



Life Science Talks™

Healthcare, from Products to Solutions

Exploring some of the latest initiatives in the provision of healthcare solutions in Europe

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EXECUTIVE SUMMARY

From experts to experts ...

As an executive search firm dedicated to the Life Sciences, Gensearch is involved in constant quality discussions behind closed doors with high-level healthcare executives. Today, through Life Science Talks, we have decided to make some of this information available to the professional community at large, provided it is non-confidential, of public interest, and likely to spark interesting partnerships in the future.

This white paper therefore condenses data drawn from a number of informative meetings with decision makers in the European healthcare sector during 2013 and 2014. More specifically, it is the result of an edition of Life science Talks dedicated to this subject and held in Paris, in May 2014.

The discussions at this event were admirably moderated by Silvia Ondategui Parra, partner at EY, and were punctuated by keynotes from leading stakeholders in European healthcare: Emmanuel Gomez, CNAM-TS, Head of Disease Management Programmes; Dr Rick Greville, ABPI, Director of Wales and International Affairs; Thierry Zylberberg, Orange, Head of Orange Healthcare; Miguel Bernabeu, Alcon (Novartis), Global Head of Market Access, Pricing and HEOR; Yvoine McCourt, Air Liquide, Head of Home Healthcare International Development; Olivier Croly, GE Healthcare IT, GM Europe. Again, we thank them for sharing their views, their concerns, and for outlining their projects in Europe within our forum.

Updating the industry

The challenges healthcare systems are facing today – a growing financial burden coupled with depleted sources of income – will require new forms of partnerships in the future, either between industries or between public and private organisations. The industry, whether pharmaceutical or Medtech, has entered a process of renewal and is revisiting its business model in order to alleviate financial costs, as well as to gain in quality and efficiency. During the Life science Talks event in May, the speakers outlined their strategies for us, along with a few exemplary projects and partnerships. These are indicative of a new mind-set: in a context of global healthcare challenges, the only solutions reside in active and organised collaboration between economic agents that were heretofore isolated, or even in competition with each other. These partnerships are a great source of innovation and momentum, giving stakeholders great hope for the future in our depressed economies.

As the industry realigns with payers' concerns, and moves from a position of selling product benefits to one of generating and measuring health outcomes (through adherence, telemonitoring, etc.), it understands that isolated products or services, however competitive in terms of cost or quality, are no longer sufficient to spark client interest. Such products must come enhanced with innovative and field-related value-added services, much of which is digitalised, to justify and monitor the benefits they claim to provide. This new trend can be summed up as the switch *from Products to Solutions*.

The following pages analyse in detail the three dimensions of this economic revolution: how it modifies the industry's relationship with the payer, with the patient, and with the client.

From Products to Solutions

No company today seems to have the in-house capabilities to cover all the requirements of this new marketing mix that encompasses medical technology, communications technology, data management expertise and personal or expert support. Furthermore, as they aim to provide maximum quality in their services, companies generally do not wish to stray from their core competencies. This dictates the need for technological and human partnerships, which are still exceptional, but should become the norm in the future.

One of the key aspects of the structural revolution taking place in the sector is data management, as the industry now operates in a world of connected objects, databases and exponential personal medical information. It is therefore calling on governments and public administrations to leverage their global position and adopt a top-down approach, to structure data management on a global level, and to invest in the latest technology to ensure robust systems and securely stored data. Data management is one, if not the only cost-cutting source available, ensuring, all the while, equal or better quality of services.

Global data management should enable patient access to the most specialised medicine anywhere in the world, a not so far-fetched public health utopia of *ubiquitous expertise*. In data management lies the future of medicine of the third millennium.

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REDEFINING THE INDUSTRY'S RELATIONSHIP WITH THE PAYER

As the pharmaceutical industry is entering the “post-blockbuster era”, and MedTech organisations are maturing in their development, it has become critical for both sectors to adapt their business model to the payer’s current constraints, obligations and mind-set.

The growing burden of chronic or non-communicable diseases on healthcare systems in the Western world, at a time when states no longer have any budgetary leeway to sustain these systems, has encouraged new types of partnerships between industry and payers.

- AN EXAMPLE FROM THE UK -

HOW THE INDUSTRY IS REINVENTING ITS RELATIONSHIP WITH PUBLIC AUTHORITIES TO REFLECT STATE CONCERNS

In his presentation on the UK, Dr Rick Greville¹ dates the redefinition of relations between industry and payers – i.e. the evolution side by side of the NHS and the pharmaceutical industry – to the publication of the Innovation, Health and Wealth report on 5 December 2011. This report outlined the need to support the adoption and dissemination of innovative medicines across the NHS, and was warmly welcomed by the ABPI, the Association of the British Pharmaceutical Industry.

THE MEDICINES OPTIMISATION STRATEGY

One of the most important aspects of the current NHS-pharmaceutical industry partnership is the Medicines Optimisation strategy. The goal is clear: to continue to gradually reduce the proportion of the yearly NHS budget spent on medicines. In 1999, this proportion was 13%, and in 2012 lower than 10%. The strategy is to target avoidable medicines wastage in primary care running today at approximately £150M per year.

More importantly, however, Medicines Optimisation is a process by which one can ensure that the right patient gets the right medicines at the right time, in turn improving adherence, reducing waste and eliminating harm. The scope is therefore vast and far-reaching, bundling fields of intervention as varied as efficacy of medicines, patient adherence, safety, and wastage reduction. Equally, the expected outcomes are global, and span patient quality of life; reduction of expensive hospital interventions; prevention of disease progression; redesign of pathways to care, to maximise value from resources; waste, errors or adverse events prevention; patient adherence improvement.

Medicines Optimisation is nevertheless first and foremost a patient-centred approach, based on 4 principles:

- Understanding the patient experience
- Evidence-based choice of medicines
- Making medicines optimisation part of routine practice
- Ensuring optimal safety of medicines use

These guiding principles are implemented through aligned measurement and monitoring.

Finally, Medicines Optimisation is a sound strategy because it represents a 3-way WIN, WIN, WIN: payer, industry and patient reap the benefits of this system concurrently. The relationships are stronger because based on reciprocity. Patient focus means greater engagement, support and individualised care, and a safer use of medicines. By focusing on outcomes, the industry will be held accountable for the intrinsic value of medicines, and patients will benefit from a quicker access to innovative medicines. The NHS will increase collaboration across sectors, focusing on patients and quality, as well as on a better use of medicines and resources.

¹ Dr Rick Greville is Director of Wales and International Affairs for the ABPI (Association of the British Pharmaceutical Industry)

THE ABPI/NHS ENGAGEMENT

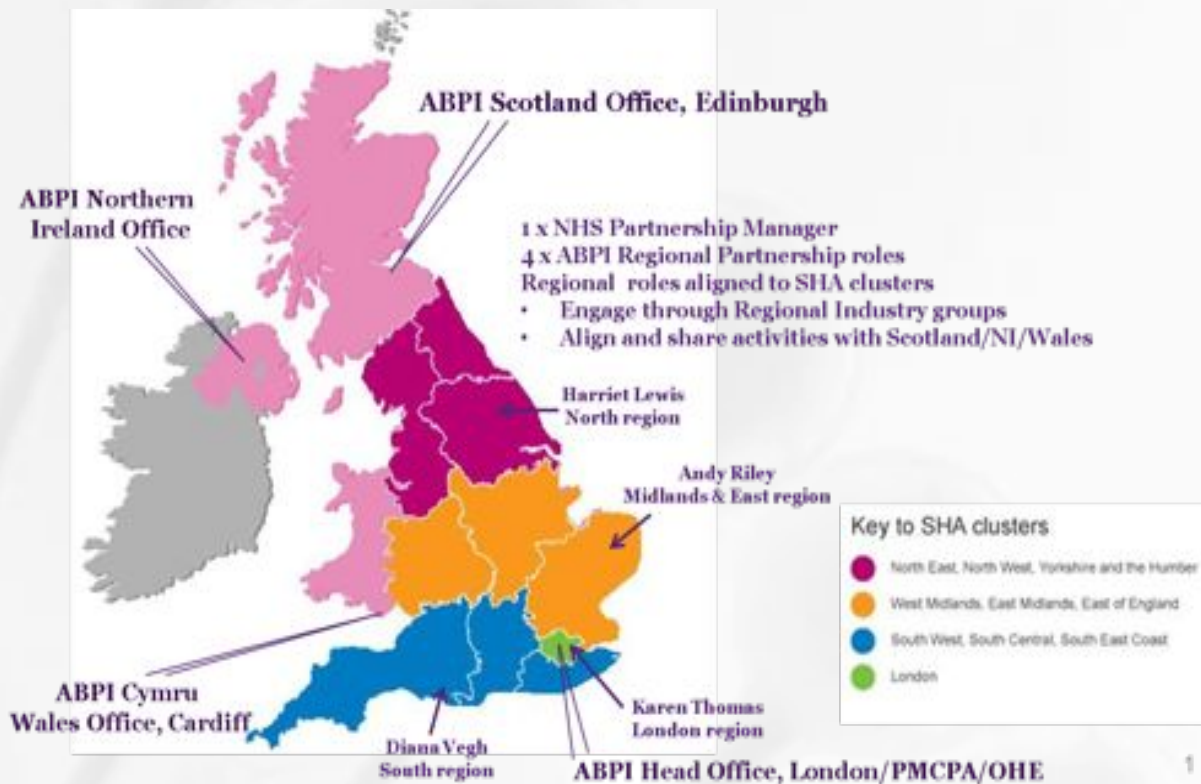
The ABPI is exemplary in its approach to supporting and partnering a national health system in a Western economy today.

Its partnership with the NHS is based on an overriding objective termed “Transforming Relationships”. The ABPI’s engagement encompasses:

- Engagement with multiple stakeholders
- Greater collaboration between Pharma companies
- Patient focused activities such as Joint Working projects
- Transformational service provision alongside medicines
- The drive to improve patient outcomes by working with partners – collaboration is at the heart of the model

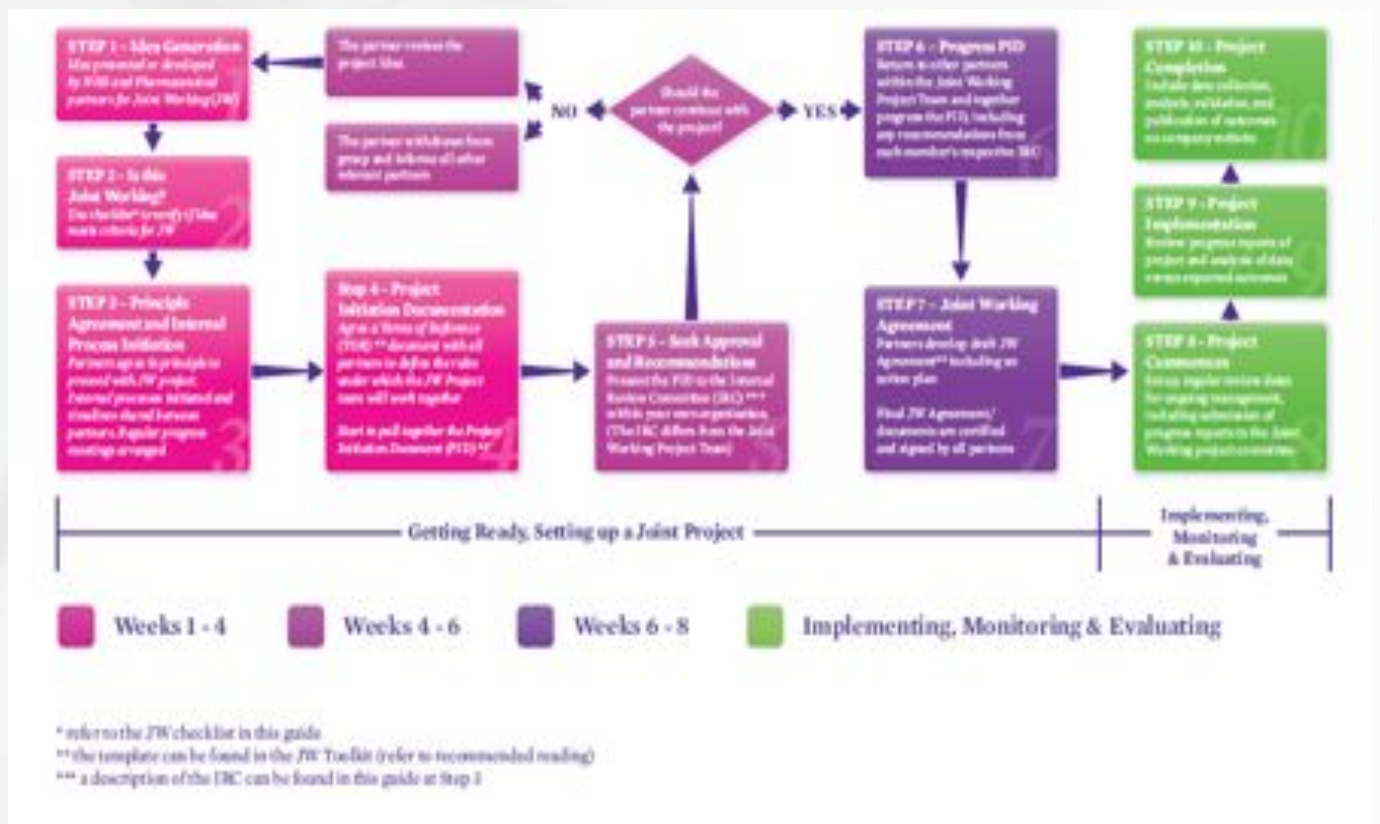
I/ LOCAL PRESENCE AND ENGAGEMENT

To ensure maximum reach and collaboration efficiency, the ABPI organisation will continue to reflect the NHS organisation in the field and, likewise, cover distinct local territories.



2/ A JOINT WORKING GUIDE

To ensure fluidity in NHS/ABPI collaboration, a working process has been defined which will serve as a guideline for all future ventures. Definition and approval of this conceptual workflow is in itself an example of the new approach. It is applicable for the entire UK or locally empowering participants at all levels to engage in partnership projects.



3/ EXAMPLES OF CURRENT PROJECTS APPLYING THIS WORK STREAM PROCESS

Examples of current NHS/ABPI partnerships include:

- **Integrated Care Pathway for Diabetes.** The goal is to improve clinical care for diabetic patients through better coordination and management in primary care. Three Pharma companies are working in partnership with the local NHS organisations to improve patient outcomes in diabetes.
- **Call for Collaboration on Medicines Optimisation strategy work streams.** This is an opportunity for companies to actively participate in a programme of service improvement projects focussing on medicines use: medicines waste, medicines safety and improved outcomes.
- **CCG (Clinical Commissioning Groups) 'Plan on a Page' Workshop.** The goal is to identify opportunities for collaboration and joint working, and to create the ideal environment for industry to build a programme of CCG Value Propositions to include data mining, service design, and intelligent commissioning. Several successful projects have been completed: neuropathic pain service and referral pathway; diabetes mapping and performance review.
- **Industry Engagement Pathway.** Local projects to facilitate NHS/industry collaboration.

THE CHALLENGES OF THIS INNOVATIVE PARTNERSHIP

Innovation upsets the status quo and raises new issues, but thankfully the difficulties are not impossible to overcome.

One of the first issues is, of course, understanding “the other party”, in this case, the organisation of the NHS. Differences between Joint Working projects, MEGs and sponsorship require an in-depth understanding of the workings of this historical institution.

Process complexity is another issue: the ten-step process takes quite some time to follow and the internal certification process within the NHS or the industry requires a great amount of forethought and planning. All the while, project complexity varies in relation to the scope of the project: single pharma vs. multi-pharma projects.

Finally, there is pressure to demonstrate results and showcase project outcomes for smaller projects before engaging the industry in larger endeavours.

We are at the starting point of a long journey, and it is too soon to draw any conclusions. Suffice to say that change is necessary, that the parties involved are motivated and optimistic, and that we can already point to some good examples of “Relationships Transformation”, even though hard facts and figures are not yet available.

- AN EXAMPLE FROM FRANCE –

**A DISEASE MANAGEMENT PROGRAMME DESIGNED TO HELP PATIENTS
AND ALLEVIATE THE BURDEN ON SOCIAL SECURITY²**

Speaking on behalf of France's national, universal and compulsory health insurance provider (Caisse Nationale de l'Assurance Maladie des Travailleurs Salariés, CNAMTS, also known as the Sécurité Sociale or Assurance Maladie) Emmanuel Gomez shed some light on a recent venture to come to grips with the rising cost of chronic disease. The example presented, Sophia, is a unique project in France in terms of its ambition and scope. Its development and outcomes are currently being followed with great interest by all the stakeholders in the French healthcare system, with a view to possibly reproducing the process in other areas of medicine.

THE IMPORTANCE OF THE FRENCH NATIONAL HEALTH INSURANCE SYSTEM IS NOT TO BE UNDERESTIMATED

The CNAMTS covers 85% of the French population, meaning it insures 58 million people and processes €150 bn. in reimbursement costs per year (approx. half for hospital expenses and half for independent health professionals). It employs 70,000 professionals and has over two thousand offices open to the public, with 35 million visits a year. It additionally receives over 200 million visits to its website every year and deals with 150 million emails and 30 million phone calls.

The importance of this organisation can be explained by the manner in which its scope has broadened: initially tasked with providing basic health cost reimbursements, it's scope now encompasses global/national prevention measures in many health areas, specialised support services for patients or health professionals, web services for citizens, health professionals or the health industry, or direct health services, including disease management and the Sophia Programme.

² Presented by Emmanuel Gomez, CNAM (Caisse Nationale de L'Assurance Maladie), Head of Disease Management Programmes.

THE AIM OF THE SOPHIA PROGRAMME

In the general context of deficit control and budgetary restrictions, the focus is quite logically being placed on the two most prevalent chronic diseases: diabetes and asthma, which respectively affect 3 million and 4 million people in France.

Sophia was launched to prevent complications, improve the state of health and quality of life of chronic patients, to reduce the occurrence of complications and related healthcare expenditure.

The greatest constraint was that of overall cost: with an absence of specific financing (the service was to be absolutely free of charge, under no restriction or obligation, as a national service), the cost had to be supported by the community. It took a long time for the project to mature, as enquiries into the cost of existing programmes abroad led to the conclusion that all were above cost targets. The challenge was to fine-tune a project within well-defined cost boundaries while remaining cost-efficient over time.

The pilot project for diabetes was launched in 2008 (with 145,000 members in 2011), and came into general use at the end of 2012.

Close to 2 million patients with diabetes were invited to subscribe to the programme.

The programme today covers both diabetes and asthma, and essentially promotes adherence through information, both general and personalised, through printed material, personalised emails and mailshots, reference booklets, newsletters, e-coaching, a website, and most importantly outbound and inbound phone calls with nurse health counsellors. The particularity of Sophia is that there are several levels of support, depending on the state of health of each member.

THE TANGIBLE RESULTS OF THE PROGRAMME SO FAR

The results of these national programmes have been assessed according to two sets of criteria: first, those related to the general perception by the target public, popularity and membership levels; second, those related to actual adherence, medical outcomes and public benefit.

1/ POPULARITY AND PERCEPTION OF THE SOPHIA PROGRAMME

As of today, over 500,000 patients have joined the programme, which represents over a quarter of the target, a very satisfactory patient engagement level in light of how recently the programme was inaugurated.

Furthermore, the satisfaction levels regarding the pilot project, measured in 2011 by questionnaire on a sample of 1115 members by an independent agency (IPSOS), yielded the following results:

- A very high level of satisfaction overall: 91% declared Sophia delivers good support and 89% would recommend it.
- 84% believed Sophia instigates behavioural change regarding their follow-up exams (70%), their diet (69%), and their exercise (53%) and felt a great improvement
- The ongoing contact with nurses (practical advice, listening, and customised support) was highly appreciated (score 7.7/10)

The survey was also carried out on over 500 general practitioners through phone interviews:

- 79% believed it's an excellent public initiative to help with the management of chronic disease
- 75% believed the programme is educational and informative, using materials that are well adapted to the patients

2/ ADHERENCE, MEDICAL OUTCOMES AND PUBLIC BENEFIT

These criteria were assessed by an independent medico-economic consulting firm, CEMKA-EVAL (period 2008-2009) and updated by CNAMTS (period 2008-2011). They yielded the following results:

- A statistically significant improvement in relation to national guidelines for...
 - Eye checks (fundus): Sophia members have a 45% greater chance of getting follow-up care than non-members
 - Electrocardiogram or visit to the cardiologist: Sophia members have a 30% greater chance of getting follow-up care than non-members
 - 3 doses of HbA1c: Sophia members have a 22% greater chance of getting a follow-up than non-members
 - Cholesterol check (or other lipid): Sophia members have a 21% greater chance of getting follow-up care than non-members
- A decrease, over time, in the cost of ambulatory and in-patient care (members versus control group)
- Lower probability of being hospitalised for diabetes or related complications
- Net savings of 80 to 208 euros per year, per member (versus control group)
- Cost savings cover programme investment beyond 3 years of operation

CHALLENGES FOR SOPHIA IN THE COMING YEARS

The CNAMTS has set the following objectives:

1. To reach the same results with final project as those obtained with the pilot project, i.e.: to enable a better understanding of the disease; improve compliance with the check-up regimen; promote healthier lifestyles; register better HbA1C values and blood pressure levels; induce lower costs for the community.
2. To attract more members. The aim is to reach 750,000 diabetic patients in 2017.
3. To develop partnerships with general practitioners.
4. To launch a similar service for asthmatic patients (pilot project in June 2014) and for heart failure (mid 2015).

REDEFINING THE INDUSTRY'S RELATIONSHIP WITH THE PATIENT

Never until now has the motivation for the industry to enter into a direct relationship with the patient been so strong.

Historically, healthcare providers have always catered to their prescribers, health practitioners or organisations, ultimately under the supervision of health authorities and social security systems. None of this has changed, only become more complex, with the acknowledgement of the "patient factor".

The patient is at the heart of therapy compliance and data production, both of which can ensure his/her health, and in parallel contribute to reducing the financial burden on the community. The industry, as a result, pursues two distinct objectives: encouraging compliance with therapy, and giving the patient expert help wherever he/she may be, through data collection, management, analysis, and secure storage and archiving.

Regarding this issue, Yvoine McCourt³ presented a few examples of integrated solutions in healthcare from Air Liquide, all of which demonstrate positive health outcomes, as well as overall cost reduction at state level.

Olivier Croly⁴ further explained the mechanisms of data sharing and how its generalisation should enable patient access to the necessary expertise anywhere in the world, a 3.0 revolution in healthcare and a fundamental benefit to mankind.

³ Yvoine Mc Court is Head of Home Healthcare International Development at Air Liquide

⁴ Olivier Croly is VP and General Manager Europe of GE Healthcare IT

HOME HEALTHCARE SERVICES AND INTEGRATED SOLUTIONS

THE WHY AND THE HOW

Home healthcare service has become an important issue, because chronic disease is a growing burden on healthcare systems around the world. Home healthcare service is a powerful solution to control the rising cost of resources, both technical and human.

It also represents a significant relief to patients and their families, whose lives are considerably altered on a day-to-day basis, sometimes over the course of a lifetime (diabetes type I).

Air Liquide's Home Healthcare entities aims to support the patient's transition from the hospital to the home in a seamless and smooth process, ensuring conditions are in place to avoid further hospitalisations. Air Liquide Healthcare has been in home healthcare service provision for about 20 years, and today it represents about 50% of its healthcare business: over 1 million patients benefit from its home healthcare services.

EXAMPLES OF COPD (CHRONIC OBSTRUCTIVE PULMONARY DISEASE) AND OBSTRUCTIVE SLEEP APNEA

COPD is a perfect example of a chronic disease representing an important burden to patients and healthcare systems, with issues such as compliance, long-term disability, frequent and lengthy hospitalisations, as well as indirect costs.

The disease can be summarised as follows:

Prevalence: 4-10% adults

Hospital admission frequency: 2 per patient per year

30-60 day readmission: 16-20%

Average length of stay: 4.5 - 16 days

Death rate: 41 per 100,000

Other example, issues of compliance can be demonstrated through the CPAP treatment for patients suffering from Obstructive Sleep Apnea. When the patients are placed on CPAP (equipment to support respiratory effort), adherence to the treatment is not guaranteed. In some markets, half the patients can have issues of non-compliance, which means they are not treated effectively. Integrated solutions therefore target maximum adherence and retain compliance as a major criteria.

THE CRITERIA OF INTEGRATED SOLUTIONS

Another important criteria is the reduction of hospitalisation frequency and duration, a factor of high cost to healthcare systems. The solution in this case is, most often, the implementation of disease management programmes, as exemplified by Sophia in France.

Repoca, for example, has been initiated in Spain with the local Air Liquide Home Healthcare representative, Vitalaire. Repoca is a six-month intense clinical and educational programme during which local teams work directly with patients. The results published in 2012 show that, for COPD patients on oxygen therapy, the programme successfully reduced hospitalisation and expenditure by about 80%. There is a cost, of course, to the additional service but it is very low when compared to the tremendous savings on hospitalisation.

With the Valcronic project in Valencia, the various partners in this project (including AIR LIQUIDE Healthcare) intend to demonstrate that by implementing an integrated solution, it can reduce the unplanned hospitalisations- the costliest type of hospitalisation - of COPD patients. Today about 75% of the admissions are unplanned..

Subscribers and payers are, of course, increasingly interested in initiatives of this nature, which are substantially beneficial to the patient as well as to the healthcare system.

WHY THE MOVE TO INTEGRATED SOLUTIONS IS INEVITABLE

Integrated solutions intend to provide better healthcare and economic outcomes, by:

- Increasing compliance levels
- Identifying high-risk patients
- Reducing hospitalisation frequency
- Shortening hospital stays
- Managing severely ill patients
- Improving patient quality of life
- Coordinating care actors.

- THE EXAMPLE OF SLEEP APNOEA -

ON THE GENERAL AND INDIVIDUAL BENEFIT OF INTEGRATED SOLUTIONS

For the last 15 years, Air Liquide Healthcare has been developing programmes in sleep apnoea, using coaching, education, face-to-face information, as well as telephone support, in order to encourage patients to comply with their therapy, essentially by enabling them to understand their illness and their treatment better.

In parallel to human support, it is developing and distributing technical devices that couple with the medical equipment and emit signals on a very regular basis and provide critical data about the patient. This information is collected by Air Liquide Healthcare or can be sent to the doctor or relevant clinical staff. Based on this data, Air Liquide Healthcare adapts the programmes to enhance adherence on case-by-case basis.

The development of integrated solutions therefore means greater proximity to the patient, a much shorter response time, and a larger scope of capabilities in our relationship with the prescriber looking after the patient.

Sleep apnoea impacts on cardio-vascular risks, and non-compliant CPAP (Continuous Positive Airway Pressure) patients face greater risks of cardiovascular events (x4) and car accidents (x 5).

Support programmes to ensure compliance are therefore key to ensure:

- Better health outcomes
- Fewer complications
- Savings on overall medical costs

There is a direct correlation between observance of treatment by CPAP, and overall medical savings, as observed in the table below (French example):



The horizontal axis corresponds to the number of hours of use of the CPAP machine, and the vertical axis to the direct related cost savings. Compliance is therefore as much an economic necessity as a requirement for the patients' health, and integrated solutions such as Home Healthcare address this strategic factor first and foremost.

- THE CASE FOR DATA SHARING -

NATIONAL OR WORLDWIDE ACCESS TO THE BEST MEDICAL EXPERTISE

As Olivier Croly⁵ pointed out, the European healthcare market is undergoing transformational change under the combined forces of:

- Rising consumer demographics and chronic disease
- Governments struggling with growing costs
- Ongoing consolidation, providers driving for scale
- The development of integrated care
- The preference for precision medicine in a context of care standardisation

The only factor capable of helping the western world face these contradictory challenges today is the industrialisation/digitalisation of healthcare. It is therefore no surprise that the rise of the “industrial Internet” has been so strong in healthcare.

This revolution is progressively transforming the industry-patient relationship, in the same way it has revolutionised every other aspect of human development and economics.

The third stage after the industrial revolution and the Internet revolution, the “industrial Internet” revolution can be defined as *machine-based analytics helping human decision-making at every step*, including, and most effectively here, in the field of healthcare. This physics-based revolution involves deep domain expertise, gives preference to automation, and focuses on predictive analytics, notably through algorithms.

This revolution, observed in every area of human activity begins with “intelligent” devices: communication is established between devices, generating “intelligent systems”, with these systems ensuring “intelligent decision making”. The systems are subsequently hard wired to systematically auto-optimize, and their development is fuelled by cost optimisation.

The healthcare industry, which has always been committed to innovation, is waging the same war against cost as every other sector in order to deliver its own products and services to best effect. Since the collection and management of patient data are key factors in this effort, it has naturally transformed the industry’s relationship with the patient.

⁵ Olivier Croly is VP and General Manager Europe of GE Healthcare IT.

DATA IS THE GREATEST SOURCE OF SAVINGS: THE POWER OF 1 (1%)

Taking the example of the United States, it is estimated that connected machines and data could eliminate up to \$150 bn. in waste across industries. If we focus on healthcare exclusively, a mere 1% reduction in system inefficiency would represent approximately \$63 bn. in savings over a period of 15 years. It's all the more inspiring when we know it's not just 1%, but several dozen percentages that are within our reach.

The potential for savings is enormous, with the key enablers being software, new data storage methods, processing architectures and R&D.

Studies conducted in the United States show that connecting machines and data can help address the sources of waste in healthcare⁶, inefficient asset and resource utilisation⁷, variance in clinical decision making, and fragmented patient care as well as:

- Eliminate \$750 bn. of waste across the healthcare system
- Prevent 98,000 medical errors each year to lower costs, reduce doctors' insurance premiums and protect patients
- Avoid 75,000 deaths due to preventable medical errors every year

Applied to Europe, the same analysis would no doubt lead us to the same conclusions.

⁶ IOM Study, *Best Care at Lower Cost*: <http://iom.edu/Reports/2012/Best-Care-at-Lower-Cost-The-Path-to-Continuously-Learning-Health-Care-in-America/Press-Release-MR.aspx>

⁷ IOM Study, *To Err Is Human: Building a Safer Health System*, Institute of Medicine, 1999: <http://www.iom.edu/-/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20%20report%20brief.pdf>

THE IMPACT OF THE INDUSTRIAL INTERNET ON HEALTHCARE ORGANISATIONS

THE INDUSTRIAL INTERNET IS CHARACTERISED BY 3 FACTORS: INTELLIGENT MACHINES, ADVANCED ANALYTICS, AND CONNECTED PEOPLE

Intelligent machines connect the world's devices, sites (healthcare, industrial, leisure facilities, etc.), fleets and networks with advanced sensors, controls and software applications. Advanced analytics combine the power of physics-based analytics, predictive algorithms, automation and deep-domain expertise. Connected people, at work or on the move, support increasingly intelligent design, operations, maintenance and higher quality service and safety.

INTELLIGENT MACHINES PRODUCE POSITIVE OUTCOMES

We can find evidence of positive outcomes in:

- Digital pathology/radiology

Example with propeller imaging: improves imaging in the case of difficult immobilisation (children, seniors) with radial scanning through propellers, extrapolating data to improve algorithm, reducing exam repeat

- Dose reconstruction

Example of iterative reconstruction: ASiR, an application to lower the dose in CT applications

- Patient profiling

Example with PET patient profiling: helps adapt to breathing profile of patient, allows treatment planning with less radiation and optimises treatment planning

- Asset management

Example of smart hanging protocols: use machine learning techniques to provide a simplified process for creating and applying hanging protocols in a radiology workflow

DIGITAL PATHOLOGY ALONE IS A PERFECT EXAMPLE OF THE BENEFITS OF DIGITALISATION

In a context of a declining number of pathologists and an aging population with chronic diseases, digital pathology empowers confident decisions in pathology. First, it enables a better and quicker diagnosis. Next, it unlocks the value of pathology data:

- It establishes information flow between pathology and clinicians
- It integrates pathology data into electronic patient records
- It centralises storage of diagnostic evidence

Finally, digital pathology optimises expertise and the pooling of resources:

- By integrating workloads across locations to facilitate sub-specialisation
- By delivering each case to the right pathologist, regardless of location
- By giving quicker access to sub-specialist consultations

ADVANCED ANALYTICS PRODUCE POSITIVE OUTCOMES

The most commonly referenced areas for positive outcomes are:

- Asset performance
- Dose excellence
- Automated protocols
- Imaging management

CONNECTED PEOPLE PRODUCE POSITIVE OUTCOMES

The most commonly referenced areas for positive outcomes are:

- Collaborative clinician networks
- Intelligent workload management
- Health information

REDEFINING THE INDUSTRY'S RELATIONSHIP WITH ITS CLIENTS

As Miguel Bernabeu⁸ explained, every healthcare system in the Western world is struggling with aging populations. While advances continue to be made in technology, patient expectations are rising and costs are spiralling. The critical task healthcare systems face today, therefore, is to transform care delivery, in support of higher performance at a lower cost.

Today, healthcare systems are trying to address this *catch 22* situation by applying pressure to reduce supplier prices and by developing Health Economic Appraisals (e.g. Australian Femtosecond HE Appraisal). Health systems are therefore progressively moving from activity-based funding models to patient outcome-based funding models.

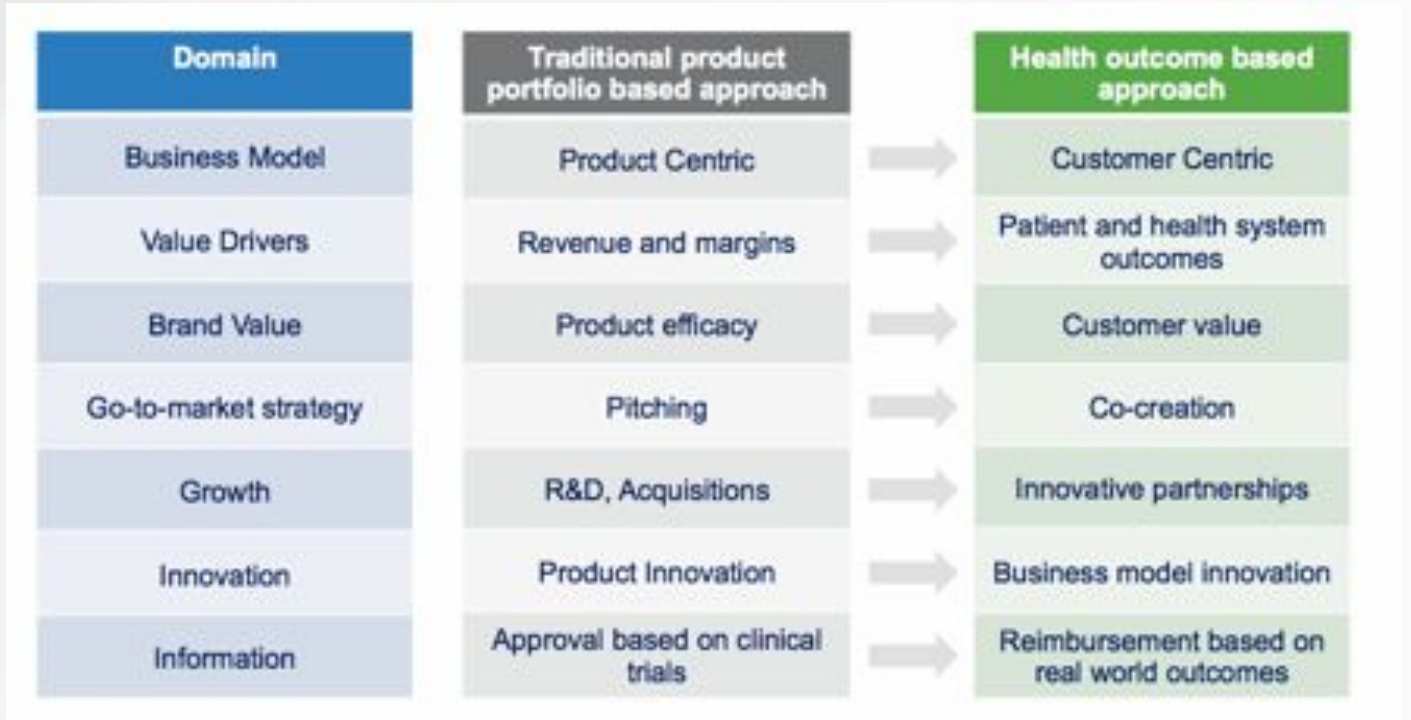
Ophthalmology is a prime example of this phenomenon, as it has undergone significant innovation in recent years (Anti-VEGFs in wAMD) placing a strain on the HC budget and eye clinics. In light of this situation, one major stakeholder in the ophthalmology industry (Alcon) has transformed the go to market. Alcon's market position and wide product portfolio presents new opportunities to strategically partner with healthcare organisations. These strategic partnerships are expected to boost procedural volumes, open up new revenue streams, and strengthen pricing power

⁸ Miguel Bernabeu is Global Head of Market Access, Pricing and HEOR for ALCON Laboratories, Novartis group.

- THE TRANSFORMATION OF THE BUSINESS MODEL -

THE NEW HEALTHCARE ECOSYSTEM WILL IMPACT BUSINESS

The healthcare system's new approach will be outcome based, and will trigger the following transformations in business:



MedTech companies will be seeking new opportunities to differentiate their offering, depending on their degree of maturity or desire to integrate vertically:



- THE EXAMPLE OF ARIADNE -

ALCON'S PROJECT TO ADDRESS THE NEEDS OF HEALTHCARE PROVIDERS IN EUROPE

THE OBJECTIVE

In response to an evolving context, Alcon's new business model is to change from a surgeon-oriented to a healthcare provider-centric approach.

Today the go to market is surgeon-focused, with the result that Alcon can be providing to many surgeons within one hospital or organisation. Development is based on multiple one-to-one commercial relationships, sparked by a transaction at one point in time. The key selling point is the product itself, based on product merits and benefits. Alcon has developed a strong relationship with surgeons, with cross-portfolio selling through EFAs. However there is no cross-selling among business units, and no recurring business guaranteed.

Tomorrow, the approach is to be customer-centric, with healthcare providers (organisations, hospitals) as the main customers. The product offering will therefore be complemented with tailored service offerings, with a broader scope of customer value in mind than that of product superiority alone. This entails a partnership approach with Key Account Management (KAM), which should allow cross-selling throughout different business units and collaboration across products and service lines.

The Ariadne pilot is to identify new opportunities for external collaboration in the rapidly transforming healthcare ecosystem in Europe (UK, Germany, Spain, and Italy), in a 4-step process:

- Internal & external diagnostic
- Opportunity identification, prioritisation & selection of targets
- Elaboration of specific business models
- Definition of an action plan

THE UK EXAMPLE

The country situation in the ophthalmology sector is as follows:

- Cataract DRG has been reduced by 2-3% per annum for last 5 years
- Hospitals are under pressure to reduce costs and improve efficiency
- Alcon premium pricing position is under pressure due to cost containment measures
- Hospitals are competing for services under government policy

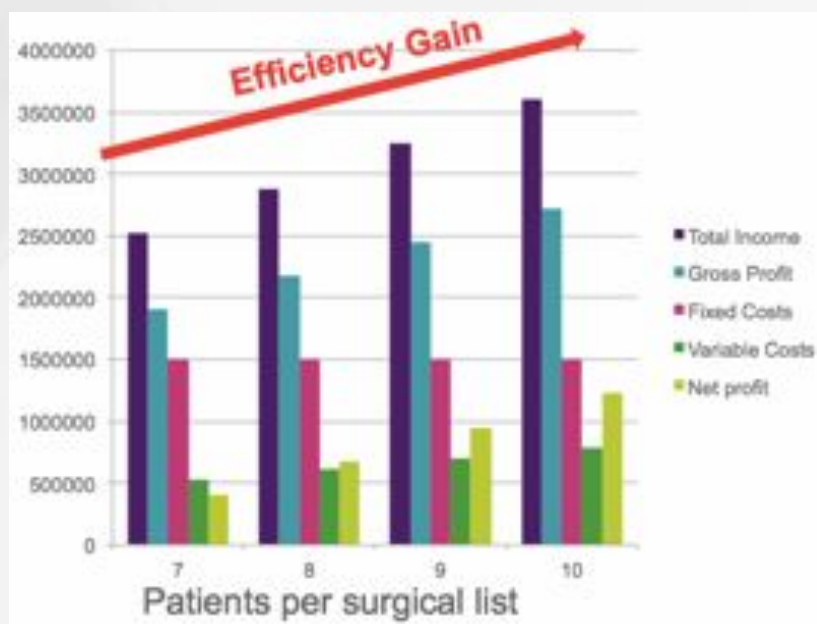
Alcon projects to leverage product dominance by offering additional and chargeable "bolt on" services to improve efficiency. The service offering is a chargeable service, which collects both static and real-time data on the performance of a cataract service in relation to the following criteria:

- Patient flow
- Resource utilisation
- Financial Health
- Patient Experience

The outputs are:

- A detailed service evaluation, including comparative benchmarking versus other services across key data
- A detailed set of recommendations for service improvements and estimated impact
- In collaboration with the client, the development of a remedial plan to address gaps and improve service

Statistics in the UK show that there is potential for efficiency gain, with an existing average of 7 patients per surgical list. There is a significant financial incentive for hospitals to improve efficiency, as an additional patient per list can have dramatic impact on net profit: +67% from only 7 to 8 patients per surgical list:



THE SPANISH EXAMPLE

A wide variety of opportunities with public or private hospitals, autonomous regions, or insurance companies and chains of opticians are in development. These include:

- Disease detection
- Patient flow improvements
- Surgical efficiency improvements
- Equipment optimisation and management
- Managed service agreements

THE EXAMPLE OF ASISA-GENERAL OPTICA-ALCON: A WIN WIN WIN

The Alcon proposition is to:

- Leverage the relationship with health insurance providers to implement patient marketing activities to drive demand for contact lenses within optical chains
- Incorporate a health insurance marketing package into its offering for contact lenses to national opticians chains

The win for the health insurance provider:

Alcon supports the promotion of a unique loyalty scheme to offer a contact lens plan to protect and expand policy holder base

The win for the opticians' chains:

A marketing campaign drives patient demand for their products, with 2 million health insurance policy holders becoming potential customers

The win for Alcon: A strategic relationship with a health insurance provider and an optician's chain, with mid-term opportunities to further develop the relationship into Surgical and Retina.

ENTERING AN ERA OF ACTIVE INDUSTRIAL PARTNERSHIPS

Necessary specialisation and deep-domain expertise are forcing industrial stakeholders to pool their competencies in order to take on multidimensional and complex projects.

More specifically, the question of integrated solutions has become one of digitalisation and communication, and is consequently giving rise to many technological/data management partnerships. Companies such as Air Liquide, Orange or GE are choosing to remain within their core competencies, while continuing to deliver the best quality service to patients and prescribers, with the latest available technologies. To this effect, they are intensifying and generalising their partnerships with each other and others, in a strategy that emphasises their expertise and ensures the best possible use of technology and digital tools.

EXAMPLES OF PARTNERSHIPS

IN THE AREA OF RISK IDENTIFICATION, HOME HEALTHCARE, AND COMPLIANCE

VALCRONIC (SPAIN)

Launched in Valencia, Spain, by Air Liquide, Valcronic is a risk identification programme to reduce hospitalisation. It is a regional programme to stratify chronic patients by risk level and provide appropriate telemonitoring self-management. Today, the programme encompasses 500 patients and 150 practitioners.

GECHRONIC (SPAIN)

Also an Air Liquide initiative, GECHRONIC is a disease management programme from hospital to home. The trial has begun on approximately 500 patients. It is an integrated model of chronic disease management using home-patient monitoring to reduce unplanned hospital re-admissions in multi-morbid high-risk patients.

ORANGE & JANSSEN INITIATIVE FOR MEDICAL COMPLIANCE (FRANCE, IN PROGRESS)

This initiative is based on a system designed to tackle the problem of medical compliance, through:

- A text messaging solution to remind patients to take their treatment
- Absence of cost for the patient

- THE CASE FOR CONNECTED HEALTH CENTERS -

EXAMPLES OF PARTNERSHIPS

THE “REGION SANS FILM” SHARED MEDICAL IMAGING PROJECT (FRANCE)

This GE-Orange partnership and regional project is based on:

- A global solution, as it comprises files, hosting, storage, diagnostic assistance (PACS) and image management (RIS)

It is the only cloud computing based radiology project in France, which has now been operational for almost 5 years.

38 hospitals have hooked onto the system in order to share images. At the latest count: 4.7 million exams are stored on the system.

They are accessible to all the connected hospitals, which may therefore share information. Once the information is extracted from the hospital, it is readily available for anyone to use it. The patient's GP has access to a portal where a summary of the medical exam and other information is available.

- Online hosting of certified personal health data: in 2010, Orange Business Services became the first telecommunications operator in France to be certified to host personal health information.

In France, the industry benefits from a law stating that to host personal medical data, one must apply for a specific authorisation from the government. Usually pre-authorisations and red tape are a hindrance to market development, but in this case, it is a fundamental protection, as it ensures privacy and preserves the medical confidentiality.

THE ANDRAL™ TELE-HEMATOLOGY PROJECT (FRANCE)

This Orange project is dedicated to blood pathology, combining anatomo-cyto pathology and haematology.

Launched in October 2012, ANDRAL is the first operational platform for laboratory tele-expertise in France. It functions as a network enabling laboratories to submit requests for opinions on a real-time basis.

THE SMARTVIEW™ PROJECT FOR CARDIOLOGY (FRANCE)

A home hospitalisation and patient follow-up system, SMARTVIEW™ is a product/service from Orange and the SORIN GROUP dedicated to cardiac patients. Thousands of patients today are equipped with Sorin equipment.

It is, in fact, a *connected pacemaker*, featuring:

- An end-to-end managed remote monitoring solution
- Electronic data transmission management from the device to the doctors in charge



The device is not connected to a mobile or GSM (Global System for Mobile Communications) network. The implant is entirely autonomous. The objective of the network is to receive information daily from the implant and store it. It can be sent, if necessary, to the physician in charge. Rhythmology and cardiac remote management are growing fields in France.

Orange takes responsibility not only for the conductivity, but for the architecture of the system, based on a small box, a home monitor, which sits by the bedside to retrieve information from the implant.

In this, as in other connected health centre projects, it is not just a question of connectivity but of capturing and retrieving information, managing the device(s), hosting the information and translating it into a viable form.

THE MY HEALTH LINE™ PROJECT (CAMEROON)

Orange and the Cameroon Minister of Health have just launched the country's first health hotline.

A straightforward solution to the lack of medical services locally, making use of the country's good GSM infrastructure to reach individuals via their mobile phones, *My Health Line* is:

- A text messaging solution to answer any citizen's health questions
- An answer sent by a health professional within one hour
- A reduced cost for the patient/customer

The "hard-to-reach" corners of the country now have a quick answer to their medical problems, thanks to a solution provided by technology.

THE INDUSTRY'S PLEA TO GOVERNMENTS AND PUBLIC HEALTH DECISION MAKERS: MAKE PROFESSIONALISED DATA MANAGEMENT POSSIBLE

It is a well-known fact in the world of healthcare that the quantity of medical information collected on the planet doubles every nine months. While the worldwide population is growing at a comparatively slow rate, the explosion of information relative to these individuals is following an exponential curve. Thierry Zylberberg⁹ made the case that the future of healthcare systems lies first and foremost in the efficient management of this data.

⁹ Thierry Zylberberg is Executive Vice President of the Orange Group and General Manager of Orange Healthcare.

DATA IS AT THE HEART OF MEDECINE

It has always been the case, but information, today, is increasingly digitalised. The evolution has been surprisingly slow nonetheless and a significant part of the medical information produced is still circulating from professional to professional in a manual or physical form. Professionals' communication may have switched from letters to emails for the most part but there haven't been many efforts to develop collaborative tools. Furthermore, a survey of this data reveals that the process and management of medical data is not yet organised globally in any way.

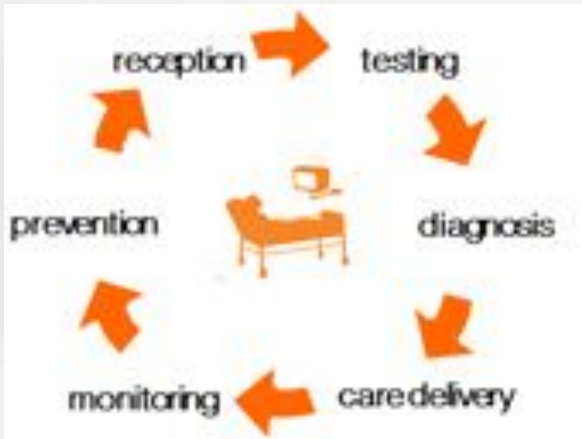
This discrepancy is already strongly regrettable at the level of an individual patient having to collect, centralise and safeguard his/her own information. It's an even greater waste on the level of global organisation. Data is not only useful locally. It's also an exceptional management tool: it's a way of measuring outcomes, the efficiency of treatments and of public policies, and steering investments and research for the future.

Yes, it is possible to find "islands" of managed data today, but there is no systematic global management of data, as we speak, at a regional level or even local level. If we take the example of France, even at the level of a single hospital, it is still very difficult to obtain a condensed catalogue of any medical issue. Each department has its own nomenclatures, parameters, and method of analysing and organising data. As a result, efficient healthcare today can be summed up in one sentence: efficient data management.

Today, there is no available infrastructure for data management because the data is organised as in an archipelago: it's an island here and island there, and never interconnected. The mission of Orange Healthcare, a telecom and IT company, is to connect these various dots: to transfer information from point A to point B, and maybe store it in between. Orange is not planning to enter new markets or provide competencies other than those of its core business. That is the reason for its multiple partnerships in healthcare: with GE, with Air Liquide, and with others.

THE FORMS OF COMMUNICATION AND THE DATA COLLECTED

In healthcare, information generally follows a circular, iterative pathway:



Data is therefore as much a management tool (to measure, analyse, manage quality and security) as it is a clinical tool (to coordinate, manage the care journey, share patient information data, etc.). Efficient healthcare requires data management and interconnectivity: the healthcare eco-system will therefore become increasingly dependent on partners such as Orange, integrators and providers of end-to-end solutions.

Orange, for example, provides medical data suppliers the following services:

- collection
- transfer
- hosting
- restitution
- analysis (BI, big data)

It therefore acts to bridge the gap between HCP, modalities and patients, and medical software and devices.

Information can be delivered between professionals within a professional environment, from a patient to a professional (remote healthcare monitoring services of an individual patient on a one-to-one basis) or directly to the patient (preventive services).

CHALLENGES AND OPPORTUNITIES FOR THE INDUSTRY TODAY

Below we list four critical or *key success factors* that have been identified by the healthcare industry today. These factors pose challenges but also represent wide-ranging opportunities for the future of the industry.

1/ INTEROPERABILITY AND SCALABILITY

The common concern of all healthcare professionals today, and therefore of their service providers, is the question of information and data management, as discussed earlier.

Ensuring data production, circulation, and storage means ensuring connectivity between devices and databases. At the core of the project of *intelligent objects and systems* is the question of the information flow; it must be seamless, robust, permanent and secure.

It is a technical challenge, but also an opportunity to unleash the potential value of partnerships in applied sciences and technical development. The possibilities are endless; the motivation is there, and the first projects in place in Europe are encouraging.

Today, these initiatives are spontaneously pulling together complementary expertise, with a view to alleviating the burden of an aging population on society and the prevalence of chronic disease, as well as to lighten the burden of the illness upon the patient.

The current projects are nonetheless too limited in breadth and depth to draw conclusions for the future. There remains the fundamental question of scalability: can these projects and interconnectivity grow, from local to regional, national and global scales without losing in efficiency, quality and security?

2/ DATA OVERFLOW FOR HEALTH PROFESSIONALS

With the production of data growing exponentially, it will become harder than ever for health professionals to work in confidence, to find the right information at the right moment, and share it with discernment and accuracy. The risk of confusion is great, all the greater when the existing information silos start interconnecting and sharing information, which is the logical, practical and inevitable evolution of information systems, in whichever field they may operate.

For the time being, the approach is bottom-up, context-generated, emerging from localised projects and information silos, but the need for a top-down approach to health data management, at a national or international level, is clearly emerging as a necessity. The stakeholders of healthcare systems in Europe are united in their plea to public decision makers and governments: create an information supra-structure, define the infrastructure and protocols, and invest in data management tools.

This *please help us help you* message is one of confidence in the future, in the necessary, but seemingly impossible equation: cost-cutting while upgrading quality.

3/ REIMBURSEMENTS AND REGULATIONS

This issue relates directly to the business model of healthcare providers, forever inextricably linked to the solvability of healthcare systems and to the level of government involvement in the modernisation of processes. For any fundamental transformations to take place, a financial architecture and regulatory backdrop must be devised that will give a strong incentive for change for all the stakeholders from the patient, to the healthcare provider, to any third parties involved. This is a complex machinery that has to be regularly oiled, and sometimes drastically transformed in a wilful manner: free market mechanisms cannot apply here.

4/ THE BOOM OF CONNECTED *MEDICAL DEVICES*

In this paper we have studied the devices that are a part of integrated services in patient pathways and delivered or serviced by healthcare providers. We should not ignore the ones that are being actively developed and commercialised by private tech companies on a pure B2C basis, and sold to perfectly healthy individuals. From connected wristbands and T-shirts to heart, diet or sleep monitors and intelligent toothbrushes, the amount of data generated is exploding.

The risk is to progressively confuse what could be considered personal data with proper medical data, and confusing patient care protocols with gadgets for a healthier lifestyle. Obviously, the same rules for security and storage should not apply.

Connecting these mass-market devices is probably the next stage of development, wherein the frontier with true medical devices will have to be either reinstated, or on the contrary, erased, with great care for the questions of robustness, security, privacy, and storage.

CONCLUSIONS

Unravelling the questions raised by data management...

The unanimous conclusion of the speakers concerning the future of medicine was the only too familiar issue of data management. If measuring outcomes is the new diktat of the market, then the unavoidable questions once again rise to the surface:

- Exactly which data outcomes are we looking to monitor? Which data is actually statistically relevant?
- Are governments and public decision makers going to act and make rational choices based upon this data (or only look for a short-term, cost-cutting bonanza)?
- Exactly by what means should the industry attempt to collect this data?
- How are the industry and healthcare systems to ensure privacy or data protection?
- Should healthcare systems give precedence to efficiency (and therefore data sharing) or to privacy (and therefore data protection)?
- Can this personal medical data, collected by the public sector, be sold to the private sector, or shared for R&D purposes?
- If so, in which specific contexts? At under what conditions?
- Should patients who are voluntarily non-compliant be given the benefit of public health services, when the cost is so high?
- Should the payer, and ultimately the community, pay for a service or a product, which is ultimately not even used?
- In the opt-in/opt-out dilemma, should the patients who refuse to have their data collected pay the subsequent cost?

Strong control by a legitimate third party

European governments now all believe in open data. The essential problem individuals have with data collection anywhere in the world is one of trust. If data is to be collected by a private company, the suspicion that this data will be sold for a profit at some point is impossible to dismiss. Therefore, any data collection in the future will have to entail strong control by a third party bearing the trust of the general public.

Data management, a cultural question?

The more we speak of globalisation, the more cultural questions come to the fore. The example of New Zealanders who fully accept the automatic disclosure of their personal medical history with a view to facilitating treatment, tracked with the help of their social security number alone, calls for reflection.

An ethical question as much as it is one of policy making, open data presents some strong advantages in emergency situations, but calls for strong government control to deter profit seekers and enforce ethical behaviour. However, as every culture has a different definition of ethics, the debate on data collection and security is not going to be solved on a global level for some time to come.

Future discussions

The industry agrees that future discussions should address these questions:

- What will the medicine of the future look like?
- What use should we make of all the data collected?
- What type of joint initiatives could be put in place?
- What kind of outcomes do we want to measure?
- What will be the new boundaries between public and private approaches?
- Who might the new stakeholders be?
- What could the next new business model be for healthcare industries?

The above questions will be discussed at our next event in 2015. You are welcome to join us!



Learn



Debate



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