Understanding The New eHealth Model

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Innovation is a key part of any modern healthcare system and this innovation takes place at many levels and across multiple disciplines. Healthcare providers have access to new treatment procedures, drugs and diagnostic equipment. However, there is one area where the healthcare sector has failed to deploy technology and expertise that is widely available and used to improve the efficiency of organisations in the financial services, manufacturing and retail sectors. While most healthcare providers have experimented with 'ehealth' they have been slow to build the core IT services and instigate the change management programs that have to be in place before online healthcare services can be deployed.

Today, as healthcare providers start to modify working practices and build the platforms that will support ehealth services, they are finding that the ehealth model itself, as envisaged a decade ago, is evolving. This evolution has been brought about, in part, by the proliferation of low cost wireless devices, the emergence of intelligent search technology and the near ubiquity of Internet connectivity in developed countries.

Originally ehealth was regarded as an appendage to the healthcare providers' core business and was run as a separate operation. A special unit would be set up to support the ehealth system for a trial period. In most cases the incumbent healthcare provider discovered that, as the ehealth model was potentially disruptive to their business, there was no way to integrate the ehealth system with their core processes.

The new ehealth model is less reliant on the support from the incumbent healthcare providers and some services deployed using this model provide basic monitoring and diagnostics directly to the consumer. There is a wealth of new technology available to next generation ehealth providers, who are deploying ehealth services, including advanced healthcare related search technology and DNA profiling. Used in conjunction with wireless devices and Internet connectivity the new ehealth should act as an effective disruptor within the healthcare market. However, many independent ehealth providers have found it difficult to deploy this model in the form of a freestanding service. At the same time incumbent healthcare providers have been unwilling or unable to co-opt the new ehealth model without either disrupting their existing business model or compromising the new ehealth model itself.

This report examines issues and challenges associated with the new ehealth model and describes technologies and revenue models that can be used to support an effective deployment of a next generation, consumer facing ehealth service.

At a Glance

With the help of wireless medical device technology healthcare providers are pushing key elements of the care process out to the edge of their healthcare networks and in so doing are creating a market for vendors with a new approach to ehealth.

eHealth is no longer seen as an appendage to the healthcare providers' care network but is increasingly regarded as a core business process.

The new ehealth model is less reliant on the support from the incumbent healthcare providers and some services deployed using this model provide basic monitoring and diagnostics directly to the consumer.

New revenue models, patient profiling technology, and other advanced services hosted by Internet IT companies will disrupt the business models of ehealth vendors, healthcare payers and healthcare providers.

In this report: FitBug, HeartMath, Google, Vitaphone the NHS NpfIT and analysis of the market for the new ehealth model.

1. Introduction – The New Model

In a perfect world an integrated ehealth service would look similar to the one described in diagram 1. Diagnosis and monitoring would be carried out remotely, based on data collected from devices carried by domiciliary healthcare workers or owned by the patients themselves. As data flowed into the healthcare providers IT infrastructure it would be routed, via intelligent agents, to the appropriate part of the healthcare network. Simple diagnosis would be carried out using a rule based analytical engine while more complex conditions would be analysed by specialist software applications that, on occasions, would request assistance from specialist medical staff. In either case data would also travel outwards to the edge of the network in the form of questions and requests for additional data to support diagnosis.

In a perfect world an integrated ehealth service would carry out diagnosis and monitoring remotely, using data collected from devices carried by domiciliary healthcare workers or owned by the patients themselves.

The service would be automated with intelligent software, which had access to vital signs data collected and stored during monitoring sessions, supporting care workers in the diagnosis of a patient's condition. Although the patient would have access to the health provider's call centre, most communication would either be face to face with a community nurse or via a monitoring device.

Intelligent software would support medical staff in the diagnosis of the patient's condition.

In addition to the devices at the edge of the network the ehealth system would have two key components. The first would be a centralised electronic patient record system which was accessible not only by community nurses and the incumbent health providers' staff but also by other health providers including dentists, podiatrists chiropodists, a range of domiciliary healthcare providers and even registered alternative healthcare providers such as herbalists.

A wide range of medical related personnel would provide data for the service and have access to diagnostic tools.

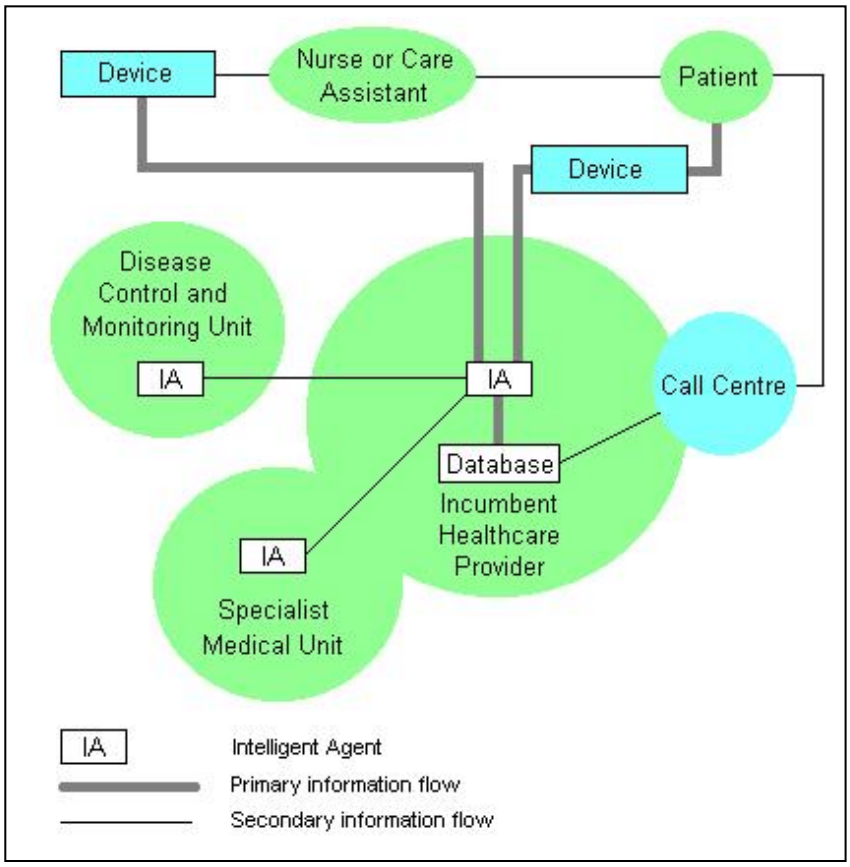

Diagram 1

The new ehealth model is based on technologies that identify healthcare trends and can detect patients who are at risk of becoming ill in the short or medium term.

If deployed in the short term, this model would be supported by the incumbent healthcare provider. However, with the trend towards privatised healthcare and a growing number of underserved consumers, any significant delay in implementation would favour new entrants to the healthcare market.

A key component of the new ehealth model is a collection of intelligent agents that act as the engine for the service. They will use personalised healthcare technology to analyse vital signs data, observations and the patient's medical history to construct a model of the patient's state of health. The intelligent agents will also determine whether the patient has the early signs of a disease and will route mass observation data to disease control and monitoring units that will detect the early stages of epidemics and track the progress of contagious diseases.

A model of the patient's state of health would lie at the core of the service and information that indicated early signs of an epidemic would be routed to disease monitoring centres.

One of the important aspects of the system is that it will take into account data from a wide range of devices such as scales and fitness machines and could be used to identify people who were merely at risk of becoming ill.

Vital signs data would be collected from a wide range of devices.

2. The Current eHealth Model

The current generation of ehealth services adhere, in general terms, to the model described in diagram 2. Tasks that, within the new ehealth model, would be carried out by the incumbent healthcare provider are instead undertaken by the ehealth vendor. In most cases the service monitors a single medical condition, usually heart disease, and the true role of the ehealth vendor is that of the specialist medical unit in the new ehealth model. The service is call centre based and most of the communication between the ehealth service provider and the patient is voice supplemented by data from the monitoring device.

The current ehealth model is predominantly call centre based and tends to focus on one medical condition – in most cases heart disease.

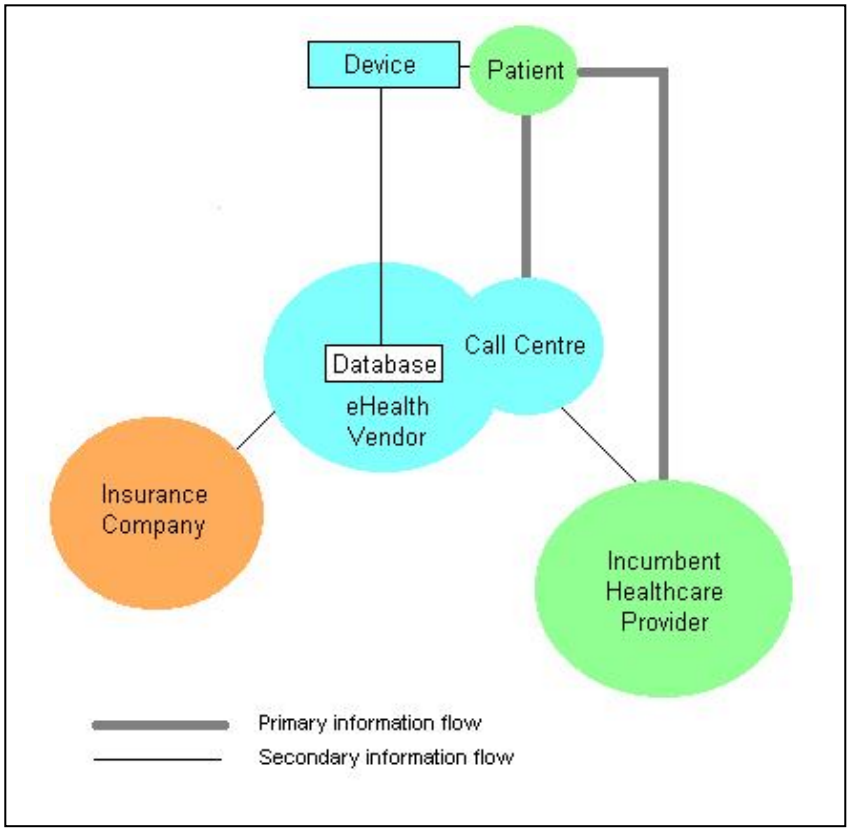

Diagram 2

The incumbent healthcare provider usually lies at the periphery of the current ehealth model, which is sometimes supported by a private healthcare insurer.

The service is call centre based with its own patient record system and the minimum of automation.

This model is typical of the one on which CardioNet, Card Guard, Vitaphone and Broomwell Healthwatch base their services.

The ehealth service providers have their own patient record system. In many cases an insurance company, rather than the incumbent healthcare provider, supports the service and in some instances refers the patients to the ehealth provider.

This model is typical of the one on which CardioNet, Card Guard, Vitaphone and Broomwell Healthwatch base their services. In the case of Broomwell, a UK based company, there is an overlap between the ehealth vendor's service and the incumbent healthcare provider's business. In this case the incumbent is the NHS.

There are significant limitations to the current ehealth model, the key being that it is designed to provide care for patients already within the healthcare system. While it may be able to detect, from analysis of vital signs data, that an existing patient is about to suffer a relapse, it is not designed to intercept the patient on their journey into the healthcare system.

This ehealth model has been designed to provide care for patients already in the healthcare system.

There are a number of reasons for the limited functionality within the current ehealth model. First the model is a short-term fix rather than a long-term play. It was not designed to provide diagnosis but merely to free up resources within the healthcare system. The healthcare providers buying into this model judge its effectiveness on the basis of the number of people who can be treated in their own home or within residential care as opposed to a hospital bed. Card Guard, Vitaphone and Broomwell Healthwatch market services, based on the current ehealth model, to patients who wish to lead a relatively normal life as soon as possible after surgery. eHealth providers also market their services to insurance companies as tools to reduce risk.

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3. Key Concepts

The scope of the new ehealth model is defined in its own capacity to disrupt the healthcare market and by the behaviour of a number of other interacting and interlinked models.

3.1. Equivalence

It is sometimes possible to identify a business process outside the healthcare sector that has been automated using online technology, and then to use the same technology to automate the equivalent process within the healthcare sector. However, it is during deployment that the limits to 'equivalence' are discovered and these limits, in turn, will define the boundaries within which the new ehealth model will operate effectively.

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This is perhaps best illustrated with an example. Expedia is an online service used in the travel industry to match available flights and hotel rooms with the travel and accommodation needs of tourists and business travellers. The UK's National Health Service (NHS) is in the process of implementing a 'Choose and Book' service that enables patients, with help from their GPs, to select the time they would like to be treated at the hospital of their choice.

The NHS Choose and Book system appears, at first sight, to be the 'equivalent' of Expedia. However Expedia relies on the flexibility of the airline and hotel industry and the willingness of the business traveller, who is committed to travel on a particular day and expects a business class service, to pay more for the same flight as a tourist who is merely filling an otherwise empty seat or hotel room. As the NHS treatment is publicly funded the willingness of a patient to pay more for a 'premium' service is not an issue. While the NHS is publishing data on the level of service in certain hospitals it is unlikely this data could be used be used in conjunction with the Choose and Book service in the same way that Expedia uses the rating of hotels. Even within a private healthcare system there would be a limit to what could be achieved with differential pricing (see 3.4).

The main reason why Choose and Book is not operating as an Expedia equivalent is because, while Expedia is a stand alone online system independent of any bricks and mortar travel agent, Choose and Book has been introduced alongside an existing, real world, service.

However, the principle reason why Choose and Book is not operating as an Expedia equivalent is due to the fact that, while Expedia is a stand alone online system independent of any bricks and mortar travel agent, Choose and Book has been introduced alongside an existing, real world, service. As GPs, despite financial inducements, are reluctant to use Choose and Book, the new system's role as a disruptive equivalent to a commercial service is limited.

Despite problems with applications such as Choose and Book there is potential for the deployment of healthcare services that are the equivalent of services that have already proved to be disruptors within other sectors. One often cited example is the use of a select range of vital signs to identify a patient who is at risk of contacting a life-style related disease.

At one time a person applying for a loan was required to sit through an interview with their bank manager. Today they merely have to provide three pieces of information; number of years at their present address, their salary and their current financial commitments. From this information the credit company can assess the risk a loan to a particular person would represent. This simple process enables a potential borrower to apply for an instant loan from an online financial services company.

Three pieces of information provide an indication of a person's credit worthiness.

Measuring a patient's blood pressure, weight and heart rate provides an indication of their susceptibility to diseases such as coronary thrombosis or diabetes.

Measuring a patient's blood pressure, weight and heart rate provides a good indication of their susceptibility to diseases such as coronary thrombosis or diabetes. This vital signs data could be collected and analysed and a service, which did this on a wide scale, could prove to be as disruptive to the health service as online loan applications has to the financial services industry.

3.2. The Disruptive Model

The new ehealth model will act as a disruptor in the healthcare market if, when deployed as a stand alone service, it is responsible for a migration of patients from the incumbent provider or delivers healthcare services to people who are currently underserved by the incumbent provider. If the model is co-opted by the incumbent healthcare provider it can only be regarded as disruptive if it results in a significant change in the incumbent's business processes.

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3.3. The Compromised Model

By examining a typical remote cardio monitoring service it is possible to see how a potentially disruptive ehealth model can be compromised. Such a monitoring service will consist of a wireless enabled ECG monitoring device that can be used with little or no supervision and transfers data, via a mobile phone and GSM network, to a call centre manned by cardiologists.

eHealth models are sometimes compromised when they are co-opted by incumbent healthcare providers.

The ehealth provider will offer this service to individual patients for a set fee to cover equipment costs plus a monthly subscription to finance a call centre. If the service is expanded, by adding blood glucose weight and blood pressure monitoring and a patient record system, it could become highly disruptive within the healthcare market. The ehealth provider would be addressing the needs of patients who, even though they are already served by the incumbent healthcare provider, are willing to pay for a premium service. Its other potential market is those patients who are not served by the incumbent provider. (This second group of patients is usually overlooked because either they cannot afford, or are not motivated to seek, treatment for their condition.)

The ehealth provider may market their service as both a disease management and a preventative healthcare tool and perhaps partner with an insurance company. This would enable the provider to continue development of a potentially disruptive model. However, they may also be tempted to enter into a partnership with the incumbent healthcare provider. The incumbent would co-opt the ehealth model and use it to serve just the patients already within its own care network. In this case the ehealth service would no longer operate as a preventative healthcare tool. The incumbent provider would, in most cases, have their own patient record system, which they would expect the ehealth service to interface with. Unless the ehealth service provider continued to develop their original model they would find its capacity to disrupt the healthcare market being steadily eroded.

Incumbent providers have their own patient record system and business processes and expect ehealth vendors to adapt their service to suit these existing systems and processes.

3.4. The Pharma Based Healthcare Model

For a majority of patients a session with their GP usually ends with the prescription of drugs. In some cases the dispensing of pharmaceutical products is a key component in the funding of the incumbent healthcare provider's operation. While the pharma model dominates modern healthcare systems it has created a large pool of underserved consumers. Two decades ago a patient suffering from stress, depression or a condition (possibly psychosomatic) their GP could not readily determine the cause of, would have to accept a course of drugs as the only treatment. Today, however, the patient can elect to be treated outside of the incumbent healthcare provider's care network by any one of a number of alternative healthcare practitioners.

While the pharma model dominates modern healthcare systems it has created a large pool of underserved consumers. Some of these consumers are turning to alternative healthcare practitioners.

However, despite the growth of the alternative healthcare sector the pharma based healthcare model is still expanding and remains the business model of choice for most healthcare providers. The success of the pharma model has been due, in part, to the patient's perception that some of the precursors to diseases are diseases in their own right.

While it has long been realised that high blood pressure increases a person's susceptibility to heart disease or a stroke, it is only recently that it has been regarded as a 'disease' that needs to be cured with a drug. The same is true of high cholesterol levels. In a majority of cases the patient does not regard alternative medicine, or even a change of lifestyle, as an option as they have been sold the idea that they have a disease that needs to be treated with a drug.

The next major expansion of the pharma model will be based on DNA profiling, which could lead to a genetic makeup that made a person susceptible to a particular condition that needed to be treated with drugs.

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3.5. Marketing Healthcare

The increasing number of patients who are turning their back on incumbent healthcare providers and pharma based treatment models should provide a thriving market for any next generation healthcare provider with workable ehealth model. However, the envelope within which the ehealth provider can operate is restricted. The key reason for this is the limited ways the ehealth provider can generate revenue. Here the concept of equivalence and the growth of pharma model conspire to make life difficult for anyone attempting to deploy a revenue model that will support an ehealth service that operates independently of the incumbent healthcare provider.

It is quite acceptable for Expedia to charge a business traveller who needs to be in New York the next day five times as much as someone who would like a weekend break in a US city on any weekend in July. However, it would be unacceptable for a hospital to charge a cancer patient five times the usual rate for an operation because they need urgent treatment. This would be seen as exploitation – as would charging a diabetes sufferer a premium to use an online glucose monitoring service that was offered at a discount to people who merely wanted to monitor their health. Currently, with respect to blood glucose monitoring, the opposite is the case. If a person has diabetes the healthcare payer will fund the use of the service while a person who merely wishes to monitor a suspected susceptibility to diabetes is required to pay for the services with their own funds.

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However, if susceptibility to diabetes comes to be regarded as a disease in its own right then it may also become unacceptable to force the patient with that susceptibility to pay for the monitoring service. In the case of a healthcare system dominated by a publicly funded healthcare provider the ehealth provider would lose users as patients with susceptibility to diabetes were transferred to the incumbent provider. In a privately funded healthcare system the healthcare payer would gain greater control over the ehealth provider's revenue model as patients moved from preventative to managed healthcare. In either case the new ehealth model would become less disruptive as incumbents whose business processes were dominated by legacy healthcare systems reclaimed an increasing number of patients.

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4. Innovation Timeline

4.1. The eHealth Model Today

Today the typical ehealth model is based on a call centre staffed by specialists who analyse vital signs data collected remotely using a wireless based monitoring device. These specialists provide feedback either in the form of a text message sent to the device itself or via a conventional telephone. In some cases, such as an emergency, the specialist can refer the patient to the incumbent healthcare provider for treatment.

Many ehealth services are based on ECG technology as the devices themselves are relatively easy to use and the data transmitted to call centres can be interpreted quickly by in-house clinicians. Innovations in cardiology, such as the use of stents and the prescribing of statins, have reduced the demand for cardiologists – some of whom have found employment in ehealth call centres.

Many ehealth services are based on ECG technology as devices are relatively easy to use and the data transmitted to call centres can be interpreted quickly by in-house clinicians.

Although most ehealth providers are attempting to add blood glucose monitoring to the portfolio of services they offer, specialists in this area are not so readily available.

The networking technologies to link devices to call centres is relatively mature and some wireless networking companies, for example Qualcomm, offer outsourced end to end connectivity services that leave the ehealth providers free to concentrate on refining their business models without having to worry about technical issues.

Most ehealth service providers are heavily dependent on incumbent healthcare providers and payers and few have business models that are truly disruptive or, due to the manual nature of their operations, will scale to serve a large number of patients. Typically one cardiologist is required for every 1,500 patients who subscribe to a cardio monitoring service.

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4.2. How the Model Will Evolve

Perhaps the first issue that ehealth service providers will be forced to address is the cost of the specialist staff required to man call centres. If government regulations allowed patient data to travel across international borders it would be possible to site call centres in regions where wage rates for medical staff were low. However, there are limits to how much operating costs can be reduced this way. The German company Vitaphone was able to locate a call centre in the former East Germany and take advantage of the large number of unemployed cardiologists in an area where wage rates were lower than in the west of the country. However, some specialists began relocating to the west and the wage rates of those that remained rose. It is quite likely that this process would be repeated on a global scale if ehealth call centres were based in India or China.

One solution to the scalability problem is the introduction of software applications that monitor data and only request human intervention during emergencies.

A more likely and realistic solution to the scalability problem is the introduction of intelligent software applications that monitor data and only requested human intervention during emergencies. These applications would also interface with disease and epidemic modelling applications hosted in disease control centres.

There are already a number of ECG based ehealth services that target the fitness and preventative healthcare market. The companies that are developing these services have a closer fit to the alternative than the mainstream healthcare market. If these companies are successful they might be responsible for the emergence of an ehealth model that was both resilient and highly disruptive to the businesses of both convention ehealth vendors and incumbent healthcare providers.

Internet search engine vendors are already active in the online healthcare market and, realising that a large proportion of searches on the Internet are health related, are likely to increase their presence in this sector and build working relationships with ehealth providers.

Internet search engine vendors are already active in the online healthcare market and, realising that health is a topic for a large proportion of searches on the Internet, are likely to increase their presence in this sector and build working relationships with ehealth providers.

The health related Internet search is already disrupting the GP's business model. As search vendors add features such as hosted medical records and patient profiling, both incumbent health providers and ehealth providers could be forced to co-opt the ehealth related business models created by search vendors.

4.3. The Ultimate eHealth Model

The online patient record and the intelligent software engine that lay at heart of the new ehealth model are destined to become central components within a modern healthcare service. Increasingly, incumbent healthcare providers will need to rebuild their business models around these components and will probably have to do this by co-opting the new ehealth model. The recent experience of the NHS with their 'National Program for IT' or 'Connection for Health' ehealth initiative illustrates how difficult it is for a large incumbent healthcare provider to co-opt even the original ehealth model.

Ultimately the ehealth model will consist of a range of online search and profiling services that are supported by wireless diagnostic devices used by domiciliary care workers in the community, nurses in 'drop in' treatment centres or by the patients themselves. This model will have been developed in close co-operation with healthcare payers – such as insurance companies – and could grow to the point where the ehealth vendor is large enough to buy in treatment such as hip replacements, cataract operations and minor surgical treatments from specialist surgical units. If this happens, the ehealth provider and the healthcare payer will move centre stage within the healthcare system – which is why, in the diagram of the new 'ideal' ehealth model, the payer does not appear as separate from the provider of the ehealth service.

Ultimately, the ehealth model will consist of a range of online search and profiling services that are supported by wireless diagnostic devices used by domiciliary care workers in the community, nurses in 'drop in' treatment centres or by the patients themselves.

The success of the new ehealth model is highly dependent on the organisation deploying it being able to serve the increasing numbers of patients who have turned their back on the pharma based healthcare model and are seeking diagnosis online and treatment in the alternative healthcare sector.

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5. Revenue Models

5.1. Device Sales

The simplest revenue model is based on the straightforward sale of a medical device. The product can either be sold directly online or through a distribution channel. Typical examples are the LifeScan blood glucose monitor and the Resperate cardio and hypertension monitoring and training device. Apart from the cost of a sales and marketing team and a product support department, the outflows associated with this revenue model are low.

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This revenue model is vulnerable to any major innovation by a competitor that either lowers the cost of a device or leads to a more effective treatment. For this reason the vendor will need to invest a significant amount of its profits in research and development. The device itself may also appear expensive compared to ones supplied, at a discount, as part of a subscription based service.

5.2. Subscriptions

Companies such as Broomwell HealthWatch, FitBug and MyFoodPhone supply a healthcare or wellbeing related service based on a device. The device itself is sold at a small premium to cost and is subsidised by the monthly fee paid by the patient. Typically, the monthly fee will be in the region of $10. This seems to be the amount that consumers deem acceptable – MyFoodPhone launched with a much higher subscription fee. However, the company found that to encourage users to migrate from the free services provided via its web server to premium services supported by a call centre, they had to reduce the subscription fees to under $10. The benefit of a subscription based revenue model is that as the patient is locked into the service there is less pressure on the vendor to constantly enhance the device itself. The vendor can also use the long-term relationship with the patient to market an upgraded device when it is developed, perhaps even providing the enhanced device at a deep discount to retain the patient.

Companies such as Broomwell HealthWatch, FitBug and MyFoodPhone supply a healthcare or wellbeing related service based on a device. The device itself is sold at a small premium to cost and is subsidised by the monthly fee paid by the patient.

Achieving scale as quickly as possible is important for any ehealth vendor that bases their service on the subscription model. The service will need the support of a 24/7 call centre staffed by trained medical specialists. While most subscription based ehealth services need one specialist for each 1,500 users – even if they provide only a simple fitness and diet advice service – they will also need the revenue from 1,000 users to finance each seat in their call centre. In the start-up phase where typically the specialist is the owner manager of the company, the cost of the call centre seat may not be an important issue. However, as the vendor grows it may be forced to enter an alliance either with an incumbent healthcare provider or a healthcare payer so that it can recruit patients in sufficiently large blocks to scale up its call centre.

5.3. Healthcare Payer Funded

The need for alliances between ehealth vendors with subscription models and healthcare payers could see payers playing a more central role within the new ehealth model. As companies such as FitBug are providing preventative healthcare services rather than healthcare monitoring services, it is unlikely their ehealth model will interest incumbent healthcare providers. However, insurance companies are interested in technology that both increases the fitness of policyholders and can also be used to quantify the risk associated with insuring the health of a particular policyholder. This has led to a number of marketing arrangements whereby insurance companies offer an ehealth service to their policyholders at a discount or reduce the premiums of policyholders who subscribe to fitness and wellbeing based ehealth services. It is envisaged that as these arrangements develop the relationship between the insurer and the ehealth service provider will become more formal – to the point where the ehealth provider is absorbed into the insurance company's organisation.

Rather than enter into a relationship with an insurance company cardio monitoring provider, Broomwell Healthwatch has chosen to supply their service to the incumbent healthcare provider – in this case the UK's NHS. While still supporting privately funded patients, Broomwell also serve blocks of patients who are, in most cases, monitored from GP's surgeries. While this arrangement has enabled the company to expand its user base to the point where it can support a 24/7 call centre, it is now operating two ehealth models. One model is disruptive and serves private patients while the other, which is compromised, serves NHS patients.

Rather than enter into a relationship with an insurance company Broomwell Healthwatch has chosen to supply their service to the incumbent healthcare provider – in this case the UK's NHS.

5.4. Other Revenue Models

There are revenue models that fall between those based on straightforward device sales and subscription-based models. HeartMath have developed an ECG based product which is similar to the cardio respiratory training device supplied by Resperate. However, HeartMath charge a premium for their device and package it with relaxation and stress reduction software. They have also published a number of guides to reducing stress and the HeartMath device itself is used in stress relief and motivational courses offered to corporates and government organisations. The consumer electronics company, Nintendo, which markets a version of its hand held games as a mental exercise device, employs a similar revenue model with software added to a simple core product.

HeartMath have developed an ECG based product that provides similar cardio respiratory training as a device supplied by Resperate. However, HeartMath charge a premium for the device by packaging it with a relaxation guide.

As Internet search vendors enter the healthcare market it will become necessary to consider advertising funded ehealth models. Today a person attempting to diagnose a condition by entering a list of symptoms into Google or Yahoo! will be exposed to a selection of advertisements for treatments and drugs. While such services are only used in a casual fashion by a small group of private users, mixing medical and advertising content is not a serious issue. If, however, the Internet search vendors build dedicated medical search technology, host electronic patient records and applications that interface with medical devices, then advertising embedded into these services will draw the attention of regulators.

There will be significant rewards for any organisation that can resolve this issue and produce technology and business processes that enable next generation healthcare providers to develop funding models, possibly based on advertising, for ehealth services.

6. The eHealth Vendor's Checklist

You may be an incumbent healthcare provider who has co-opted an ehealth model or a next generation healthcare provider who is deploying as service based on the new ehealth model. In either case you will need to know if the model you are using is truly disruptive and whether the revenue model it is based on is resilient in the face of competition and technological change.

6.1. Is Your Business Model Disruptive?

If you co-opted the ehealth model is it still capable of changing business processes within your organisation or has the model itself been modified to fit the business processes? A classic case of a co-opted ehealth model that has ceased to be disruptive is the NHS's 'NPfIT'. In a freestanding form the NPfIT had the potential to be highly disruptive within the UK healthcare sector, delivering healthcare to undeserved patients and lowering the cost of care to those already being served. However, pressure on IT suppliers to modify applications to suit legacy business processes that were already in place, and were not going to be changed, resulted in a model that merely automates rather than disrupts the NHS's existing business model.

Is your ehealth model still capable of changing business processes within your organisation or has the model itself been modified to fit the business processes?

If you are a next generation healthcare provider is your ehealth service delivering healthcare to patients who are not served by the incumbent healthcare provider? If you have a service that targets the preventative healthcare market sector the answer to this question is most likely to be 'yes'. In that case you should be looking to extend the service so that it also delivers healthcare to patients who are underserved by the incumbent. These are patients who are either on long waiting lists or are unhappy with the level, or type, of care they receive when they do get an appointment.

If you are delivering healthcare services to the incumbent provider's undeserved patients are you doing this in co-operation with the incumbent provider? If the answer to this question is 'yes' then have you compromised your business model to accommodate the needs of the incumbent provider? You may need to ensure you are still devoting resources to developing and promoting your original ehealth model. This is especially important as you will need to ensure your company has access to new Internet based technologies such as intelligent medical search, patient profiling and hosted electronic patient records that, during the coming decade, will prove highly disruptive within the healthcare market.

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6.2. Is Your Revenue Model Resilient?

If your ehealth service is based on a 24/7 call centre operation what happens to your revenue model if a competitor sets up a call centre in Eastern Europe or India?

Will your ehealth service meet the challenges posed by innovations in call centre and back office processes and technology?

What happens to your subscription based revenue model if a university researcher develops an Internet based intelligent agent that analyses data produced by the device you are supplying to your patients?

If Google or Microsoft built a healthcare service that hosted patient records and analysed medical device data could you modify your business model to preserve your revenue model?

Could you co-opt the ehealth model of a large IT company into your own model and still generate revenue?

Could you co-opt the ehealth model of a large IT company into your own model and still generate revenue?

7. The Four Billion Dollar Market

In an analysis of the market for health and fitness products that has already been enhanced by the addition of subscriptions and value added services, it was estimated that potential revenues from key players could total $4 billion per annum. The figures are set out in the table below.

Activity	Participants (million)	Penetration %	Units (million)	Vendors	Unit Price + Subscription ($US)	Sales + Subscriptions ($million per annum)
Walking	88	4	3.5	Polar, Fitbug	60 + 10/month	210 + 420
Running/cycling	55	12	6.6	Garmin, Polar	200 + 10/month	1,320 + 790
Gym	52	8	4.2	Polar, SciFit	100 + 10/month	420 + 500
Brain exercise	18	8	1.4	Nintendo	100 + 20	140 + 170
Stress management	18	4	0.7	HeartMath	200 +10	140 + 80
					Total	**2,230 + 1,960**

Assuming an annual growth of 20%

Speculative figures for subscription services

Resources

"Seeing What's Next" by Clayton M. Christensen
Published by Harvard Business School Press
ISBN 1-59139-185-7

This book provides an overview of how disruptive processes impact on incumbent players in mature markets. Special attention should be paid to Chapter 8, which examines a range of existing and potential disruptive processes within the healthcare sector.

The impact of the new ehealth model on healthcare and the ehealth market is analysed in greater detail in the following Wireless Healthcare Reports:

"Wireless Based Remote Monitoring and Diagnosis"

"eHealth and Consumer Electronics"

"Wireless Based Disease Management"

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