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Healthcare and Life Sciences Predictions 2020
A bold future?

The Deloitte Centre for Health Solutions

The Deloitte Centre for Health Solutions, part of Deloitte UK, generates insights and thought leadership based on the key trends, challenges and opportunities within the healthcare and life sciences industry. Working closely with other centres in the Deloitte network, including the US Center for Health Solutions in Washington, our team of researchers develop ideas, innovations and insights that encourage collaboration across the health value chain, connecting the public and private sectors, health providers and purchasers, and consumers and suppliers.

Foreword

Deloitte UK's Centre for Health Solutions has published numerous reports on the current and future issues of the healthcare market place – our insights drawn from primary research, desk research, significant interaction with our clients and stakeholders in the health and life sciences sector, and from the depth and breadth of capability within our global network. Our work is typically precise and evidence based, focused on the challenges of today and the solutions of tomorrow, building on prior research. We have perhaps been cautious in our views.

This report is entirely different. It is deliberately challenging about the future world, perhaps even provocative. Our work draws on observations of trends, events and small but bold steps that – if accelerated through to the year 2020 and beyond – paint a picture of a world that is very different from today. Executive teams across healthcare and life sciences organisations often ask – "do you have a paper setting out the challenges of our future market place? We have a strategy working session next month and need some insights, challenge and a little provocation." This document aims to fulfil that requirement.

In this report we set out ten provocative statements predicting the world of 2020. Each prediction is articulated and brought to life through a series of portraits which imagine how patients, healthcare professionals and life sciences organisations might behave in this new world. Our predictions lean more towards an optimistic view of the future, although we recognise that many in our industry are sceptical about the constraints and therefore pace of change. We describe the big trends rolled forward to 2020 and some of the constraints that will need to be overcome. We also provide examples and evidence, based on the here and now, that show that the predictions are perfectly plausible, perhaps inspiring and surprising!

Our industry is changing quickly – requiring a bold response that is often difficult to implement – and yet organisations struggle to understand how to respond effectively and build a sense of urgency. We hope this report creates rich dialogue and enables a move to action. Certainly throughout Deloitte – we have had enormous fun discussing these predictions and sharing our experiences. We hope you have the same experience within your own organisations as you peruse this report and reflect on your current situation and future scenarios.

Karen Taylor
Director
Deloitte UK Centre for Health Solutions

Hanno Ronte
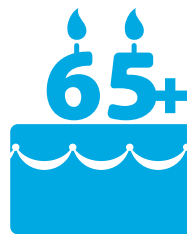Partner
Monitor Deloitte

Simon Hammett
Partner
EMEA & UK Healthcare & Life Sciences Lead

What we know today and estimate about tomorrow
Trends in healthcare and life sciences

Average life expectancy in OECD countries in 2012 was **80 YEARS,** an increase of **5 years** since **1990**: **Japan** has the highest at **84,** with **UK 81** and **US 79, China 75** and **India 66** years[1]

Meet the over 65s – by 2018 they will number some 580 million – **10% of the global population** – or one in every:

4 Japanese
5 Western Europeans
10 Chinese[2]

Developed markets remain the main spenders **on healthcare** – 77% **of global spend** in 2014. Developing markets are forecast to increase their share from **23%** in 2014 to **32%** by 2020[3]

The number of people with **diabetes** globally is **382 million,** around I in 4 are **Chinese**. There are more **diabetics** in **China** than the combined populations of **Germany** and **Portugal**[2]

Growth in average annual **healthcare** spending 2014 - 2018 is expected to range from **2.4%** in **Western Europe** to **4.9%** in **North America**; and from **8.1%** in **Asia and Australia** to **8.7%** in the **Middle East** and **Africa**[2]

Total global pharmaceutical spending is expected to increase by 6.9% a year from **USD 1.23 trillion** in 2014 to **USD 1.61 trillion in 2018**. **Oncology** is expected to remain the main contributor among therapeutic areas[2]

Generics will take a larger share of total global medicine spend, increasing from **27% (USD 261 billion)** in 2012 to 36% **(USD 421 billion)** by 2017[4]

Med tech industry sales are expected to increase from **USD 363.8 billion** in 2013 to **USD 513.5 billion** in 2020. **In-vitro diagnostics** will be the top segment[2]

In **2013**, across the G7 markets, there was **a companion diagnostic** deal nearly every working day – 226 deals, up from only **8 deals** in 2009[3]

Sources:
1. Life expectancy data, World Health Organisation, 2012. See also: http://apps.who.int/gho/data/node.main.688?lang=en
2. 2015 Global life sciences outlook: Adapting in an era of transformation. Deloitte DTTL, 2014
3. Informa Plc Market Line Extracted October 2014
4. Medicines Outlook through 2017 IMS institute for healthcare informatics

Ten Predictions for 2020
Provocative insights – both evolutionary and revolutionary

External environment shaping predictions

Internal industry performance shaping predictions

Health consumers in 2020
Informed and demanding patients are now partners in their own healthcare

Prediction

Individuals are better informed about their genetic profile, the diseases they have and might have, and the availability of healthcare. Expectations of healthcare and better outcomes for themselves and loved ones are at their highest. The 'quantified self' has embraced prevention and is devoting time, energy and money to staying healthy. When ill, patients demand specific treatments; they are also willing, in part, to pay. Patients are true consumers, they understand they have options and use information and data about themselves and providers to get the best treatment at a time, place and cost convenient to them.

The 2020 world

- Healthcare organisations now engage with patients through social media, regularly gauging their needs and driving them to appropriate products and services for their budget and healthcare requirements.

- Online patient communities have grown exponentially and are rich sources of crowd-sourced data, with rating systems for drugs and healthcare provision.

- Advanced analytics on patient chatter in these communities gather health information, providing a better understanding of which treatments deliver the best outcomes, allowing real time tailoring of pharmaceutical messages and services. They also provide early alerts on diseases, such as influenza.

- Businesses and governments work with communities of patients, hospitals and payers to identify best practice and cost-effective treatments.

- New provider and industry models, including mutuals and other forms of collaboration and cooperation, help decrease costs and improve care.

Conquered constraints in 2020

- Consumers accept that they are largely responsible for their health – incentives for good behaviour are now firmly established – from reductions in co-payments to lower taxes (for example, for not smoking).

- Privacy and security of data remain concerns, but there is an understanding of the benefits of sharing data.

- Payers and providers embrace complex patients, having invested in analytics and programmes that lead to new care pathways.

- Clinicians go from being reluctant to engage with electronic health information from wearables to active engagement in developing and improving the technology.

- Most patients in developed countries now have access to their own electronic health records, and decide who to share it with.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *Launch of new on-line interactive courses for primary care doctors on how to get the most out of new technology and how to deal with knowledgeable, health savvy, patients; many of whom are often better informed than their doctors.*

- *'P4-Medicine' is the new norm – medicine that is Predictive, Preventative, Personalised and Participatory. The new participating platform, PatientPeoplePower.com, was last night's worthy winner of the award for the most influential patient advocacy movement in 2019-20.*

The 2020 patient portrait

Mary knew that she was at risk of developing breast cancer as, following her mother's death from the disease, genetic testing showed she was carrying the same gene. Her more immediate worry, however, was that her recent weight gain meant her diabetes was becoming more difficult to control, as well as increasing her risk of breast cancer.

It all started when she had to give up work to look after her seriously ill mother and eating became her main form of comfort. Data on her smart phone app showed her health was worsening. What's more, her diabetic nurse specialist had messaged her every two weeks for the last three months to get her to come in, based on the continuous streaming of her health data, including her home weighing machine, to her health record.

She also knew she wouldn't be eligible for the new breakthrough drug with weight control benefits she had found for her Type 2 diabetes, if she failed to get her BMI down to an acceptable level. She hoped her new online support group and the 'Be the Local Loser' gaming competition on her smart phone will help her lose weight and reduce her health risks.

A pharmaceutical marketing manager view in 2020

The new social media department has been operating for three years and has enjoyed a number of notable achievements in supporting key brand launches and winning several new media awards. The department was singularly responsible for helping both patients and payers understand that not only was the efficacy of the drug and service package superior to the previous care packages, it also encouraged the right behaviour change in patients, creating long lasting health, and thus cost benefits. It was also responsible for building a new form of trust between patients, doctors and the pharmaceutical company.
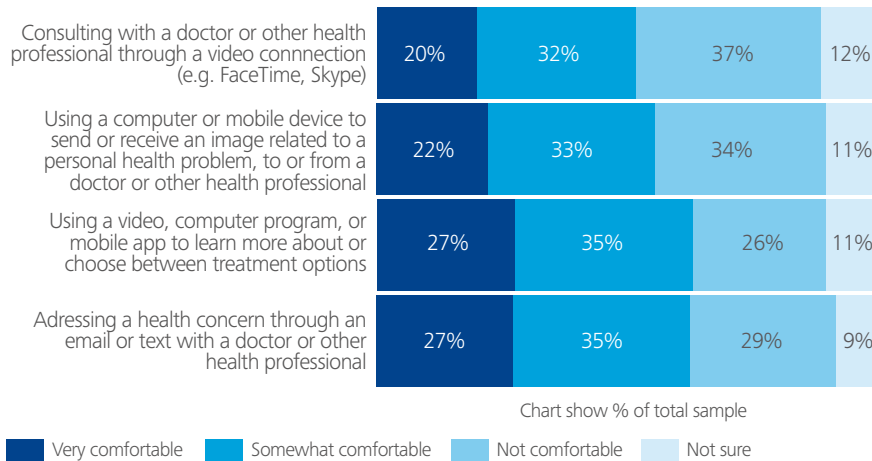
Evidence in 2014
Patients becoming more like consumers

"While most industries have embraced the idea that the customer comes first, healthcare has lagged far behind. No more, the recognition has finally dawned on healthcare providers that meeting the challenges of today rests on their ability to put the customer at the centre of everything they do, changing from a paternalistic approach to a patient-centred approach that will recast the deal between patient, providers and payers."

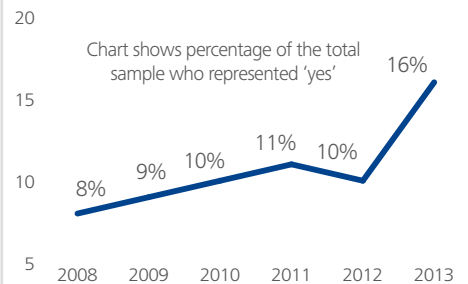Sarah Thomas, Director, Deloitte US Center for Health Solutions, Deloitte Services LP

How comfortable are you, or would you be, with the following types of interaction?

	Very comfortable	Somewhat comfortable	Not comfortable	Not sure
Consulting with a doctor or other health professional through a video connnection (e.g. FaceTime, Skype)	20%	32%	37%	12%
Using a computer or mobile device to send or receive an image related to a personal health problem, to or from a doctor or other health professional	22%	33%	34%	11%
Using a video, computer program, or mobile app to learn more about or choose between treatment options	27%	35%	26%	11%
Adressing a health concern through an email or text with a doctor or other health professional	27%	35%	29%	9%

Chart show % of total sample

■ Very comfortable ■ Somewhat comfortable ■ Not comfortable ■ Not sure

Source: Deloitte US Centre for Health Solutions, 2013 Consumer Survey Segmentation

Do you currently maintain an electronic health record of any kind for yourself, not counting the record(s) any of your doctors might maintain for you?

US consumers' use of electronic health records, across all age groups, has doubled in the last five years from eight per cent to 16 per cent

Chart shows percentage of the total sample who represented 'yes'

2008	2009	2010	2011	2012	2013
8%	9%	10%	11%	10%	16%

Source: Deloitte US Centre for Health Solutions, 2013 Consumer Survey Segmentation

New entrants are transforming healthcare. For example, US retail outlets are becoming serious primary care providers by expanding their services in response to consumer demand. Providing cheap, fast, convenient care, seven days and evenings a week (when finding a primary care doctor can be a challenge). Services include access to vaccinations, screening and management of chronic conditions. Most retail clinics accept insurance and all take cash payments. Increasingly, the clinics are affiliated to, or have partnerships with, their local healthcare systems; enabling them to share data and access patients' electronic health records. Consumers do not need to make an appointment, reasons for the visit are entered onto a digital screen and the consumer is usually seen by a nurse practitioner or physician assistant within minutes.

In October 2014, Walmart opened a series of new clinics, limited to markets where people are uninsured or under-insured, have a high rate of chronic diseases or struggle to get access to medical care, as well as places where it has a large number of employees. Visits costs USD 40, (about half the industry standard) or just USD 4 for Walmart US for employees and family members with the company's insurance. A pregnancy test costs just USD 3, and a cholesterol test USD 8.

See also: http://www.marketwatch.com/story/wal-marts-new-everyday-low-price-a-40-doctor-visit-2014-10-17

Healthcare delivery systems in 2020
The era of digitised medicine – new business models drive new ideas

Prediction

The home is where much of the medical care takes place. It is no longer confined to clinicians in the clinic or hospital. The ubiquity of digital communication means that many doctor-patient contacts are now virtual and deliver care to the patient in their home.

Specialist hospital treatment is reserved for trauma and emergency surgery; local day care organisations deal with most elective surgery, while chronic and long-term conditions are managed in the community. Care is provided via accountable care (type) organisations for a defined patient population, which take on the population risk. New funding models include year-of-care tariffs, pooled budgets, capitation or personal health budgets.

The 2020 world

- Web-based portals that enable regulatory compliant (and reimbursable) video interactions between patient and clinician are now supported by a wide array of web-integrated wireless monitoring devices.
- Healthcare productivity has been revolutionised including reducing travelling and waiting times, and inconvenience by providing routine contacts through telemedicine-enabled clinical e-visits, supported by digital diagnostic tools which facilitate physical examinations at a distance.
- Robotic or robotically enhanced surgery is commonplace, utilising robotically enhanced surgery platforms to access detailed radiological information while allowing the surgeon enhanced visualisation of the surgery with his/her 3D goggles.
- Key technologies have become established: For example, 3D printing of medical devices and organs; 'scar-less' surgery with entry via the oesophagus rather than skin incisions; and nerve cell transplants that improve the functionality of heart-failure, stroke, and paralysis patients.

Conquered constraints in 2020

- Tele-mentoring, in which a remote surgeon can help guide an on-site surgeon/robot, has full regulatory approval and clinician support.
- Clinician resistance to adopting telehealth and mHealth solutions has been significantly reduced, now that regulatory agencies and funding bodies have clarified their positions on the safety and efficacy of the technology and new tools help clinicians synthesise the data provided.
- New funding models enable payers to commission for outcomes for a defined patient population from vertically integrated accountable care organisations in every health economy.
- Giving patients ownership of their own data has allowed a shift to patient-centred and outcome-based delivery models.
- The silos between hospital and community care have been reduced by designing care pathways around the patient, with hospital doctors and nurses running clinics and delivering care in the community and primary care staff providing in-reach services to community and specialist hospitals.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *Record numbers of clinicians access patient records on multiple devices – and access the same record that the patient can access and augment with their own data.*

- *Survey confirms that the convergence of biomedicine, IT, health data, wireless, and mobile have transformed medicine from an art to a data driven science, providing the right care, in the right place, at the right time and at affordable cost.*

- *The last UK hospital announced it is now paperless, including an integrated electronic health record accessible by patients and clinicians. It is now planning to use these data to revolutionise service design.*

- *Seventy-five per cent of all surgical operations are now carried out in ambulatory centres or units.*

The 2020 patient portrait

Javier's on going-treatment for his cancer could not be more different to that of his father's treatment for the same cancer. Javier's treatment, except for the surgery, which was performed in a local hub of a famous cancer specialist hospital, was all delivered at home as part of the new shift to providing care in the home, including chemotherapy, physiotherapy and nutrition support.

His family too was now more integrated into his care, had a better understanding of what was happening to him and how they could help. Javier and his named family carer had access to an on-line 24/7 call centre and to a cancer care navigator for any issues or questions that arise.

A provider view of 2020 digital healthcare

In our recent board meeting we agreed a refresh of our IT strategy to reduce departmental siloes. We agreed to:

- *deploy a Knowledge Management (KM) solution to give clinical data context based on the latest clinical guidelines, and allow more effective clinical diagnosis and treatments*

- *upgrade our electronic health records (EHR) to real-time clinical tracking and interaction with patients in their home*

- *join the remote Intensive Care Unit Monitoring consortium, which already manages 600 of our town's hospital beds.*

Evidence in 2014
The rise of connected health

"Technology alone, such as the smartphone, is not a silver bullet for healthcare. Instead, success lies in the convergence of digital health and human interaction. It also relies on developing partnerships which harness technology, while providing trust-based, patient-centred care; and balances person-to-person engagement with the efficiencies provided by technology."

Sara Siegel, Deloitte Partner, Healthcare Strategy and Consulting

Patients Know Best (PKB) – a patient owned healthcare record system. Patients monitor their own vital signs, and link to a PKB app or website via some 100 or so wearables and other devices. Information is retrieved, uploaded and shared with doctors (and researchers if patient agrees). When the results are outside the norm both clinicians and patients are alerted. PKB integrates fully into any health records system, including the UK NHS secure network, and is available for use by patients and clinicians worldwide.

Source: http://www.patientsknowbest.com/

Since 2008 **Kaiser Permanente Northern California (KPNC)** has operated an inpatient and ambulatory care electronic health record system for its 3.4 million members. The number of virtual 'visits' has grown from 4.1 million in 2008 to 10.5 million in 2013. It also provides a suite of mobile and tablet applications enabling members to exchange messages with their doctors, create appointments, refill prescriptions, and view their lab results and medical records. The smartphone app supports self-service transactions while the tablet app focuses on prevention, health analytics, and achieving KPNCs 'total health' vision. In 2013, some 2.3 million telephone consultations were made via mobile phone compared to around 64,000 in 2008.

Source: Copy righted and published by project hope/health affairs, Robert Pearl, Kaiser Permanente Northern California: Experiences with internet, mobile and video technologies, Health Aff. 2014 Vol.33,no.2, 251-257. The published article is archived and available on-line at www.helathcaffairs.org

Mercy, the fifth largest Catholic health system in the US, has developed a program called *SafeWatch* as a solution to a shortage of intensivists. Critical-care specialists (both doctors and nurses) work in a telemedicine hub, monitoring patients in the Intensive Care Unit (ICU) 24 hours a day. They identify abnormalities, uncover potential problems and assist with care when a patient's attending physician is not in the ICU. Other hospitals in the area can utilise these services for overnight cover. Indeed, specialists in the hub monitor more than 450 beds in 25 ICUs across a five-state region. Benefits include: a 15-20% reduction in ICU mortality rates, a 10-15% reduction in ICU length of stay, reduced code blues, significant reduction in ICU nurse turnover and improved patient satisfaction.

Source: http://mercytelehealth.com/services/safe-watch/safewatch-faqs/

Artificial Intelligence (AI) systems are now being deployed in medicine to help pharmaceutical companies prevent drug – drug interactions and help clinicians interpret diagnostics. Handheld accessible portals will soon be able to apply the power of a cloud-based Watson to health and medicine, enabling the clinician to enhance the speed, accuracy, and cost-efficiency of diagnostics; obtain decision support for applying evidence-based data sets; and choose the most appropriate therapy for an individual patient (drug, device, or surgical intervention).

See: http://www.kauffmanfellows.org/journal_posts/exponential-technologies-across-health-care/

The Netherlands approach to homecare **Buurtzorg Nederland** is a not for profit model that uses a countrywide team of 6,500 nurses in 360 teams, treating around 70,000 patients a year. The nurses have full autonomy and provide the totality of care needed, empowering the patient through building strong personal and community relationships. Supported by hand held technology and freed from excessive rules, the nurses deliver significant efficiencies. They have reduced the hours of care needed per patient by 50 per cent while improving quality. With only 35 back office staff, and 15 coaches, this model keeps costs low and delivers high staff and patient satisfaction.

http://www.kingsfund.org.uk/sites/files/kf/media/jos-de-blok-buurtzorg-home-healthcare-nov13.pdf

Wearables and mHealth applications in 2020
## Measuring quality of life not just clinical indicators

Prediction
Wearables shape the quality of life of today's consumer, capturing and tracking how people live with and manage their condition. Consumers and providers integrate information from multiple devices seamlessly to create a comprehensive view of the individual. Wearables are now adopted widely (beyond keep-fit and health fanatics) and specialist medical (bio-sensing) wearables are affordable. The new clinician/patient partnership is based on improved awareness, self-management and prevention strategies, replacing the paternalistic approach of old.

The 2020 world

- The tipping point for broad adoption of wearables has been reached – wearables are used voluntarily and are recommended as part of prevention and wellness protocols.

- The next generation of wearable devices are interoperable, integrated, engaging and outcomes focussed. The technology has become much cheaper and more sophisticated and the data quality has improved.

- Wearables now continuously monitor a broad range of physiology – from posture to brain activity.

- Biosensing devices analyse and compare with other devices and 'interact' with the medical literature.

- Extensive use in clinical trials allows tracking of quality of life, not just efficacy and safety.

- Treatment plans now include 'wearables' as a prescription – monitoring the sickest patients and helping to better control healthcare costs.

- Wearables have made the home an extension of the hospital, allowing those who have received care to rapidly transition home.

- Patient reviews and ratings evaluate the new health apps and technologies, based on an agreed industry standard for app integration.

- Biosensing devices are as much the realm of start ups as non-traditional health companies, creating a big new industry, with the winners still emerging.
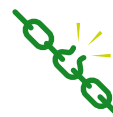
Conquered constraints in 2020

- Convenience of data collection, medical accuracy of data and interoperability between devices/analysis tools have been addressed.

- 'Quality of life' metrics are now standard in clinical trials.

- While privacy is still a concern, effective regulation and corporate branding have made consumers more willing to share their device data – from activity trackers to medical oriented data.

- Patients have learnt to share different types of data in different ways, linking their data to now standard electronic medical records; with patients ensuring the accuracy of their own medical record.

- Consumer engagement with their data has led to better medication adherence and management of chronic disease; a clear return on investment (ROI) for providers.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from the 2020 wearables monitoring market report

- *The latest report on this new market highlights how a new French start-up company is targeting new heart health indicators. The start-up found an early indicator of heart attack in the analysis of heart beat data streams from a wearable ECG monitor.*

- *Another small company has demonstrated how a doctor can get a better sense of vascular risk using its proprietary algorithm to analyse a patient's credit card bill and supermarket loyalty card, and thus their diet and behaviour.*

The 2020 patient portrait

Akil's 82 year old father is sadly losing his mobility and his dementia appears to be worsening. But with new technology he can live at home – for example, Akil gets an alarm if his father does not open the fridge daily.

Akil himself uses wearable devices to optimise his exercise, sleep and nutrition, as well as alerting him to the risk of his biggest health worry – an asthma attack. By understanding the triggers of his asthma, he is healthier than he has been for a while, and is enjoying the reward vouchers he receives from his employee plan for healthy living.

A pharmaceutical company compliance meeting in 2020

The introduction of the new drug monitoring device was a revelation last year in 2019. There was a run on the device by patients who were prescribed the drug. It was almost accidental that a 'system of care' evolved, incorporating the drug, the wearable device, the education service, the social media feedback loop and payer response to the outcomes data and value pricing. It made it difficult for the other 'me too' drugs to launch.

Evidence in 2014
The rise of bio-sensing technology

"The wearables industry is growing rapidly, fueled by a mix of both innovation and hype. These devices have the potential to revolutionise healthcare through remote monitoring, disease management and early detection. However, wearables will have to transform from fitness tools of the healthy to valid, reliable accessories for even the sickest among us."

Harry Greenspun, MD, Director, US Center for Health Solutions. Deloitte Services LP

Venture funding of biosensors and wearable technology increased five times from 2011-2013 (to $283 million), more than double the growth of digital health during the same period. In 2014, some 90 million wearable computing devices will be shipped, of which approximately 74 million will be biosensing, although current trends suggests around half will likely be simply a fad unless consumers and healthcare providers can agree on their worth.

See also: http://rockhealth.com/2014/06/future-biosensing-wearables/Source: http://www.patientsknowbest.com/

HealthPatch is a sensor fitted to a disposable and adhesive patch that can be placed on the chest and can be used to monitor both acute and chronic diseases. Biometric data and changes in vital signs are wirelessly sent to, and monitored by doctors and patients via bluetooth. The sensor collects continuous, clinical-grade, multimodal data that can be used to perform accurate analyses on countless important health parameters, such as sleep studies (duration, sleep staging, and sleep apnea studies), gait analysis, arrhythmia detection, respiratory rate, fall detection, heart rate variability, and temperature.
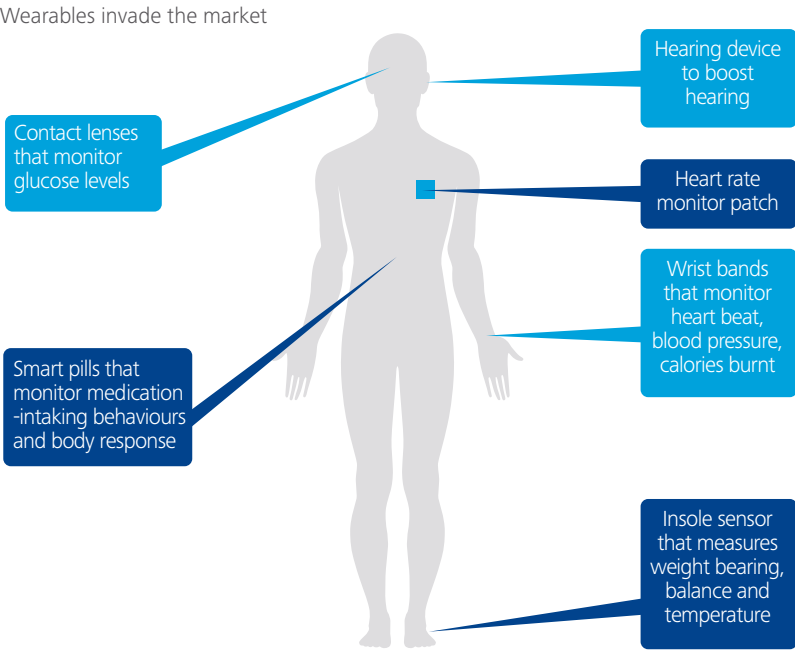
Source: http://www.vitalconnect.com/news/introducing-the-healthpatch

To date wearables have been somewhat of a novelty, however industry researchers agree that wearables are now entering the commercialisation phase. While some practical challenges remain (including design, ease of use, standards, privacy and cost); the interest among healthcare providers, industry and consumers is growing. As a result:

- the number of mHealth apps that are published on the two leading platforms (Apple and Android) has more than doubled in only 2.5 years to reach more than 100,000 apps as of Q1 2014

- the mHealth market revenue reached $2.4 billion in 2013 and is projected to grow to $26 billion by the end of 2017 (still less than one per cent of the global healthcare market)

- the major source of income for mHealth app publishers is expected to come from services (69 per cent)

- the top app users already collect several hundred million of vital parameters per month.

Source: research2guidance mHealth developer economics report. May 2014. See also: http://mhealtheconomics.com/mhealth-developer-economics-report/

Examples of how wearables might transform information and understanding of peoples health status

Wearables invade the market

Hearing device to boost hearing

Contact lenses that monitor glucose levels

Heart rate monitor patch

Wrist bands that monitor heart beat, blood pressure, calories burnt

Smart pills that monitor medication -intaking behaviours and body response

Insole sensor that measures weight bearing, balance and temperature

Big Data in 2020
## Health data is pervasive – requiring new tools and provider models

Prediction

For many countries healthcare data has become a national infrastructure priority and attracts significant funding (similar to the building of highways in the US in the 1950s). As a result, patients themselves, clinicians and healthcare officials use healthcare data to transform diagnosis and treatment to improve outcomes and healthcare productivity. Pharmaceutical companies now collaborate fully with patients and healthcare systems using data to develop better treatments, launch them faster and price according to improvement in health outcomes.

The 2020 world

- Healthcare systems recognise the value of existing and new data sources (for example, Electronic Health Records, patient provided data) and have created governance to allow data access and sharing, formed data partnerships and are changing how care is delivered on the basis of data insights.

- Use of healthcare data becomes a measure of national economic development.

- Pharmaceutical companies have built, bought and hired new capabilities (data management/analytics) and partnerships (with payers and hospital systems) to use Big Data across the value chain from discovery to value pricing. Data has blurred boundaries between traditional research and development and commercial functions.

- New data driven competitors disrupt the research & development (R&D) model with a focus on data and outcomes as opposed to the science only.

- Genetic testing is accepted as actionable information.
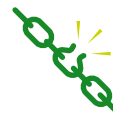
Conquered constraints in 2020

- Public recognises benefit of appropriately used personal health data.

- Significant national funding for IT and health data infrastructure provides access, but also protects confidentiality and controls use of patient data.

- The quality of and regulatory environment for patient generated data (from fitness trackers to other real time monitoring devices) has improved and consumers have more say over, and are more trusting of, how data is used.

- Clinicians have real time data from patients and use analytical tools to use comparative data for day-to-day decision making.

- Pharmaceutical companies are a more trusted partner to the healthcare system, with a successful track record in partnerships across diagnostics, data analytics, private and public care provision.

- Pharmaceutical companies have developed data approaches to deal with complexities of different health system maturities.

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NEWS Annual report of an independent real world data service centre in 2020

- *Now in its fifth year, this fully functioning ten year partnership is delivering results. A partnership between a pharmaceutical company, a data management and analytics company and a primary and secondary care healthcare system has generated demonstrable results of improved patient outcomes.*

- *It has answered fundamental questions on clinical service design and treatment pathways (for example: the role of education in changing behaviour) and insights on timing of the use of specific drugs in specific sub-populations.*

- *The service centre is now the focus for new drug development with the addition of biomarker and genomics data for a sizeable number of patients.*

The 2020 patient consultation

Nadia, a patient in her late 30s with severe asthma has been referred by her primary care doctor to a hospital specialist for a review. Her doctor is concerned that the health care data, she provides regularly, which is captured by her watch and smartphone, shows a deterioration in her condition. He has also mapped her readings to a new weather app which shows details of the level and types of air pollution at the time of exacerbations in her condition.

In preparation for the referral appointment the specialist has compared her data, including the results of pre-ordered tests of her genetic sequencing, to patients with the same biomarkers and risk stratification and has searched for details of whether any of the successful treatment options currently being trialled by the hospital could be suitable. The system flags Nadia's eligibility for a new trial, which the specialist discusses with her and together they agree to a personalised treatment plan which she subsequently shares with her primary care doctor.

The pharmaceutical data centric enterprise

The company has just completed a major transformation to align functional roles to integrate real time, real world data into the workflow of development research, outcomes and personalised reimbursement monitoring. The company created a centre of excellence for real world data analytics with the appropriate protocols and training for staff to analyse and interrogate the significant volumes of internal and external data. It required hiring a completely new breed of people – the data scientist who combines commercial, scientific and technological 'know how'.
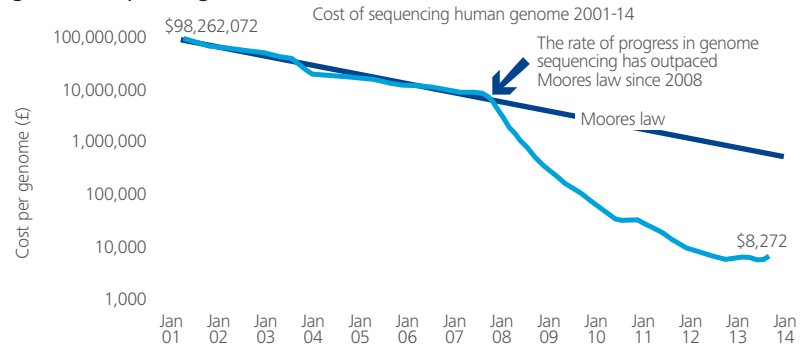
Evidence in 2014
Digital devices and electronic patient records contribute to data explosion

The era of electronic medical records (EMR) has finally arrived along with a data explosion. Big data is ubiquitous and is helping to enhance patient care at much lower costs. The traditional stethoscope is now a museum piece, replaced by digital ones that record, analyse, and synchronise examinations with mobile phone apps.

Source: Dainel Kraft, Exponential Technologies Across Healthcare, Kauffman Fellows report 2011. See also: http://www.kauffmanfellows.org/journal_posts/exponential-technologies-across-health-care/

The rise of personalised medicine is supported by a rapid decline in the costs of genome sequencing

Cost of sequencing human genome 2001-14

The rate of progress in genome sequencing has outpaced Moores law since 2008

Moores law

$98,262,072

$8,272

Source: National Human Genome Research Institute

Today we live in an era of 'one size fits all' medicine, with many drugs not working on 50% or more of the population.

Source: Daniel Kraft, Exponential Technologies Across Health Care, Kauffman Fellows report 2011, Volume 2. See also: http://www.kauffmanfellows.org/journal_posts/exponential-technologies-across-health-care/

It took at least one week to sequence a genome in 2011, now it takes only about a day.

Source: http://www.businessinsider.com/illumina-genome-sequencing-growth-2013-10#ixzz3IgUk672f

In December 2013 The U.S. Preventive Services Task Force recommended that women who have one or more family members with a known potentially harmful mutation in the BRCA1 or BRCA2 genes should be offered genetic counselling and testing.

Source: http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/brca-related-cancer-risk-assessment-genetic-counseling-and-genetic-testing

New business models: 'Beyond the pill', outcomes and real world data are providing health data and transforming what is possible

Supply drivers

Medical & patient data
Electronic health records (EHRs), health sensors, social media, and genomics create rich new data sources for analytics

Big Data analytics
Cheap computing power and sophisticated analytics drive insights into patient behaviour, treatment costs and R&D

Mobile/mHealth
Pervasive mobile and smart phone adoption creates new engagement models within daily routines

Healthcare professional digital workflow
Increasing integration of EHRs and telehealth driving new digitally-enabled coordinated workforce models of care

Health information technology enabled opportunities

Demand drivers

Rollout business models tied to patient outcomes that also reduce medical errors and improve quality

Discover and deliver targeted and personalised therapies with real world evidence of impact

Influence patients behaviours 'beyond the pill' and sustain engagement outside the traditional care setting

Drive population management, protocol driven patient risk pool and stratification management

Source: Monitor Deloitte

Regulatory compliance and patient safety in 2020
Regulations reflect the convergence of technology and science

Prediction

Building on the regulatory frameworks from the 2000s, new regulations now encourage innovation through the convergence of science and technology. The pre-eminent regulatory agencies around the world have adapted to new realities as disruptive technologies challenge the traditional methods and processes used to assess the quality, safety and efficacy of prescribed medicine. In 2014 the science of the drug was the epicentre of most regulatory processes, but today regulators have adopted a far more data-driven approach based on patient outcomes.

The 2020 world

- The US Food and Drug Administration (FDA) and European Medicines Agency (EMA), achieve alignment and global reach, including hub and spoke models, with other countries flexing guidance as appropriate.

- While retaining national sovereignty countries leverage each others findings and regulatory frameworks in support of greater transparency.

- Regulators have invested in new capabilities to manage data and technology regulations.

- Frameworks for use of Big Data, wearables, social media and biosimilars are established, with additional controls to protect patients and physicians. Faster approval processes are making health product and drug developers and investors less risk averse.

- From drug approval to reimbursement and interaction with stakeholders, companies face rising costs of regulatory compliance, which have given rise to new infrastructures shared between industry and regulators.

- Adaptive licencing and models for real time trials are established and commonly used in 2020.

- The rise of the 'quantified-self', genomics, social media, and the exponential growth of on-line patient communities, have shifted attention of regulators to monitoring performance in the real world.

- Common technical standards have been established across the globe to ensure drug quality, reduce redundant manufacturing plant inspections, and help companies manage increasingly long supply chains.

- Direct to consumer distribution has become more prevalent with increase in market share for private health monitoring apps/devices.

Conquered constraints in 2020

- Regulators have hired highly capable and respected data scientists and technologists to develop and manage new regulatory demands, automating the regulatory process and surveillance more than ever.

- A new social contract, maximising scientific discovery and patient autonomy, has led to more engaged participants and a more rigorous approach to regulation and patient safety.

- Diminishing barriers between drugs, devices and diagnostics have combined into 'healthcare solutions' for a particular disease area – impacting the way these solutions are developed and regulated.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *The World Health Organisation (WHO) has convened the second global regulators' congress for the international harmonisation of medical regulation.*

- *Fines from off-label selling and poor promotions have receded with the focus of regulators shifting to drug safety reporting and patient privacy concerns.*

- *The US and EU Governments have approved an uplift in funding for regulators in recognition of the increasing complexity of regulation and the critical requirements of the connected world.*

The 2020 patient portrait

Sonia was concerned about her recent diagnosis of rheumatoid arthritis. She joined an online patient community and downloaded a diagnostic app to understand her disease, the drugs already available and those being tested through clinical studies. The certification system for the diagnostic app and social media site allowed Sonia to trust the results from her smartphone app and how her doctor would use them to monitor her treatment. The app suggested a clinical trial for a new drug, and she signed up online, confident that the regulator has provided a safety net and her doctor would be notified immediately of her enrolment in the trial.

An analyst view of pharmaceutical compliance in 2020

The increasingly complex regulatory environment, together with global alignment between regulators, has driven the development of a cloud-based infrastructure that is shared between industry and regulatory agencies. It caused a surge in costs but access to this infrastructure has allowed biotechnology companies to maintain their advantage of nimbleness against 'big pharmaceutical' whilst simultaneously achieving enhanced regulatory outcomes. Adaptive licensing and real time trials are also supported effectively for the first time, shortening development cycles. Adept stewardship of regulatory compliance activity by small, medium and large organisations is now a distinctive competitive advantage.

Evidence in 2014
Challenges to regulation from technological innovation and patient expectations

"Clinicians and patients have exacting expectations of regulators and are unforgiving when regulators are perceived to impede the adoption of promising new technologies or treatment but also when they fail to protect patients from quality or safety issues. Regulators must invest in new capability to meet new expectations, such as assessing information governance and cyber security, which will gain increasing prominence in the light of increasing amounts of data."

David Hodgson, Deloitte Partner, UK Healthcare and Life Sciences Audit Advisory Lead

- The products **regulated by the FDA represent over 20 cents** of every consumer dollar spent on pharmaceutical products in the United States.

- **Every American pays about $8 per year** for the vast array of protections and services the FDA provides.

- **Three quarters** of all significant pharmaceutical advances that were approved anywhere in the world in 2013 **were approved first by the FDA.**

- The fiscal year (FY) 2015 President's **Budget Request for FDA is $4.74 billion** for the total Program Level, which is $358 million above the FY 2014 Enacted level.

Source: http://www.fda.gov/downloads/AboutFDA/ ReportsManualsForms/Reports/BudgetReports/UCM388309.pdf

A British Medical Journal article in 2014 highlights the growing backlash to the imbalance of the randomised control trial in which patients are expected to adhere to arduous protocols, are randomised to placebo, and are blinded to their health status. Also that once the results are published, while more than 90 per cent would like a lay summary of results, only a minority (less than 10per cent) get one. This has led to the development of enabled online 'patient powered research networks.' In these networks participants have begun systematically to un-blind themselves, pool their data, review and discuss literature, conduct statistical analyses, and post their findings online, for example 'PatientsLikeMe'. This suggests the need for a new social contract that maximises scientific discovery and patient autonomy, setting the stage for better trials with more engaged participants.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3905107/

Google's biotechnology company, Calico, has developed a proto-type contact lens that can analyse the sugar concentration in tears. This has thrown up some issues that regulators have not dealt with previously. The lenses are expected to improve the management of diabetes and eliminate the need for skin prick blood tests by streaming information to artificial intelligence algorithms that will then optimise dosages for individual patients accounting in real time for exercise, food and drink and other external factors that affect blood glucose levels. This type of disruptive technology, however, will require significant changes to existing clinical trial and marketing authorisation (MA) assessments for combination products. For example, regulators will need to consider the control frameworks needed to prevent a lethal dosage as the algorithm learns about a new patient. They will need to approve dosage thresholds rather than explicit dosages, and new analytic competencies will be required to assess study outcomes and MA submissions. Moreover, variation procedures will need to accommodate algorithm patches and regulators will need to place a new emphasis on cyber security and data protection.

Source: Deloitte analysis of regulatory risks. See also: http://www.healthline.com/health-news/diabetes-google-develops-glucose-monitoring-contact-lens-012314#2

Research and development in 2020
The networked laboratory – partnerships and big data amidst new scrutiny

Prediction

In 2020, research and development (R&D) has few boundaries; the R&D model is networked, built around academic and other partnerships. The share of 'in-house only' discoveries is at an all time low. R&D activities are widely distributed, with pharmaceutical companies co-ordinating and integrating at the centre. The focus is on understanding disease biology and genetics; current standards and cost of care; and treatment pathways. Networked R&D combines pharmaceuticals and technology with increased patient engagement to prevent and treat disease. Company R&D strategies compete on returns from high value, low volume, western markets and lower value, high volume emerging markets.

The 2020 world

- Pharmaceutical companies collaborate with stakeholders earlier in the R&D cycle and access the best R&D earlier.

- Technology has changed the nature of R&D – with diagnostic biomarkers used in real time monitoring via wearable devices, and the convergence of technology and biology blurring the boundary between medical devices, continuous diagnostics and augmentation.

- 'Investigator-less clinical trials' – in which clinical trial sites are replaced by local clinics, remote monitoring and virtual clinician visits – have resulted in a significant reduction in the cost of clinical trials and the generation of more meaningful data through continuous monitoring.

- DNA sequencing now costs less than USD 50 per genetic profile, allowing extensive screening and effective targeting of trial patients and personalisation of drugs and interventions.

- Patients search out trials to participate in, forcing pharmaceutical companies to compete for patients, especially in well characterised, small patient group trials.

- Regulators are now comfortable with step-wise launches and focus on safety, efficacy and quality of life.

Conquered constraints in 2020

- Pharmaceutical companies have prioritised the most valuable legacy and new R&D data sources and have adapted the operating model to efficiently and routinely exploit these.

- Massive data analysis (trial and genomics) is now fully integrated with the research process (chemistry and biology).

- Collaboration in pre-competitive areas is the norm.

- Regulators have addressed the changing requirements for trials, establishing a new standard beyond Randomised Control Trials (RCTs).

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *Researchers have successfully developed nano-particle pills which work together with a wrist sensor to continuously monitor blood flow, allowing research into, and detection of, early cancer and heart attacks.*

- *Patient recruitment is increasingly challenging, with the patient experience of the trial now a competitive tool.*

- *Genomics and small target populations challenge RCTs as the norm, with 'real time trials' now common.*

The 2020 patient portrait

John has just received his diagnosis of a rare cancer. In his social media blog, he found that one of two trial drugs appears more promising and that patients have reported on social media that they were well supported in the trial. He recognises the corporate brand of the company, and feels that he can identify with its values. He resolves to speak to his physicians to sign up to the trial.

A pharmaceutical company executive team review meeting in 2020

The executive team just approved three new partnerships yesterday – two as part of the long term funding of the Department for Alzheimer's research at a leading university and one with a small, well funded Silicon Valley biotechnology company working with genomics data. The latter was exciting because it was running a real time trial where patients gave digital consent and added significant clinical and behavioural data via remote, smartphone data collection. Regulators and reimbursement agencies have accepted the new data.

Evidence in 2014
R&D Networks are emerging as the route to serve unmet needs

"R&D in 2020 will need a plug and play model to enable seamless, tailored interaction with patients, payers, peers and technologists to profitably deliver the transformational outcomes of 2030."

Julian Remnant, Deloitte Partner, EMEA R&D Advisory, Life Sciences Lead

Google is aiming to diagnose cancers, impending heart attacks or strokes and other diseases, at a much earlier stage than is currently possible.

The company is working on technology that combines disease-detecting nanoparticles, which would enter a patient's bloodstream via a swallowed pill, with a wrist-worn sensor. The idea is to identify slight changes in the person's biochemistry that could act as an early warning system. The work is still at an early stage. Google's ambition is to constantly monitor the blood for the unique traces of cancer, allowing diagnosis long before physical symptoms appear.

Source: BBC News 28 October 2014.
See also: http://www.bbc.co.uk/news/technology-29802581

It's an inescapable fact that Innovation starts with an 'I'. In exploring R&D in 2020 the eye is a great place to begin. The eye is a complex organ comprising over 40 different components which have yet to be fully characterised. A major barrier to the next wave of treatments for eye conditions is the complexity of the organ itself. An example of an initiative, working to unravel some of the mystery, is EyeWire, an online game run by the Seung Lab at Princeton University where players map retinal neurons. Using the power of the crowd in addition to in-house artificial intelligence, the project provides researchers with the information to understand how neurons work together to process information.

Source: EyeWire. Seung laboratory at the Massachusetts Institute of Technology. See also: http://blog.eyewire.org/about/ accessed 23rd Sept 2014

Two thirds (433) of drugs launched between 2000 and 2013 in the US were a partnership between companies, one third (268) went alone.

Source: Informa Plc, Biomed Tracker, accessed May 2014

Drug Partnership deals: US launched assets since 2000
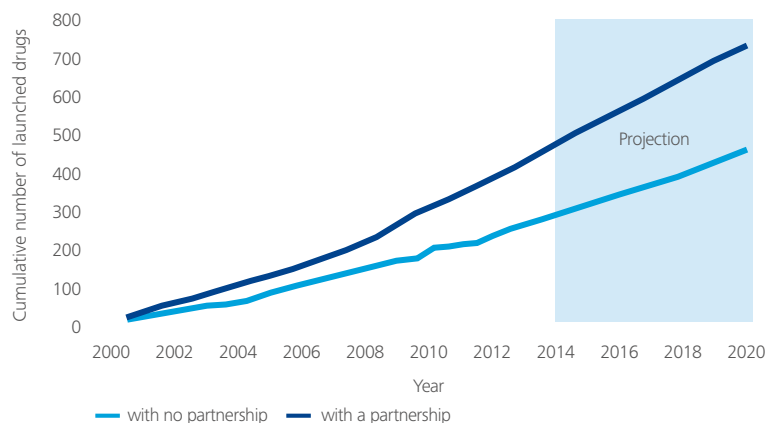
Source: Informa Plc, Biomed tracker, accessed May 2014

Business models are now being tailored to deliver complex and highly innovative products to market which demonstrate improvements to patient outcomes. The life sciences industry, in recognition that it needs access to skills and capabilities which often sit with external organisations, has developed new deals which differ from traditional mergers and acquisitions. These include: asset swaps, alliances and joint ventures which enable pharmaceutical companies to access extraneously conducted research and apply strong therapy area focus and capabilities to accelerate products to market.

Likewise, there is a need to ensure the development of products which address the most pressing threats to public health (for example new antibiotics). The FDA and European Commission/Innovative Medicines Initiative (IMI) have looked at ways of incentivising the development of new and effective antibiotics, including co-funding clinical trials and providing incentives that are attracting companies and investors to come back to this field of research. In July 2014, the UK Government also launched a new major international review to look broadly at the economic issues surrounding antimicrobial resistance.

Source: Deloitte analysis of new business models for research and development.
See also: http://www.wellcome.ac.uk/News/Media-office/Press-releases/2014/WTP056762.htm

The pharmaceutical commercial model in 2020
## Local is important but with a shift from volume to value

Prediction

Formularies and procurement processes create a 'winner takes all' for the best in class drugs. The salesforce model of the 2000s no longer exists – replaced by a more customer facing model using medical educators and orchestrators of clinician dialogues. Pharmaceutical companies now use reinforcing multi-channel marketing to ensure clinicians have access to information when and where they want. New outcome-based, commercial and contracting models routinely integrate pharmaceutical companies in clinical service delivery. These changes have shaped the commercial model around diseases rather than geographies. Tailored therapy area strategies are led by market access first and sales and marketing second. Local data and service partnerships share the risks of outcomes, ensuring clinicians and pharmaceutical companies have the same interests in population outcomes and more effective use of healthcare budgets.

The 2020 world

- A global Customer Relationship Management (CRM) infrastructure and understanding of physician preferences allows tailoring of multi-channel information that is meaningful to clinicians.
- Campaigns are globally executed, local face-to-face contact through salesforces/educators is much reduced.
- Pharmaceutical companies participate 'beyond-the-pill' in local healthcare with local general managers and their teams now focused on managing the risks and local services.
- Big Data partnerships create real world population registries permitting indication and outcome based pricing and population-based funding models.
- Integrated payer/provider business models (accountable care type organisations) are the norm.
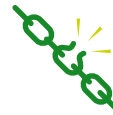
Conquered constraints in 2020

- Pharmaceutical companies have understood and embraced how to deal with the risks associated with healthcare service delivery. Experiments that show what is possible have evolved into successful long term partnerships.
- Healthcare systems and clinicians have accepted that pharmaceutical companies play an important role in educating and delivering the latest scientific knowledge – on drugs and treatments – and see them as an integral, positive part of the system.
- New and complex partnerships have emerged with clearer legal principles – from partnerships with healthcare providers to joint ventures amongst industry stakeholders.
- The distinction between pharmaceutical and biotechnology companies has been largely eroded following several years of mergers and acquisitions.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *The Schizophrenia Conference 2020 showed that the only way forward is for integrated service delivery – combining the use of drugs and home services in a partnership between the patient and their carer and the acute, primary and community service providers together with pharmaceutical and device companies.*

- *A new pharmaceutical collaboration paves the way for co-operative competition: two pharmaceutical companies have pooled all their resources into a joint venture to optimise outcomes for patients (rather than wasting effort and resources on competition).*

- *Price per pill is the exception for new launches – in 2020 all new drugs now receive market access through outcomes based pricing contracts, especially high priced medicines.*

The 2020 pharmaceutical 'orchestrator'

John has worked for the same pharmaceutical company for more than ten years and nearly everything has changed. He no longer has to persuade the receptionist at the primary care practice to let him see even one doctor to show him the evidence on his latest drug. Instead he has had three calls from the same receptionist asking him when he can share the latest real world data insights from the local area and the results of the study on the best practice treatment protocols. This particular practice is interested in the latest population management incentives developed by the insurance fund. John has shared the doctor's request for more webinar invitations and is sure the global multi-channel team has already actioned it.

A 2020 practice manager view

Memo from practice manager: Could you all please attend the practice meeting next week as we have invited John, from the diabetes drug company, to come along and talk to us about the latest data and findings from the diabetes protocol changes we implemented last year. The preview of the data he shared with me is truly astonishing – it seems we are making a huge difference by using more outreach programmes and prescribing different drugs for our younger patients. John will discuss with us how we can get access to more of the incentives available from the sick fund to allow us to expand. John is bringing the company's diabetics expert with him and the session should be good training for all of us.

Evidence in 2014
The development of enterprise level marketing

"In the short-term, biopharmaceutical companies should consider definitive steps towards development of a new commercial model that effectively incorporates, and seamlessly serves, all key decision makers in each local ecosystem."

Hanno Ronte, Deloitte Partner, Monitor Deloitte

The evolving stakeholder landscape

Commercial model elements		Focus of traditional commercial models	Focus of new commercial models
	Audience Whom you choose to engage	Individual stakeholders, especially healthcare professionals and patients	Broader system of care with emphasis on interconnections and networks taking place around a patient
	Offering What value you provide to your defined audience	• Product value • Clinical value • Health economic value	Product and non-productive value including: • Value added tools and services that drive better medical outcomes • Superior customer experiences • New forms of partnerships
	Channel How the value you provide reaches your audience	Primarily push channels, such as sales representative detailing and direct-to-consumer advertising	Integrated mix of push and pull channels, such as social media, online support communities, gaming, public education campaigns and alliances with advocacy groups

Source: Jeff Wordham and Sheryl L. Jackson, Transforming Commercial Models to address new healthcare realities.
July 12, 2013, http://dupress.com/articles/transforming commercial models to address healthcare realities. Graphic: Deloitte University Press, DUPress.com

For doctors working within organised provider systems, some 42% are not allowed to see sales reps (17% more than last year). With increasing numbers of physicians now working within an organised provider system, such as an integrated delivery network, or working for organisations moving towards an accountable care type model, the authors predict that more restrictions around sales rep-to-doctor contacts and greater formulary control can be expected.

Source : Working the System: Key findings from Capgemini Consulting and Quantia study. October 2014. See also: http://www.quantia-inc.com/wp-content/uploads/2014/10/Whitepaper-Quantia-Capgemini-Consulting-Working-the-System.pdf

In 2011-12 the number of sales reps in the US fell below the number in China. Sales force levels in China increased by 17% to 80,000 in the 12 months to March 2012, while the US recorded a fall of 8% to 72,000.

Source Cegedim Strategic data. See also: http://www.pmlive.com/pharmaceutical_news/china_overtakes_us_number_pharmaceutical_sales_reps_404785

Johnson & Johnson (J&J) Innovation is opening up a new incubator in Houston, housed within Texas Medical Center's new Innovation Institute. J-Labs expansion (formerly Janssen Labs) in Texas is expected to open in early 2015 to house up to 50 life sciences start-ups, with an emphasis on offering education. The J-Labs model charges a no-strings-attached flat fee to its resident start-ups, and included in this rent comes funding advice, access to R&D educational training and resources, and basic, shared administrative support for start-ups across the healthcare spectrum – pharmaceutical, biotech, medical device and digital. By becoming embedded in the innovation clusters, while technically unattached, its aim is to scope out the best new technology from the ground up. Start-ups in this new incubator will potentially also have access to J&J's venture arm.

Source: Meghana Keshavan, Med City News. See also: See: http://medcitynews.com/2014/10/jj-opening-new-j-labs-incubator-houston-early-next-year/?

The pharmaceutical enterprise configuration – the back office in 2020
Single, global organisation responsible for insight enablement

Prediction

Global Business Services (GBS) is the standard delivery model for all back office functions. Covering Finance, HR, Procurement, Real Estate, IT and Customer Contact, it is the information engine that enables insight across the value chain. GBS is responsible for end-to-end process governance, managed globally across a network of integrated shared service centres and Centres of Excellence (COEs). It comprises, rich technology and analytics capabilities, leading talent development and process management and performance protocols. The back office is now the nerve centre of the business, enabling pharmaceutical companies to become truly insight driven. GBS is seen as a strategic partner playing a central role in driving the right cost and resource allocation decisions across the enterprise.

The 2020 world

- GBS is measured on the value it creates and the risk it contains. All of the paper is gone. A central control centre monitors core, extended and outsourced process performance, exceptions and service levels. Processes are completely web, workflow and self-serve enabled.

- GBS has moved beyond the transactional and has become the analytics factory for the enterprise. It consistently provides the business with the essential facts and new information they need to make effective decisions even in the face of extreme complexity.

- GBS underpins the real world evidence agenda with full accountability for insight generation through its deep capabilities in advanced analytics.

- GBS has simplified the compliance landscape through its enablement of end-to-end processes. Global, real-time compliance is now the norm.

Conquered constraints in 2020

- Investments in integrated Enterprise Resource Planning (ERP) have finally paid off. Near real-time processes based on in-memory processing offer significant advances in performance. Extensive use of visual process management and process analytics tools.

- Master data management constraints have now been addressed at a global level enabling the seamless integration of internal and external data sets including social media insight.

- Disparate technology architectures have been replaced through the adoption of cloud based solutions across the enterprise. Regulatory hurdles have been overcome to provide a cost effective, scalable and readily deployable enabling architecture.

- All applications are now mobile-device enabled and device and operating system agnostic. Analytics results are pushed from GBS to a user's device real-time.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- "The GBS organisation at PharmaforToday has really started to deliver from both a cost and value perspective. By adopting common governance and standardised processes across the back office, we have delivered year-on-year cost savings and assured the quality of information across the business. Our integrated network of 'Centres of Excellence' have provided the insight that has underpinned our recent top line growth." Susan Smith, SVP, GBS, PharmaforToday.

- Their agile, flexible and standardised back office models have shifted big pharma from their previous laggard state to a trail blazer in organisational efficiency and effectiveness.

The 2020 portrait of a local market relationship director

In less than an hour, the new dashboard has provided me with all my critical local performance data. Bringing together financial and operational data with our CRM outputs has enabled greater transparency on customer profitability and has also driven enhanced customer satisfaction as a result of more effective targeting. It really helps that our back office systems are now standardised and that GBS is providing us with value added information that is consistent across all of our markets.

A 2020 industry analyst view of pharmaceutical companies

A 'Buy' rating for PharmaforToday given it has finally addressed its back office support model – it is now global, leaner and driving critical insights for the business. Targeted investments in R&D have paid off with a revitalised pipeline and number of successful new launches. Their joint venture with a key Health Analytics company is really starting to pay dividends.

Evidence in 2014
The move to Global Business Services (GBS)

"Pharmaceutical companies are facing an increasingly challenging environment, with cost containment increasingly a factor of life as patent cliffs, reimbursement pressures, longer development cycles and time to market, as well as competition from generics erode the ability to maintain and improve profit margins. GBS provide a flexible platform to help simplify, standardise and reduce the cost of an enterprise and support effective decision making across increasingly complex layers of local, regional and global functions."

John Haughey, Deloitte Partner, Life Sciences Consulting Lead

Three large European pharmaceutical companies are together moving more than 200,000 employees around the world to new virtual HR solutions – by the end 2015. One firm is replacing more than 50 legacy solutions.

Source: http://www.computerworlduk.com/news/it-business/3509980/cloud-hr-tools-support-transformation-of-pharmaceuticalceutical-industry-say-workday-customers/

The life sciences industry has generally lagged others in its adoption of more efficient and effective back office models e.g. shared services and outsourcing. This is rapidly changing with nine of the largest 25 pharmaceutical companies having adopted, or being in the process of adopting, a GBS model.

Source: Deloitte research into adoption of GBS by the top 25 pharmaceutical companies

The top three companies delivering cloud based systems to life science companies to increase back-office efficiency are growing fast – total revenues have recorded a CAGR of 17% since 2010 – from USD 5.3-8.5 billion).

Source: Deloitte research into size of market growth

Overall [for Lilly], some 16,000 reps are now working in the cloud. Lilly CTO Michael Meadows says "there were smiles all around when the new system was rolled out. Training was quick, and sales folks jumped on board. Compared with the old systems, user satisfaction improved to a degree way higher than we had anticipated or even hoped". The new system will save Lilly millions of dollars per year in IT costs and efficiency improvements. Importantly it will also help improve the effectiveness of their sales organisation.

Source: Fierce Pharmaceutical, April 2014. See also: http://fiercepharmaceuticalmarketing.com/story/eli-lillys-sales-force-finds-crm-harmony-cloud/2014-04-02

New business models in emerging markets in 2020
Still emerging, but full of creativity for the world

Prediction

While the traditional pharmaceutical markets in the US, Japan and Western Europe remain the main markets for drug companies, new markets requiring new business models are gaining pace. The focus on Brazil, Russia, India and China (BRIC) is now being challenged by new emerging markets in Latin America, Vietnam, Indonesia and Africa. These are proving an even bigger surprise, incubating new business models and leading in the development of new drugs.

The pharmaceutical industry has responded to the various healthcare delivery models being adopted by different emerging countries and are tailoring their strategies accordingly. The focus is on access, affordability and outcomes – with an emphasis on local and being more than just the pill.

The 2020 world

- Insights and learnings from emerging markets have led to the emergence of new business models, creating a step change in the operating and commercial models of traditional markets.

- New markets in Africa and Asia have emerged – where formerly only generics companies played.

- Indonesia and Nigeria are leading the way in addressing the sheer size, geographical spread and inherent challenges of young populations with high levels of unmet need, prevalence of infectious diseases and poverty.

- Management teams are diverse and routinely include locals from emerging markets.

- Pharmaceutical companies have established dual brands, for certain emerging markets, allowing more locally tailored pricing models, while preventing parallel trade.

- Diabetes and specific cancers are now the foremost healthcare issues in these emerging economies, challenging all stakeholders to develop solutions.

- Translational medicine, including gene sequencing, has allowed emerging markets to leap-frog the West in some elements of research. With Brazil and China the main sources of drug innovation, providing a major contribution to the solutions for ageing and co-morbid populations globally.
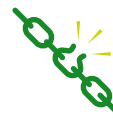
Conquered constraints in 2020

- IP protection and regulatory frameworks for operating in BRICS and other emerging markets have evolved and are now understood.

- Ability to manage and run local partnerships in diverse cultures and legal environments has improved and the number of partnerships has reached a tipping point.

- Emerging market governments recognise that innovative treatments and global pharmaceutical companies have a role to play in their markets and have developed mutually beneficial relationships.

- The exponential development of healthcare technology has enabled emerging countries to develop new more flexible models of healthcare focussed on mobile, high volume, low cost delivery. In response pharmaceutical companies have developed tailored strategies that align to this more flexible environment.

- Pharmaceutical companies have invested wisely in local talent development initiatives which are paying dividends.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *Breaking news: First major drug is approved in the US that was discovered in a lab in an emerging market, following a long collaboration with a local pharmaceutical company.*

- *Micro-finance solutions for vaccines developed for the African continent are now being adapted for cancer drugs in the US and Europe.*

- *The new CEO is a former head of Asia Pacific and is accelerating the pace of change given his experience there.*

- *First major Indonesian pharmaceutical company is on an acquisition trail in the US and EU.*

The 2020 emerging market manager portrait

We, jointly with the local hospital, built a completely new treatment algorithm for diabetes, which allowed each doctor to treat nearly twice as many patients with more predictable and better outcomes. We shared that with our colleagues in the US and EU and they have taken it to their local hospitals, and invited our client to visit. This shows that frugal innovations have a bigger role in more developed countries than previously seemed likely.

An emerging market government official in 2020

We have just opened a new local pharmaceutical factory, a novel partnership agreement between a global pharmaceutical company and a local company. The partnership is fully integrated in the local healthcare system. It has involved building a new translational medicines institute at the local university, establishing the local adjacent secondary hospital as a centre of excellence, and building a state of the art 'Virtual Care' telemedicine hub. While the partnership initially caused some controversy, the majority of patients and clinicians and local politicians have welcomed the change.

Of India's population of 1.2 billion, some 12 million, including 300,000 children, are blind. Around 80 per cent of blindness in India is caused by cataracts.
To clear the current backlog India must deliver 5 million eye surgeries a year for a decade.

The Aravind hospital in South India is now recognised as the largest and most productive eye care facility in the world, it provides 60 per cent of the UK's volume of cataract operations at 1 per cent of the cost.

Source : http://moreforless.reform.co.uk/pdfs/Opthalmology_at_Aravind.pdf

In emerging markets the dual pressures of poverty and a large, rural population with a low hospital bed base and limited numbers of trained staff, make effective healthcare delivery especially challenging. The Narayana heart hospital in India provides high volume, low cost heart surgery with outcomes that are among the best in the world. The hospital achieves high productivity through effective use of technology and maximising consultant and operating theatre time, greater use of trainees and non-clinical support staff, and making doctors accountable for cost and quality. The UK NHS, tariff for cardiac surgery ranges from £8,226 to £11,757 depending on complexity; in India, cardiac surgeries cost around £3,100-£4,340; at Narayana surgeries cost less than £1,116, irrespective of the complexity of the procedure or the length of hospitalisation.

Source: http://moreforless.reform.co.uk/pdfs/Narayana_Hrudayalaya.pdf

The main challenges for emerging markets are access and affordability with low levels of public or insurance based funding and high levels of out of pocket expenditure. Governments have responded by introducing new access and funding models, for example:

- China has introduced a measure to reduce the price gap between local generics and off-patent branded drugs.

- India has passed legislation to introduce universal healthcare and in July 2014 expanded price caps to 108 medicines.

- Nigeria is implementing a National Health Insurance scheme to establish universal healthcare for all citizens by 2015.

- Mexico is encouraging transnational and domestic companies to introduce generic medicines at affordable prices, and in April 2014 proposed new internal reference pricing using domestic equivalents as the reference point.

Source: Deloitte research

The expansion of mobile and wireless technologies around the world has provided an unprecedented opportunity for more effective healthcare delivery in emerging markets. As the communication infrastructure in emerging nations improves, telemedicine is extending healthcare, particularly access to specialist care, to more citizens. Local clinics and practitioners can consult remote specialists via video-conferencing, mHealth applications and remote diagnostic tools. Chinese and Indian companies are some of the heaviest investors in video-related health technology in parts of Africa; with Indian doctors treating African patients remotely in five regional hospitals. Existing mobile network operators are subsidising telemedicine programmes. For example, a number of public-private partnerships are delivering vital health information through mobile phones to mothers in low- and middle-income countries in Africa and Asia, with measurable improvements in maternal and child health. Telemedicine services are also being used in radiology, cardiology, ophthalmology and pathology in many emerging countries. Mobile technology is also helping to tackle many communicable diseases, such as tuberculosis, and to undertake disease surveillance, disaster and disease management.

Source: Deloitte research as part of the Centre for Health Solutions Study into Technology Enabled Care – due Spring 2015.

Driven by the pressures of public health challenges (Ebola, Hepatitis C, HIV) and high cost of innovative new drugs, emerging economies have kicked off an ambitious initiative to collaborate to share knowledge and increase timely access to innovative new treatments. demonstrated by the first ever BRICS pharma innovation collaboration forum, held in Beijing 27-28 October 2014.

Source: Informa Plc, Scrip Regulatory Affairs, Accessed November 2014

Impact of behaviours on corporate reputation in 2020
## A new dawn of trust

Prediction

The pharmaceutical industry has made real inroads in repairing the negative corporate reputation that has plagued it over the last few decades. Tackling corporate reputation has been a top priority for all pharmaceutical companies, though for most, full rehabilitation will require a few more years. Successes have been where the pharmaceutical companies have become more inclusive and actively seek to understand and meet the needs of their stakeholders. Equally important has been the impact of the industry's campaign to demonstrate more transparency in its approach to drug development and pricing.

The 2020 world

- Over the past five years, most companies have found a way to balance corporate responsibility with financial reward and now demonstrate this in a set of measures reported in their annual reports.

- Corporate brands are now more prominent and trusted, and a differentiator in attracting both partners for R&D and patients for trials.

- New research confirms that the corporate reputation of the industry and an individual pharmaceutical company is inextricably linked to the quality of the relationships built with patient groups. Corporate brands are used nearly exclusively – from healthcare and R&D partnerships, to patient apps and social media.

- Closer contact with patients and clinicians through engaging with pharmaceutical company branded clinical services has improved awareness and reputations.
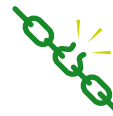
Conquered constraints in 2020

- Concerted social media participation and new partnerships with patient groups have helped the pharmaceutical industry reverse the previously antagonist stance.

- Assumptions that pharmaceutical companies lack a philanthropic approach have been overturned through stories of improved healthcare in developing countries and positive feedback from hard-up patient groups.

- A culture of improved transparency has become prevalent – in relation to drug pricing; payments made to prescribers; results of all clinical trials; and by making all data available to independent scrutiny.

Note: All elements on this page are from a perspective of 2020 and are fictional

News snippets from 2020

- *The 2019 annual survey of patient groups worldwide shows a continued improvement in the pharmaceutical industry's corporate reputation. Top performers are judged to have significantly improved the extent and scale of networking and the access to data, medicines and insight. These companies have also introduced transparent pricing and service policies and can demonstrate clear ethical behaviours. The patient groups commentated that they now work in partnership with pharmaceutical companies as an integral stakeholder in the system.*

The 2020 patient portrait

James, who has osteoarthritis and heart disease, has been prescribed a newly approved drug. James is well aware of the associated benefits and risks and participates actively in the online discussions group, co-hosted by the drug company and the regulator, that debates the pros and cons of the drug. In addition, the drug company has provided James with support, and information about local pharmacies and carer groups whose information lines are open 24/7. The company has offered to discuss the situation with James's employer to reassure them that the drug regimen will not interfere with his capacity to work.

The pharmaceutical company's clinician and patient relations department in 2020

At our recent board review of progress in improving our corporate reputation we identified the following success factors:

- *Building an umbrella brand for the company with links to all our digital assets.*

- *Moving beyond individual therapies, not just selling the pill, but combining it with support tools to enhance patient use and adherence.*

- *Emphasising specific examples of ethical and trust related governance throughout our financial reporting ststements.*

Evidence in 2014
The case for improving the pharmaceutical industry's corporate reputation

Patient groups view as to the areas in which the pharmaceutical industry's reputation has deteriorated the most over past three years

% of patient groups saying that pharma is "excellent" or "good" at these activities	2011	2013
Relationships with the media	63%	45%
Ability to have ethical marketing practices	34%	26%
Acting with integrity	31%	25%

Source: http://alexwyke.wordpress.com/2014/02/13/corporate-reputation-of-pharmaceutical-the-patient-perspective-february-2014/

The pharmaceutical industry's changing era's of influence

Era	1960-1990 – Era of competition	1990-2012 – Era of market access	2013-2020 – Era of system solutions
Lever	Frequency and reach	Outcomes data	Integration
Tone	Let me show you...	Let me show you...	How can we help?...
Patients	Information	Activation	Engagement
Focus	Product	Product	Customer

Source: Benchmarking Strategy for Corporate Patient Centricity, PatientView, 2013. see also: http://alexwyke.wordpress.com/2013/09/22/a-benchmarking-strategy-for-corporate-patient-centricity/

Those pharmaceutical companies ranked top on corporate reputation in PatientView's 2013 survey were either focused on HIV/AIDS or had HIV/AIDS drugs in their portfolio. However, these companies were still criticised for their pricing strategies. Positive attributes were the delivery of new products and adoption of new patient-centric strategies. Patient groups also tended to be view generic companies more favourably (largely as the generics business was seen as promoting wider access to drugs for patients). Overall, patient groups appear to be influenced by five main factors when determining the reputation of a pharmaceutical company:

- a fair pricing policy

- a good portfolio of products that brings hope to people within the group

- positive media coverage about the company; a sense of patient centricity

- a perception of year-on-year positive changes in the company's investment stance (for example supporting campaigns or patient-centred research)

- a view that the relationship with a company can be relied upon over the long term, rather than short term.

Source: http://alexwyke.wordpress.com/2014/02/13/corporate-reputation-of-pharmaceutical-the-patient-perspective-february-2014/

The eight areas in which patient groups and patients call for change to improve the pharmaceutical industry's corporate reputation.
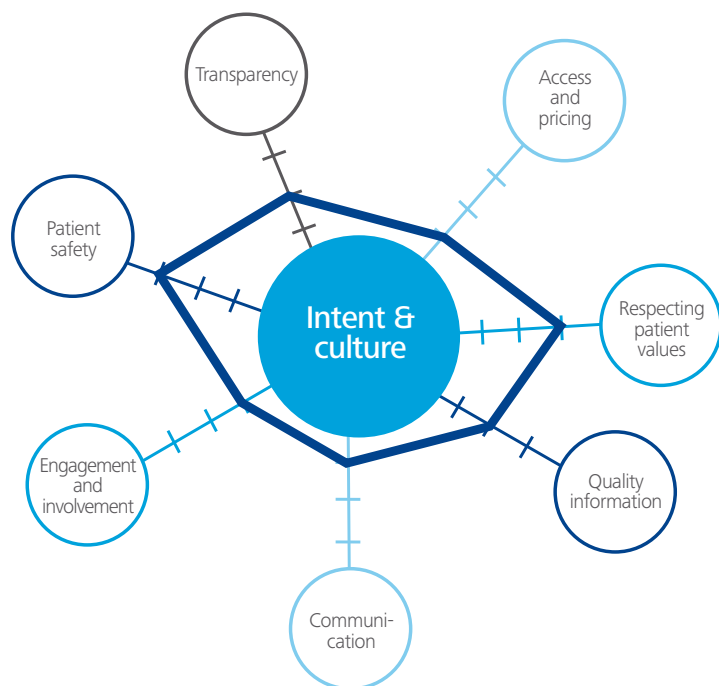
Source: Benchmarking Strategy for Corporate Patient Centricity, PatientView, 2013. see also: http://alexwyke.wordpress.com/2013/09/22/a-benchmarking-strategy-for-corporate-patient-centricity/

Glossary of terms in 2020
The 'new speak' in healthcare and life sciences

Term	Potential definition in 2020
Augmented wear	Contact lenses, pumps, pace makers or other implants with measuring/tracking functionality. Augmented wear could see devices 'add further value' such as a 'zoom lens or night vision' built into the contact lens.
Clinician Support Educator/ 'Orchestrator'	Used to be called a 'sales rep'. Now is the glue that holds the local healthcare system together and provides information and training for the local clinician community.
Global Business Services Officer	A global executive appointment that manages the entire back office and functions to support the global operations. It manages the analytics assets for the firm as well as the complex supplier partnerships that support the global virtual back office.
Health co-creator	A new type of patient – informed, knowledgeable about their own health, and fiercely informed about what is possible in terms of drugs available, trials being run and what s/he should be entitled to from the healthcare system.
Healthcare partnerships for outcomes	Pharmaceutical company partnerships with the healthcare system – either payers or secondary care institutions that are multi-year and focused either explicitly or implicitly on patient populations outcomes.
Intensivists	A medical specialist in critical care medicine.
Moore's law	An observation made by Gordon Moore in 1965. He noted that the number of transistors per square inch (related to computer processing power/memory) on integrated circuits had doubled every year since their invention.
Multi-channel relationship management	No longer just multi-channel marketing – pharmaceutical companies use multi-channels to manage relationships with each clinician – both to serve the clinician and his patients better, but also to ensure all that is done is compliant with regulations.
Nanoparticle Pill	An oral pill containing nanoparticles which enter the bloodstream to, for example, achieve targeted drug delivery or identity changes in a person's biochemistry (if paired with a wrist-worn sensor).
Networked R&D	R&D is now about finding and evaluating other people's ideas. Network management of a whole series of contacts – from academia to promising start ups is critical.
Pharmacogenomics	The study of how genes affect a person's response to drugs.
Quantified self	A consumer who tracks multiple dimensions of his health and quality of life using a variety of sensors – from a smartphone to specific sensors and more medically oriented devices (e.g. glucose meters).

Add your own terms!

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