DELIVERABLE

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Project Title: Establishing the value and business model for sustainable eHealth services in Europe

D3.1 Adoption challenges and success strategies: Preparing for a draft adoption and incentives roadmap

(Old name: D3.1 “Incentivisation strategies” - retitled, with the agreement of the consortium)

Authors:

Charly Bunar  
Veli Stroetmann  
Diane Whitehouse  
Natalie Wong

empirica  
empirica  
EHTEL  
empirica

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Dissemination Level

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## Revision history, status, statement of originality

### Revision history

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Abstract
In this document, the landscape of adoption barriers and success strategies for implementation of interoperable eHealth services is reviewed.

A VeH multi-stakeholder value chain and a reference business use case have been developed by the project consortium. Based on an extensive literature review, stakeholder engagement and the results of a business modelling workshop, this deliverable places these two items in their organisational context. It therefore describes the development of a European Interoperability Framework into a Refined eHealth European Interoperability Framework, and the state-of-the-art on interoperability in a set of European Competitiveness and Innovation Programme eHealth projects. Given the current rapid progress of the legal/regulatory field of eHealth interoperability, the deliverable currently places less emphasis on these issues than it does on organisational matters.

Rather, the deliverable shows that integrated governance models, integrated payment schemes, procurement as a strategic enabler, and change in both organisational culture and front-line staff behaviour through leadership are among the most essential elements for the successful adoption of interoperable solutions in the healthcare domain. It also identifies a number of barriers to adoption and incentivisation.

With these findings in mind, the deliverable concludes with an outlook of the next tasks to be elaborated in D3.2. D3.2 will aim at reviewing the multi-stakeholder value chain, evaluating integrated governance and payment schemes in practice, and validating these with the help of a range of expert interviews which will provide the baseline for a checklist and roadmap to the adoption of interoperable eHealth solutions.

Keywords
Connecting Europe Facility, financial management, governance, incentivisation, integration, interoperability, legal, payment schemes, policy, procurement, regulatory, reimbursement.

Statement of originality
This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.
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<td>CEF</td>
<td>Connecting Europe Facility</td>
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<tr>
<td>DG SANTE</td>
<td>Directorate General for Health and Food Safety</td>
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<td>DSI</td>
<td>Digital Service Infrastructure</td>
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<td>EC</td>
<td>European Commission</td>
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<td>eCCIS</td>
<td>eCare Client Impact Survey</td>
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<td>EFTA</td>
<td>European Free Trade Association</td>
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<td>eHDSI</td>
<td>eHealth Digital Service Infrastructure</td>
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<td>eHGI</td>
<td>eHealth Governance Initiative</td>
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<td>eHN</td>
<td>eHealth Network</td>
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<td>EIP on AHA</td>
<td>European Innovation Partnership on Active and Healthy Ageing</td>
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<td>ERN</td>
<td>European Reference Network</td>
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<td>GDHI</td>
<td>Global Diffusion of Healthcare Innovation</td>
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<td>GP</td>
<td>General Practitioner</td>
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<td>HCP</td>
<td>Healthcare Provider</td>
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<td>HITECH Act</td>
<td>Health Information Technology for Economic and Clinical Health Act</td>
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<td>HTA</td>
<td>Health Technology Assessment</td>
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<td>ICT</td>
<td>Information and communication technology</td>
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<td>IHE</td>
<td>Integrating the Healthcare Enterprise</td>
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<td>IT</td>
<td>Information technology</td>
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<td>JASeHN</td>
<td>Joint Action Supporting the eHealth Network</td>
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<td>JIC</td>
<td>Joint Initiative Council</td>
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<td>KPI</td>
<td>Key Performance Indicator</td>
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<td>MSP</td>
<td>Multi-Stakeholder Platform</td>
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<td>NCP</td>
<td>National Contact Point</td>
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<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>OMB</td>
<td>Operational Management Board</td>
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<tr>
<td>PDCA</td>
<td>Plan-Do-Check-Act</td>
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<tr>
<td>PHS</td>
<td>Personal Health System</td>
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<tr>
<td>SDO</td>
<td>Standards Development Organisation</td>
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<td>SHN</td>
<td>SemanticHealthNet</td>
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<td>SLA</td>
<td>Service Level Agreement</td>
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<td>VeH</td>
<td>VALUeHEALTH</td>
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<td>WHO</td>
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Executive Summary

VALUeHEALTH (VeH) is establishing how interoperable eHealth services can create, deliver, and capture value for all stakeholders, to justify a sustainable market when scaling up cross-border interoperable services through the Connecting Europe Facility (CEF) after 2020. The consortium is developing an evidence-based business plan for sustainable eHealth solutions, complemented by revenue streams for developing and operating self-funding high-priority pan-European eHealth Services beyond 2020.

The task of WP3 is to identify adoption challenges, success strategies and sustainable incentive schemes, and to draft an adoption roadmap including scale-up strategies.

Through extensive desk research, Deliverable 3.1 (D3.1) has surveyed the landscape of adoption challenges and success strategies. This in-depth initial work has contributed to better position the work of WP3 in preparing the upcoming VeH consultation and validation phases, an eventual VeH roadmap, and aligning WP3’s work with that of other related work packages.

Five key observations already emerge from the work of D3.1. They relate to:

- The Refined eHealth European Interoperability Framework,
- The need for integrated governance and integrated payment,
- A typology of financial and non-financial incentives,
- Procurement as a means to boost adoption of interoperable solutions, and
- Care process interoperability and organisational cultures.

First, the Refined eHealth European Interoperability Framework (ReEIF) is the proposed framework which will be used by the European Commission (EC) and Member States (MSs) as a guideline for current and upcoming projects that intend to create and employ interoperable solutions. Adopted by the Joint Action to Support the eHealth Network (JASeHN) and approved by the eHealth Network (eHN), it provides a granular view on interoperability. From top to bottom, the first three layers of interoperability are legal and regulatory interoperability, policy interoperability, and care process interoperability (the latter two were previously merged under organisational interoperability).

Second, this classification of the framework into the two distinct sets of interoperability enables the eventual solutions to be implemented in more specific ways. Governance in an interoperable setting can be associated with regulatory and legal interoperability, while policy interoperability emphasise contracts, agreements, and payment schemes that need to be resolved to arrive at a functioning interoperable solution.

Third, European projects and academic research are increasingly looking beyond the technical and process related aspects of interoperable solutions and are instead focusing on cost-benefit analyses as well as the impact (un)coordinated payment schemes can have on front-line staff behaviour. A typology is presented for financial and non-financial respectively as a means to introduce unambiguous wording that will help frame and guide the discussions in VeH and beyond.
Fourth, eHealth investments can be understood as strategic change management projects. Guidelines and profiles should be developed and include clear guidance to procurers. **Commercial clarity on the use of standards** is necessary, especially when procurement is devolved to a local level and is undertaken by non-technical partners such as general practitioners who have neither the time nor inclination to learn ‘standards speak’. From their perspective, the requirement development process is one means by which procurers can exert influence on the supply chain, can match the influence of suppliers and thus achieve a balanced procurement. Support can also be achieved by embedding procurement for interoperable solutions in a wider eHealth strategy.

Fifth, European projects such as CareWell¹ have successfully employed a systematic stakeholder assessment methodology and developed a value model for each stakeholder. The advantage of this approach is to identify the variety of stakeholders that are involved and what tangible and intangible benefits and impacts they may experience from a change in their workflow and organisational setup. Experience from this and other projects indicates that **cooperation, communication, and leadership** are essential to create buy-in from frontline staff in order to change behaviours.

With these findings in mind and with the support of the VeH multi-stakeholder value chain, WP3 will continue to evaluate integrated governance and payment schemes as well as validate these with the help of experts from the field. It is envisaged that an incentivisation workshop and/or interviews will be conducted to generate empirical insights. This output will be used to develop an actionable and time-bound roadmap in Deliverable D3.2 that will help the EC, the MSs, the eHN and the CEF to spur on the development of an eHealth Digital Service Infrastructure (eHDSI) until and beyond 2020.

¹ [http://carewell-project.eu/home.html](http://carewell-project.eu/home.html)
1 Introduction

VALuEHEALTH (VeH) is working on how eHealth interoperability can create, deliver, and capture value for all stakeholders. The project’s intention is to identify and generate business models that create value and contribute to an eHealth Digital Service Infrastructure that is sustained beyond 2020. After having prioritised two use cases in work packages (WP) 1 and 2, a reference business use case – based on diabetes – was developed that cuts across the identified domains of Safe Prescribing and Integrated Care. WP3’s objective is to review the Refined eHealth European Interoperability Framework, the state-of-the-art of interoperability in European projects, and to condense adoption challenges and success strategies that can be addressed to increase the uptake of interoperable solutions in eHealth.

This deliverable functions at a general level of assessment of adoption challenges, success strategies and incentivisation schemes. It does not drill down to the fine-tuned level of examination of the specific VeH reference business use case or the prioritised use case.

1.1 Strategic context

It is important to bear in mind the current general health policy background. Considering these critical social, economic, demographic and mobility trends helps to situate today’s preoccupations with growing potentials for synergies among nations and the interoperability of health systems.

The European Commission (EC) has highlighted health as one of its main priorities in the current programming period. The eHealth domain was emphasised in the Europe 2020 programme and in the eHealth Action Plan 2012-2020 which describes a strategy to move eHealth forward. One reason for this emphasis is that Europe is predicted to become an ageing society, which will create a number of challenges and opportunities. In fact, the impact of this potential demographic change is so strong that the EC has explored the notion of a Silver Economy indicating the societal impact that the imbalance of people both inside and outside the workforce will pose for the market. Simultaneously, this demographic challenge of an ageing society is not confined to Europe but also applies to North America and East Asia. Hence, the literature review and analysis conducted in WP3 takes an international perspective.

The recent – indeed, on-going – economic crisis has influenced national healthcare sectors significantly in terms of public expenditure. Countries are responding to this crisis in different ways. The main message emerging from these trends is that health actors will need to strive for efficiency rates by doing more with less. The introduction of information and

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2 For more details, see section 4 on the interoperability of eHealth.
5 Current and upcoming migration and settlement patterns may alter these demographic trends so that European society, at least in certain Member States, might become more youthful.
communication technology (ICT) in a meaningful way that modifies organisational structures, designs and workflows is considered to be part of the solution to these straitened economic conditions in the health and social care sectors.

There are many use cases that can be thought of as being relevant to the healthcare community. Not all use cases are, however, of equal importance to everyone: this is because not all actors share the same goals or needs, and they may face a range of individual and institutional barriers that hinder their buy-in. As a result, there is a variety of ways to incentivise the diverse actors. Their type and selection of these incentives is to some extent related to whether the healthcare provision envisaged is public sector, private sector or based on a mixed model, and whether it is organised through a national health system (Beveridge-style\(^9\)) or an insurance-based system service (Bismarckian-style\(^{10}\)).

The Health in All Policies report by the World Health Organization (2013) acknowledged this diverse context and drew from it a number of applicable conclusions. The main emphasis of the report lies on building trust and consensus on goals. It points out that the terms and concepts used by the involved actors differ based on their viewpoints. Hence, it is advisable that governance bodies are included within and across organisations for all the policies to be considered. As a result, the policies selected will attain their full intended impact. The governance model proposed by the eHealth Network (eHN)\(^{11}\) ensures this to the extent that it brings together decision-makers and experts in different fora such as the eHN itself, the Joint Action to Support the eHealth Network (JASeHN), and the Operational Management Board (OMB).

### 1.2 Aims and scope of the document

This deliverable looks into existing lessons learned and evaluates incentivisation schemes that can be employed to bring stakeholders together for a common cause. Its aim is to assess the benefit of initiatives that change currently used health IT products and services, as well as healthcare service as a whole, and to distil strategic approaches that are common to successful eHealth implementations.

The focus in this document is on policy, process and organisationally-related aspects of interoperability. A strong underlying assumption is that, to turn initiatives for change into credible, broadly endorsed, and financially sustainable endeavours, approaches need to be considered that win hearts as well as persuade minds\(^{12}\).

The methodology used in this deliverable applies desk research and complements its findings with output from VeH-organised workshops. The desk research comprises policy documents, project documentation, and literature from both academia and practice in relation to change management and incentivisation of organisational interoperability. The workshops invited stakeholders from various disciplines to provide input to and validate content on stakeholder engagement, business modelling, and incentivisation. The output generated from these workshops has been used by the different VeH WPs to suit their designated perspectives and focus.


\(^{10}\) [http://www.pnhp.org/single_payer_resources/health_care_systems_four_basic_models.php](http://www.pnhp.org/single_payer_resources/health_care_systems_four_basic_models.php)

\(^{11}\) [http://ec.europa.eu/health/ehealth/docs/ev_20151123_co02_en.pdf](http://ec.europa.eu/health/ehealth/docs/ev_20151123_co02_en.pdf)

\(^{12}\) [https://hbr.org/2015/05/focus-on-winning-either-hearts-or-minds](https://hbr.org/2015/05/focus-on-winning-either-hearts-or-minds)
While the aim of this deliverable is specific, the resources used to elaborate its work are purposefully broad and multidisciplinary. The intention is to consider perspectives from several different viewpoints so as to remain open to the challenges and solutions from practice in Europe and beyond and to reflect the broad multi-stakeholder perspective of eHealth.

By mapping these wide-ranging activities onto the Business Model Canvas, WP3 is mainly concerned with customer segments, customer relationships and channels that could be used from the perspective of the EC and the Connecting Europe Facility (CEF) (see Figure 1). An emphasis is, in other words, put on the aspect of value delivery of eHealth interoperability.

![Figure 1. Mapping WP3 onto the Business Model Canvas](image)

1.3 Structure of the document

Following this introduction, chapter two of this document provides a more thorough description of the methodology employed during the analytical work of WP3. Chapter two briefly explains the different techniques and sources that have been used to contribute to the deliverable’s consolidated findings. Chapters three and four of this document provide the core of the work conducted so far by WP3. The multi-stakeholder value chain, VeH reference use case, and a typology of incentives are explained in chapter three. In chapter four, interoperability is reviewed from the perspectives of barriers and frameworks, evidence from pilot projects, and change management aspects. The specific challenges and strategic responses resulting from this review are condensed and addressed in the subsequent chapter five. Deliverable 3.1 closes with an indication of the next steps in the context by which WP3 aims to validate and enhance these findings. It will do so through the use of workshops and expert interviews dedicated to the incentivisation of organisational interoperability. This output will serve as a means to draw an actionable roadmap until 2020 and beyond for the EC, the post-Connecting Europe Facility (CEF) situation and the Member States (MSs).
2 Methodology

The methodology underpinning D3.1 comprised desk research and two workshops, one on stakeholder engagement and another on business modelling. This approach provided the foundation for elaborating theoretical models and deriving consolidated observations from both theory and practice. The desk research included literature from academia and non-governmental organisations (NGOs) as well as research and policy documents. The workshops invited at least four types of stakeholders – which VeH calls tiers – including eHealth experts such as policy makers and health insurers, industry and SDO representatives, healthcare professionals and patient representatives. The mix of methods ensured an early validation of results could be undertaken by involving practitioners and their experiences in particular projects. These two sorts of approach were also conducted in parallel, which means that desk research preceded, accompanied and followed each workshop, thus enabling the WP3 team to continuously reflect on the challenges addressed in this deliverable.

2.1 Desk research

Policy and strategic documents from the EC, the eHN, the eHealth Governance Initiative (eHGI) and individual MSs, a reference case underlying the whole of VeH, and all kinds of benefits cited as experienced by the domain’s stakeholders, were all subjected to desk research. The literature review was further elaborated in light of findings gathered from the two workshops that took place during the writing of this deliverable. Additionally, the outcomes of eHealth pilot projects and demonstrator sites, including their lessons learnt on applying and managing change, were also investigated.

2.2 Workshops

Two workshops acted as the basis for some limited expert- and practitioner-related investigation of adoption challenges and incentivisation strategies. The principal findings of both workshops are outlined below. Further details, however, are provided in annexes I and II.

2.2.1 Stakeholder engagement workshop

The first stakeholder engagement workshop that was organised by VeH took place on 23rd September, 2015 at the Airport Meeting Centre in Brussels, Belgium. Twenty-five participants came together to be briefed on the vision of VeH and to discuss use case prioritisation, stakeholder engagement, and barriers and corresponding benefits and incentivisation schemes from the perspectives of each stakeholder tier. The latter was done in two parallel breakout sessions.

Session one was joined by seven participants. The use cases that were looked at are about supporting transformational change, with the patient at the centre of the process rather than the traditional interchange of data between silos. The potential barriers of adoption of the use cases identified and discussed by the group were difficulties with liability, confidentiality and ethics.
In terms of benefits, it seems that the prime beneficiary in each case is the citizen. However, the actual benefits derived may be societal and also not just financial. Similarly, the incentives used may be linked to professional standards and, again, not be uniquely financial. For example, unifying the patient summary strengthens standards and ease of adoption. It avoids having to develop customised or proprietary solutions for different European nations or regions (this can be seen as an incentive for industry stakeholders who may not want to have to manage several releases of any technological solution).

Session two was joined by a breakout group of six participants. The main conclusion of this session was that the perception of net value generated by a use case depends on the stakeholder type. For example, whereas Tier I and Tier II institutions (see Figure 2 in chapter 2 of this document) may value economic gains, Tier III and Tier IV individuals may strive for more care-related values.

Indeed, the tensions between care-related and economic values emerged at several points during this workshop. For example, public health was considered by the session attendees as a public good. It was perceived that, a societal shift had occurred during the 20th century from the “responsible citizen” to the “individual consumer” which has given rise to public scepticism and abstention from activities such as having vaccinations and giving blood donations. Reviving individuals’ consciousness of the general public (“public health”) and its needs was therefore seen as an important value-based pillar of activity.

In fact, it was observed that individuals or patients are often prepared to contribute to the production of value when they do it for their own health\(^{13}\). The view popular in this workshop session was that what now needs to be addressed is to encourage patients and healthcare professionals to understand that it is alright to produce value for industry, i.e. that there is an aggregated economic gain to countries when the companies based in them are productive and, as a consequence, pay company taxes and being more likely to further invest in innovation and thus enriching the market. In this sense, there is a parallel with the focus of EC eHealth policy directions that not only emphasise growth and improvement in health but also in terms of the industrial partners supporting health and social care\(^ {14}\). As a pun, it was noted that eHealth can stand for both “electronic health” and “economic health” in which individuals gain generally "more health" while still on an economic basis\(^{15}\).

Various suggestions on different types of incentives related to digital health interoperability, operating at various organisational or individual levels, were made in the second workshop session. At a societal level, one was to earmark specific types of taxes e.g., corporate taxes from the pharmaceutical sector, and to use these for domain-specific investments such as improved healthcare infrastructure. A second, at an individual level, was that citizens/patients could be offered tax incentives to become data-enterers (or enterers of their own data, including health data) (i.e., as a part of “the sharing economy”\(^ {16}\)). A third related to encouraging and sustaining take-up, when it could be important to improve the use of


technologies based on user-centred design and characterised by ease-of-use and gamification. A summary of the findings is presented in Table 1.

**Table 1. Stakeholder engagement workshop findings**

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production of value</td>
<td>Integrated governance and integrated payments, incl. corporate taxes and individual incentives</td>
</tr>
<tr>
<td>Ethics</td>
<td>Professionalism</td>
</tr>
<tr>
<td>Confidentiality and liability</td>
<td>Regulatory guidance and legal protection</td>
</tr>
<tr>
<td>Usability and Interoperability</td>
<td>User-centred design, ease-of-use, gamification, and technical standards</td>
</tr>
<tr>
<td></td>
<td><strong>Contrasting opinions expressed between the three fields of economic health, the individual’s health, and public health</strong></td>
</tr>
</tbody>
</table>

**2.2.2 Business modelling workshop**

The first business modelling task force workshop that was held by VeH took place on 12\textsuperscript{th} and 13\textsuperscript{th} January, 2016 at the EHTEL Offices in Brussels, Belgium. Once again, 25 participants came together to be briefed on the vision of VeH. They also designed and validated a multi-stakeholder value chain, customised value propositions, built a VeH business model, and proposed suggestions for sustainability strategies and multi-stakeholder engagement. There was, however, a different combination of participants from those who had been present at the 23\textsuperscript{rd} September 2015 workshop.

The workshop’s focus was primarily on brainstorming and on business models. Discussions focused on the three use cases of safe prescribing, integrated care for diabetes, and European Reference Network(s) (ERNs). All breakout session participants were performed their tasks during the course of a day-and-a-half.

The workshop outcomes were assessed by the WP3 team for their relevance to incentives and incentivisation. This was not, however, a straightforward task, since the workshop itself was not concentrated on this topic and incentives were covered only indirectly. Generally, the mention of words starting with the stem ‘incent...’ was rare. Therefore, a more encompassing form of word analysis was used. Analogies to ‘incentive’ were sought.

Hence, two sorts of indirect mentions of incentives have been considered: first, use of words with similar meanings to ‘incentive’ e.g., motivation; encouragement and, more explicitly from a monetary perspective, payment; and, second, less explicit discussions of the topic as a whole. For example, the topics of value propositions, customer relationships, and revenue streams, representing some segments within the Business Model Canvas mentioned in Section 1.2, may all have relevance for the challenge of identifying appropriate incentives. Similarly, incentives can be seen to be covered by the question posed to workshop attendees when they were asked (in breakout session 3) to identify answers to the question of “what’s it in it for me” in terms of clinical, economic, patient-centred (‘humanistic’) and societal benefits.
Where there are commonalities in comments on incentivisation-related issues, they appear to be around the types of stakeholders involved; the potential for value propositions; possible customer relationships (especially if broad models, such as a commons-based approach\textsuperscript{17}, are to be used); and revenue streams like membership fees or subscriptions; regulation, certification or licensing (see Table 2 for a summary of findings from this workshop).

The workshop concluded with a series of proposed next steps to determine the degree of similarities between the use cases, which resulted in the selection of a single reference case.

Three other proposals were made. First, it was proposed to explore briefly what a (single) scheme or approach to incentivisation might hypothetically be; second, to examine incentivisation schemes for the most dissimilar use cases; third, to explore in detail the materials on benefits (i.e., “what’s in it for me”) to assess where there are outliers in terms of stakeholders. For example, are some stakeholders specific to only one use case? Is there weak evidence for benefits in some cases, such as the software industry under safe prescribing?

\textbf{Table 2. Business modelling workshop findings}

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Funder</th>
<th>Provider</th>
<th>User</th>
<th>Beneficiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivotal question: What’s in it for me?</td>
<td>An effective incentivisation (i.e. intrinsic motivation, encouragement, payment) depends on customer relationships and revenue streams (e.g. regulation, membership fees, certification, licensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient-centred (‘humanistic’)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{17} https://eu.boell.org/sites/default/files/a-commons-approach-to-european-knowledge-policy.pdf
3 Setting the scene

This chapter explores in a succinct way four basic factors that need to be understood in relation to the work of WP3. They are the multi-stakeholder value chain and the VeH-selected reference business use case, as well as the CEF and its national contact points, and the use of a stakeholder-related platform. Understanding these four items helps, first, to capture the complexity of the multiple stakeholders involved in the VeH value chain and, second to grasp the reasons why the project has decided to concentrate on a single example of a proposal for eHealth-related interoperability in Europe, i.e. spreading financial risk on different stakeholders.

3.1 Multi-stakeholder value chain

For eHealth initiatives to flourish, VeH proposes that stakeholders need to be identified early on in any value-related initiative and that they are involved in a decision-making capacity in the conception, design and adoption phases of change initiatives. This approach will ensure a greater consensus on and credibility of overarching goals, a mutual understanding of individual views, and the development of a relationship that is built on trust and co-operation. Thus, VeH advises the formulation of a multi-stakeholder value chain in order to identify key actors, their respective roles in creating, delivering and optimising value, and their respective incentives (see Figure 2). Based on the development of this value chain, descriptive and evidence-based value propositions for eHealth interoperability can be developed, quantified and customised accordingly.

![Figure 2. Stakeholders along the value chain](adapted from earlier work by the SemanticHealthNet project)

Four generic stakeholder types – or tiers – have been identified in the healthcare sector. **Funders** include decision makers and policy makers as well as public and private payers whose role is to (financially) incentivise the promotion and adoption of eHealth services and products in an effort to improve outcomes. **Providers** include the insurance and

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pharmaceutical industry, electronic health record (EHR) vendors. ICT purchasers, as well as Standards Development Organisations (SDOs). Their task is to provide and procure eHealth solutions that optimise effectiveness. Users of eHealth solutions are health and care professionals as well as personnel in both the public and private research sectors. The beneficiaries of a re-organised business and healthcare ecosystem include patients, carers and citizens who are, as a result, empowered to ‘own’ their own health and to partner with the healthcare professionals who are part of the health team. During the business modelling workshop, Safe Prescribing and Integrated Care were used as use cases to analyse and identify stakeholder relevant values. The participants in the workshop used the stakeholder levels defined above: they also included in their discussions Partners and enablers as additional classes of actors that can be considered and grouped together.

3.2 Reference business use case and its relationship to stakeholders

As a result of the work of WP1 and WP2, VeH agreed on the use of a reference business use case on the optimal and efficient management of diabetes through interoperable solutions. The reference case consolidates an approach to the two items, Safe Prescribing and Integrated Care, which were found to possess the most immediate relevance and importance to the VeH community. The case also includes the aspect of European Research Networks (ERNs) which can be considered as one of the eHDSI elements beyond 2020. The relationship of this reference business use case to its sub-domains is depicted in Figure 3.

Figure 3. The VALUeHEALTH reference business use case

VeH has also developed a number of stories and scenarios as a result of having chosen this reference business use case (these are mostly contained in D4.1 and in the upcoming deliverables of WP2). The stories related to Frieda Becker (published in D2.1) comprise and illustrate how the reference case may play out in practice. The case is composed of three
scenarios which include cross-border, unplanned, and planned treatment as well as relocation to another country and the subsequent access required to Ms Becker’s previous health records.

While the use case scenarios are each different – in terms of the patient’s circumstances – the underlying commonalities are the interoperability assets employed, and products used, by the patient herself and the healthcare providers supporting her. In the reference business use case, governments, industry, healthcare providers, and patients are all stakeholders who either have considerable influence over and/or interest in the matter at hand. The interoperable services provide recurrent values to these stakeholders. For example:

- Governments are interested in societal value occurring through patient safety and better treatment outcomes.
- Industry is interested in the economic aspects of the case through the opening up of new markets and the reduction of investment risks resulting from large-scale innovation environments.
- Healthcare providers are spurred on by clinical and ethical values as the quality of life of the patient is likely to improve and the quality of their own work similarly.
- Patients experience added value from the improvements in the quality of their life that results from the enhanced trustworthy and reliable treatment they receive.

3.3 The Connecting Europe Facility and National Contact Points

The reference business use case selected by VeH calls for interoperable eHealth services to provide clinical value, economic value and societal value. The VeH consortium believes that the national level bodies mandated to act as contact points for cross-border interoperability services provide the best-fit stakeholder perspective to span the three areas of sustainability that help secure and realise this potential. Figure 4 depicts in a schematic way the interactions that take place considering both distinct layers of interoperability and the responsible actors that are active in each of these layers. The institutions’ action areas include the sustainability of:

- The core services to be developed, maintained and extended at a European level.
- The Member State generic services connecting to the core services.
- The national ICT investments and organisational change investments to create and use better (interoperable) health data.

As the eHealth Stakeholder Group has put it, “[c]osts and benefits do not fall in the same places when implementing interoperable services” (eHealth Stakeholder Group, 2014: 7). This 2014 review indicated that risk-sharing (i.e. spreading risk on a number of stakeholders to reduce financial risks for the individual) is a viable option to align stakeholders for which national coordination seems to be the most appropriate organisational form. National bodies can liaise and be guided by European bodies: they can in turn provide guidance within their own state boundaries, and they can also support regional stakeholders in their hands-on implementation of innovative services. The multi-purpose role of those national level bodies reflects a socio-technical understanding of the development, maintenance, deployment/uptake, and improvement of eHealth services which can be applied to specific administrative, clinical, or public health use cases.
3.4 A stakeholder-related platform

The WHO’s most recent report *From Innovation to Implementation – eHealth in the WHO European Region* (2016)\(^\text{19}\) emphasised the necessity for elaborated governance structures: “[Political] commitment is manifested in strengthened eHealth governance, practical eHealth strategies and sustainable, long-term funding mechanisms. Most importantly, success in national eHealth adoption is often influenced by a range of factors that extend beyond the obvious requirements of skills and funding for technology and it is here that intersectoral engagement of stakeholders, led by the health ministry, is a key catalyst for success.” (WHO, 2016: 84).

In the context of the European Union, the eHN’s governance model for the eHDSI during the CEF funding similarly emphasises coordination and communication between decision-makers and experts\(^\text{20}\). Hence, the eHN is in itself and through its governance procedures becoming a platform that accounts for this requirement of a stakeholder-related platform, agreeing to establish new bodies such as the Operational Management Board when required. The eventual establishment of **interoperable, cross-border eHealth services** shall fulfil the following requirements:

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“This refers to a platform which enables the interaction between citizens/patients and health care providers, institution-to-institution and organisation-to-organisation transmission of data, or peer-to-peer communication between citizens/patients and/or health professionals and institutions. The services shall comprise cross-border access to electronic health records and electronic prescription services as well as remote health/assisted living teleservices, etc.”

4 Interoperability in eHealth

This chapter outlines existing interoperability frameworks in the eHealth domain. It starts with an in-depth description of the current refined eHealth European Interoperability Framework. It then investigates how interoperability was implemented in European projects with regards to adoption challenges and success strategies.

The chronological presentation of these projects shows the incremental advancement in the field, starting with a focus on technical solutions, afterwards considering context and infrastructure, subsequently taking the perspective of different stakeholders, and finally assessing the benefits and impacts for the variety of affected stakeholders through systematic methodologies.

4.1 Towards the Refined eHealth European Interoperability Framework

A number of European Interoperability Frameworks for public eServices have been developed, since the first one was published in 2004. The original European Interoperability Framework (EIF) was focused on eGovernment as a broad category for cross-border services that requires the cooperation of actors such as public administrations, private businesses and individual citizens. The framework emphasised the European perspective, and was intended to supplement National Interoperability Frameworks in their application and further development. The EIF identified three levels of interoperability, namely organisational, semantic and technical interoperability.

The framework has been revised over the years. An updated European Interoperability Framework version 2.0 (EIF²) was published in 2010. It included a more detailed view of interoperability levels and a more elaborated description of how to address them. EIF² retained all three previously identified levels of interoperability and further added legal interoperability as another dimension. It advised that organisational interoperability would ensure business process alignment through documented agreements and structured service relationships, e.g. through Memoranda of Understanding (MoUs) or Service Level Agreements (SLAs). Similarly, change management was identified as “critical to ensure the accuracy, reliability and continuity of the service delivered” (EIF, 2010: 22).

This revised framework was used as the foundation to validate specific items relating to the eHealth domain. It led to the publication of the eHealth European Interoperability Framework (eEIF) in 2013.

The study echoed one existing pillar, and added two new pillars, of recommendations for improving organisational interoperability. These recommendations relate to increased collaboration in various areas, i.e., among states and between bodies; on the development of standards; and on quality labelling/certification. The three areas are worthwhile looking at in detail.

First, according to the eHealth Governance Initiative’s (eHGI) discussion paper\(^{25}\) which was endorsed by the eHealth Network (eHN), cooperation, among Member States and between national authorities and standardisation bodies, should be promoted as should incentivisation strategies for healthcare providers.

Second, a collaborative approach to the development of standards was encouraged through SDOs and professional associations. The establishment of the Joint Initiative Council (JIC) was considered to be a valuable step forward in increasing awareness and cooperation to develop, acknowledge and implement effective standards. Similarly, the cooperation of professionals on a European level was referred to as aiding the development of standards as good practices. Process improvements were increasingly under discussion in the community. To sustain these efforts, the study suggests considerations for targeted funding.

Third, since there is no European authority that oversees or steers developments in eHealth, quality labelling and certification was proposed as a valuable tool to drive development and harmonisation in the field on national, European and transatlantic levels. The report listed the following examples of approaches to quality:

- **Incentive-based**\(^{26}\) approach [Users of a quality labelled or certified system are granted some advantages, mostly financial], [is] generally [used] in more competitive market[s] (e.g., Belgium [Each user of such a quality labelled system is granted 800+€ per year.] or the USA [Some $45,000 over 5 years for each healthcare professional, $2M over 4 years plus 200€ per discharge for hospitals, or based on number of patients per month (e.g., US$ 20)] that grants financial compensation to the users of quality assessed applications, with the vendor being urged to obtain that label by their users;
- The **regulatory/legal** approach ([in countries] such as Canada, France, Norway or Serbia) limiting access to some services to users of quality assessed applications;
- The **procurement-based** approach (United Kingdom), where regulator and buyer are both public bodies;
- The **market pressure** approach (Ireland) where a healthcare professionals organisation takes the initiative to quality assess the applications offered to their members (this is a variant of the procurement-based approach);
- The US has defined a complementary “**negative financial incentive**” after a five year period (from 2014 onwards) for healthcare professionals not meaningfully using the quality assessed electronic health record systems;
- Denmark is very advanced in **product certifications**.\(^{24}\) (eEIF, 2013: 42)

Collaboration, standards and quality seals are, in essence, the drivers that can help promote interoperable eHealth solutions on a national or European level. The review also indicates that current national approaches differ in terms of the methods and tools that they use to achieve quality in eHealth products and services and the specific objectives they want to achieve. It is from this starting point that a broader review of European pilots and their lessons learnt is summarised in chapter 4.2 of this deliverable.

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\(^{25}\) [Link](http://ec.europa.eu/health/ehealth/docs/ev_20121107_wd02_en.pdf)

\(^{26}\) Our emboldening throughout this bulleted list.
Two years later, in November 2015, the eHN published a **Refined eHealth European Interoperability Framework (ReEIF)**.

The revised framework defines interoperability in two ways: one that it calls ‘broad’ and another that it describes as ‘narrow’:

“[I]nteroperability among ICT systems is a means to the end of enabling agencies, organizations, groups of users, municipalities, regions, or even nation states to interact with each other more efficiently and effectively. [...] Thus, as an important notice, broad interoperability addresses not only the organization of (technical) interoperability, but also the interoperability of (healthcare providing) organizations. [...] [In a narrow sense], it involves the ability of information and communication technology (ICT) systems to communicate with each other so as to utilize each other’s capabilities, or to provide composite capabilities to their human users.”

A preliminary outcome of the latest in this series of four initiatives adds further distinctions to the levels of interoperability involved in eHealth.

The evolution of interoperability levels identified since 2004 in these EC documents is listed below in Table 3. What stands out in this table is the increased level of granularity of the definitions: with a move from initially three levels of interoperability to six. Over a 12-year period, the list of interoperability levels has been increased in number, and has been re-worded so as to better pinpoint the dimensions that are to be considered.

**Table 3. Levels of interoperability by EIF**

<table>
<thead>
<tr>
<th>EIF</th>
<th>EIF²</th>
<th>eEIF</th>
<th>ReEIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Legal</td>
<td>Legal</td>
<td>Legal and regulatory</td>
</tr>
<tr>
<td>Organisational</td>
<td>Organisational</td>
<td>Organisational</td>
<td>Policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Care process</td>
</tr>
<tr>
<td>Semantic</td>
<td>Semantic</td>
<td>Semantic</td>
<td>Information</td>
</tr>
<tr>
<td>Technical</td>
<td>Technical</td>
<td>Technical</td>
<td>Applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IT Infrastructure</td>
</tr>
</tbody>
</table>

The current set of levels is six strong: they move steadily from the most high-level to the most operational and technical. The legal level has been expanded to include both legal and soft law (regulatory) matters. Looking at what was previously considered to be the organisational level of interoperability, today, two distinct fields (policies and care processes) need to be taken care of. The semantic level has been renamed ‘information’, and the technical level now includes both applications and IT infrastructure.

In terms of the work of the VeH project, on the one hand, WP3 handles the first three levels of legal and regulatory issues; policy issues; and care processes; on the other hand, WP4 tackles those related to information, applications and information technology (IT) infrastructures.

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D3.1 Adoption Challenges and Success Strategies

The underlying principles which were defined in earlier versions of the framework were validated by the ReEIF. These principles include security and privacy, transparency, preservation of information, reusability, technical neutrality and adaptability, openness, patient centricity, and a use case-based approach.

The ReEIF is actionable insofar as these six interoperability levels can be cross-tabulated against the relevant stakeholders and required activities (see Table 4 below). Policies are addressed through collaboration agreements that are formulated by policy makers, healthcare managers and professionals as well as patients. This indicates a need for vision, leadership and collaboration among different stakeholders. Care processes need to be aligned, too, which requires the involvement of business and information architects, information analysts and terminologists as well as support from healthcare professionals and patients. Here, too, collaboration ensures that the technical solution supports an organisational setup that is ultimately patient-centred.

Table 4. Interoperability level by stakeholder and by action required (table by authors)

<table>
<thead>
<tr>
<th>Level of Interoperability</th>
<th>Stakeholder</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strategic</td>
<td>Tactical</td>
</tr>
<tr>
<td>Legal and regulatory</td>
<td>Regulators</td>
<td>Directors</td>
</tr>
<tr>
<td>Policy</td>
<td>Policy makers</td>
<td>Healthcare managers</td>
</tr>
<tr>
<td>Care process</td>
<td>Business and information architects</td>
<td>Information analysts, terminologists</td>
</tr>
<tr>
<td>Information</td>
<td>Software engineers</td>
<td></td>
</tr>
<tr>
<td>Applications</td>
<td>System architects</td>
<td>System engineers</td>
</tr>
<tr>
<td>IT Infrastructure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hence, the successful deployment of ICT, and significant uptake of new technologies among cooperating organisations, requires the active engagement and support of a number of stakeholders. These stakeholders may be found in the cooperating organisations, in regions or even across different national borders. Bringing the stakeholders together is a complex task as the actors affected need, first, to be identified and, second, this process needs to be followed by a collaborative change management initiative that not only addresses them but also manages them based on the stakeholders’ own and the initiative’s needs. To facilitate this, incentivisation schemes need to address institutions and individuals, and they need to
create a state of mind that induces and manages change successfully: As Kaiser and Lee (2015) observe:

“The investment [to shift strategies toward value-based care] required is as much in leadership as in dollars. […] The leading providers are taking an “all in” innovative approach as they do the hard work of developing new organizational competencies and nurturing cultural change from within.”

4.2 State-of-the-art on interoperability in European projects

The interoperability frameworks outlined in chapter 4.1 (above) share some similarities with the outcomes of a number of European projects in the Competitiveness and Innovation Programme Information and Communication Technology Policy Support Programme (CIP ICT PSP)29. The CIP ICT PSP was the antecedent to the work that is now being undertaken in the frame of the CEF.

The programme has provided real-life opportunities to Member States in different domains of public administration – in this case, eHealth – to enable the concept of interoperability to evolve, to be tested or concretely applied, and to provide insight into the benefits that connectivity can create on a practical level. These have provided visibility to a wide range of actors about what means to achieve eHealth interoperability are available and whether or not they may be of interest in other geographic and organisational contexts.

Eight examples of specific projects are reviewed here. The projects provide insight into the process of refinement of insights into interoperability. They are presented in a chronological order based on their starting date and finishing date. They are described in terms of their focus and any recommendations that they have produced that are relevant for VeH.

4.2.1 epSOS

Running from 2008 to 2014, European Patient Smart Open Services was a European large-scale project which, by its end, included 45 stakeholders representing 22 European Union (EU) Member States and three non-EU countries. epSOS developed and tested a cross-border patient summary as well as ePrescription and eDispensation solutions. Patient summaries are intended to collect and provide medical data about a patient in order to document his or her treatment and to use this information as the basis for future clinical decision making. ePrescription and eDispensation are about using an electronic prescription that is transmitted to, and retrieved by, a pharmacy that dispenses the required medicine and documents this dispensation in an electronic report. The technical solution developed by epSOS was run at 16 pilot sites which provided evidence of benefits for patients and health professionals.

Patients could undoubtedly benefit from seamless healthcare services in Europe. When a patient travels to another country, data on that person’s medication history is retrievable and adequate medication can be received when necessary30. Similarly, healthcare professionals can access the patient’s medical data, and information on current prescriptions can be

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29 http://ec.europa.eu/information_society/activities/ict_psp/about/index_en.htm
30 http://www epsos eu/fileadmin/content/pdf/ epSOS_Value_Story_Patient_2014.pdf
translated into a language that the professional speaks so as to support and improve his or her decision-making processes\(^{31}\).

### 4.2.2 EXPAND

From 2014 to 2015, the thematic network **Expanding Health Data Interoperability Services (EXPAND)\(^{32}\)** has been carried out to address challenges of moving local pilots to large scale deployment of cross-border eHealth service as extension of national infrastructure. EXPAND built on pilot projects within epSOS taking into account progress in the policy and standardization aspects, and focused on the achievement of scalability and sustainability. It has shown that national or regional infrastructures for eHealth depend on a national legal and regulatory framework for eHealth and a national interoperability framework for eHealth. Apart from the two frameworks, reusable operational services across use cases and authentic sources of information as well have to be in place.

The project encouraged cross-border collaboration on eHealth deployment based on the evaluation and re-use of interoperability assets delivered by epSOS. A list of assets in the scope of Patient Summary and ePrescription were prepared and handed over to the CEF which contributed to the guidelines adopted within the eHealth Network. EXPAND has established requirements of the inclusion of and quality measurement for eHealth interoperability assets which enable the definition of functional characteristics of a European eHealth interoperability infrastructure. The project has been instrumental in bridging the gap between the epsOS pilot and deployment of cross-border eHealth services.

### 4.2.3 Renewing Health

Started in 2010, the **Renewing Health** (REgioNs of Europe WorkINg toGether for HEALTH) project\(^{33}\) involved nine of the most advanced European regions for health-related ICT implementation in the validation and evaluation of the use of Personal Health System (PHS) for innovative telemedicine services to monitor chronic diseases. The project is partially funded under the CIP ICT PSP. Despite integration of the service solutions at regional level being the highest priority for the project partners, the use of international standards and the progressive convergence towards common interoperable architectures were also sought to prepare and facilitate scaling up at national and European levels. One of the WPs in Renewing Health was dedicated to standards and interoperability: clinicians from various pilot sites performed profiling of development and maintenance and quality assurance plans and tools, liaising with standard bodies and industrial associations in order to provide feedback of real-life interoperability experience\(^{34}\). Shared recognition of the importance of standards and interoperability in eHealth solution was seen (see Figure 5)\(^{35}\).


\(^{32}\) [http://www.expandproject.eu/](http://www.expandproject.eu/)


\(^{35}\) [http://www.renewinghealth.eu/documents/28946/394219/D18.2+v1.0+Renewing+Health+Readi](http://www.renewinghealth.eu/documents/28946/394219/D18.2+v1.0+Renewing+Health+Readi)
4.2.4 eHealth Innovation

Functioning from 2011-2013, eHealth Innovation (eHI) was an EU-funded thematic network that investigated how eHealth services can be integrated. The focus of eHI was on patient-centred eHealth that would empower the patient through self-care. While the project looked at several diseases in detail, emphasis was placed on chronic disease management and integrated care for an ageing population (this focus on integrated care has really taken off in several of the CIP ICT PSP’s later large-scale and smaller-scale pilots). In the thematic network, the use of ICT was reviewed from multiple perspectives such as through personal devices or PHSs. The role of ICT was equally wide-ranging; it ranged from enabling data sharing and coordination to real-time patient communication. In eHI, putting local processes in place that support eHealth solutions was considered to be a task that required tailoring the technical solution to actual needs. The take-away finding of eHI was that the biggest barriers to eHealth deployment are organisational and cultural, not technical (see Figure 6).
D3.1 Adoption Challenges and Success Strategies

Understanding the complexity of ICT for care integration

Integrated care record

<table>
<thead>
<tr>
<th>Enablers</th>
<th>Critical success factors</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good national/regional communication infrastructures connecting healthcare settings</td>
<td>Need to fund, develop and deploy standards based interfaces between existing legacy systems</td>
<td>Relatively immature ICT infrastructures in social care</td>
</tr>
<tr>
<td>Relatively mature interoperability standards for EHRs and terminology</td>
<td>National patient identifier is probably a prerequisite to large scale integration</td>
<td>Lack of social care provider directory services</td>
</tr>
<tr>
<td>Most countries have or are establishing healthcare provider directory and authentication / authorization services</td>
<td>Need to foster a culture in which record sharing is accepted and welcomed amongst professionals</td>
<td>The present generation of interoperability standards have been designed to represent health data and might not be ideally suited to social care data</td>
</tr>
<tr>
<td>Growing sophistication of EHRs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shared EHR / access to subsets of EHR data

<table>
<thead>
<tr>
<th>Enablers</th>
<th>Critical success factors</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relatively mature interoperability standards for electronic health records, and terminology</td>
<td>Ensure EHRs are consistently populated</td>
<td>Different terminology and documentation practices between health and social care</td>
</tr>
<tr>
<td>Standards for clinical models that can be used to precisely define sub-sets of an EHR</td>
<td>All professionals will need education to understand what kinds of information are most useful to share with other colleagues</td>
<td>Relative lack of familiarity of reading and using records between health and social care</td>
</tr>
<tr>
<td></td>
<td>Define access permissions to enable “need to know access” whilst assuring patients of appropriate protection of privacy</td>
<td>Most health records are not patient-friendly (social care records too?)</td>
</tr>
</tbody>
</table>

Figure 6. Enablers, critical success factors and challenges of ICT for integrated care

(Kalra & Stroetmann, 2013: 31)36

To achieve the successful deployment of integrated care, eHI considered care pathways to be a basic precondition. Formalising a care pathway means that patients can be grouped together, and variations in treatment and outcomes can be controlled and pinpointed. Thus, the role of each pathway needs to be defined: this contributes to the identification of their sequential arrangements and the role of healthcare professional(s) both within and across pathways. Hence, mere connectivity between technical components is not sufficient. eHI also built on findings from an evaluation of 16 pilots on chronic disease management and integrated care in the UK37. They involved the need for a shared vision and well-prepared staff.

As a strategic response and guideline for policy and organisational enablers, eHI identified:

“Organizational leadership within payer organizations to introduce reimbursement based on novel (risk sharing, outcome driven) business models.” (eHI, 2013: 37)38

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37 http://www.rand.org/content/dam/rand/rand/pubs/technical_reports/2012/RAND_TR1164.pdf
4.2.5 SemanticHealthNet

From 2011 to 2015, Semantic Interoperability for Health Network (SemanticHealthNet (SHN)) used a heart failure use case to contribute further to the development of a semantically interoperable patient summary and ePrescription services. Thus, it provided a very complementary approached to the epSOS large-scale pilot: in its focus on business cases and value propositions, it also acted as a precursor to the work of VeH.

The SHN team identified that individual stakeholders require different value propositions around topics such as the underlying business case, governance structures, or the ICT used, in order to gather their sustained interest and support^39.

SHN benefitted from the help of experts from the eHealth field to identify four aspects relating to the promotion and development of interoperability in eHealth. The experts concluded that a prioritisation of four elements – services, customer segmentation, integrated governance models, and diversified funding sources – can be seen as drivers for interoperability in Europe. The development and adoption of interoperable assets is shaped by perceived factors such as market forces (including patient rights, emerging trends and industry developments, such as mobile apps and cloud solutions). The perceived benefits of cross-border/organisational interoperability are best derived from “robust cost-effectiveness analyses (to establish the overall clinical and economic benefits), quality of life assessments (to assess the humanistic impact), and business model simulations (to demonstrate business relevance, benchmarking and sustainability)” (SHN, 2013: 17) as ways to assess quantitative and qualitative benefits of interoperability. The experts also suggested perceived success criteria in relation to sustainable interoperability which include “% of cross-border cases where doctors accessed patient summary data [and] % of health providers think patient summary is useful” (SHN, 2013: 17).

In addition, SHN developed actionable recommendations for decision makers in the industry and ministries from the perspectives of clinicians and patients, healthcare purchasers, clinical research, and SDOs^40. The recommendations include financial aspects such as receiving direct funding and using open/ royalty-free standards, and cultural aspects such as creating products and services that are a delight to use while fostering an environment in which the use of eHealth solution is considered to be a best practice (see Box 1 below). The list of items is long and broad in range, supporting Tsiachristas et al.’s (2013)^41 argument for aligning incentives across stakeholders.

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^39 http://www.semantichealthnet.eu/SemanticHealthNet/assets/File/SHN%20288408%20D7_1%20Identification%20of%20stakeholders.pdf

^40 http://www.semantichealthnet.eu/SemanticHealthNet/assets/File/SHN%20288408%20D6_1%20Recommendations%20to%20industry%20and%20health%20ministries.pdf

SHN recommendations to industry and to health ministries

“Clinician and Patient Perspectives

- [...] Incentives, including funding, need to be provided to ensure good documentation, including manually curated summaries.
- Provide benefits to clinicians from good documentation such as contextual advisory systems: an added value for health professional work flow and the outcomes of care.
- [...] Smart incentives and penalties must be developed and applied to push healthcare providers (organisations and individuals) to explore and follow evidence based practices.

Healthcare Purchaser Perspectives

- [...] Health ministries and authorities should make investments in clinical content standards and terminologies and make them freely available for healthcare practitioners and industry to use
- [...] Health ministries, insurers and commissioners should promote contracts endorsing person centred care, i.e. requiring healthcare providers to collaborate, to co-ordinate care and to engage patients
- Health authorities should define the use cases for which standards are needed, but not develop standards. Governments should then purchase rights for royalty-free use of standards
- [...] Health authorities should provide the framework for interoperability, and central services such as registries, allowing industry to design useful services without the overhead of establishing each time the basic info-structure

Clinical Research and Learning Healthcare Perspectives

- [...] An open data access mentality is needed, so that research sponsors and data sources support each other with scaling up data access and use
- [...] We need to stimulate our “demand side”: this is vital to promote standards adoption.
- Governments can promote standards adoption by mandating the use of standards – but they also need to reduce the costs of standards adoption, especially for SMEs.

Standards Development Organisation Perspectives

- [...] Standards have to be accessible financially and intellectually, and a “delight to use”- this includes providing clarity about which ones to use, and when.
- [...] Mappings between different, non-interoperable standards introduce patient safety risks and have huge maintenance issues. In addition the need for mapping must not be left to each vendor to work out – these are real costs incurred today.
- We should share quality assured multi-lingual assets (including guidance, education and mappings).”

Box 1. Recommendations for the development and deployment of interoperability solutions (SHN, 2013: 5-8)
4.2.6 Momentum

Further advancements have been made by the Momentum thematic network which ran from 2012 to 2015 and focused on the field of telemedicine. The network brought together stakeholders from the community who shared their expertise on the development, implementation and scaling up of telemedicine in routine care. The Momentum Blueprint\(^{42}\) provided a condensed version of the activities that are required to set up and scale up telemedicine in practice. The tasks are actionable and targeted primarily at telemedicine-doers. There are 18 critical success factors that are classified in four categories: context, people, plan and run (see Figure 7). The application of this process is estimated to take eight working weeks. It can be supported by using a self-assessment test to assess and monitor an organisation's status and progress towards the deployment of eHealth (specifically telemedicine) services.

The Momentum blueprint takes a holistic and people-centred approach (similar to that proposed by VeH, as is explained in the remainder of this deliverable). Any eHealth solution will need to: be considered in the context of the specific organisation; support stakeholders; chart stakeholders’ needs; be planned thoroughly; and the technical and organisational implementation needs should consider items such as privacy awareness (the lack of which can be detrimental to the success to deployment).

4.2.7 SmartCare, BeyondSilos, and CareWell

Three of the most recent European projects on ICT-supported integrated care are **SmartCare, BeyondSilos** and **CareWell**. A common factor in the three projects’ tasks is to identify and measure the impact and economic gain provided by integrated care pathways. This is done with demonstrations done respectively by 23, seven and six pilot regions where health care and social care services are integrated. Using the ASSIST tool\(^{43}\), the regions are supported and monitored in their process of integrating services and in conducting a cost-benefit analysis so as to examine to what extent inter-organisational changes have resulted in cost improvements. It is expected that the final outcomes of these three sets of pilots will yield tangible findings that contribute to the value models proposed by VeH. Results are expected towards the end of 2016 for SmartCare, and by January 2017 and February 2017 for BeyondSilos and CareWell respectively.

The methodological approach\(^{44}\) of these projects includes four steps that can be reproduced by any other region that wishes to advance by integrating care (see Figure 8): the steps are known as value case development. One, active and passive **stakeholders** who are affected in any way by a change in services need to be identified. This is an iterative process in which stakeholders are communicated with on a one-on-one basis that ensures that information can be shared and perspectives can be determined. Two, any **impacts** that a stakeholder may perceive as a result of changing processes need to be identified and made measurable. Three, **data** needs to be collected for the indicators identified beforehand. Relevant data may be retrieved from a variety of sources, such as performance indicators, questionnaires or interview responses. Four, an **evaluation** of the collected data should be conducted by examining the value derived for each stakeholder. This task helps to transform intangible benefits into tangible benefits, and to measure them across the board. As a consequence, investments can be justified, funding requirements can be calculated, and service impacts can be anticipated and managed.

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44 http://carewell-project.eu/fileadmin/carewell/deliverables/d8.1_carewell_first_report_on_dissemination_and_exploitation_activities.pdf
Based on the stakeholder assessment, a value model can be drawn for the organisation in question\textsuperscript{45}. This model includes actors that are directly involved as well as passively affected by changes to the delivery or use of new or altered products or services (see Figure 9). The model includes the actor (listed in a blue box on the left-hand side of the diagram), the surrounding institution (a grey box that is followed by dashed arrows which indicate the direction of information or services). The circular lines that lead to the stakeholder are either dotted to indicate intangible impacts or dashed to show tangible impacts on resources: orange lines reflect negative impacts while blue lines are positive impacts.

The value model is a powerful tool that helps to map the actors involved in integrated care and to document and compare in a structured way what the expected impacts are beforehand (ex ante) and what the measured impacts are afterwards (ex post). The differentiation between actors and organisations as well as tangible and intangible impacts is also worthwhile.

From a methodological perspective, CareWell employed an evaluation team that conducted interviews before and during the deployment of site-specific activities in order to draw the value model. The findings were quantified by using the eCare Client Impact Survey (eCCIS) and the eCCIS scoring tool to survey the patients’ perspectives, and by employing the ASSIST tool to collect and understand costs from the organisation’s perspective.

Identifying stakeholders, drafting a value model, and mapping the organisation and pathways in their as-is and to-be status led the participating pilot sites to elucidate four lessons learnt:

- **Multidisciplinary teams** representing all stakeholders are crucial to take into account their needs when defining the organisational models and pathways.
- New care pathways have to be integrated into the **routine practice** of the professionals, so that it does not require an extra effort, but a reorganisation of the daily tasks.

\textsuperscript{45} Ibid.
• Professionals have to be trained in the use of new technologies, and have to be supported to develop **new skills**.

• Involvement of decision-makers of healthcare organisations is essential to encourage **front-line professionals** to adopt new working procedures.” (emphasis added, CareWell, 2014: 52)\(^{46}\)

\(^{46}\) [http://carewell-project.eu/fileadmin/carewell/deliverables/d3.1_carewell_organisational_models_and_pathways.pdf](http://carewell-project.eu/fileadmin/carewell/deliverables/d3.1_carewell_organisational_models_and_pathways.pdf)
5 Adoption challenges and success strategies

Given the practical experiences of European MSs and regions with interoperability challenges, and their various ways of deploying new products and services, it is worthwhile examining the means of achieving successful adoption.

A study by Martínez-González et al. (2014) conducted a meta-review of 27 studies on integrated care programmes for chronic conditions covering heart failure, diabetes mellitus, chronic obstructive pulmonary disease, and asthma. The study found that, while the care continuum is often reviewed, governance, financial management, and the organisational culture are rarely evaluated.

The ReEIF, which has been described in detail in chapter 4 of this document, logically but not explicitly covers these three areas of governance, financial management and organisational culture. The legal and regulatory layer of interoperability covers governance-related aspects, the policy layer includes aspects of financing, and the layer of the integrated care process includes implicitly organisational culture as a factor to be accounted for. Based on the review above, these three items – governance, financial management and organisational culture – are elaborated as a non-exhaustive list of challenges that need to be overcome.

5.1 Governance and regulatory related aspects

Bringing both the EC and MSs in various bodies together on a European level can help to facilitate the task of requesting, agreeing and implementing standards for interoperability on the levels stipulated by the ReEIF. The eHN has revised the non-paper on the IT Governance Model, published by the Directorate General for Communications Networks, Content & Technology and the Directorate General for Informatics, and has applied it to the healthcare domain. The result is a governance model for the eHealth DSI that is to be in place throughout the CEF funding period.

The governance model consists of the EC and MSs co-chairing the eHN, the Directorate General for Food and Health Safety (DG SANTE) chairing the Operational Management Board, and providing advice to the Joint Action to Support the eHealth Network (JASeHN). The MSs are also part of the eHN: they send their national experts as delegates to JASeHN, and have their National Contact Points (NCPs) in place. This coordination activity between the EC and MSs on a political level, the eHN and JASeHN on a strategic and tactical level, and the NCPs on an operational level helps to ensure an effective coordination between all these actors and a fruitful and continuous development of coherent strategies and standards. The interplay of these actors is depicted in Figure 10.

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It is in this context that the role of the CEF could be further specified in relation to the eHealth domain and in terms of the tasks it can “own” so as to drive forward the development of interoperable assets and the implementation of interoperable services.

Figure 10. Preliminary governance model for the eHealth Digital Service Infrastructure during CEF funding (eHealth Network, 2015: 5)

All levels of interoperability that are outlined in the ReEIF need to be addressed at both a European and national level, since eHealth services can be provided both cross-border between MSs as well as within a single country (and between its various healthcare providers). EHRs provide a solid illustration of the current European landscape with regards to how interoperability and eHealth provisioning are implemented.

From a technical perspective, the storage of data can be done in a centralised or decentralised way. Centrally, this means that a national database may be in place that directly stores data, such as in France, or that a database stores redirects users to local databases, such as in Austria. The data fed into the databases may then be subject to a standard or schema that stipulates what data is to be compiled. This can be regulated at a regional level, such as in Finland, or at a national level, such as in Austria. An example overview of EHR solutions in Europe is depicted in Table 5.

<table>
<thead>
<tr>
<th>Database</th>
<th>Schema</th>
<th>Regional</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decentralised</td>
<td>Italian</td>
<td>Spain</td>
<td>Austria</td>
</tr>
<tr>
<td>Centralised</td>
<td>Belgium</td>
<td>Finland</td>
<td>Croatia</td>
</tr>
<tr>
<td></td>
<td>Finland</td>
<td>Croatia</td>
<td>France</td>
</tr>
</tbody>
</table>

Table 5. Example overview of EHR solutions in Europe (table by authors based on Milieu Ltd & time.lex (2014))

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50 Ibid.
Regulation, thereby, can cover a variety of aspects that need to be considered, such as the content of EHRs, patient consent, liability of healthcare professionals, data protection and privacy, as well as the relationship and use of EHRs in the wider field of eHealth solutions such as ePrescriptions. The granularity of the accompanying regulation on EHR content differs across Europe and is subject to on-going legal and regulatory developments.

The Milieu Ltd/timelex (2014) study found that interoperability and cross-border transfer of data is considered by MSs to be subject to European regulation. The authors, therefore, recommended that (open) standards and guidelines are needed on a European level to contain market fragmentation and to help Member States to take this as a baseline for their own national and regional EHR regulations. Standards and their implementations are also advised so that synergies develop with ePrescriptions and other eHealth solutions (links between these fields are seemingly lacking in practice).

Hence, the heterogeneity in approaches and content relating to e.g. EHR regulation and their set-up, administration and databases is best addressed by moving towards a European regulation that would aid Member States by providing them with a reference point that they can relate to and build their own, national regulation on. So far, there seems to be a lack of orientation on these matters on a national level.

Relevant regulation in this context can be seen at the example of data protection and cross-border healthcare provisioning. In the past, Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data provided the foundation for data protection and the right to privacy in the EU. It was repealed by the General Data Protection Regulation which builds on its preliminary work and specifies the process of data collection in today’s digital society. In the Preamble, personal data is defined with regards to health and healthcare. Processing genetic data, biometric data (for identification purposes), and data concerning health is prohibited unless “processing is necessary for the purposes of preventive or occupational medicine […] or for reasons of public interest in the area of public health” (see Article 9(2)). Remedies, liability, and penalties as a consequence of an infringement of this regulation are also addressed and are meant to protect individuals and their data. The Directive 2011/24/EU on patient’s rights in cross-border healthcare complements the view and regulation of data protection from the perspective of the healthcare sector. Hence, the Directive’s focus is on “facilitating the access to safe and high-quality cross-border healthcare and promot[ing] cooperation on healthcare between Member States” (Article 1(1)). One of the barriers for a lack of cross-border healthcare provisioning and uptake is addressed in the Preamble:

55 “(35) Personal data concerning health should include all data pertaining to the health status of a data subject which reveal information relating to the past, current or future physical or mental health status of the data subject.”
“(56) [...] Widely different and incompatible formats and standards are used for provision of healthcare using ICTs throughout the Union, creating both obstacles to this mode of cross-border healthcare provision and possible risks to health protection. It is therefore necessary for Member States to aim at interoperability of ICT systems. The deployment of health ICT systems, however, is entirely a national competence.”

In this endeavour, it established the foundation for the eHealth Network through Article 14 as a means to “facilitate cooperation and the exchange of information among Member States” with the objective to “work towards delivering sustainable economic and social benefits of European eHealth systems and services and interoperable applications, with a view to achieving a high level of trust and security”.

In accordance to the EC priority of facilitating interoperability and security of cross-border online service to achieve a Digital Single Market, the eIDAS Regulation EU 910/2014 on electronic identification and trust service provides a legal framework for cross-border eID and trust service. Implementation acts alongside standards specifications published under the CEF were adopted to complement the eIDAS Regulation in terms of interoperability for Europe-wide electronic identification mechanisms. Together, they laid foundations for more reliable and convenient online service access and use across the EU, in the area of healthcare provision as well as all other public services.

Looking at the inventory of interoperability assets within the EXPAND project, assets related to governance and legal aspects in general include regulations and policies, agreements on standards access and service, and code(s) of practice. Each asset can be seen on both the EU level as well as the EU level with national localisation (see Table 6 below). These assets, mainly guidelines and agreements, need to be addressed on a European level to serve as a reference point for MSs to achieve national localisation.

As illustrated in the table, evaluation has shown that the majority of these needs are recognised and on-going effort by the EC or eHN are made to deal with such needs. Yet, the acceptance appraisal indicated that many of the guidelines and agreements, even the existing ones, are only accepted and adopted on a local level and are still pending at the level of the eHN and CEF (which, in turn, hinders the uptake by MSs).

57 The document regarding the establishment of the eHealth Network specifically lies in the Commission Implementing Decision (2011/890/EU), http://ec.europa.eu/health/ehealth/docs/decision_ehealth_network_en.pdf
D3.1 Adoption Challenges and Success Strategies

Table 6. Evaluation of governance and legal aspect related interoperable assets
(adopted from EXPAND ⁵⁹)

<table>
<thead>
<tr>
<th>National/Regional</th>
<th>EU Level</th>
<th>EU - Localized to National Level</th>
<th>Status</th>
<th>Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>National laws and Regulations, National policies</td>
<td>EU Legal Interoperability Guidelines</td>
<td>National implementation of guidelines</td>
<td>Existing (epSOS) to be maintained (eHN)</td>
<td>Adoption (epSOS, subgroup for epSOS upkeep) Pending (eHN)</td>
</tr>
<tr>
<td>Licenses and agreements for access to standards</td>
<td>EU level agreements with SDOs</td>
<td>Usage rights for cross border services</td>
<td>On-going (EC)</td>
<td>Pending (eHN)</td>
</tr>
<tr>
<td>Service Level Agreements</td>
<td>SLAs between MS and between MS and the EU level service providers</td>
<td>National implementation and monitoring of conformance</td>
<td>Not started (EC,CEF)</td>
<td>Pending (CEF)</td>
</tr>
<tr>
<td>National code of practice</td>
<td>EU level agreements</td>
<td>code of practice for cross border services</td>
<td>On-going (EXPAND) analysis of eHN decisions and impact, recommendations</td>
<td>Adoption (epSOS) Usage (EXPAND)</td>
</tr>
</tbody>
</table>

5.2 Financial incentives

Some researchers and practitioners place a focus on aspects of financing as incentives.

Suter et al. (2009)⁶⁰ proposed ten key principles that they deemed to be relevant to conduct successful projects when integrating health systems (see Figure 11). The list of principles is considered to be an aid in the decision-making and design process. What stands out is that financial management is treated as an explicit and stand-alone category (which seems understandable in light of the complexity of payment schemes described below).


In the United States of America (USA), healthcare providers receive financial incentives under the Health Information Technology for Economic and Clinical Health Act (HITECH Act)\(^{63}\) for the meaningful use of health IT – a definition of minimum government standards for using EHRs and patient data exchange. The programme aims at boosting the meaningful use of certified EHRs as well as medication reconciliation to improve patient care\(^{64}\). It has provided more than 25 billion US dollars of incentives since 2009\(^{65}\), and has significantly increased the rate of adoption of EHRs among healthcare providers. In 2015, eligible providers and hospitals unable to demonstrate meaningful use will not only fail to receive incentive payments, but may also be subject to payment adjustments under Medicare. A 2011 survey found that among both adopting and non-adopting physicians, financial incentives or penalties are the top factor affecting their decision to adopt EHRs. In the United Kingdom (UK), reimbursement schemes, free computers and software, grants and pay-for-performance mechanisms like the Quality and Outcomes Framework have acted as strong

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64 [Update on the Adoption of Health Information Technology and related Reports to Facilitate the Electronic Use and Exchange of Health Information: Report to Congress. The Office of the National Coordinator for Health Information Technology, October 2014.](http://www.healthit.gov/policy-researchers-implementers/health-it-legislation)

incentives for health IT adoption. Incentive payments have been shown to be effective as providing an initial boost to the adoption of health IT by hospitals and health providers. They have been shown to reduce barriers for adoption and help to achieve critical mass, but have been criticised as temporary measures that will not support sustainable health IT use. It has as well been pointed out that, when stakeholder engagement is lacking, influence of these financial incentives is limited.

To solve the problem of the Meaningful Use Program focusing only on the demonstration of use of eHealth instead of its value in improving clinical outcomes, the US government proposed new regulations to achieve programmatic and payment reform focusing on quality-based reimbursement. The Medicare Access & CHIP Reauthorization Act of 2015 (MACRA) proposed rule impose a change in the way healthcare is paid for and aims at establishing the infrastructure for value-based reimbursement. The proposed rule has two major components: (i) Merit-based Incentive Payment System (MIPS); and (ii) Alternative Payment Models (APMs). It replaces the current sustainable growth rate (SGR) methodology with a Merit-based Incentive Payment System (MIPS). The MIPS is based on four performance categories including quality, advancing care information, clinical practice improvement activities and resource use, and consists of both positive and negative payment adjustment. This allows the reimbursement scheme to focus on quality of care and certified EHR use. Participation in eligible Advance Alternative Payment Models (APMs) e.g. physician-focused payment models will also be incentivised within the scope of the proposed rule. According to definition in the act, eligible APMs concern the use of certified EHR technology, payment based on quality measures and financial risk as indicated in the legislation. The policy principles aim to increase the quality and efficacy of care.

In order to arrive at an actionable VeH incentives roadmap, it is advisable to conceptualise a typology of benefits and payment methods. This will enable the project consortium to talk with each of the stakeholder tiers (i.e., types) in terms that resonate with each set of

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69 Orszag PR. Evidence on the costs and benefits of health information technology. Testimony before Congress. 2008.
73 Middleton B. Achieving U.S. Health information technology adoption: the need for a third hand. Health Aff (Millwood). Project HOPE - The People-to-People Health Foundation, Inc; 2005 Sep;24(5):1269–72
stakeholders. Such a typology will be helpful in pinpointing actionable incentives that can be employed to drive the adoption of interoperable solutions. Berenson et al. (2016a) have developed such a typology that is focused on the cross-organisational behaviour that the incentive is meant to bring about rather than the organisation-specific recipient.\footnote{Berenson, R.A., Upadhyay, D.K., Delbanco, S.F., & Murray, R. (2016a). \textit{A typology of payment methods}. Retrieved from http://www.urban.org/sites/default/files/alfresco/publication-pdfs/2000779-A-Typology-of-Payment-Methods.pdf.}

The incentives are aimed at improving and achieving better outcomes in terms of health and healthcare rather than addressing primarily patients in terms of engagement and self-management. For the purposes of VeH, a more thorough and detailed view on incentives for integrated care is required which is explored later in this section based on additional work by Berenson and colleagues.

The overarching typology is depicted in Box 2 (below). It is based on a differentiation between base payments and incremental payments. It separates base payments into fixed, activity-based and population-based payments, and then assigns payments to a specific provider type. This list is portrayed as a continuum: the ambiguities as to who provides these payments are intended. It is a “typology that centers more on the incentives inherent in payment methods, deemphasizing primary classification based on the type of provider receiving the payment. This approach is consistent with the desired trend in payment policy toward promoting integration of services and breaking down organizational silos that may be reinforced with provider-specific payments” (Berenson et al., 2016a: 12).
“Base payments

**Fixed payments**
- Salary for a health professional
- Historically or geographically (or territorially)-based for a hospital
- Line-item budget for a hospital
- Lump-sum payment to a hospital or a health professional

**Activity-based payments**

**Fee-for-service**
- Straight charges for a hospital and health professional
- Discounted charges for a hospital and a health professional
- Usual, Customary, Reasonable (UCR) fee for a health professional
- Fee Schedule for a physician or other health professional
- Per diem payment to a hospital for an inpatient stay
- Ambulatory care groups or similar for an outpatient hospital service

**Case rates**
- Diagnosis Related Groups (DRGs)-based payment to a hospital for an inpatient stay
- Episode based payment for a hospitalization and some posthospital period
- Multiprovider bundled episode payment around an inpatient hospitalization

**Population-based payments**
- Retainer payments to a health professional
- Multiprovider episode payment based on one or more conditions
- Partial capitation to an organization or a health professional
  - Primary care capitation
  - Specialty capitation
  - Contact capitation
- Global budget to a hospital
- Global capitation to an organization
- Percentage of premium payment to an organization

**Incremental payments**
- Shared savings
- Shared risk
- Pay-for-performance
- Gainsharing between a hospital and physicians
- “Nonvisit functions” – monthly payments for care coordination activities for particular patients.”

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**Box 2. Typology of payment methods for paying providers**
(Revised: Berenson et al., 2016: 15)
In Europe, research conducted by Tsiachristas et al. (2013) investigated in detail integrated care payment schemes in Austria, England, France, Germany and the Netherlands. The incentives can be financial, ethical, ingrained in an organisational culture or governance-related. Their effect may be immediate or lead to long-term and lasting changes. There is a necessity to review and discuss adequate payment schemes for new and more complex operational set-ups because traditional payments do not, by nature, consider these changed conditions. Time-bound or instance-based payments for visits do not adequately mirror a treatment process that is less well-defined in terms of the start-point and end-point of a single patient visit to a clinician or health professional.

In order to derive the best care-related outcomes while fairly accounting for and distributing financial risk, Tsiachristas and colleagues (2013) suggest aligning incentives across different stakeholders. Payers want resources to be allocated efficiently (which is meant to effectively lead to an impactful integrated care delivery): this result could be fostered through population-based payments. Providers want to provide integrated care, which could be financed through various means such as bundled payments, pay-for-coordination and pay-for-performance. Patients want to use this service and contribute to prevention and the self-management of their diseases: this can be supported by waivers, reductions or discounts for the contributions that they themselves are making to achieve these goals, such as by following a healthy or sports-related lifestyle. Ultimately, the conclusion is that “integrated care requires integrated payment” (see Figure 12).

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81 Ibid.
82 Ibid.
In contrast, misaligned incentives may lead to adverse behaviour from individual stakeholders, which will ultimately impact the outcome of the care process. Such barriers can include gaming the system, inflexible task allocations, or a lack of transparency. A review of the facilitators and barriers underlying these payment schemes is presented in Figure 13.

The recommendations made by Tsiachristas and colleagues are to consider thoroughly the medical and professional context in which integrated care is to take place and to adjust payments accordingly. This means offering a selection of reward schemes to choose from, using incentives that address the individual and the group as a whole, and paying a premium.
for certain risks. This also includes a balanced approach to incentives and disincentives and using a mix of absolute and relative targets to measure and meet desired care outcomes\textsuperscript{85}.

This approach is shared by Berenson et al. (2016b) who described selected payment schemes from the perspectives of different stakeholders and from the aspect of the compatibility that these schemes share with one another. Their study argues that condition-specific bundled episode payments and global capitation are particularly well suited as base payments for integrated care: they can be complemented by shared savings and pay-for-performance schemes as increment payment. A breakdown of the perspectives that funders (such as Ministries of Health or insurers), users (such as Healthcare Providers (HCPs)), and beneficiaries (such as patients) may have on each of these four payment schemes is depicted in Tables 7 and 8 respectively\textsuperscript{86}.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\textbf{Funder} & \textbf{User} & \textbf{Beneficiary} \\
\hline
\textbf{Activity-based: Condition-specific bundled} & • Combine accompanying conditions and delegate responsibility to HCPs for a collaborative management of the patient
• Request test results to avoid false diagnoses
• Request claims form to document diagnoses
• Fees based on historic costs build in prior negotiation leverage
• Bundling healthcare providers creates negotiation leverage which may raise prices & • Risk adjustment required and handling of multiple chronic conditions
• Gaming the system from primary recipient by not referring the patient for additional (costly) procedures
• Normative pricing based on community averages penalises more costly providers who may not participate & • Population-based measures need to be in place to monitor whether or not a cohort may be stinted from services
• Patient-reported outcomes can serve as a quality measure \\
\hline
\textbf{Population-based: Global capitation} & • Responsibility for managing medical care costs are directly transferred to the HCPs
• Sharing of risks (e.g. based on patient’s health status) with HCPs may be necessary
• Integrated HCPs may develop negotiation powers that lead to higher prices
• Requirement for quality measures including referral appropriateness and for balancing disincentive to stint on prevention activities & • Prepayment provides ongoing cash flow
• Flexibility to determine the best mix of services
• Purchase of reinsurance as insurance and technical risks are taken which requires a sufficient patient population to spread these risks
• Lack of infrastructure including administrative system to manage financial risk & • Integration of services likely as opposed to maintaining a siloed environment
• Limited freedom of selecting HCPs as theses form integrated care organisations
• Risk on HCPs may cause patients to be held away from care \\
\hline
\end{tabular}
\caption{Stakeholder views on base payments for integrated care\textsuperscript{87}}
\end{table}

\textsuperscript{85} Ibid.
\textsuperscript{86} A more detailed description of these and an additional five payment schemes can be found in Appendix III.
Table 8. Stakeholder views on increment payments for integrated care

<table>
<thead>
<tr>
<th>Funder</th>
<th>User</th>
<th>Beneficiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Based payment quality measures remain in place</td>
<td>• Incremental reward or penalty in addition to base payments which leads to limited incentive to completely reinvent the organisation</td>
<td>• Ability to chose between different HCPs remains</td>
</tr>
<tr>
<td>• Continued base payment may outweigh incentives for shared savings</td>
<td>• Achievable targets with low risk-bearing</td>
<td>• Profit from savings?</td>
</tr>
<tr>
<td>• Integration of HCPs provides them as a group and individually with negotiation leverage regarding their base payments which may outweigh targeted savings</td>
<td>• Once easy savings have been made, new savings may be hard to achieve, especially when an organisation has outperformed expected spending</td>
<td></td>
</tr>
<tr>
<td>• Threshold required?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Split of shared savings between funder and user?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What emerges from this comparison is that risks play an important role in the ability and will of healthcare professionals to accept certain payment schemes. **Funders may be well advised not to shed risk fully but to share it in supporting their clients.** Simultaneously, integrated care can put funders in a difficult negotiating position because integrated organisations are able to develop **bargaining power** by rejecting collectively to participate when certain of their demands are not met. From the perspective of patients, it is essential to make sure that there is a certain degree of **freedom of choice** when using a particular healthcare organisation and it is important to be treated based on quality of care rather than inaccurate metrics. The 2016 study concludes as follows:

“Anticipating and addressing operational challenges in design through accompanying policies and oversight may resolve the concerns. Yet, sometimes, implementation challenges may make a conceptually logical payment method too difficult to actually put into place.” (Berenson et al., 2016: 3)
Financial incentives introduced purely to urge adoption of interoperable eHealth solutions will be doomed to failure as they will be unsustainable once the incentives are gone. For the importance of non-financial incentives, see particularly section 5.4 of this chapter.

5.3 Smart procurement as a strategy to boost adoption of interoperable solutions

eHealth investments should be understood as strategic change management projects. Procurement can play a massive part in bringing the market forward, and can be a key stimulus for greater competition through the mandating of particular standards. A market perspective would postulate that issues of interoperability will be solved most efficiently through payment mechanisms and through the incentives that payers would create once the appropriate reimbursement scheme is in place. In spite of European regulations regarding the adoption of standards, ultimately interoperability depends predominantly on the intention of vendors to be interoperable. The intention of the vendor to be interoperable in turn depends on the procurers recognising the value of interoperability and specifying interoperability as a necessary criterion when implementing procurement guidelines.

5.3.1 Supporting guidelines and profiles development and uptake

National and regional agencies should ensure that guidelines and profiles developed by consortia and fora are widely disseminated in an understandable format, their benefits understood, and their implementations supported – this would include clear regulatory guidance to procurers. Procurers must become legally empowered to include interoperability requirements in tenders. Commercial clarity on the use of standards is necessary, especially when procurement is devolved to a local level and is undertaken by non-technical partners such as general practitioners (GPs) who have neither the time nor inclination to learn ‘standards speak’.

Uptake of guidelines and profiles could certainly benefit from meaningful financial incentives. This could be achieved more easily if mechanisms were established through which the procurement of an interoperable solution is rewarded, as is the case of the “meaningful use” requirement in the USA. At a European level, for example, the Renewing Health large-scale pilot provided a technical specification for use in procurement and a basis for cooperation in the implementation of an interoperable eHealth solution. On EU level, regulations and guidelines from the EC have been supporting standards-based procurement. Under the Regulation (EU) No 1025/2012 on European standardisation, one objective is to review current ICT standardisation policy to enable referencing to selected ICT technical specifications in public procurement. Criteria for procurement presented in the regulation include market acceptance, interoperability, alignment with European standards, etc. The more up-to-date Directive 2014/24/EU on public procurement as well provides guidelines for MSs to formulate technical specifications in public procurement procedures referencing to national standards, European standards and international standards (see Article 42

88 http://www.renewinghealth.eu/en/
The healthcare sector should adopt guidelines to facilitate the application of the transposition of these regulations in eHealth procurement.

An interesting example of innovative procurement is the UK national framework agreement for telecare through which 13 prime suppliers were able to deliver 2,800+ products in the field of telehealth and care. Most suppliers did not show a drive to conform to national or international standards which erected unintended and unforeseen barriers to innovation and interoperability. The framework agreement thus severely lacks flexibility to accommodate new offerings and new added value services. It is clear that there is a need for technical education amongst procurers. Forward thinking procurement, e.g. flexible contract models that includes plans for later service expansion, is needed to accommodate the continually evolving scene of eHealth interoperability. In the case of Northern Ireland, when procuring the country’s national telemonitoring solution, additional future services with specified costs were included in service contracts. Such planning makes the initial investment more efficient and introduces cost savings. The inclusion of legal expertise at an early stage in a project is also advantageous, as it can guarantee the compliance of all project work with regulation.

5.3.2 Shifting the influence to procurers and the users

The development of clear requirements for interoperability solutions is another aid to the smooth running of the procurement process as it means that vendors are able to respond appropriately to needs. The requirement development process is one means by which procurers can exert influence on the supply chain, can match the influence of suppliers and thus achieve a balanced procurement. Estonia achieved this through applying standards and uniting the purchasing power of the healthcare market when investing in their EHR and the Estonian National Health Information System (ENHIS). In Germany, Northern Norway and Northern Ireland, feedback was provided to bidders and extensive specifications employed in conjunction with negotiations; this tactic ensured that influence shifted to the procurers and thus facilitated a better final offer matching the need for interoperability.

Support can also be achieved by embedding procurement for interoperable solutions in a wider eHealth strategy, whether on the level of a region or a country. This creates standardised investment paths with which to speed up the process. Any personnel involved in the procurement process must also be specially selected to ensure that they have the necessary skills and knowledge to handle the process. Solutions include e.g., hiring external specialists; training a diverse team with flexible skills sets; or involving all members of an organisation in the procurement process which would mean that a very large variety of experiences could be exploited. In this case, the procurement of an interoperable solution would be planned as part of the redesign of the whole service. When the procurement process of the redesign of a service is carried out through user involvement, it ensures that all relevant features are included and the system is intuitive to use. The end-users are familiar with the system and recognise (through "buy-in") that they have had a stake in its development. A sense of involvement and clear feedback offer reassurance to the users that their views are being considered. In Uppsala, Sweden this was achieved, when the county-wide EHR was developed, by implementing an electronic issue tracking system where end-users could register their problem or observation and then monitor its progress along the
reporting pathway until it was resolved. Users may accept a solution more quickly and easily when they are engaged in the development and can understand why it is being implemented.

5.4 Care process interoperability and organisational culture

Setting up integrated care processes will require the establishment or re-organisation of inter-organisational processes. This means that change management efforts will have to be conducted in all of the organisations that are involved in the new process.

For illustrative purposes, Figure 14 maps such a healthcare ecosystem: the figure is an abstract representation only. In reality, use cases will need to be interpreted and evaluated in their national contexts which currently vary substantially.

Figure 14. The healthcare ecosystem

A comprehensive and thorough comparison of 28 countries is provided by The Health Systems and Policy Monitor from the WHO which describes in detail the set-up of each of those 28 national systems. Hence, managing change in the healthcare sector requires both a holistic and yet detailed approach. There are many individuals within a network of institutions whose buy-in is needed to change inter-organisational processes.

The European Innovation Partnership on Active and Healthy Ageing (EIP-AHA) has conducted a review of barriers that are present within any given organisation. This review was undertaken by the partnership’s B3 action group on integrated care. The partnership received survey responses from 25 individuals who are actively involved in the EIP-AHA.

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92 http://www.hspm.org/mainpage.aspx
results of the survey show that five out of the 11 frequently encountered barriers are found across all four phases of a project lifecycle (see Table 9 below).

Table 9. Challenges in healthcare system change management (table by authors) (Challenges are: Red – Very strong; Orange – Strong; Yellow – Medium; Green – Weak)

<table>
<thead>
<tr>
<th></th>
<th>Planning of change</th>
<th>Adoption phase</th>
<th>Full scale implementation</th>
<th>Continuous improvement after deployment</th>
<th>Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of funding</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Stakeholder resistance</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Inflexible information</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Lack of adequate incentives</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Lack of recognition of the need for change</td>
<td>9</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Lack of leadership</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Lack of vision</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Inadequate skills</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Pressure for short term results</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Unstructured approach</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Lack of time</td>
<td>11</td>
<td>11</td>
<td>9</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

These barriers can be classified into four groups. The strongest barriers are a lack of funding and stakeholder resistance. This immediately highlights the need for getting funders on board as well as involving staff from the beginning of the change process so as to provide the possibility for co-designing processes as well as decrease fears. These barriers are followed by two other items, inflexible information and lack of adequate incentives. A thorough communication strategy and a meaningful incentivisation strategy are helpful in reducing these barriers and increasing a project’s success. All of these items are within an organisation’s own control. Hence, these barriers are not insurmountable. Rather, they are obstacles that can be overcome when addressed appropriately.

Looking beyond Europe, the Report of the Global Diffusion of Healthcare Innovation (GDHI) Working Group (2015) studied in detail eight cases of ICT introduction and innovation in healthcare systems, namely two in the USA and one each in Argentina, England, Nepal, Singapore, Sweden and Zambia. These cases are telling insofar as they tackle different health topics and are embedded in national healthcare systems and socio-economic settings.

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According to the GDHI, change management is most effective when internal and external stimuli are in place and when these efforts are consciously managed and well executed: “[O]ur case studies show that a carefully planned and guided change program with a dedicated support structure can overcome obstacles, transform systems and bring value more rapidly to clinicians, patients, healthcare organizations, insurers and payers, and the wider society.” (GDHI, 2015: 6)

The underlying **process model** shown in Figure 15 focuses on innovation (it runs through three sequential phases that lead towards organisational transformation, symbolised through a black and grey band half-way down the diagram). Innovation is supported through **top-down enablers** (in green) such as vision and leadership, transparency of research, data and communication channels, and **bottom-up frontline behaviours** (in blue) such as an engaged public and social demand for innovation, addressing the concerns of professionals, and a tailoring and manifestation of the solution in the wider context. Transformation is reached because a climate for change is created as the foundation of this process. Internally, this includes providing the workforce with time and space for learning and the opportunity to change their behaviour. Based on this approach, everyone in the organisation can become engaged. Once best practices have been identified, new policies and practices can be further adjusted and tailored to the existing landscape to make change permanent and sustainable.

![Figure 15. Drivers for innovation in the healthcare ecosystem (GDHI, 2015: 35)](image-url)
Accompanying the HITECH Act and its programs using financial incentives to boost meaningful use of EHR mentioned in Section 5.2, the US Office of the National Coordinator for Health IT (ONC) created the Beacon Communities initiative\(^\text{95}\) to integrate top-down enablers and bottom-up frontline behaviors drivers for EHR implementation. Funding of 250 million US dollar was offered to 17 recognized Beacon Communities throughout the country to test innovation approaches for using connected eHealth technology to enable health data quality improvement and interoperability across communities’ network. A learning guide\(^\text{96}\) has been published to report lessons and insight gained from the initiatives and four implementation objectives were proposed to serve as reference for strategies to ensure data quality and interoperability:

- Identify and Engage Physician Champions and Stakeholders and Jointly Develop Vendor Engagement Strategy
- Identify Measures, Identify and Map Data Elements, and Conduct Initial Data Quality Review
- Develop and Implement EHR Data Quality Improvement Activities
- Establish Process To Continuously Monitor EHR Data Quality and Resolve Data Quality Issues

These four proposed principles are aligned with the frontline behaviour transformation indicated in the process model in Figure 15.

5.5 Non-financial incentives

There are also non-financial incentives which enable consistent support to clinicians. These may contribute in playing a role to tackle barriers to EHR adoption and implementation. Table 10 below lists examples of possible non-financial incentives according to stakeholder tiers.

<table>
<thead>
<tr>
<th>Table 10. Non-financial incentives according to stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-financial incentives</strong></td>
</tr>
<tr>
<td><strong>Provider (Vendor)</strong></td>
</tr>
<tr>
<td>- Recognition</td>
</tr>
<tr>
<td>- Availability of Standard Templates</td>
</tr>
<tr>
<td><strong>User</strong></td>
</tr>
<tr>
<td>- Recognition</td>
</tr>
<tr>
<td>- Education and Training</td>
</tr>
<tr>
<td>- Employment of Support Staff</td>
</tr>
<tr>
<td>- Demonstration of Benefits</td>
</tr>
<tr>
<td>- Suitable Implementation Assistance and Strategies</td>
</tr>
<tr>
<td>- Person-centred Care Contracts</td>
</tr>
<tr>
<td><strong>Beneficiary</strong></td>
</tr>
<tr>
<td>- Demonstration of Benefit</td>
</tr>
</tbody>
</table>

Each of these non-financial incentives is explored systematically in the six sub-sections that follow. Many of the experiences and examples cited come from north America (both Canada

\(^{95}\) https://www.healthit.gov/policy-researchers-implementers/beacon-community-program

and the USA), and either the UK or England specifically. Many of the factors provide contrasts between the attitudes and behaviours of adopters and non-adopters.

5.5.1 Institutional and social recognition

Recognition is one category of non-financial incentive. It can be further classified into institutional and social recognition, as is seen in Table 11 below. In order to fully account for the spectrum of means that are available as motivation in terms of recognition, both incentives and related disincentives should be considered. Incentives aim to promote and reward desiring behaviour and activities; while disincentives target non-conforming behaviour or non-compliance with established standards (e.g. codes of conduct or codes of behaviour or simply company or employee rules).

<table>
<thead>
<tr>
<th>Table 11. Types of recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional Recognition</strong></td>
</tr>
<tr>
<td>Incentives</td>
</tr>
<tr>
<td>+ Certification of actors</td>
</tr>
<tr>
<td>+ Rotating presence in governance body</td>
</tr>
<tr>
<td>+ Invitation to pilot participation</td>
</tr>
</tbody>
</table>

Having a recognition mechanism in place enables healthcare providers who conform and comply with established standards to know that their effort is appreciated. Recognition is especially important for industries involving professionals of various sorts. High performing professionals might not necessarily expect rewards but they will expect to be recognised. Healthcare providers are often concerned about their image as perceived by the public: it becomes a key motivation for them to improve and comply with standards when recognition by authorities is involved. The English National Health Service (NHS) has found recognition useful as a lever to influence healthcare providers’ decision and behaviour.

Another alternative, besides extra recognition or accreditation schemes, can involve including the knowledge and skills for eHealth interoperability as a requirement for certificates for healthcare professionals. In a 2005 survey concerning the HITECH Act in the USA, four out of 10 adopters admitted that the major influence in their decision to adopt an EHR is that adoption is a board certification requirement, and 44% of non-adopters mentioned that this would be the major driver of their potential adoption.


Recognition as an incentive to adoption and implementation of interoperable IT solutions applies not only to users, such as healthcare providers, it also applies to providers, especially eHealth solution vendors. Industrial partners’ effort to create interoperable eHealth solutions will depend highly on the market for and uptake of their products. The recognition and accreditation of authorities do not only aim at motivating intrinsically the designer and vendors to create interoperable solutions, it also serves as a guideline for the buyers and users of these solutions. This will affect market and procurement decisions, and eventually influence the choice of products which vendors present to the market.

5.5.2 Availability of health record standards

A significant barrier to implementation is the current inability of eHealth innovations to connect and share information effectively with external entities. Physicians in Canada, for example, have claimed that they would be more willing to adopt EHRs if external connectivity could be improved. There is also hesitation in committing to a vendor product if a technical platform were to become obsolete in the future, and there would be changes in the requirements for connectivity to external sources of data.

Health data serves many purposes in the contemporary healthcare environment, but fundamentally it is the foundation of high quality, safe patient care. The establishment of healthcare record standards addresses this need as it is through the input of structured and qualified information that the communication of records between practices is made possible. Standards for the clinical structure and content of patient records were already created and published in the UK in July 2013. They promote not only the quality of standard data input by clinicians but also facilitate the development of interoperable EHRs and eHealth solutions from vendors by making standards available and transparent and highlighting solutions which are compliant with national standards and interoperable on a national level.

5.5.3 Training, education and employment of support staff

When talking about the adoption and implementation of eHealth solutions, it is essential that the people accountable for performance have the knowledge and tools to fulfil the requirements so as to avoid discrepancy of performance across clinicians aroused purely due to the lack of knowledge and skills.

A 2010 satisfaction survey reported that 72% of physicians felt they could benefit from more training to advance their use of EHRs. On the one hand, it has been suggested that clinicians and practice staff do not have the technical competencies to be comfortable around eHealth systems. On the other hand, it was found in a Canadian study that clinicians were unsatisfied not only because too little training was provided to them, but also because the training came too soon after implementation. At such a preliminary stage, physicians still had insufficient experience with their systems to be able to ask meaningful questions in the

104 https://www.rcplondon.ac.uk/projects/healthcare-record-standards
training setting. It is therefore to be recommended that training programmes must be continuous, well-timed, and targeted\textsuperscript{107}.

Other options include training specific persons to be highly specialised in technology and/or eHealth innovation. This may serve as an approach to combat concerns about time constraints. (In particular, a barrier to the successful procurement and implementation of eHealth innovations is the time commitment required to manage administrative tasks such as researching, acquiring and being trained in innovations.\textsuperscript{103} See Chapter 5.3 of this deliverable for approaches that deal with procurement.) A Canadian study reported that the presence of a leader (whether a clinical or organisational leader) who is regarded by peers to have a strong knowledge of technology was the most important facilitator of adoption for the study site\textsuperscript{108}. Physicians in a variety of specialties reported that shifting certain tasks in the EHR to clerks and transcriptionists reduced the degree of interference with their own face-to-face patient care and the quantity of below-license work.\textsuperscript{109} One of the initiatives of the American Medical Association has been to work with policymakers and others concerned about institutional liability to “liberalise” the ability to use office support personnel to reduce physician “clerical work” related to eHealth use.

In addition to training focusing on health technology and system, system independent education is also brought up during workshops as one of the major needs. Investments need to be made to training frontline staff in information and knowledge management, and in how to leverage the value of ICT in their activities. This enables the understanding of benefits and value brought by eHealth, and motivates frontline staff to take over the responsibilities to adopt and take advantage of health IT.

5.5.4 Demonstration of benefits

A major barrier to the uptake of interoperable solutions in the healthcare sector is the doubt shared by healthcare providers and clinicians of the benefits they will experience. In a study in Canada\textsuperscript{110}, clinicians expressed concerns regarding whether there will be a positive return on investment and whether the benefits of implementing an EHR outweigh the costs (costs include purchasing, coordinating, monitoring, upgrading and governance)\textsuperscript{111}. Benefits have to be demonstrated to convince clinicians to put in the additional effort and go the proverbial “extra mile”, in comparison to their current workflow, to adopt such eHealth solutions. Evidence also needs to be provided for the added value of semantic interoperability to convince healthcare funders, procurers and clinicians to commit to the changes needed in the longer-term (these are topics likely to be covered by the work of VeH WP5).

Despite the availability of research literature showing the various socio-economic benefits that interoperability can bring due to improved care coordination, safe prescription, and so


\textsuperscript{110} The emerging benefits of electronic medical record use in community-based care. Canada Health Infoway, April 2013.

\textsuperscript{111} Boonstra, A. & Broekhuis, M. 2010. Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. BMC Health Serv Res., 10, 231.
on, it is also crucial to display the advantages which clinicians can experience first-hand so as to boost their adoption. Examples include decision support system using interoperable data; workflows that are streamlined by automatic information exchange; clinically useful analyses that operate by using healthcare providers’ own hospital or clinical trust’s routine data: all of these can act as strong incentives for clinicians to achieve the better information management and higher data quality which facilitate interoperability. The sharing of experiences from early adopters and successful pilot sites can contribute to the demonstration and promotion of benefits to healthcare providers who still have their concerns and doubts.

Besides demonstrating the benefits of eHealth interoperability to health professionals, it is also necessary to educate patients on the subject of healthcare interoperability. A survey by the Pennsylvania eHealth Partnership Authority has shown that fewer than 50% of patients were aware of the benefits that health information exchange could offer, and only 28% knew that, in the USA, the healthcare industry is in the process of establishing information exchange standards\footnote{http://www.paehealth.org/resources?id=251}. Educating patients and raising their awareness on the benefits of health information interoperability encourages them, in contexts in which they have the opportunity for choice, to choose services from healthcare providers who have interoperable solutions in place and conform to standards. This approach works in a similar way as self-regulation in the demand and supply of interoperable eHealth solutions between users and vendors influenced by authoritative recognition.

5.5.5 Suitable implementation assistance and strategies

In the USA, assistance with selecting a suitable EHR and associated technical assistance in implementation were rated among the top six factors which affect the adoption decision of physicians. Among physicians who had not adopted EHRs, about half indicated that provision of technical assistance in implementation from the authorities would act as a driver for adoption\footnote{http://www.oha.com/KnowledgeCentre/Library/HealthReportsAndProtocols/Reports%20and%20Studies/Incentives%20for%20Transformation%20of%20Health%20as%20a%20Strategic%20Health%20System%20Priority.pdf}. Help from health authorities and national contact points is crucial. Guidelines and advisory mechanisms have to be in place to mitigate the insecurities of healthcare providers concerning interoperable EHR selection and technical implementation. User-friendly and intuitive interoperable solutions may also be officially recognised so as to facilitate their active selection and procurement.

Regional diversity regarding priorities, expertise and readiness confirms that a one-size-fits-all approach to eHealth adoption and implementation will not be effective\footnote{Gagnon, M. P., et al. 2010. Implementation of an electronic medical record in family practice: a case study. Informatics in primary care, 18(1):31-40.}. As mentioned in Chapter 5.2, with the exception of an adjustable incentive payment mechanism to accommodate the needs and system structure of various stakeholders, non-financial aspects also have to be managed in a flexible way so as to help increase the adoption of interoperable solutions. Indeed, clinicians have indicated that they value highly having an implementation strategy that is customised to their local environment and their pace of adoption.\footnote{Gagnon, M. P., et al. 2010. Implementation of an electronic medical record in family practice: a case study. Informatics in primary care, 18(1):31-40.} This requires thorough communication and understanding between the policy and organisational levels of healthcare provision. Support and guidance from Member States and health authorities should match individual needs and resources provided to healthcare providers concerning interoperable EHR selection and technical implementation.
providers for interoperability implementation should be allowed to be allocated in areas of individual priority.

5.5.6 Person-centred care contracts

Accompanying the transformation of health systems into the era of integrated care, health authorities, insurers and commissioners should take the opportunity to promote person-centred care contracts. According to the Picker Institute Europe\textsuperscript{115}, key principles of person-centred care include, but are not limited to: (i) fast access to reliable health advice; (ii) effective treatment delivered by trusted professionals; (iii) continuity of care and smooth transitions; (iv) clear, comprehensible information and support for self-care. All of these require healthcare providers to exchange health information, collaborate and co-ordinate care. eHealth interoperability will be a prerequisite to achieve effective care processes within the scope of person-centred care. The use of healthcare contracts which have person-centred care as their basis would urge healthcare providers to employ interoperable standards and solutions so as to ensure efficient communication and collaboration among each other.

\textsuperscript{115} \url{http://www.pickereurope.org/about-us/principles-of-patient-centred-care/}
6 Next steps

This deliverable has surveyed a set of preliminary work in relation to WP3, through both a review of the literature and the results of a set of practical initiatives including projects. It has brought together various fields of investigation with a particular emphasis on adoption challenges and success strategies. It has shown that integrated governance models, integrated payment schemes, procurement as a strategic enabler, and change in both organisational culture and front-line staff behaviour through leadership are among the most essential elements for the successful adoption of interoperable solutions in the healthcare domain. It also presents a VeH value chain model and a typology of incentives including an overview of the need for integrated payments.

Among the next steps in WP3’s work, WT3.2 will set out to validate these findings with the help of an incentivisation workshop and expert interviews. To further illustrate the practical applicability of these concepts/models, it is envisaged to identify and compare three empirical instances of integrated payments and to analyse how they are regulated and governed, what they consist of, and what their impact is on eventual care processes. This output will help gauge whether or not the VeH value chain model needs to be revised to include partners and enablers, and whether to transpose the incentivisation strategies presented in Section 5 of this deliverable into a matrix format.

The validation and feedback for well regulated, integrated incentivisation and payment schemes will then result in two artefacts:

- A roadmap will be focused on directions to be taken by the EC and the MSs. It will include specific and actionable steps that can be followed until and beyond 2020.
- A ‘cookbook’ will include guidelines and checklists to be developed for MSs and HCPs. Both will be able to use it to their support decision making at different phases of the product development cycle, including the scaling up strategies needed.
Annex I: Stakeholder engagement workshop minutes

The first stakeholder engagement workshop that was held by VALUeHEALTH (VeH) took place on 23rd September, 2015 at the Airport Meeting Centre in Brussels, Belgium. Overall 25 participants came together to be briefed on the vision of the project and to discuss use case prioritisation, stakeholder engagement, and barriers and related incentivisation schemes from the perspectives of each of the four stakeholder tiers. Discussion on incentivisation schemes was done in two parallel breakout sessions.

Below are the minutes of each of the breakout sessions on optimising the value chains.

Breakout Group C (1): Optimising the value chains for the VeH use cases

Participants (in alphabetical order):

- Strahil Birov, empirica
- Constance Colin, CPME
- Jacob Hofdijk, partner in Casemix
- Marcello Melgara, LISPA
- Veli Stroetmann, empirica
- Geert Thienport, RAMIT
- Jeremy Thorp, HSCIC

Work in breakout group C (1) commenced by looking at the different use cases, allowing for some useful observations to be documented.

The use cases are about supporting transformational change, so that the patient is at the centre rather than the traditional interchange of data between organisational silos. This approach was highly appreciated by the experts in the breakout group.

Some use cases cover generic functions (e.g. access to activity data in a) and c), planned activity in b), d) and e)) and some cases are specific instances of others (e.g. d) is an instance of b), which leads to the question whether these dependencies should be reflected in the assessment process.

Some use cases (e.g. a) and c)) may lend themselves to cross-border; others (e.g. d)) less so.

Use cases typically require involvement of multiple parties and organisations.

**Barriers:** The potential barriers to adoption of the use cases discussed in breakout session C1 were liability, confidentiality and ethics.

**Benefits:** In terms of benefits, it seems that the prime beneficiary in each case is the citizen, but the benefits may be societal and not just financial.

**Incentives:** Similarly, besides financial incentives, there may also be incentives linked to professional standards. For example, unifying the patient summary record helps battle custom/proprietary solutions for different regions, which can be seen as an incentive for industry that does not want to manage several releases. Another example provided by the experts was the Blue Line concept that has been developed in the Netherlands.116

Breakout Group C (2): Optimising the value chains for the VeH use cases

Participants:

- Alex Berler (Integrating the Healthcare Enterprise, Greece)
- Charly Bunar (empirica)
- José Luis Cobos Serrano (Spanish General Council of Nursing)
- Victoria Hedley (European Union Committee of Experts on Rare Diseases Joint Action Assistant Manager, Newcastle University, England)
- Henrique Martins (Portuguese Ministry of Health)
- Diane Whitehouse (EHTEL)

The aim of breakout group C (2) was to focus on two use cases. The group identified who uses, who benefits, and who pays in the two use cases of Public Health, and Research, in order to optimise the underlying value chain. The discussion built on the example of Population Health Comparisons, with a focus on Rare Diseases (which combines elements of public health and research).

**Stakeholder-perceived value**: The main discussion of the breakout group was that the perception of net value generated by a case depends on the stakeholder. For example, Tier I and Tier II institutions may value economic gains, while Tier III and Tier IV individuals may strive more for care-related values (see Figure 1 below).

Feedback was given on the definition of Tier II and Tier III stakeholders. There should be a differentiation among Tier II stakeholders (i.e., between the pharmaceutical industry and ICT industry), and the insurance industry should also be included to the list. The list of Tier III stakeholders should incorporate professions or bodies that link practice and research, such as research nurses.

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**Figure 16**: The four tiers of interoperability stakeholders, as identified by the SemanticHealthNet project

117 [http://www.semantichealthnet.eu](http://www.semantichealthnet.eu)
Production of value - public health and value for industry: Public health was considered by the session attendees as a public good. Regrettably, a societal shift in the 20th century from the “responsible citizen” to the “individual consumer” has given rise to public scepticism about public good(s) associated with abstention from activities such as having vaccinations and giving blood donations. Revival of individuals’ consciousness of the public and its needs is seen as an important value-based pillar of activity. (In fact, it was said that individuals/patients are often prepared to contribute to the production of value if they do it for their own health.)

A challenge that now also needs to be addressed is to encourage patients and healthcare professionals to understand that it is alright to produce value for industry, i.e. that there is an aggregated economic gain for countries when the companies that are based in them are productive and, as a consequence, pay company taxes. Various suggestions were made. One was to earmark specific types of taxes e.g., corporate taxes, and to invest these in designated commitments e.g., on local health care or public care.

Data entry and creation of value for countries: Two suggestions were made about facilitating data entry. One was that individuals could be offered tax incentives to be data-enterers (or enterers of their own data, including health data) i.e., as a part of “the sharing economy”\(^\text{118}\). Another was to emphasise use of technologies characterised by ease of use and a focus on user responsive design that incorporate principles, such as gamification, that contribute to sustained take-up.

The discussion eventually centred on the topic of data that is at the heart of population health comparison. Population health comparison acts as the intersection where individuals as data providers, professionals as data registrars, and industry and research as data users meet. A number of questions arose, however. Can the pharmaceutical industry’s provision of free databases to healthcare provider organisations and healthcare professional organisations be considered as not-for-profit funding or as purchase of data? Who owns the data acquired and has access to the data? Are these terms and conditions static or will they change over time?

In the United States of America, through the meaningful use\(^\text{119}\) of data and technology, it is hoped to yield large returns for all stakeholders in the healthcare sector. The workshop attendees agreed that a mediating process is necessary to create awareness, transparency and mutual trust between the actors involved so as to build the foundation for consensus and agreed next steps.

In Europe, there is no centralised European governance body for Population Health Comparisons\(^\text{120}\); this absence leads to national and regional implementation variations.

Yet, the multiple beneficiaries in this example could lead to shared funding of the ecosystem\(^\text{121}\) if it were to be co-ordinated well.

As a pun, it was noted that eHealth can stand for both “electronic health” as well as “economic health” i.e. in which individuals can gain generally “more health” on a more economic basis.\(^\text{122}\)

\(^{118}\) https://en.wikipedia.org/wiki/Sharing_economy

\(^{119}\) http://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives

\(^{120}\) Although not mentioned during the meeting, the European office of the WHO may fulfill this role.

\(^{121}\) See e.g. David. S. Evans, Managing the Maze of Multisided Markets, http://www.strategy-business.com/article/03301?qko=16442
Annex II: Business modelling workshop minutes

All the breakout sessions during this workshop took place under time pressure since the workshop lasted for only a day-and-a-half.

Coverage of incentives during the January 2016 VALUEeHEALTH workshop

Generally, the workshop's focus was on brainstorming. The workshop did not directly cover incentives since it was focused instead, more generally, on business models. However, the two ways in which incentives have been identified as having nevertheless been covered – directly or indirectly – are discussed below. This set of notes is structured to address the coverage of incentives at the workshop in terms of:

- General background.
- Two use cases: Safe prescribing; Integrated care represented by both diabetes and European Reference Network(s) on rare conditions.
- A brief summary, including some indications of where further study on incentives may be necessary.

General background

The various breakouts during the January 2016 workshop tended not to cover the issue of incentives directly or in detail. Generally, the mention of words starting with the stem ‘incent...’ was rare.

**Direct mentions:** Where a direct mention of such a word was identified, it is noted in this short document.

**Indirect mentions:** Two sorts of indirect mentions of incentives can be considered a) use of words with similar meanings to ‘incentive’ e.g., motivation; encouragement; and, more explicitly from a monetary perspectives, payment; and b) less explicit discussions of the topic as a whole. For example, the topics of value propositions, customer relationships, and revenue streams may all have relevance for the challenges of identifying appropriate incentives. Similarly, incentives were covered by the question posed to the breakout attendees in breakout session 3) when they were asked to identify answers to the question, “What’s it in it for me?”, in terms of clinical, economic, patient-centred (‘humanistic’) and societal benefits.

The two use cases

The coverage of incentives in terms of the two use cases (safe prescribing; integrated care in relation to both diabetes and European Reference Network(s)) is examined here.

**Incentives and safe prescribing**

These notes cover both the direct and indirect mentions of incentives referring to safe prescribing.

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Direct mention of incentives for safe prescribing

In terms of safe prescribing, “incentives” or “incentivisation” was mentioned only once directly i.e., in terms of the incentives for health care authorities on identifying enablers within the multi-stakeholder value chain. More widely, enabling safe prescribing was thought to be stimulated by such enabling factors as new legislative frameworks for health, prescribing, safety and security that will influence attitudes to prescribing safety, legislation on counterfeit medicines, universities, third party payers, insurers and also help raise awareness. Regulation was also raised under other circumstances, as an indirect kind of incentive.

Indirect mention of incentives for safe prescribing

Value propositions examined in the safe prescribing use case focused on the three issues of patient safety, economic aspects and decision support systems to benefit a wide variety of health care professionals, among others.

Under safe prescribing, four types of benefits were examined from the perspectives of four types of stakeholders: governments/public health authorities; industry, especially the software industry; prescribers/dispensers; and patients, citizens and employers (i.e., society). Economic benefits were identified for all four stakeholders; however, the three other benefits were named for only three stakeholders each. No clinical and no patient-centred benefits were mentioned for the software industry. Most revealingly, no societal benefits were mentioned for patients/citizens/industry.

Taking the single example of governments/health agencies, the perceived clinical, economic, patient-centred (humanistic) and societal benefits of safe prescribing included:

- Clinical: A healthier population with improved health outcomes.
- Economic: Optimisation of the efficiency of the healthcare systems, with reduced healthcare costs, reduced drug-related hospital admissions, and (possibly) cheaper pharmaceuticals.
- Patient-centred (humanistic): Improved patient safety and satisfaction, with safer use of medicine, and the avoidance of up to 20,000 deaths through incorrect prescriptions.\(^{123}\)
- Societal: Implicitly, expanded public support of government (public) health actions; avoidance of prescription errors and better reporting; better adherence/compliance to prescriptions; and, last but not least, reduced costs (i.e., less loss of life, and improved procedures through reduction of use of unsafe drugs).

The design of revenue streams need to be based around the diversity of users involved in benefitting from and using safe prescribing. The range of revenue streams is interesting in terms of many suggested items being oriented around different fees mechanisms e.g.,

- Membership fees or subscriptions including on the basis of willingness to pay.
- Indirect revenues appear to materialise through savings made in certain domains (providing, one assumes, that those savings are fed back into the revenue stream).

\(^{123}\) In addition, one participant gave the example of Sweden where he argued, more generally, that 40% of prescription drugs in Sweden could be avoided.
• Some innovative new transactions might lead to additional revenues e.g., localised or regionalised 3D printing of medicines and a more committed use exploration and use of pharmacogenetics.\(^{124}\)

**Incentives and integrated care in the case of diabetes**

These notes cover both the direct and indirect mentions of incentives referring to the integrated care focused on diabetes.

**Direct mention of incentives for diabetes**

In terms of the value propositions for patients, formal carers, and investors – as stakeholders – several benefits and unmet needs were examined. The types of incentives outlined included:

- Bundled payments.\(^{125}\)
- Financing for both systems and individuals.
- Integrated care contracts.\(^{126}\)
- Other forms of incentives (that were unspecified).

**Indirect mention of incentives for diabetes**

There was little indirect mention of incentives in relation to diabetes. Here, the notes focus on benefits and on revenue streams.

**Benefits:** In terms of the benefits that can be identified of focusing on integrated care/diabetes, the breakout session focused on patients, formal carers, and investors. For both the patients and the investors, the team was able to highlight each of the four types of benefits: clinical, economic, patient-centred and societal. However, for the formal carers, only two types of benefits were mentioned: clinical and economic.

**Incentives:** In contrast to the previous breakout group on safe prescribing, this group was able to mention many more specific forms of incentives for the diabetes field – indeed, four were highlighted (forms of financing; bundled payments; integrated care contracts as well as a generic “other forms of incentives”).

**Revenue streams:** In terms of revenue streams, they were clearly identified. On the one hand, subscription and membership were mentioned; on the other hand; certification and licensing were emphasised. These revenue streams do have certain similarities in common with issues mentioned under safe prescribing. For example, subscription and membership appear to have similarities with two of the suggestions made under safe prescribing in relation to willingness to pay. Certification and licensing have some similarities with the notion of regulation.


\(^{125}\) See e.g., [https://hbr.org/2015/10/getting-bundled-payments-right-in-health-care](https://hbr.org/2015/10/getting-bundled-payments-right-in-health-care).

Incentives and Integrated care in relation to European Reference Networks

These notes cover both the direct and indirect mentions of incentives referring to the use case of the European Reference Network(s), most specifically in relation to rare conditions.

Direct mention of incentives for the European Reference Network(s)

There was only one direct mention of incentives, and this was in relation to pharmaceutical companies (among the various potential funders of the system) being interested in gaining more patients, accessing research data, and use of the registries that would be set up.

Indirect mention of incentives for the European Reference Network(s)

Indirectly, the most interesting discussions for the purposes of thinking about incentives are those on value propositions and customer relationships.

Overall, it seems that the European Reference Network might be incentivised by a value proposition that ensures that virtual clinical expertise can be provided in any location in a safe and trustworthy way, while – at the same time – enabling an increased revenue for the network(s). The value propositions cited were particularly for the pharmaceutical industry and for clinicians.

The customer relationships provide two polar opportunities: a “commons”-based approach, and a virtual business enterprise approach. The approach preferred by the breakout group members appears to have been based on the notion of the “commons”, supported by careful regulation, a collective approach, trusteeship, and stewardship. The initial, but least preferred approach, was based on a virtual business enterprise that had a more commercial, business model underpinning it with what seems to have been tentatively described as a “Mr CEF127 post 2020” approach.

A brief summary of the workshop including the need for possible additional study

Investigating the January 2016 workshop materials for their relevance to incentives/incentivisation has not been an easy task since the workshop was not focused directly on this topic.

Mentions of incentives were rarely direct, and more often indirect. Where there were commonalities, they appear to be around the types of stakeholders involved; the potential for value propositions; possible customer relationships (especially if broad models such as a commons approach, were to be used); and revenue streams like membership fees or subscriptions; regulation, certification or licensing.

WP3 will have to determine what it needs to do more precisely to design a dedicated approach that focuses on incentive issues, perhaps based in part on extracting materials on incentives from workshops/focus groups previously organised by the consortium or in conjunction with workshops to be organised in the future by other work packages.

127 It is assumed that this term was used because of the individualism involved in the business model and perhaps also since a specific leader/business executive would be employed to lead the approach.
Several obvious future tasks have been spotted while examining this material. They may not necessarily be tasks for WP3 specifically, but they could be considered as more general tasks for the consortium as a whole.

Two types of activity lists are highlighted below.

**Possibilities for more advanced approaches**

In relation to incentives/incentivisation, at this stage of the VALUeHEALTH project – i.e., January 2016 – it might be useful to:

- Prioritise the use cases even further, based on criteria either previously used or ones which might be either deliberately pragmatic or more moral/societal in orientation. I.e., reduce the use cases down to one or two.
- Determine whether the current use cases show any degree of similarity/similarities and, hence, whether – as a result – a similar approach to incentivisation/incentives could be used for all of them.
- Explore briefly what a (single) scheme or approach to incentivisation might hypothetically be.
- Assess whether it is worthwhile in this type of project, with its limited resources, to pay attention to more than one incentivisation approach/scheme.
- Examine whether, if there is no similarity in the business models or among the current priority use cases, what should an incentivisation scheme for the most dissimilar use cases be and whether it is in fact necessary to explore this degree of diversity.

**Possibilities for further study of the outputs relating to overall benefits**

It would be well worthwhile to examine in detail the materials on benefits (i.e., “what's in it for me”) to:

- Cluster or classify more accurately the benefits identified in relation to each case.
- Examine where there are commonalities and cross-overs across use cases between the same sets of stakeholders; between different stakeholders; within particular types of benefits e.g., clinical; economic.
- Assess where there are outliers in terms of stakeholders, i.e., whether some stakeholders are specific to only one set of use case.
- Assess where there is weak evidence of benefits in some cases (e.g., the software industry under safe prescribing).

Be aware that the “what's in it for me” approach is similar to materials provided to the consortium by Jeremy Thorp (HSCIC, England) in terms of building descriptions of different stakeholders’ needs and incentives.

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128 “Use case” in the context of this annex to D3.1 is intended to refer to these three cases: safe prescribing; integrated care in relation to diabetes; integrated care in relation to European Reference Networks.

129 Pragmatic approaches might involve e.g., rationale for development; ease of development; ease of incentivisation. Conversely, a more predominantly morally/societally important approach might perhaps be one that is more difficult to achieve in the short-term and likely to need continued (public) support even after 2020.
Annex III: Characteristics of selected payment schemes

The following are characteristics for nine selected payment schemes identified by Berenson et al. (2016b) in their study Payment Methods: How they work\textsuperscript{130}. The nine payment schemes are:

- Payment type 1: Fee schedule for physicians and other health professionals.
- Payment type 2: Primary care capitations.
- Payment type 3: Per diem payment to hospitals for inpatient stays.
- Payment type 4: Diagnosis Related Groups-based payment to hospitals for inpatient stays.
- Payment type 5: Global budgets for hospitals.
- Payment type 6: Bundled episode payments (w/ focus on condition-specific approach).
- Payment type 7: Global capitation to an organisation.
- Payment type 8: Shared savings.
- Payment type 9: Pay per performance.

The original study investigated each payment schemes based on their key objectives, strengths, weaknesses, design choices to mitigate weaknesses, compatibility with other payment methods and benefit designs, the focus of performance measurement, and potential impact on provider prices and price increases. For the sake of clarity and applicability to VeH, a few of these dimensions have been removed and the core aspects of each payment scheme are summarised here: each scheme is allotted a table/page of its own.

### Payment type 1: Fee schedule for physicians and other health professionals

| Definition | “A fee schedule is a list of the maximum rate a payer will allow for services, with the definition of services based on code sets such as CPT (Current Procedural Terminology) in the United States and ICD-10 PCS (International Classification of Diseases, tenth revision, Procedure Coding System) in some other countries. Typically, the payment is the lower of the provider’s actual charge or the fee schedule allowance.” |
| Strengths | + gives payers more control over payment + reward activity and industriousness and promote patients’ access to care + A fee schedule implicitly adjusts for the different case mixes different clinicians and practices experience, thereby paying comparatively more for sicker patients that need more services. |
| Weaknesses | - encourage overprovision of services, because clinicians often determine the need for services and can induce patient demand - payment is provided for activities, not for outcomes - Fee schedules can contribute to care fragmentation, as fee schedules provide no inherent incentive for providers to coordinate care - Coding complexity [...] “gaming” or outright fraud. |
| Compatibility | “The hybrid fee schedule/capitation approach attempts to balance overuse and underuse incentives to approach payment neutrality, while still paying physicians their rough variable costs for additional fee-schedule services” |
| Impact on price | “The existence of fee schedules does not mean that prices in commercial insurance markets are necessarily consistent across either payers or individual providers. In fact, evidence suggests fee schedule prices vary widely both across and within markets” |
## Payment type 2: Primary care capitations

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<td>“Capitation is a prospective unit of payment per patient, per month or year, in which a payer makes a fixed payment for a defined set of services, regardless of the quantity of services actually provided. This payment approach can be used for an individual health professional, for a group of health professionals for their collective professional services (&quot;professional capitation&quot;), or for provider organizations to assume risk for most health services (&quot;global capitation&quot;).”</td>
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<th>Strengths</th>
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<td>+ &quot;Primary care capitation places &quot;performance risk&quot; on clinicians, providing them financial incentives to limit provision of unneeded services.”</td>
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<td>+ &quot;This payment approach internalizes to the primary care physician decisions over the allocation of activity and costs, permitting more flexibility in individualizing care to meet patients’ needs”</td>
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<td>+ &quot;The approach gives payers predictable and capped costs, while providing the recipient clinician a predictable cash flow.”</td>
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<td>+ &quot;Primary care capitation is administratively straightforward (although design approaches to address its weaknesses can add substantial complexity)”</td>
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<td>- &quot;Primary care capitation may lead to stinting on care—particularly care that can be avoided without compromising the patient’s well-being in the short term (e.g., disease screening and prevention services).”</td>
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<td>- &quot;In the absence of risk adjustment for health status, primary care physicians can “cream-skim”— that is, shun sicker, costlier patients that would take up more time and resources in favor of healthier ones for whom payment would be the same.”</td>
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<td>- &quot;The approach creates an incentive for primary care physicians to refer their patients to other physicians for services outside the scope of the capitated payment […] fragmenting care and raising total costs to the payer”</td>
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<td>- “[P]rimary care capitation assumes statistical averaging of patients with different health care needs, so a minimum number of patients is needed for it to work correctly. Payers may need to maintain a fee-for-service program in parallel with capitation, adding administrative complexity.”</td>
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<td>&quot;As discussed under fee-for-service, a hybrid of primary care capitation and fee schedule payment, as well as incremental payments such as shared savings and P4P, are all compatible—and in some contexts, probably desirable. This hybrid approach softens the polar financial incentives of capitation and fee-for-service but adds complexity to the payment approach.”</td>
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<th>Impact on price</th>
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<td>“[P]hysician practices with negotiating leverage can, nevertheless, achieve higher capitated amounts that deviate from the community average, effectively passing through higher prices and desires for higher-than-average price increases in their capitated rates.”</td>
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Payment type 3: **Per diem payment to hospitals for inpatient stays**

| **Definition** | “Per diem payment for inpatient services provides a fixed amount for a patient day in the hospital, regardless of a hospital’s charges or costs incurred for caring for that particular patient. [...] Service-specific per diem diminished payers’ need to formulate outlier provisions for unusually costly patients.” |
| **Strengths** | + "Per diems, over more than 30 years, have led to straightforward administration and contracting. This payment method has facilitated administrative standardization, with supporting software to facilitate coding and billing."  
+ "Per diems provide some constraints on cost-generating hospital behavior, because the payment amount per day is prospectively set (while the total actual payment is retrospective)” |
| **Weaknesses** | - “Hospitals have no incentive to avoid unnecessary days during a hospitalization”  
- “Per diems do not provide much transparency about hospitals’ actual clinical activities” |
| **Compatibility** | “Medical groups at risk for inpatient hospital services now have direct interest not only in avoiding inpatient care through more vigilant and higher-quality ambulatory care, but also in using less-intensive and less-costly sites of service. In addition, medical group personnel can actively manage their patients as inpatients and accomplish early discharges supported by strong transition programs, rather than rely on the hospital and separate clinical staff, for a high-quality, “early” discharge, thereby addressing the incentive for unnecessarily long hospital stays.” |
| **Impact on price** | “Nothing intrinsic in the per diem payment approach affects hospitals’ prices or their incentives to increase prices.” |
Payment type 4: Diagnosis Related Groups-based payment to hospitals for inpatient stays

| Definition | “Diagnosis related groups (DRGs) provide a flat per-discharge (or per-death) payment that varies based on diagnoses, severity, and whether and what procedures were performed. [...] The basic setup for DRG-based hospital payment includes the following elements:
   - a patient classification system to group patients [...]  
   - hospital cost information used to determine DRG weights [...]  
   - a standard monetary conversion factor [...]  
   - actual payment rates [...]  

The approach assumes that hospitals treat a random variation of patients such that, on average, patients who are more costly than their DRG payment rate are offset by patients who are less costly. [...] Most DRG payment systems include outlier payments as insurance against incentives to avoid or prematurely discharge costly or potentially costly patients (called “outlier cases,” based on length of stay or actual computed costs). [...] Outlier payment therefore reflects to a limited extent the actual cost incurred by the hospital for extreme cases, rather than the cost of an average case, to balance the cost-containing objectives of DRGs with practical concerns about payment fairness.” |
| Strengths | + “Because the payment amount per principal diagnosis is fixed, hospitals have strong incentives to reduce costs per stay.”  
+ “Hospitals may improve care quality because they will typically improve internal care pathways and reduce lengths of stay (longer stays can be associated with greater iatrogenic harm and hospital-acquired infections).”  
+ “Having a uniform, standard classification system facilitates transparency and permits interhospital comparisons by payers and consumers.” |
| Weaknesses | - “With a fixed payment per case, hospitals retain an incentive to increase the number of patients hospitalized, even when outpatient management is acceptable or preferred.”  
- “Hospitals benefit from increasing revenues per patient, most easily achieved by changing coding practices of diagnoses and procedures (“DRG creep”) or by providing services that lead to reclassification of patients into higher-paying DRGs.”  
- “Hospitals have an incentive to select profitable, low-cost patients (“cream-skimming”) in each DRG and transfer or avoid unprofitable, higher-cost patients.” |
| Compatibility | “DRGs provide hospitals with stronger incentives than per diems to decrease provision of unneeded services and to promote more internal collaboration for efficiency. Yet an organization receiving population-based payments is at risk for the costs of hospitalization. Thus, payers may prefer to contract with hospitals using per diems rather than DRGs, if the payer can directly affect length of stay through its own efforts rather than relying on the hospital.” |
| Impact on price | “DRG-based payments have no inherent incentives that counter the market power of “must-have” hospitals. [...] Hospitals also frequently carve out particular high-volume specialized service lines from DRGs, with payment based on discounts off charges to produce greater margins.” |
# Payment type 5: Global budgets for hospitals

| **Definition** | “A global budget provides a fixed amount of funding for a specified population, rather than fixed rates for individual services or cases. The main objective is to constrain the amount a hospital can spend in order to limit the total amount of money spent on health care within the system. [...] Essentially, a global budget represents a one-line budget and provides the hospital more management flexibility to allocate resources. [...] A global hospital budget implies that all payers participate and thus is simpler to operationalize in a single-payer or all-payer environment [...] Hospital budgets are generally set through one of three approaches – historical, capitated, and normative—or some combination of the three.” |
| **Strengths** | + "Similar to capitation, global budgeting fundamentally changes the incentives hospitals face, providing a direct incentive to improve operating efficiency and reduce volume of cases, outpatient encounters, and services per patient.”  
+ "A hard cap global budget rigorously enforces limits on spending and provides spending predictability for payers and health care policymakers.”  
+ "A global budget is relatively straightforward for the hospital to administer, and it is seemingly less susceptible to the fraud associated with false or inflated claims for services.” |
| **Weaknesses** | - “Global budgeting does not apply readily outside of an all-payer or single-payer environment.”  
- “Payers may base allowances for annual budget increases on factors unrelated to health, such as the growth in inflation or “gross domestic product” (“GDP”), or on budgetary constraints outside of the health care sector, thereby eroding the global budget’s purchasing power.”  
- “Too much divergence from historical spending may cause real financial hardship for affected hospitals, which can compromise quality and access to care.” |
| **Compatibility** | “Global budgets are theoretically compatible with population-based payment approaches, such as shared savings, because they remove hospitals’ incentive to increase the volume of services. [...] Global budgets may be less compatible with certain insurance benefit designs, such as tiered networks.” |
| **Impact on price** | “The impact of global budgets on commercial insurers’ prices will vary based on whether the budget-setting approach historical, normative, or capitation based.” |
## Payment type 6: Bundled episode payments (with a focus on a condition-specific approach)

| **Definition** | “With the bundled episode approach, a prospective payment is made for all care a patient receives over the course of a defined clinical episode or period of management [...] The episode of care has two dimensions: a clinical dimension, which can represent either the set of services or the clinical conditions that compose the episode, and a time dimension that reflects the beginning and the end of the episode. In essence, the approach is designed to transfer financial responsibility for the technical risk (i.e., risk related to care production) that is under the included providers’ control, but not the probability (or insurance) risk that relates to the burden of illness and injury in any large patient population. [...] Compared to procedure-based episodes, bundled episodes for conditions could affect much more health care spending and could create much stronger incentives for care coordination across health professionals and providers. Condition-based bundled episodes also could counter the volume-inducing incentives of procedure-based episodes [...] However, particular challenges associated with chronic condition-based episodes must be addressed—particularly for patients with multiple chronic conditions.” |
| **Strengths** | + “This approach directly counters the possible bias in procedure-based bundled episodes toward unnecessary procedures, by focusing on all components of care rather than each procedure.”  
+ “Condition-based episodes could provide a significant role for specialists, who may be functioning as principal physicians for patients with chronic health conditions, without encouraging them to perform procedures or refer their patients to other providers.” |
| **Weaknesses** | - “Many conditions—even common ones—are not well defined, offering providers an incentive to “find” conditions in order to receive a prolonged payment for a condition-specific episode. Current variations in ICD diagnosis coding, even for common conditions such as congestive heart failure, suggests a lack of standardization with the potential for gaming (although definitions of conditions for episodes are improving).”  
- “In managing a chronic condition, the cost of a procedure typically dwarfs the cost of medical management absent the procedure. A single condition-specific payment, then, would perhaps create a powerful incentive for its primary recipient to not refer the patient for necessary procedures.” |
| **Compatibility** | “Payment for a condition-specific inpatient treatment episode is quite compatible with DRGs, but not with per diem payment. Indeed, some jurisdictions have expanded the duration of a DRG case to extend beyond hospital discharge, so that the hospital takes responsibility for improving discharge planning and transitioning patients back to other facility-based or community-based providers.” |
| **Impact on price** | “As with some payment approaches, if the bundled episode fee is based on historic costs, the payer will build in current pricing disparities that result from variable negotiation leverage. Basing payment on normative pricing, such as the community average, would directly penalize higher-priced providers and make their voluntary participation less likely. A specific concern is that putting hospitals, clinicians, and, perhaps, postacute care facilities together into a recognized “focused factory” could produce, in effect, a “bargaining unit.” This could raise prices higher than they would be if the parties were negotiating separately, without their ongoing joint participation in providing services.” |
## Payment type 7: Global capitation to an organisation

| **Definition** | “Global capitation is a payment model specifically for integrated health care delivery. [...] The core concept is that total payment does not vary based on the actual services provided to individuals in the population served. The services included in global capitation typically include at least physician, hospital, and postacute care facility-based services, and may include additional services, such as prescription drugs. [...] By accepting a defined fixed payment to provide contracted services, providers assume the financial risk for their patients, usually including both insurance risk and technical risk. The former is financial risk caused by the likelihood of a random event occurring that is not under the control of providers. The latter relates directly to how care is produced, and therefore is under the providers’ control. Because of insurance risk, organizations accepting global capitation typically buy reinsurance to help protect against losses from unanticipated high-cost cases. For global capitation contracting to work well, it should apply over a sufficient number of members to spread insurance risk, thereby reducing volatility and the impact of bad financial experience resulting from random occurrences. [...] In essence, global capitation transfers responsibility for managing medical care costs and quality from the third-party payer directly to the provider receiving the payment.” |
| **Strengths** | + “Global capitation is the most robust method for health care services across the spectrum to internalize incentives for improving efficiency and effectiveness. It is the prototypical population-based payment method and offers the recipient organization the greatest opportunity to change its business model and culture.”
+ "The model promotes integration of services across what are often “siloed” independent clinicians and facilities.”
+ "A global capitation payment is a relatively simple transaction, involving less administrative infrastructure for both payers and providers than fee-for-service does. Yet, the method becomes complex when payers require risk adjustment of payments and monitoring of quality.” |
| **Weaknesses** | - “Many organizations lack the capital and infrastructure, including administrative data systems, to manage substantial financial risk.”
- “Risk-bearing provider organizations have greater potential to become insolvent or to compromise quality. This potential calls for strong regulatory oversight, which some jurisdictions may be reluctant to take on.”
- "In market-based health systems without regulated prices, consolidated and integrated groups capable of accepting global capitation can develop market power and use it in their price negotiations with payers, thereby raising prices and health care spending even if they are able to reduce service use.” |
| **Compatibility** | "Globally capitated provider organizations can pick a range of payment options to compensate health professionals, including salary, productivity analysis of fee-schedule-based relative value units produced, various forms of sub-capitation, including primary care, specialty, and contact capitation.” |
| **Impact on price** | "Global capitation rates are typically calculated based on actuarial analysis of average individuals—the normative or community average—not the historic costs of care capitated providers have experienced. [...] A globally capitated health care system or physician group offers different opportunities for addressing pricing differences in hospitals and, to a lesser extent, the physician specialty market. Health care systems typically grant preference to hospitals within their own systems, whatever their prices. In contrast, a physician group without commitment to a particular hospital or hospital system can aggressively shop on price, assuming quality is comparable. By actually moving or threatening to move patients from one hospital to another, a capitated physician group can achieve price concessions from hospitals seeking to preserve or increase their market share of bed days and outpatient services. Of course, again, physician groups can only negotiate lower prices in reasonably competitive markets, such that the threat of moving patients is a credible one.” |
### Payment type 8: Shared savings

**Definition**

“This form of incremental payment, which some consider a form of pay-for-performance focused primarily on spending reductions, is commonly associated with accountable care organizations (ACOs). [...] In this method, essentially, base payments continue using established methods (typically, fee schedules for professionals, DRGs or per diems for hospitals), while ACO entities can receive additional payment if their spending for beneficiaries is lower than a target. When the ACO achieves savings, it can then distribute its share (possibly adjusted by performance on a set of quality measures) to its constituent members. [...] A fundamental difference between global capitation and shared savings and shared risk approaches is that the former is a base spending method and includes most revenues a payer provides the recipient organization, whereas the latter provides incremental reward or penalty placed on top of other base payment methods.”

**Strengths**

+ "One-sided shared savings does not require provider organizations to take on major financial risk, something many such organizations—especially small organizations—are not in a position to do. It establishes gentler, perhaps more realistic, positive incentives that can provide a reasonable entry for organizations that are new to risk-bearing and lack capital to manage global capitation.”  
+ “Even short of a fundamental reorientation to providing care, provider organizations under shared savings can adopt relatively straight-forward approaches (e.g., improving transitions of care from hospital to community, coordinating care for patients seeing many different providers, adopting evidence-based guidelines).”

**Weaknesses**

- “The dominant, base payment methods used in shared savings models remain volume based. Expecting the small incremental incentives placed on a separate or intermediary ACO organization to reduce spending (to counter the volume-inducing incentives of the underlying payment system) may be unrealistic.”  
- “Operationally, determining whether and to what extent savings have actually been attained can be challenging.”  
- “As with global capitation, ACOs may need to consolidate and integrate to have sufficient size and scale to meet requirements under shared savings and shared risk methods. This may empower organizations to use their newfound organizational clout to negotiate higher prices for the base payments that determine most of constituent members’ revenue—as well as strengthen their negotiating position with other payers that don’t participate in the shared savings arrangement.”

**Compatibility**

“As an incremental payment approach, shared savings provides bonuses and shared risk bonuses and penalties compatible with a range of base payment methods. The savings calculation is based on spending regardless of the form of payment, except for global capitation (which provides a fixed payment, making shared savings calculations unnecessary).”

**Impact on price**

“The horizontal and vertical integration ACOs represent can be used to increase pricing power in negotiations with private payers over physician and hospital prices. This counters the cost savings objectives of the shared savings approach. [...] For commercial insurance, in contrast to public payers, shared savings is based on spending targets, which themselves are based on historic cost trended forward. This method actually accepts and “bakes in” pricing differentials that the constituent providers have been able to negotiate. The shared savings approach might moderate price increases, but not necessarily, because providers’ prices might well be higher than their share of savings from beating spending targets.”
**Payment type 9: Pay-for-performance**

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<th>Definition</th>
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<tr>
<td>“A pay-for-performance (P4P) model consists of financial incentives or penalties based on a provider’s ability or inability to meet certain performance expectations based on predetermined measures. [...] P4P models measure performance using clinical process and outcome measures and surveys on patients’ experiences with care. [...] The measures used in P4P programs can be targeted to an individual physician, a group of physicians, or an organization, such as a hospital or a large integrated delivery system. Typically, performance bonuses or penalties have represented a few percentage points of the base payment providers or health professionals would have received. However, because the economics of different providers varies substantially, a 1 or 2 percentage point bonus or penalty has much different impact. [...] Various formulations of P4P programs differ based on whether providers attain a certain level of performance or improve from a baseline performance enough to qualify for bonuses.”</td>
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<thead>
<tr>
<th>Strengths</th>
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<tr>
<td>+ “P4P introduces into payment policy emphasis on the quality of care produced, a core element of care that has been missing in base payment methods.”</td>
</tr>
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<td>+ “As an incremental payment method, P4P can be implemented with varying degrees of intensity, consistent with the context of application, the strength of the measures available for the clinical conditions to which it is being applied, or other relevant factors.”</td>
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<td>+ “Although there are clear gaps in what is accurately measurable, a commitment to P4P could create momentum to expand measure sets and approaches to achieving greater measurement accuracy.”</td>
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<table>
<thead>
<tr>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>- “P4P introduces significant administrative complexity associated with acquiring data and verifying it for accuracy.”</td>
</tr>
<tr>
<td>- “Behavioral economics suggests that, in professions that require high cognitive skill and high intrinsic motivation, associating better performance with financial incentives could be counterproductive because it might compromise commitment to quality. P4P incentives for organizations such as hospitals may or may not impart this “crowd out” of intrinsic motivation.”</td>
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<tr>
<td>- “Most P4P programs tend to concentrate on clinical process measures rather than outcomes, which are what consumers or payers are most interested in achieving. Moreover, research indicates that process measures are not strongly related to significant healthcare outcomes.”</td>
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<table>
<thead>
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<th>Compatibility</th>
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<tr>
<td>“As an incremental payment based on measured performance, P4P is compatible with all base payment methods. P4P is also compatible with shared savings incremental rewards and penalties, with the former typically focused more on quality and the latter on costs. However, measurement of costs and cost increases could be included as part of P4P without a separate shared savings program.”</td>
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<thead>
<tr>
<th>Impact on price</th>
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<tr>
<td>“As an incremental payment approach, P4P does not directly address providers’ prices or incentives for price increases. Relative market power as expressed through negotiations over terms and conditions, however, can affect the specific P4P design implemented. Powerful providers can simply refuse to participate or can participate in ways payers would not prefer, for example, by compelling payers to provide upside-only rewards rather than rewards and offsetting penalties.”</td>
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Annex IV: A thought experiment – An eHealth Incentivisation Chain

VALUeHEALTH has examined the concept of a value chain that can explain the kinds of incentives that can be operationalised in the eHealth field (see Figure 16). This value chain focuses on three elements: the economic value, the clinical value, and the societal value of interoperable eHealth services.

All the types of incentives cited in this flowchart come either from the policy-oriented literature or academic literature, practical examples of implemented eHealth, and/or examples that have been cited or commented on by VeH consortium members and invited stakeholders or experts at workshops and webinars.

The left-hand side of the chart describes the types of Tiers of stakeholders that are involved (the types of stakeholders build on the VALUeHEALTH value chain, but appear to be expanding potential the four types of tiers of stakeholders). The right-hand side of the chart outlines the ultimate value-based goals to be achieved.

In a sequential, linear fashion (from left to right), the chart outlines:

- The types of incentives that are involved in the process.
- The interactions between the various types of incentives (i.e., there can also be options among the various types).
- The arrangements that can (or should) be built between the stakeholders, the incentives and each other, and the operational flow functioning.
- The ultimate fit of the incentives with the anticipated or planned-for end-values.

With relation to the reference case, incentives and expectations can actually be further classified by stakeholder tier.

- **Funders**: The reference use case highlighted the funding role of governments (health ministries), insurers, and also patient payers. Pharma and the medical devices industry may contribute finance through research sponsorship (paying for data collection and/or for data access). For safe prescribing, regulatory bodies may also contribute in cash or in kind. For diabetes, Venture Capital and NGO investments may also be considered. For ERNs, disease registries are particularly relevant, and the EC may fund some of the necessary core infrastructure.

- **Providers**: These are primarily clinicians (GP, hospital), social care, patients themselves, the ICT industry, pharma and the medical device industry. For safe prescribing, regulatory agencies and community pharmacies were also highlighted as important providers (although community pharmacy is probably relevant to all three use cases). For ERNs, rare disease specialist centres, disease registry providers, genetic testing providers, bio banks and Orphanet are also important care and/or data providers.

- **Users**: Healthcare professionals, social care providers, informal carers, patients and their families are all users. For safe prescribing, health authorities, home care organisations and managed care service providers are also relevant. For ERNs, research communities and charities are also important users.
- **Beneficiaries**: Patients, families and informal caregivers are all direct beneficiaries. Health ministries and insurers are also beneficiaries. For safe prescribing, employers and society as a whole are also considered beneficiaries. For ERNs, health authorities, research and pharma are also beneficiaries.

- **Partners**: Seemingly, the reference use case recognised the potential partnerships with patient associations, health professional associations, health authorities, regulators, policy-makers, SDOs, ICT industry, research centres, and charities. For safe prescribing there is a long list of additional partnering stakeholders: drug agencies, pharmacovigilance networks, pharma, drug information centres and drug database creators.

- **Enablers**: The common enabler stakeholders are the ICT industry, SDOs, research organisations, payers, health authorities, policy-makers. For safe prescribing, patient safety agencies and legislators are also enablers. For ERNs, the CEF is expected to be an important infrastructure enabler.
Figure 17. A thought experiment – An eHealth Incentivisation Chain
Annex V: List of interviewees considered for work involved in D3.2

The following is a list of experts who are being considered for inclusion in the proposed semi-structured interviews, to be conducted as part of the further work of WP3.

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation/ Community/ Area of expertise</th>
<th>Stakeholder tier (I to III)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leo Lewis</td>
<td>EIP on AHA (promoter, B3 AG)</td>
<td>I or III</td>
<td></td>
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<tr>
<td>George Crooks</td>
<td>NHS24 (Scotland)</td>
<td>I</td>
<td></td>
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<tr>
<td>Donna Henderson</td>
<td>NHS24 (Scotland)/EIP on AHA</td>
<td>I or III</td>
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<tr>
<td>Michele Thonnet</td>
<td>French Ministry of Health</td>
<td>I</td>
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<td>Jeremy Thorp</td>
<td>National Health System</td>
<td>I</td>
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<tr>
<td>Jakob Holdijk</td>
<td>Casemix (Netherlands)</td>
<td>I or II</td>
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<td>TBD</td>
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<td>I or III</td>
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<tr>
<td>Miroslav Koncar</td>
<td>Oracle</td>
<td>II</td>
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<td>Mario Romao</td>
<td>Continua Health Alliance</td>
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<td>Nicole Denjoy</td>
<td>COCIR</td>
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<td>Rachelle Kaye</td>
<td>AIM</td>
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<td>Jan van Emelen</td>
<td>Voka Health Community</td>
<td>MACX nv</td>
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<td>Nurit Friedman</td>
<td>Maccabi Research</td>
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<td>International Diabetes Federation</td>
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<td>EU-US collaboration</td>
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<tr>
<td>Don Detmer</td>
<td>Professor Emeritus (USA)</td>
<td>III</td>
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<td>Peter Singleton</td>
<td>UCL (UK)</td>
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<tr>
<td>Tom Jones</td>
<td>TanJent Consultancy (UK)</td>
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<tr>
<td>Trisha Greenhalgh</td>
<td>Oxford University (UK)</td>
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<td>Maria Lluch</td>
<td>LSE (UK)</td>
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<td>Alexander Hoebst</td>
<td>UMIT</td>
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<td>David Satola</td>
<td>World Bank</td>
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<tr>
<td>Joan Dzenowegis</td>
<td>WHO</td>
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