learning in Our everyday Lives – A Conversation with Yoshua Bengio, Emerj, February 19 2019
[7] See Marr B., Forbes, February 14 2018, What Is Deep Learning AI? A Simple Guide with 8 Practical Examples, October 1 2018
[8] See Obermeyer, Z., et al., S. Science, 366(6464), pp.447-453. Dissecting racial bias in an algorithm used to manage the health of populations. 2019

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"The pace of change has never been this fast, yet it will never be this slow again."
Justin Trudeau, World Economic Forum 2018

We had best all get on board the train of digital transformation because once it's left the station without us it will be too late to catch it.

We would love to support you in your digital transformation. With initiatives such as hr | equarium (www.equarium.com), which brings insurtechs and insurers together, and our experience in automation and the integration of external data sources as demonstrated by hr | QUIRC and hr | ReFlex, we stand ready to help you on your journey.

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