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# Beyond sales and awareness: Using marketing analytics for improved health engagement and outcomes

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**Abstract** Customer insights generated from marketing science show great promise in encouraging health engagement and improving health outcomes through intervention programmes. A health insurance case study introduces the effects of leveraging marketing analytics into preventative care, by building targeting segmentation to better understand

the customers' profiles as well as to design the optimal interaction and communication methods based on each segment's preferences and characteristics. The findings indicate that marketing analytics is relevant to a significantly greater improvement in health engagement and outcomes when compared with a control group with non-specific interactions. Specifically, this interaction resulted in an increase in wellness visits from 23.3 to 66.4 per cent and a significantly positive impact on the health status of the test group. The results provide further supporting evidence of the benefits of leveraging marketing analytics in health engagement.

**KEYWORDS:** marketing analytics, health engagement, health care, market segmentation, Big Data

## INTRODUCTION

Marketing analytics and its related tools are commonly used to unveil customer preferences and behaviour patterns in order to provide insights for product development and service launches. With ongoing rapid change and increased competition from forces such as globalisation and the digital revolution, firms have new opportunities to generate useful insights from a variety of information sources frequently described as 'Big Data'. Segmenting, positioning and targeting are key activities within the marketing arena. Once firms have the necessary information extracted from both internal and external data sources, a process of dividing the population into separate segments based on consumer behaviour patterns and needs is conducted to distinguish customer groups and compare characteristics across segments. After analysing segments, the firms start targeting attractive groups and customising products and services to meet the needs of each group.

With most health programmes, there is a misunderstanding that health services should match universal populations, medical conditions or situations.<sup>1,2</sup> In the past, health and wellness programmes were conducted by coaching and nursing services to either the general population or unhealthy groups without understanding customer profiles and mapping the different needs to the

different customer segments. Therefore, the outcomes on health behaviour change were less effective without the consideration of personal context. A study on the self-management of chronic lower back pain, through a qualitative analysis of the impact of interactions on a patient-centred website, shows the positive effect of providing differentiated stimulus on self-management attitudes and behaviours.<sup>3</sup> Another study, focusing on cancer, also demonstrates a variation in health outcomes by understanding different customer patterns.<sup>4</sup> Moreover, by sending out personalised dietary guidance, eg a promotion on increasing fruit and vegetable consumption and reducing saturated fat intake, researchers positively impacted a health improvement programme.<sup>5</sup> This body of research shows the key individual difference variables and characteristics linked to the underlying model of behaviour change, which have effects on health engagement and consequent outcomes.

Marketing analytics in healthcare, with the advantage of providing insights on individual needs via analysing depersonalised data using analytic computing technology, can serve as a powerful tool to optimise interaction strategies by providing more tailored services to different segments. A study of market segmentation shows that consumer-based variables such as activities, preferences and opinions are significantly

related to healthcare quality when used to provide customised services.<sup>6</sup> In addition, this study provides evidence that the customised services provide better customer satisfaction, and also have benefits on the cost side. Beyond the service quality provided to outpatients or inpatients, another example of how marketing analytics drives better service is preventive care. Predictive analytics has a widespread use in preventive healthcare, which relies on anticipatory actions that can segment prevention based on demographic factors, lifestyles and genetic predisposition. Currently, there is still a long way to go in utilising customer data regarding preventive care. A study shows that about half of all deaths in the USA in 2000 were due to preventable behaviours and exposures.<sup>7</sup> This study also estimates that 400,000 people die each year in the USA due to poor diet and a sedentary lifestyle. If a predictive analytics strategy can fully leverage the information flow into accurate operations, entire populations may obtain more targeted service and reduce unsystematic risk. The evidence shown in another research study explains that utilisation rates of healthcare services remain low for preventive services. Increasing the use of just five preventive services would save more than 100,000 lives each year in the USA.<sup>8</sup>

At Cigna we have found that applying marketing segmentation tools has enabled us to vary health coach messaging to customers, adapting the exact communication to the customer's profile. This has been especially effective in our projects targeted at increasing preventative care utilisation. In this paper we discuss how methods of building segmentation to predict particular customer needs and specified interactions can be applied to resolving the issue of predicting reactions to message delivery and communications. The aim of this case study is to understand the benefits of applying marketing analytical methods such as segmentation and predictive modelling in health improvement programmes. This study

employs both qualitative and quantitative methods, and reports the results of 101 cases. The results demonstrate meaningful increases in wellness visits, improvement in health outcomes and a saving on total medical costs, which were observed after applying specific messages to targeted groups.

## CASE STUDY

According to estimates made by the World Health Organisation, about 55 million people died worldwide in 2011, two-thirds of this group from non-communicable diseases. Preventative care is especially important given the prevalent, worldwide incidence of chronic disease and resulting deaths.

This case study is about how Cigna uses marketing tools to improve a client's employees' preventive care in order to improve their health outcomes and lower their expenses on medical costs.

The company is a global health services organisation. Its insurance subsidiaries are major providers of medical, dental, disability, life and accident insurance and related products and services — the majority of which are offered through employers and other groups. In addition to providing insurance, the company also offers various tools to improve their customers' health and to save their customers out-of-pocket medical expenses, to name just a few.

## Control versus test validation

In this campaign the company randomly selected 101 employees out of over 10,000 employees from a participating client as the test group, while the remaining employees were considered to be the control group. The main factor was whether the employee received a targeted preventive health campaign. The outcome of this experiment is measured by the preventive care utilisation rate. People using preventive

care in the next year would be considered users. The preventive care utilisation rate is defined as the number of users as a percentage of the total number of people within the group. It should be noted at the outset that, throughout the case study and in all the applications of marketing analytics conducted by the company, individual health information is always safeguarded and depersonalised data were only used to create predictive models. Personal information at the individual level was absolutely never used.

### **Analysis of employees: Customer segmentation**

To achieve the objective of improving the client's employees' preventive care utilisation, the company assumed a hypothesis that not all the people are the same: they have different needs, concerns and characteristics. Some characteristics that seem irrelevant to health care may affect health. For example, research has shown that individualism-collectivism, in addition to other culture-related constructs, plays an important role in an individual's health decision making and health behaviours and has been found to explain some amount of variance in preferences for health messaging.<sup>9</sup> Another study found significant differences between cultural orientations in terms of reported engagement with and perceived attractiveness and novelty of the information presented in the tailored condition.<sup>10</sup> While Japanese participants were more likely to re-read the tailored information, they were less likely to find it useful to change their dietary behaviours compared to those who were shown the generic messages.<sup>10</sup> As a result, particular strategies should be further divided into discrete segments. Each segment consists of people with similar needs and concerns. The organisation then develops strategies that are closely targeted to each segment. This is generally called customer segmentation.

The company divided the population into different segments. Segmentation can lead the organisation to better understand the employees. Its aim is to provide the following information in each segment: (1) what the employee's health condition is; (2) what the employee's claim behaviour is; (3) which communication methods the employees prefer; (4) what affects the employee's willingness to go to a clinic; and (5) their view on preventive care.

According to the above-listed information that segmentation should provide, the company performed the segmentation based on the following information: (1) chronic condition of the employee; (2) claim history of the employee; (3) the most frequently used methods of communication; (4) factors that affect the employee going to see a doctor; and (5) opinion and frequency of preventive care visits.

The first two pieces of information were in the internal database, while the last three pieces of information were obtained by sending out questionnaires to employees.

Traditionally, the technique used to divide one group into segments is the hierarchical clustering method, which clusters the observations that are most similar. Here similar observations mean observations with small distances. Whenever a function maps the Cartesian product to real numbers and satisfies non-negativity, coincidence axiom, symmetry and triangle inequality, it is referred to as distance. The most generally used distance is Euclidean distance.

In this case, the company used the hierarchical clustering method (see Figures 1 and 2) with distance being average linkage. Average linkage tends to join clusters with small variances, making it somewhat biased toward producing clusters with equal variance. It considers all distances between observations, meaning that it is less influenced by outliers than most methods. The following algorithm and highlighted average linkage method describes this process:

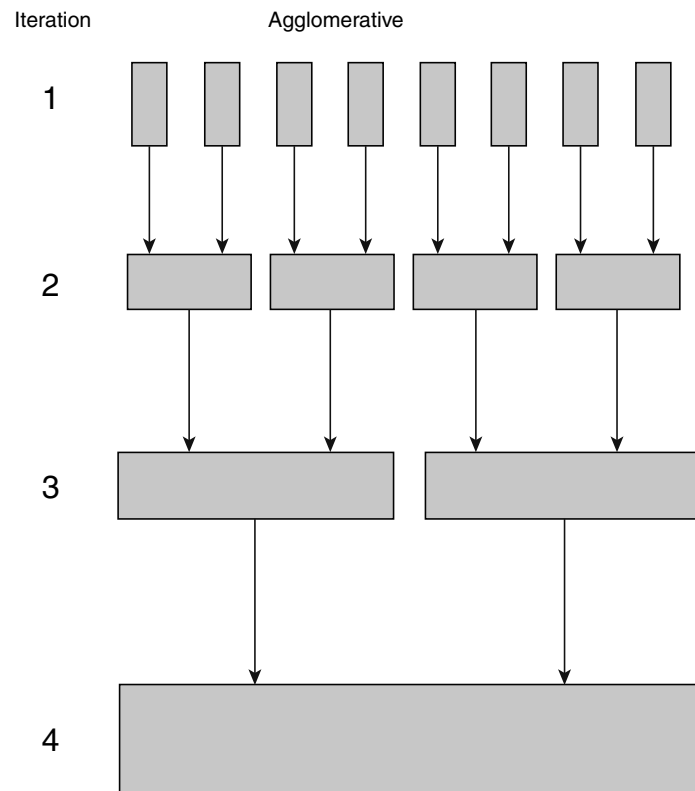


Figure 1: Hierarchical clustering

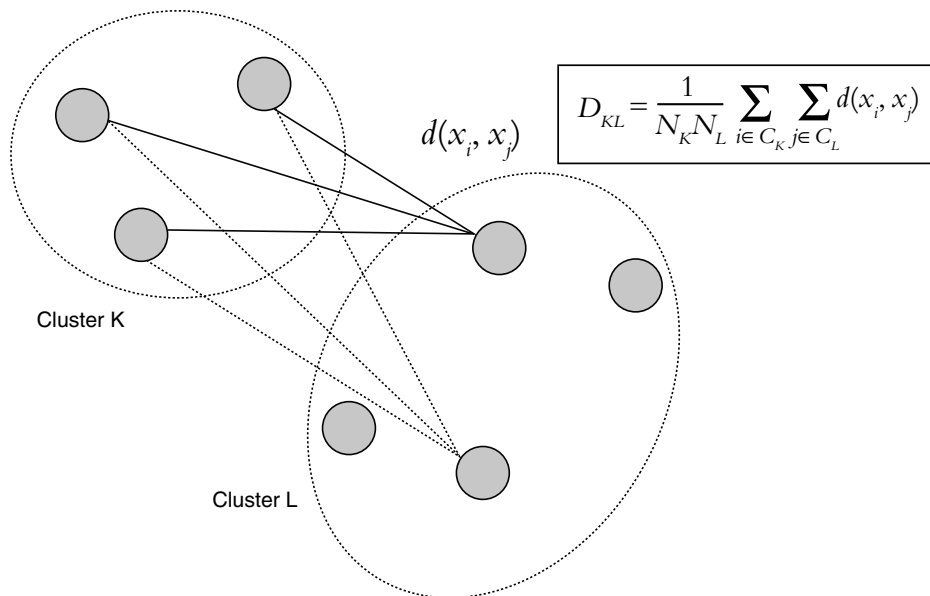


Figure 2: Average linkage (the distance between clusters is the average distance between pairs of observations)

1. Start with  $n$  clusters containing a single object.
2. Find the most similar pair of clusters  $C_i$  and  $C_j$  from the proximity matrix and merge them into a single cluster.
3. Update the proximity matrix (reduce its order by one, by replacing the individual clusters with the merged cluster).
4. Repeat steps (2) and (3) until a single cluster is obtained (ie  $N - 1$  times).

The distance between two clusters is defined by

$$D_{KL} = \frac{1}{N_K N_L} \sum_{i \in C_K} \sum_{j \in C_L} d(x_i, x_j)$$

where  $N_K$  is the number of observations in  $C_K$  (cluster  $K$ ), and  $d(x_i, x_j)$  is the distance between two customers with information  $x_i$  and  $x_j$ .

Average linkage was originated by Sokal and Michener.<sup>11</sup> Different segments have different characteristics. One classical segment contains customers with the following characteristics: they are middle aged; they have fewer chronic diseases on record than average; they prefer mail and internet communication; and they seldom use preventive care because they think that it costs money. The following sections will show how the company will design different strategies for each specific segment.

### Messages

The best communication methods succeed in getting across the right message in a clear way that gets noticed by the target audience, while at the same time saving on time and cost. Research shows that the title and the first few lines of the wording greatly affect the willingness of the reader to continue reading. That is to say, focusing on what customers like is better than describing everything in a message.

In this campaign, the company educated employees about the necessity for preventive

care and engaged employees in preventative care. The key aspects of the campaign were not only to get messages across about the benefits of preventive care, but also to encourage them to use preventive care. The company used different messages to different employees according to their needs and concerns:

- Employees are unclear about which preventive care they should use. The message focuses on the functions of different types of preventive care and focuses more on the diseases the employee may have according to the segment.
- Employees think preventive care does not help much. The message focuses on statistics of how preventive care prevents death and the percentage of people having chronic disease.
- Employees think using preventive care wastes time. The message focuses on the network of the company's healthcare programme and offers guidance for the convenient use of the service.
- Employees think preventive care costs money. The message focuses on an analysis of how preventive care can save money in terms of the expectation of total medical costs in the future.

Targeted messages will effectively draw the employee's attention, helping to improve the utilisation of preventive care. The messages were also developed in a way which mirrored the employee's professional interests.

### Communication channels

Good communicators succeed in choosing the best medium of communication for the particular purpose in mind. The company uses different ways to send out the messages:

- Written communication. The company sent out the messages by mail to employees' working address. Paper-based items sent by mail have the advantage of providing a clear

statement that is likely to reach its intended recipient.

- Oral communication. The company called the employees. Oral communication allows most misunderstandings to be solved immediately.
- Face-to-face communication. The company held a briefing day about saving medical costs. Face-to-face communication can save time and subsequent communications.
- Online communication. The company put promotional material on both the company's and employer's websites, focusing more on the needs of employees who prefer to get information on the internet. The advantage is that ongoing help is provided by popup help facilities. This is an inexpensive, quick and efficient means of communication.
- Social network. The company sent out messages over social networks such as Facebook and Twitter. This allows employees to read the message casually and in their own timeframe.

## RESULTS

A year after the campaign, the company observed that 82 per cent of the pilot participants had completed biometrics screening. This means that at least 82 per cent of the people received and read the message and found it useful. The 95 per cent confidence interval of the contact rate ranges from 74.4 per cent to 89.6 per cent. This is much higher than the control group, in which we used only telephone calls, and the contact rate is around 40 per cent. Statistically, it proves that the communication channel strategy can improve contact rate.

The objective and the most important result was preventive care utilisation. The wellness visit rate increased from 23.3 per cent to 66.4 per cent. The 95 per cent confidence interval of the preventive care use rate ranges from 57 per cent to 75.8 per cent. This means that the test group's outcome

is significantly higher from a statistical standpoint than the 23.3 per cent observed in the control group, providing evidence that the main factor, relating to being contacted with targeted messages, significantly affects the outcome.

## CONCLUSIONS

Through this case study we have gathered some interesting evidence. First, not only can marketing analytics methods promote product and positioning but they can also improve health. This is performed by targeting customers by their chronic conditions and the motivators and barriers to their utilising preventive care.

Secondly, customer centricity plays an increasing role in the world. Personality is formed by daily life; people like to have choices that are aligned with their personalities and personal preferences. A single strategy applied to a large group of people shows low efficiency, whereas targeted strategies are highly effective. We see, from the difference of contact rate between a single strategy, using only calls, and multiple-targeted strategies, that efficiency is doubled by multiple-targeted strategies.

Thirdly, analytic technique also becomes a factor affecting efficiency. Quantitative analysis is used more frequently than before due to access to more electronic information. Quantifying qualitative information is vital. In this case study, how to measure the customer's satisfaction towards products and how to match this measure with new customers is key to strategy development. In addition, clustering customers into different segments according to multiple continuous variables is another indispensable step. On the one hand, data are as important as the technique. On the other hand, technique cannot be applied without data support. One limitation of this study was the small sample size and a single employer. Further validation with a larger sample of employers and employees would be useful. Suggestions

for further research include using additional marketing analytic techniques, including propensity modelling, to further refine the targeting and therefore identify those customers who are most likely to respond from a health engagement perspective to targeted messages.

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