

Is Digital Disruption the End of Health Insurance? Some Thoughts on the Devising of Risk

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Big data is at the insurance industry's door. (Swedloff, 2015: 340)

In April 2015, the New York Times reported that Oscar, a New York based health insurance company usually located in the compound adjective category “hipster start-up,”¹ had joined another elite group, that of the “unicorn start-up”, just sixteen months after going live. Oscar was valued at \$1.5 billion after raising \$145 million to enable it to expand outside of New York and New Jersey where by Spring 2015 it had around 40,000 customers. Start-ups are relatively rare in health insurance – the field is dominated by companies like Anthem, Cigna, United Health and Humana, giants that are nonetheless in the process of a chain of mega consolidations. Compared to the competition, Oscar's valuation figures and customer numbers are small, but the company has been generating attention disproportionate with its size. One of the reasons for this is that Oscar stands as a bellwether marking the disruption that the combined effects of digital technology and legislative change are bringing to the insurance and healthcare industries and to the people they serve.

Oscar is a digital company, started by entrepreneurs whose backgrounds in industries like social gaming and hedge funds provide the platform for its particular mode of integrating technology, data and design. Together with freedom from the interoperability challenges of the legacy infrastructures within traditional insurance companies, this has given Oscar an advantage in presenting a more “human” user experience for people buying individual policies on Obamacare's new exchanges. Oscar offers a number of key “digital healthcare” signals including remote access to primary care and downloadable health records, but it is their Misfit fitness tracker scheme in particular that drives attention. In promising policyholders financial rewards for achieving fitness goals, the Misfit scheme is not only a textbook behavioural ‘nudge’ but also an emblematic case of the digital individualisation and gamification of value.²

It is this that makes the company almost a real time case study in what might happen to insurance in a digital world. This paper considers how technological disruptions are acting together with recent legislative interventions in the US and the UK to devise new systems and practices of risk within both private and social health insurance. These disruptions could go to the very heart of what insurance means.

Gamifying health insurance costs: Oscar's Misfit fitness tracker

See appendix, Figure 1

Healthcare systems globally are confronted by three major challenges: costs outpacing growth in GDP; uneven quality in outcomes and patient experience; and inadequate access to care (WHO 2014; Halvorson et al. 2012). Digital transformations hold out the promise of addressing these through initiatives ranging from digitized health records to remote consultations to self-care managed through apps and wearable devices. Insurance systems, whether nominally public or private, are central to how such digital initiatives are being orchestrated to meet these challenges and to incentivize improved care and healthy behaviour. Globally, insurance is the key infrastructure underpinning healthcare financing.³ While private, multi-payer systems such as that in the US are sometimes described as an insurance model; single-payer, welfare-based systems like the National Health Service (NHS) also employ risk-spreading, insurance-like techniques and retain a contributory element through national insurance. General taxation is the main source of NHS funding with national insurance contributing a much smaller portion.⁴ Changes to the NHS over the last 25 years have expanded the ways private finance is involved in healthcare financing. The public/private distinction is significant but it obfuscates the fact that both healthcare systems feature a hybrid mixture of public subsidy and private finance.⁵ Recent reforms further this hybridity by increasing the scope for competition and private provision in the UK while extending public subsidy in the US. This context of legislative and technological disruption, in combination with changes to international trade regulations like TTIP, the global circulation of

healthcare finance reform experts between government and industry, and the emergence of new providers from outside of the insurance sector, has already begun to alter how risks are devised in healthcare insurance and funding.

In the US, the effort to reshape the social and health insurance landscape through the 2010 Patient Protection and Affordable Care Act⁶ (ACA) has served for years now as a national proxy for debates about the proper role and limits of government action. Through the ACA's enactment and implementation, the way many people encounter health insurance has dramatically altered. Digital media and technologies play a prominent role in this encounter. They are mobilised in the first instance as part of the multichannel recruitment and marketing strategies launched by state and federal government, by pro and anti ACA advocacy groups and by insurance and healthcare plan providers. But digital marketing reaches beyond recruitment into attempts to motivate and shape healthier behaviour. These attempts blur at their edges into a more diffuse, potentially much more significant enterprise in exploring the capacity of digital technologies to measure, value, price and monetise risk on the basis of individual behaviour. Insurance providers offering qualified health plans (QHPs) on the state and federal marketplaces (the exchanges) established by the ACA, are prohibited from discriminating according to orthodox, "actuarially fair" means of pricing the risk posed by pre-existing health conditions. Combined with the ACA enshrined responsibility to "be as healthy as you can," incentives for the development of new means of devising risk linked to behaviour shaped by big health data and the "internet of things" (IoT) are starting to emerge.

In the UK, the 2012 Health and Social Care Act continues the longer trend for increasing the scope for markets, competition and private provision in the NHS. Over the last twenty-five years, a succession of governments have pursued a more or less consistent programme of commercialising the NHS introducing, for example, internal markets, foundation trusts empowered to borrow money and go bankrupt, "choose and book" services for patients and the use of specialist private clinics (ISTCs) to treat NHS patients.⁷ These changes are vast, complicated and almost continuous – as James Meek puts it "you can't step in the same NHS river twice" (2014: xx). What is already clear though is that the broad canvas of changes – markets, competition, choice, patients as consumers – means that the UK and the US healthcare systems are becoming steadily less unlike one another. Controlling costs, reducing waste, increasing efficiency are the overriding goals in both

systems and in both the newest weapon is somewhere in digital, uber-personalised, connected, mobile health. Underneath the hype of big data analytics and algorithms, digital garages, incubators and accelerators, there is the prospect of deep transformation in the logic and structure of insurance and the devising of risk that is taking place across global networks of practice. These transformations involve figures from formerly distinct fields such that insurance innovation is being driven not from within the sector but by systems, technologies and practice developed outside in consumer electronics, data science, venture capital and the big four Apple, Amazon, Facebook, and Google.

This paper sets some recent changes to the devising of risk in health and life insurance in historical context. It begins with an attempt to clarify what I mean by "devising." This forms the background to an explanation in the following section of the *practical* character of risk measurement, valuation, pricing and marketing – collectively "devising" – in insurance historically. Risk in insurance has always been a matter of calculation and judgement, a matter of integrating technical and commercial practice in ways that the market will bear and to which it will respond. The paper closes with a review of some broader claims together with some concrete instances of how digitization is currently shaping health insurance practice.

On Devising

The term "device" has gained far more traction in recent years than the idea of devising. They are closely related but "devising" fits better with the adaptable, pliable, sometimes capricious, character of risk practices. In *Market Devices*, Muniesa et al. (2007) explained that "devices" act, they have agency, but cautioned that this does not imply a machine/human division. Instead, Muniesa et al. advocate treating the person as part of and enacted through, the device. A device is therefore meant to be a hybrid thing, a notion conveyed more readily in the French word "agencement" which combines both arrangement and action. Agencements, as Michel Callon explained in this newsletter some years ago now, assemble humans, prostheses, tools, equipment, formulae, algorithms, etc. and things happen just as a consequence of the way these elements are connected (Callon 2005). Connections are productive because they give identity (or definition) to particular forms of action. This matters because connections are the key to how human practices and equipment come to bear on market action through particular forms of ranking, valuation, calculation, measurement, pricing etc.⁸

As provocative as it is, there are a lot of problems with the idea of devices/agencements.⁹ Among the most significant relates to whether and how boundaries are to be defined. If market devices are defined as those socio-technical, material and discursive assemblages that intervene in the constructing of markets, then they can be almost anything and everything connected with market activity. This level of generality is not all that helpful in practical or analytical terms. The boundaries and relations between one market device and another are left open, as too are questions about the scale and level of their operation. Silence on questions of scale and level is not entirely an accident. Just as MacKenzie (2006) noted the difficulties of establishing a causal relationship between the use of a mathematical pricing model and a change in market conditions, the formulation of market devices understands events as having multiple causes that cannot be traced to fluid, dynamic-boundaried devices. This does not counter the claim that devices configure markets, it just means that the manner in which they do so is fraught, partial, open to debate and prone to failure (c.f. Callon, 2010). In Law and Ruppert's (2013: 229) discussion devices are "more or less patterned teleological arrangements" with function and purpose – they do things – though not necessarily the things they are supposed to. The latent, implicit or unintended functions of devices are for the competent analyst to dig up.

Another problem is that no matter how clearly the incorporation of human action within devices is articulated, as the term has been taken up, it almost inevitably connotes the concrete, material machine, THE TECHNOLOGY! Technologies may simply be "ways of doing" but in the literature they almost always become the thing – the shiny, barely familiar, brand new thing. This is just a bit too materially, too technologically observant. In the darker English vernacular, devices are not just material, mechanical contraptions. They are also, sometimes simultaneously, tricks, disguises and deceptions. This is the sense in the confessional prayer of the Anglican church:

we have folowed to much the devises and desires of our owne hartes. We have offended against thy holy lawes: We have left undone those thinges whiche we ought to have done, and we have done those thinges which we ought not to have done, and there is no health in us.

Here the sense is of "devises" working almost behind the backs of their owners. Devises that might backfire or not fire at all, or sometimes work far better, or in ways other than anticipated.

This combination of unruly and instrumental effects, techniques, practices and tricks is what is at work – and in play – in the "devising" of risk. Devising is a collective term: like "constructing," it connotes the practical "doing" of risk, the practices at stake in transforming risk into a measurable, priceable, tradeable category. More than devices, *devising* points at the summoning, the conjuring, of risk and this works for thinking about the consumer market "appeal"¹⁰ that life and health insurance have to make. Making stable markets for insurance historically did come to depend on the development of technical forms of reasoning, of actuarial calculation and valuation, but never without the simultaneous orchestration of sentiment. Sentiment, as Oliver Wendell Homes (1872: 159) noted, "is the fulcrum and the place to stand on if you want to move the world." The bubbling, global enterprise in following, shaping, measuring, valuing, pricing, monetising and gamifying human behaviour and its big data trails, that is currently underway in contemporary health insurance, still depends on this orchestration in order to devise risk.

Devising risks in life and health insurance: a quick history

To explain why this combination of reason and sentiment is so important to the devising of risk it is worth considering life insurance practices historically. The history of how nineteenth century commercial insurance came to offer the first practical and market test of statistical and probabilistic models in part through the relentless promotion of the idea that large numbers behaved in accordance with discoverable laws, is by now well known (Gigerenzer et al. 1989, Hacking, 1990, Porter, 1996). At the same time, establishing a market for life insurance meant selling it as a solution to loss and change, to fortune and accident, to life and death. Probability, statistics and actuarial science in this context were seized upon as much as a rhetorical as a technical solution. What interested insurance companies, was not simply what emerging techniques could actually do, but what they could be claimed to do.

By the middle of the century references to the certainties offered by statistical laws were standard fare in promotional matter. Companies were by then using mortality statistics to price their premiums and probabilistic and actuarial calculations to forecast their liabilities. Even so mortality statistics could not have offered the kind of financial guarantees that were being promised. Insurance companies wilfully glossed the salient distinction between the populations they insured and the population from

which mortality tables were drawn. They relied primarily on Price's eighteenth century Northampton tables, which overestimated mortality but even if they had drawn upon more accurate tables this would not have altered the fact that their local insured population was distinct from that of the mortality tables. As the Institute of Actuaries had it in 1852, mortality rates would characteristically differ in every insurance association (Porter, 1996).

For this reason, companies needed good rules to inform the selection of lives as well as competent management as much as they needed mortality statistics. In order to secure admission to a life assurance company, the life "proposed" had to be deemed of sufficient quality. The method of selection took a variety of forms, from an appearance before the board in the early part of the century to a medical examination in the later decades. As the century progressed, insurance companies played an increasing role in measuring, valuing, pricing and mediating the health of the populations they insured. Insurance offices and organisations were involved in the establishment of a range of standards and tests for assessing health, disease and risks medically. With the task of securing the acceptance of the overall logic of collective mortality risk achieved, insurance actuaries increasingly turned to working with doctors to create new tools for assessing individual risks. Insurers worked with health and medical professionals to develop measures, including Quetelet's index, now known as the Body Mass Index (BMI), but also for smoking and alcohol consumption and a range of diseases and medical conditions (Bouk 2015; Jureidini & White 2000; French and Kneale 2009; Kneale and French, 2012). At the same time insurers have been involved, since the early twentieth century, in more diffuse and generalized efforts to promote public health through education and the sponsorship and organisation of sporting and "wellbeing" activities.

One of the most significant sectors in which insurance-driven health promotion took place was that in which a mass market for life assurance was finally established: industrial life assurance (ILA). ILA was a form of life assurance targeted at the industrious working classes. In the UK, it was the preserve of companies like the Prudential, the Refuge and the Pearl, all set up between 1848 and 1864, using a system of agents not only to sell policies but to collect weekly premiums. In contrast to the slow trajectories of "ordinary" life offices, ILA grew spectacularly quickly. Thirty million policies were in force in the UK by 1910 and over 100 million by 1940. This trajectory was in part a consequence of just how well agents were able to

translate a quantitative, statistical product into a form that would engage passionate interests. ILA initially supplied the means for an urgent, practical and deeply sentimental need: funeral expenses. The market for industrial insurance was vast but it was also unstable, controversial and the target of continuous regulation. Larger companies, notably the Prudential, addressed this by enlarging the scope and aspirations of ILA toward greater sums assured, and by developing sufficient agility to shape the changing legislative context to their own advantage. In particular, the company lobbied consistently, as did the sector as a whole, to ensure the admission of industrial assurance companies as "approved societies" under the 1911 National Insurance Act.

Given that the UK National Insurance Act was a field-changing piece of legislation – the Obamacare of its time – enacted to improve public health while at the same time eliminating the colossal market for industrial assurance, being included was quite an achievement. After 1912, many companies, notably the Prudential, benefited from the Act. They became actively involved in the promotion of public health through their separate roles as the "approved societies" that administered medical expenses and sickness benefits (until the establishment of the NHS), and this only bolstered their commercial standing.

By the 1920s, the Prudential was the largest life insurer in the UK by far and was embarked on a drive to expand the range of its business beyond "industrial branch" policies. This expansion involved an ongoing process of measuring company claims experience against pricing expectations to inform decisions about how to balance, expand and promote the product portfolio. There was nothing straightforward about this – as the company's attempt to capitalise on a demographic opportunity opened up by the First World War illustrates. In the early 1920s the Prudential introduced the iconic "Everywoman" endowment policy targeted at the new group of professional working women, who were unlikely to marry given the shortage of available men. Although opportunistic, the company was still tentative about the kind of cover it was willing to offer professional women. Responding to a suggestion from one of its own female employees that the real appetite among professional and single women was not for endowment but for sickness cover, the company remarked:

The question of sickness insurance for women is, except within narrow limits, an exceptionally difficult one. The rate of sickness amongst women is high, so that premiums would appear unduly heavy. Moreover, an assurance company could not

hope to get a fair average amongst those to whom it issued such policies; only those who were nearly certain that they would experience heavy sickness would pay the premium asked. The result is that what is known as “selection against the company” would operate, and the business would involve a loss. (Prudential Bulletin, 1926: 999)

Adverse selection is the hardy perennial in devising risk.¹² Those most motivated to take out cover are likely to be those with reason to fear. This selects risks against the company because customers have information about their health that companies do not. It was to avoid adverse selection that ordinary assurance companies introduced medical examinations. Industrial policies, however, were issued without any medical screening beyond some basic questions on the proposal form. Similarly, while medicals were used for many of the Prudential's ordinary branch policies, the Everywoman policy abandoned them in 1921, calculating that the increased attractiveness of non-medical insurance would offset the loss of any selection benefits. In refusing to offer the sickness cover, the company was in line with the sector's prevailing view at the time that only the state could adequately define a cost for women's sickness cover by compelling contributions.

This was a commercial judgement about a prospective outcome rather than an objective financial “fact” – were such a thing even possible. Financial valuation, as Muniesa (2012) insists, is neither subjective nor objective but *practical*, that is, it involves the practice, the activity, of turning things or people into objects or subjects of valuation. In this instance, women's sickness was an object that industrial companies declined to value. Reckoning the overall commercial value of insurance has always been a practical chore of enormous complexity. No matter how complicated the computation of value was – and even with advances in mechanical and digital computation, the proliferation of product portfolios, funds and investment strategies in the twentieth century always upped the ante – it was never just about the arithmetic. As Ine Van Hoyweghen explains, calculating economic prices on lives

encompasses the absorption of an intermingling of economic, managerial, accountancy, actuarial and medical knowledges, figures and tools. Insurance calculative devices are crucial in linking these distinct actors, considerations and domains in order to frame the life insurance transaction. So even if there are – at the outset – multiple considerations and calculative agencies involved in underwriting, the devices render the en-

actment of particular versions of what ‘sound underwriting’ for the insurance company means. (2014: 347)

Financial valuation is about actively and practically considering value precisely for commercial purposes, and the two are never simply equivalent. One of the things this points to is that no combination of financial valuation figures, whether of new or existing policy numbers, annual premium income, overall surplus figures etc. could determine the commercial value of the branches. That was a judgement that depended on the weight given to the different factors underlying fluctuations in sales and margins. Such a judgement had to interpret, for instance, whether fluctuations were short-term reactions or long-term trends, whether they might be influenced by operational changes, like reductions in the expense ratio, block re-organisation or marketing initiatives. Even then, the value given to the different branches was also a matter of the will to develop, maintain or reduce the corporate emphasis accorded to the different branches. The sheer size, overall profitability and increased diversification of industrial offices throughout the twentieth century went far beyond expanded product portfolios in the branches into overseas enterprises, investment fund management, group and individual pensions, property management etc.

What all this is pointing to is that historically, devising risk in insurance is always a matter of orchestrating practice and technology in line with the broader environment to engineer products priced at levels the market will bear. Practices and technologies for improving the accuracy of health assessment, and for promoting health and wellbeing, have played a major part in this devising. The idea of insurance unmediated by technology, by practice, by environment particularly legislation, makes no sense. As Wajcman (2014) notes, “our experience of human action and the material world is [always] mediated by technology.” This is worth bearing in mind as the hype about what digitization might do to insurance and to healthcare nears fever point.

Devising risk in the context of digitization

Illustrations of how the practices and technologies of risk shift in line with changing legislative environments are currently being sketched out on both sides of the Atlantic as insurance and health care providers in the US and the UK react to the ACA and the ongoing restructuring of the

NHS respectively. This section focuses primarily on the US context before returning to the UK towards the end.

The ACA shows how dramatically a single piece of legislation can alter the environment. The healthcare law offers substantial federal subsidies to try and create a more equitable distribution of healthcare costs. It is an enormously complex piece of legislation but among its main objectives was to provide cover for the roughly 41 million people who were estimated to be uninsured at the end of 2013.¹³ These were people who were not covered by their employers, not poor enough to qualify for Medicaid, which covers people with low income or a disability, and not old enough to be covered by Medicare, the program for the over 65s. In a country where medical bills are responsible for the majority of personal bankruptcies,¹⁴ this might have been expected to be a popular measure. But things have not been quite that simple. After years of debate, political challenges culminating in the federal shutdown of September 2012, legal challenges of which the latest was only resolved in summer 2015, and the completion of two enrolment periods resulting in a substantial reduction in the uninsured, the Act is only now looking stable enough to survive.¹⁵

The heat surrounding the ACA is partly a function of the extent to which it turns the spotlight on the ways ideas about freedom, fairness and the allocation of responsibility between individuals and the state are enshrined in insurance practice. The ACA reconfigures that settlement to expand and collectivise ideas about fairness beyond the individual and at the same time introduces challenges to “actuarially fair” means of valuation. Insurantly, the ACA is actually a much less dramatic break than the intensity of this debate implies. The US healthcare system can be described as a four-legged stool in which three legs, Medicare, Medicaid, and the large-group insurance market (contracting typically with large employers), had been functioning fairly well and will change only moderately under the Act. The other leg, the individual and small-group market, is the ACA’s main target. Eligible people can now access subsidized healthcare through newly-created state exchanges/marketplaces, in which providers have to offer defined benefits, guaranteed access and identical premiums for all, *irrespective of pre-existing conditions*. This creates a single insurance pool in each state and introduces significant new challenges, notably ensuring that sufficient healthy “young invincibles” register to balance adverse selection. Under the ACA, the individual mandate requiring all eligible Americans to have basic health coverage is too

weak to ensure universal compliance, and since those under 26 can stay on their parent’s plans, concerns about the quality of the pool remain.

The requirement that providers accept everyone replaces the “actuarially fair” model of pricing risk with one that relies on people paying a “fair share” of the costs of their pool and “being as healthy as they can.” As legal scholar Tom Baker (2010) has pointed out, neither “fair share” nor “be as healthy as you can” are explicitly addressed in the Act. This leaves a space for interested parties – among whom insurance companies and healthcare providers certainly number – as so do some new “digital” entrants to the market – to elaborate in practical terms what “fair share” and “healthiness” mean.

As Baker (2010) also observed, the Act continues a long trend in U.S. healthcare financing away from an ordinary market approach in which people pay for their own care at the point of consumption, towards paying a fair share of the overall cost mainly through insurance premiums and taxes. Insurance systems, by definition, distribute risk and responsibility, and it has been clear for a long time that the “fairness” or “justice” of that distribution is in the eye of the beholder.¹⁶ While privatised actuarial systems of the type that have prevailed in the US place more of the burden on individuals than the socialised systems that were developed in Europe in the twentieth century, that divide has never been anything like water-tight in practice. Even the exemplary post-war welfare state settlements of the UK and Scandinavia left plenty of scope for privatised risk management, and for states to “reconstitute market relationships in the course of formulating regulations to promote efficiency and manage risk” (Mabbett, 2010: 16; c.f. Baldwin, 1990; Lehtonen & Liukko, 2010). This mixed economy has always preserved enough space for arguments that socialising risk was “unfair” to some contributors, leaving open the possibility of dismantling or re-engineering parts of the settlement. In a post-ACA US, Baker maintains, judgements about what is fair are still likely to remain more closely linked to the consumption of health care than in places less preoccupied with freedom and choice. But the new responsibility to be as healthy as you can will tighten the link between fairness and current lifestyle and wellness factors because of the new responsibility to be as healthy as you can.

The ACA represents a major move in the reconfiguration and redistribution of risk and responsibility. This is due to the fact that prohibition of discrimination against individu-

als based on their health status is a prohibition of perhaps the fundamental characteristic of actuarial fairness, that is; “individuals pay according to the expected value that insurance has for them and insurance companies compete by identifying new ways to exclude the highest-risk individuals from their pools” (Baker 2010: 1601). It is such a significant move that it necessitates the introduction of a number of new actuarial and marketing practices. These practices employ digital means to recruit and persuade new “young invincible” customers, means that blur at their edges into a broader project to cultivate responsibility for individual health and wellness.

An example of the new actuarial¹⁷ and marketing practices is the wave of pro and anti-ACA recruitment and advocacy advertisements that have appeared over the last few years. Some of this material was pitched feverishly high and target specific younger audiences. The Koch brothers-funded “creepy gynaecologist” YouTube video, for example, depicted Uncle Sam ready with a speculum as a warning against the excesses of state intrusion enacted in the ACA. In return, the Obama administration and a number of pro-ACA advocacy groups used targeted ads to tackle adverse selection by enlisting younger sign-ups. In one example, three young men are shown accomplishing a keg stand with the legend “Brosurance. Keg stands are crazy. Not having health insurance is crazier. Don’t tap into your beer money to cover those medical bills. We got it covered. Now you can, too. Thanks Obamacare!” The ad was one of a series by the Colorado Consumer Health Initiative (CCHI) and Progress Now Colorado Education in Autumn 2013. The *Got Insurance* series provoked outrage in some quarters by seeming to endorse behaviour out of line with public health messages.

Some of the ads in the series also demonstrate how easy it is to get the language of a younger demographic wrong. Instead of relying too heavily on crafting content with clear youth appeal, the Obama administration applied the multi-channel networked campaigning techniques used in the 2008 election to inform ACA advocacy and outreach strategy. This meant targeting, tailoring and personalising messages across platforms such as YouTube, Facebook, Twitter, Instagram etc. For example, in the final weeks of the 2014-15 Open Enrolment period for insurance, Barack and Michelle Obama, and Joe Biden were tweeting childhood photos of themselves under the banner “no one stays young and invincible forever,” to coincide with national youth enrolment day on January 29.

Direct advocacy and recruitment is not the only way in which the ACA has boosted the already vast health care marketing spend in the US.¹⁸ There are other, more diffuse, messages circulating in the post-ACA context, sponsored by a whole range of government, insurers and health care provider organisations. The “What Would You Do” series, part of the American Academy of Orthopedic Surgeons’ “nation in motion” campaign, pushes strong messages about the individual’s responsibility to fight for health, whatever the circumstances, that sit well within a “be as healthy as you can” framework.¹⁹ One example shows a determined-looking mountain biker under the heading “What would you do if a serious sport injury almost took your leg? Merline Love refused to backpedal. A severe injury in a pickup game left Merline facing a possible amputation. Through her own determination – and a resourceful orthopaedic surgeon – she’s back to full speed. Way to fight back Merline.” This persuasive project, moreover, can now draw on a set of digital devices for measuring and monitoring just how seriously people are taking the responsibility to be healthy. This in turn creates opportunities for devising risk digitally that may challenge the structure, and perhaps the logic, of insurance markets.

Devising individual behaviour

This link between advertising content and health policy may seem like a stretch, but the attempt to induce people to take more responsibility for their health is not just being orchestrated through marketing channels. Nor are digital transformations being set to work on insurance only by revamping multi-channel distribution strategies. Instead, in national health policy, in industry “grey literature,” through online and offline platforms and in a number of pilot schemes and incremental innovations, attention is focusing on the ways that the convergence of IoT innovation, big health data and the explosion of health and well-being apps can offer solutions to the new forms insurance problems are taking.

The changing calculative base of insurance has created a global climate in which more traditional, employer or insurer-sponsored “wellness” programs are expanding and being augmented by “self-health,” monitored and enacted with digital tracking technologies that provide data to be fed back to insurance providers’ calculative apparatus.²⁰ The ACA pushes further in this direction through the “be as healthy as you can” edict, and through the associated broadening of incentives employers can give their staff for participation in wellness programs, for example by boost-

ing cash rewards on premiums or deductibles from 20% to 30%. There is also a pot of \$200 million in grants, to which small businesses can apply, to set up such programs (Olson and Tilley, 2014). In the UK, healthier behaviour, monitored by wearable devices, is currently rewarded in private insurance schemes like VitalityUK and BUPA Boost. In November 2014, the Department for Health's framework for action for the NHS described how

better use of data and technology has the power to improve health, transforming the quality and reducing the cost of health and care services. It can give patients and citizens more control over their health and wellbeing, empower carers, reduce the administrative burden for care professionals, and support the development of new medicines and treatments. (NIB, 2014: 3)

The NHS has endorsed the use of apps for behaviour change in fitness, smoking cessation and alcohol consumption and is investigating the possibility of "kitemarking" health apps in 2015.²¹ Pilot digital health schemes, such as myhealthlockerTM, which allows data from wearable devices to be integrated into Patient Health Records (Chana, 2013), are proliferating across the NHS system. The expressed policy aim on both sides of the Atlantic is to "personalize" health care through the use of data and technology. The lesson in "mass personalization" is explicitly being taken from consumer markets in industries like online retail, electronics, travel and banking which are frequently cited as models by organisations like the NIB in the UK and the private insurance sector.²²

There is clearly bubbling interest in these areas. A deal between health insurer Humana and Apple that permits the insurer to share data collected through Apple's proprietary Health app was announced in October 2014. The scheme works by bringing together all of a person's fitness data from different wearable devices and apps into one hub, consolidating existing connections between wearable manufacturers and insurers.²³ This was followed with the release in March 2015 of Apple's ResearchKit, an open-source platform for creating apps that will collect health care research data from a significant portion of the population. This, according to Fortune, "is a crucial step in tying big data, connected sensors and medicine together for advancing both public health goals (i.e., anticipating how a disease like the flu might spread) and personal health goals (i.e., improving outcomes for diseases like diabetes)."²⁴ Wearable devices themselves have gone from nowhere 5 years ago to being heavily touted as the area where the

most significant expansion is expected.²⁵ The potential benefits of collaboration between companies and insurers are clear for companies like Fitbit.

Today Fitbit sells its trackers in bulk to "thousands" of employers at a discount, along with sophisticated tracking software that can, for instance, get one office competing against another or see how active certain employees are ... Amy McDonough, who oversees Fitbit's employer program, wouldn't comment on how Fitbit data would affect pricing negotiations between employers and health care providers, though health insurer Cigna said fitness trackers "may" have an impact on future group insurance pricing. (Olson and Tilley, 2014)

These developments are nevertheless unprecedented. As described above, the insurance industry has a long history of monitoring health and offering differential premiums accordingly. The use of specific rewards and incentives for healthy behaviour however can be traced to South African insurance company Discovery Health, which began offering them in 1997. The lifestyle approach pioneered by the company enables insurance "to begin to transform itself into a more engaging and potentially efficacious anticipatory technology of the self" (French and Kneale, 2009: 1041). Innovations like PruHealth, established as a joint venture between Discovery and the Prudential in 2004 offered "vitality points" for participation in everyday health activities. These points could be used to save between 25% and 100% on renewal premiums. It has since informed the development of a range of incentive-based insurance and corporate wellness schemes in Europe, Asia and the US. Trading as VitalityHealth and VitalityLife in the UK and majority-owned by Discovery, the current version of the product offers incentives for the use of Garmin and Fitbug trackers, as well as gym membership and other healthy behaviours. In the US, the most celebrated schemes are currently being offered by relatively small companies like Oscar Health, whose Misfit scheme was described at the outset, and John Hancock who offer a Fitbit under the Vitality scheme.

It is the prospective pace and extent of such innovation, rather than their current scale, that is driving attention. The giant insurers are busily funding labs and research in acknowledgement that the industry is on the tipping point for digitisation. Allianz is spending \$500m annually to develop capacities including through the "digital accelerator," an innovation lab and InsureTech business builder, while Aviva recently hired a global insight chief to help set

up a “digital garage.”²⁶ In comparison, Discovery, with just over 4 million customers as against Allianz’s 78 million and Aviva’s 31 million, remains a relatively small player.

At the level of practice, however, the bulk of the insurance sector is moving much more slowly than the hype suggests. Digital in insurance is still most likely to be used in reference to the development and refinement of multi-channel marketing strategies. This may partly reflect the fact that wearable technology is still at an early stage of adoption. Fewer than 1 in 10 Americans wear a tracking device and many discard them after a few months. High-profile wearables like Google Glass failed to find a market, and Apple watch has gone from a high-profile launch to speculation that sales have been much lower than expected.²⁷ Many insurers are currently more interested in gaining access to the data to figure out how it could be used to refine pricing and cost calculation, than in using the devices for behaviour change.²⁸

This leaves the sector in an odd state of complacency and anxiety that is underpinned by some complicated reasoning. As Rick Swedloff (2015) explains, it could turn out to be hugely expensive to use big data effectively to produce more accurate risk classifications, the cost of making even marginal improvements could well exceed any additional revenue generated, especially if companies succumb to the pressure of press coverage extolling the wonders of big data. The largest players are aware that data mining and monitoring could be used not only to price policies more accurately but to modify the behaviour of the riskiest customers at an individual level. But they are also aware of how difficult this will be. A long history in the practice of balancing company experience, external data and market appetite may make them slow to respond to the idea that digital mediation of risk would allow them to operate as “big mother.” If *The Economist*²⁹ is right that these changes question

the basic logic of the insurance industry – that it is impossible to predict who will be hit by what misfortune when, and that people should therefore pool their risks. “Cherry-picking” low-risk customers and spurning those who will prove liabilities is becoming much easier. In the process, insurers may transform themselves from distant, cheque-writing uncles into ever-present and interfering helicopter parents. The prize for the nimblest will be huge: the industry manages more than \$30 trillion, nearly as much as the \$36 trillion held by pension funds; last year it made \$338 billion in profits.

It may turn out that it is not traditional insurers who prove to be the most nimble.

Concluding Comments

There are a number of striking features in this story. One of them is the extent to which key changes that will impact on health care financing on both sides of the Atlantic are being worked out on a global scale. These changes are making the taxonomic distinctions between different health care systems less pronounced. The significant but nevertheless overdrawn distinction between the US’s privately and the UK’s publicly funded systems is blurring further as both systems attempt to develop a new mix of legislative and digital solutions to health care financing. The ACA has significantly increased the scope for public subsidy and cost sharing in the US. While the extent to which successive governments in the UK have succeeded in a deliberate effort to privatize the NHS is hotly contested, the waves of restructuring over the last two decades have undoubtedly been informed by the logic of marketisation. The current digital strategy is expressly to bring the NHS closer to norms of digital provision set in commercial markets (Leys & Player, 2011; Meek, 2014; NIB, 2014; Ham et al. 2015).

This touches on another feature of the story, which concerns the increasing role of players from outside the traditional health care and insurance sectors. Diabetes patients might, in the not too distant future, be able to use their health care budgets to purchase a smart contact lens that can monitor blood sugar patented by Google, in partnership with Novartis. Alongside the fitness trackers, a slew of companies, including 90 new health care start-ups launched in the US since the ACA became law, are developing digital health and medical devices and apps.³⁰ The annual “Health Datapalooza” hosted by the Department of Health and Human Services to encourage entrepreneurs to use its resource to develop digital health solutions, is one instance of a much broader, global enterprise in digital health innovation where key players are coming from systems architecture, data management and consumer electronics, as well of course as Apple, Google and Facebook. Venture capital funds like Rock Health were set up specifically to fund “startups building the next generation of technologies transforming health care”.³¹ This is further blurring the healthcare/lifestyle distinction. As James Park, the CEO of Fitbit put it, “having a consumer product DNA is I think something really difficult for medical device companies to replicate. ... I would say consumer focused com-

panies, whether it's us or Apple, probably have an inherent advantage in the future."³² Older businesses are also taking a share of the market in the US. One of the side effects of the ACA is that people are paying higher deductibles before insurance cover kicks in. This is creating an opportunity for retail pharmacies like CVS, Walgreen and the in-store pharmacies at Walmart to offer walk-in clinic services with clear pricing, cheap care and quick service. The endpoint, digital health advocates argue, is health care "uber-personalised for a market of one."³³

If this proves to be the case, there could be huge disruption to the baseline risk-pooling logic of insurance, which proceeds from the assumption that since, even with robust data, it is impossible to predict exactly who will be hit by what misfortune when, the costs of risk should be distributed, in accordance with certain agreed criteria of fairness, across a given population. These criteria of fairness vary in different systems, but to date they have generally revolved around a measure of contribution – whether through taxation, national or private insurance payments – in combination in private systems with broad actuarial criteria like age, gender and pre-existing conditions, and certain specific lifestyle risks, including for example smoking and dangerous hobbies. Although lifestyle pricing is already present in the extra costs of cover encountered, for example, by smokers and paragliders, this falls far short of the type of individual pricing that may become possible through digital tracking and monitoring devices.

The potential to devise risks digitally leaves insurers in an interesting position. It is not simply that a traditionally conservative industry, populated by huge companies, weighted by cumbersome legacy infrastructures, lacks the nimble responsiveness of a digital technology start-up. Nor is it that the margins to be gained from digital risk classification may be outranked by the costs in the always delicate balancing of financial valuation, commercial judgement and market appeal. It is that charging a bespoke price for the way an individual life, tracked and profiled in all its mundane details, is lived, is not insurance.

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Endnotes

1Valuations in excess of £1billion

2http://www.nytimes.com/2015/04/21/business/dealbook/oscar-a-health-insurance-start-up-valued-at-1-5-billion.html?_r=0 ; <http://linkis.com/wharton.upenn.edu/zglTU>; <http://fortune.com/2014/12/09/oscar-health-insurance/>; <http://www.usatoday.com/story/tech/2015/06/24/oscar-uses-tech-to-make-consumers-less-grouchy-about-health-care/29150055/>; <http://www.wired.com/2015/04/oscar-funding/>; <http://www.latimes.com/business/la-fi-obamacare-exchange-20150724-story.html>

3In the UK, general taxation remains the main source of NHS funding with national insurance contributing a much smaller portion. National insurance played a central role in the quasi public/private health care funding system in the UK until the launch of the NHS in 1948. Changes to the NHS over the last 25 years have expanded the ways private finance is involved in health care financing.

4National insurance played a much larger role in the quasi public/private health care funding system in the UK until the launch of the NHS in 1948.

5See also Deborah Mabbett's (2010) authoritative discussion of the shifting ground between 'market coordinating' and 'redistributing' types of social policies; c.f. Elsässer, Rademacher & Schäfer (2015).

6Popularly but controversially known as 'Obamacare' http://www.huffingtonpost.com/charlene-obernauer/obamacare-vs-affordable-care-act_b_4044579.html

7See Leys & Player, 2011; Meek, 2014;

<http://www.kingsfund.org.uk/projects/verdict/nhs-being-privatised>

8See Kjellberg and Mallard (2013); Muniesa (2012); Caliskan and Callon (2009; 2010) and Callon and Muniesa (2005) for more on these varieties of market action.

9For more on this see McFall (2014) Chapter 1.

10See Clark et al. (2010)

11There were also versions of industrial life insurance in many parts of Europe, United States, Australasia and Africa

12c.f. Stiglitz and Akerlof discussed by Baker (2010: 1576-7) "Some insurance buyers are low-risk 'peaches' and other insurance buyers are high-risk 'lemons.' In many cases the insurance

buyers have at least some sense of whether they are lemons or peaches. If the insurance company can tell the difference between lemons and peaches, it will charge the peaches a peach price and the lemons a lemon price consistent with actuarial fairness, and the market will work efficiently ... If insurance companies are not able to tell the difference between lemons and peaches, however, or if they are prevented from charging different prices, then they will have to charge all of the buyers the same price. This will be a price that will be higher than at least some of the peachy (low-risk) buyers are willing to pay. So the people who choose to buy insurance will be disproportionately high risk, requiring the insurance company to raise the price, driving more of the low-risk buyers out of the pool, and so on. This is the dynamic that nineteenth-century insurance actuaries first called 'adverse selection.'"

- 13 <http://kff.org/report-section/the-uninsured-a-primer-what-was-happening-to-insurance-coverage-leading-up-to-the-aca/>
- 14 <http://www.npaf.org/files/>
- 15 The Department for Health and Human Services estimated "14.1 million adults who gained health insurance coverage since the beginning of open enrollment in October, 2013 (including 3.4 million young adults aged 19-25) through March 4, 2015. Over that period, the uninsured rate dropped from 20.3 percent to 13.2 percent – a 35 percent reduction in the uninsured rate." (160315) See also <http://kff.org/health-reform/issue-brief/adults-who-remained-uninsured-at-the-end-of-2014/> The King vs Burwell challenge was resolved in favour of the ACA on June 25 2015 <http://www.scotusblog.com/case-files/cases/king-v-burwell/>
- 16 See for instance the debate in Ewald (1991); Baker and Simon (2002) and Clark et al. (2010)
- 17 See the discussion of risk adjustment, reinsurance, and risk corridors at <http://kff.org/health-reform/issue-brief/explaining-health-care-reform-risk-adjustment-reinsurance-and-risk-corridors/>
- 18 <http://www.fastcompany.com/3019062/obamacare-means-youre-getting-hit-with-a-tsunami-of-health-care-marketing>
<http://www.forbes.com/sites/brucejapsen/2013/05/11/adspending-on-obamacare-may-make-don-draper-blush/>
- 19 See more at <http://www.anationinmotion.org/>
- 20 http://www.mercurynews.com/health/ci_25639907/wellness-programs-grow-more-popular-employers c.f. Lupton, 2014
- 21 <http://www.england.nhs.uk/2014/11/13/leaders-transform/>
- 22 For more on "mass personalization" see Vargha (2010). See also NIB (2015) and Accenture (2015)
- 23 <http://www.forbes.com/sites/parmyolson/2014/10/01/apple-iphone-healthkit-humana-insurance-partnership/>;
<http://www.forbes.com/sites/parmyolson/2014/06/19/wearable-tech-health-insurance/>
- 24 <http://fortune.com/2015/03/15/apples-researchkit-is-a-big-hit-at-sxsw/>
- 25 <http://www.ft.com/cms/s/0/ba07070a-86fc-11e4-8a51-00144feabdc0.html?siteedition=uk#axzz3OKpX63T0>

- 26 http://www.economist.com/news/finance-and-economics/21646260-data-and-technology-are-starting-up-end-insurance-business-risk-and-reward?fsrc=scr/In_ec/risk_and_reward;
http://www.cmo.com/articles/2015/2/17/the_cmo_com_europe_i.html?scid=social42044126&adbid=578473535607177216&adbpl=tw&adbpr=46768880; Accenture (2013; 2014); Bain and Co. (2014)
- 27 <http://www.forbes.com/sites/quickerbetteertech/2015/07/13/why-the-apple-watch-debut-is-worse-for-apple-than-glass-was-for-google/>
- 28 <http://www.forbes.com/sites/parmyolson/2014/06/19/wearable-tech-health-insurance/>
- 29 http://www.economist.com/news/finance-and-economics/21646260-data-and-technology-are-starting-up-end-insurance-business-risk-and-reward?fsrc=scr/In_ec/risk_and_reward
- 30 <http://www.bloomberg.com/news/articles/2015-03-20/dozens-of-startups-in-obamacare-s-wake-reveal-law-as-job-creator>
- 31 <http://rockhealth.com/>
- 32 <http://time.com/3751693/fitbit-ceo-medical-industry/>
- 33 Comment by Nigel Jones, of *Capgemini*

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Appendix

Figure 1

