Strategic Intelligence Monitor on Personal Health Systems phase 2
(SIMPHS 2)
Country Study France

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<th>Definition</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALD</td>
<td>Affection de longue durée</td>
<td>Long-term illness</td>
</tr>
<tr>
<td>ANAP</td>
<td>Agence nationale d’Appui à la Performance des établissements de santé et médico-sociaux</td>
<td>National Agency for performance support to health and social care facilities</td>
</tr>
<tr>
<td>ARH</td>
<td>Agence Régionale de l’Hospitalisation</td>
<td>Regional Hospitalisation Agency</td>
</tr>
<tr>
<td>ARS</td>
<td>Agence Régionale de Santé</td>
<td>Regional Health Agency</td>
</tr>
<tr>
<td>ASIP Santé</td>
<td>Agence des Systèmes d'Information Partagés de Santé</td>
<td>National Agency for Shared Healthcare Information Systems</td>
</tr>
<tr>
<td>CGIET</td>
<td>Conseil général de l’industrie, de l’énergie et des technologies</td>
<td>General Council for Industry, Energy and Technologies</td>
</tr>
<tr>
<td>CNAM TS</td>
<td>Caisse Nationale d'Assurance Maladie des Travailleurs Salariés</td>
<td>National health insurance fund for salaried workers</td>
</tr>
<tr>
<td>CNR SDA</td>
<td>Centre National de Référence - Santé à Domicile et Autonomie</td>
<td>National Reference Centre for Health at home and autonomy</td>
</tr>
<tr>
<td>CNSA</td>
<td>Caisse nationale de solidarité pour l’autonomie</td>
<td>National solidarity fund for autonomy</td>
</tr>
<tr>
<td>CPS</td>
<td>Carte Professionnelle de Santé</td>
<td>Professional Health Card</td>
</tr>
<tr>
<td>CRAM</td>
<td>Caisse Régionale d'Assurance Maladie</td>
<td>Regional Health Insurance Fund</td>
</tr>
<tr>
<td>DMP</td>
<td>Dossier Médical Personnalisé</td>
<td>HER</td>
</tr>
<tr>
<td>DGCIS</td>
<td>Direction Générale de la compétitivité de l’industrie et des services</td>
<td>Directorate General for competitiveness of industry and services</td>
</tr>
<tr>
<td>DGOS</td>
<td>Direction Générale de l’Offre de Soins</td>
<td>Directorate General for care offering</td>
</tr>
<tr>
<td>DSSIS</td>
<td>Délégation à la Stratégie des Systèmes d’Information de Santé</td>
<td>Delegation for the Health Information Systems Strategy</td>
</tr>
<tr>
<td>DRASS</td>
<td>Directions régionales des affaires sanitaires et sociales</td>
<td>Regional Directorate for Health and Social Affairs</td>
</tr>
<tr>
<td>DDASS</td>
<td>Directions départementales des affaires sanitaires et sociales</td>
<td>Département Directorate for Health and Social Affairs</td>
</tr>
<tr>
<td>FIEEC</td>
<td>Fédération des Industries Electriques, Electroniques, Energétiques et de l’Équipement</td>
<td>Federation of Electrical, Electronic</td>
</tr>
<tr>
<td>Acronym</td>
<td>Name</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>FIQCS</td>
<td>Fonds d'intervention pour la qualité et la coordination des soins</td>
<td>Fund for intervention in the field of quality and coordination of care</td>
</tr>
<tr>
<td>GIP</td>
<td>Groupement d'Intérêt Public</td>
<td>Public Interest Group</td>
</tr>
<tr>
<td>HAS</td>
<td>Haute Autorité de Santé</td>
<td>High level Health Authority</td>
</tr>
<tr>
<td>HPST</td>
<td>Hôpital, Personne, Santé et Territoire</td>
<td>Hospital, People, Health and Territory</td>
</tr>
<tr>
<td>MRS</td>
<td>Mission Régionale de santé</td>
<td>Regional Health Mission</td>
</tr>
<tr>
<td>ONDAM</td>
<td>Objectif national de dépenses d'assurance maladie</td>
<td>National objective for statutory health insurance expenditure</td>
</tr>
<tr>
<td>UNCAM</td>
<td>Union Nationale des Caisses d'Assurance Maladie</td>
<td>National association of health insurance funds</td>
</tr>
<tr>
<td>URCAM</td>
<td>Union Régionale des Caisses d'Assurance Maladie</td>
<td>Regional association of health insurance funds</td>
</tr>
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</table>
1 Introduction

This Country Study on IPHS developments in France has been carried out in the framework of the SIMPHS2 project. The latter is the continuation of SIMPHS1 which studied the structure and dynamics of the Remote Patient Monitoring and Treatment (RMT) market in 2009-2010. The focus of SIMPHS2 has been expanded beyond RMT to also investigate telecare, mobile health and fitness/wellness under the umbrella “Integrated Personal Health and Care Services” (IPHS). The overall objective was to understand the processes of innovation diffusion, the impact of technologies on health and social care integration as well as the role of governance and impact assessment in facilitating innovation diffusion and ultimately market uptake. In order to obtain the most comprehensive picture of IPHS and the context in which such services unfold, both the supply side and the demand side have been investigated.

The SIMPHS Country Study on France aims at gathering empirical evidence for the production of strategic intelligence on the IPHS market so as to understand the innovation dynamics, anticipate changes, identify barriers and key success factors in the French health and social care context.

The report starts with a characterisation of the French Healthcare system and IPHS development. In particular sections 2.1 to 2.3 provide background data on the socio-economic trends in France, on healthcare expenditures and resources as well as on chronic diseases developments. Section 2.4 provides a description of the health and social care system and the recent reforms that have contributed to shaping an environment that is more favourable to the deployment of IPHS solutions, in the context of ageing and chronic diseases developments. Section 2.5 discusses briefly plans and programmes launched by the French government over the last few years in an attempt to better manage chronic diseases. Section 2.6 is about the role of ICT in promoting integrated care, which is tackled through the various stakeholders at government levels which contribute to ICT deployment in health and social care. Finally section 2.7 provides a brief overview of current noticeable initiatives in telehealth or telecare, after a brief overview of the telecare sector in France.

Section 3 then looks into specific pilots and experiments carried out in the French regions, which leads to an analysis of findings in terms of governance, innovation and impact assessment presented in section 4. Section 5 concludes the report.
2 The French Healthcare System and IPHS development

2.1 Socio demographic background

2.1.1 Population data

With 13% of the EU27 total population France is the second most populated country in Europe after Germany. As of 1 January 2011 the French population exceeded the 65 million mark for the first time with an estimated total population of 65.027 million out of which 63.1 million lived in metropolitan France. The population growth rate in 2009 was above the EU27 average with a value of 5.2‰ while the population natural growth rate was the third highest in Europe behind Ireland and Cyprus, with a value of 4.3‰. In other words birth increase has had a larger impact on population growth than migration, which is an exception in Europe. Indeed France has one of the highest fertility rates in Europe. Other factors explaining the natural growth are a high and still increasing life expectancy and a still favourable age pyramid structure.

In 2010 16.8% of the population was over 65, which corresponds to the EU average. The share of those below 20 was 24.6%. More data on the age structure of the French population in 2010 is available at Annex 1, Table 3 while Table 4 shows the evolution of the age structure over the period 2001-2011.

As of 1 January 2011 the average age was 38.9 years for men and 41.9 years for women making the average for both categories more than 40, a figure which has increased from 37 twenty years ago and is expected to reach 43.6 years in 2040 (see Annex 1, Table 5).

Mortality has decreased in all age groups in 2010. While the share of older people compared to the total population has been growing, the number of death has remained relatively low. Life expectancy at birth has increased continuously between 1950 and 2009, from 69.2 years for women and 63.4 for men in 1950 to 84.5 years for women and 77.8 years for men in 2009. Life expectancy at birth increased by another 4 months in 2010 both for women (84.8) and men (78.1). As is the case in other EU countries the difference in life expectancy for men women has been decreasing since the 90s. A chart showing the evolution of life expectancy per gender since 1946 is at Annex 1, Figure 3 while further details on life expectancy at birth and at 60 for each gender for the last 10 years can be found in Table 6.

The basis of the French population pyramid has been growing slightly in the period 2004-2010 thanks to the increase in the number of births over that period (see Figure 4 in Annex 1). However this trend has not been sufficient to counter the increasing ageing of the population. Like in other EU countries, ageing is one of the key challenges faced by the French healthcare system in the years to come.

As baby boomers (i.e. the 1947-1973 generation) started reaching the age of sixty in 2006 the 60 and over age group has been growing while that of young people below 20 years has been decreasing by 0.1 point per year. It is worth noting that the 65 and over age group is

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1 INSEE: http://www.insee.fr/fr/themes/document.asp?reg_id=0&ref_id=ip1332#inter1
2 Corresponds to the European part of France, i.e. including Corsica and excluding overseas territories
4 See footnote 3
5 IRDES, 2011
6 INSEE 2011
only growing by 0.1 point while it is the 60-64 age group which has been growing fastest. As a result the 20-59 population has been shrinking fast since 2006.\textsuperscript{7}

According to INSEE projections, the share of 60 years old and over will continue to grow fast until 2035: while it was 16.8\% in 2010 it is expected to represent 24.8\% of the population from 2015 and to reach 30.6\% of the population by 2035. From 2020 ageing will be most noticeable in the 75 and over age group as a result of baby boomers reaching that age. Later on it is the 100 years old age group that will grow.

If current trends continue to hold the population of metropolitan France should reach 73.6 million by 2060, i.e. 11.8 million more than in 2007. The number of 60 years old and over will grow by 10.4 million until then, meaning that one third of the population will be over 60 in 2060. France is expected to have 200,000 inhabitants aged 100 years and over in 50 years from now. (See Figure 5 and Table 7 for more details).

The population ageing index defined as the number of 65 years old and over per 100 inhabitants aged 20 or younger has increased from 61.3 in 2000 to 68.2 in 2011.\textsuperscript{8} (see Table 8). The old age dependency ratio which measures the proportion of 65 years old and over compared to the total active population (20-64 years) was 28.56\% in 2011.\textsuperscript{9}

2.1.2 Regional perspectives

France is divided in 27 regions (including Corsica and overseas territories) out of which 22 are located in metropolitan France (see maps in Figure 6). Out of these 22 regions four have more than 4 million inhabitants, seven have between 2 and 4 million, nine have between 1 and 2 million and two regions have less than 1 million inhabitants.\textsuperscript{10} The demographic differences among French regions are also reflected in terms of age structure and ageing of the population whereby the share of 60 years old and over in some regions like Limousin reaches 30\% while in others like the greater Paris area (Paris-Isle-of-France) it is down to 17.5\% of the total region’s population. The share of young people below 20 years goes from 20.4\% in Corsica to 26.9\% in North-Calais.

The demographic diversity across regions is further reflected in terms of the number of communes within each region with Corsica having 360 communes on the lower end and Midi Pyrénées having 3,020 communes on the upper end. As to large communes with more than 100,000 inhabitants the range goes from Corsica which has no large commune to Isle-of-France with five communes of more than 100,000 inhabitants (including Paris).

Public expenses per inhabitant range from €202 in Brittany to €1,320 in Corsica, while public deficit per inhabitant is lowest in Aquitaine with €89 per inhabitant and reaches €1,055 in Corsica.

Social indicators differentiate the French regions further, for instance in 2009 the GDP per inhabitant ranged from €22,984 euro to €99,676 in Ile de France.

\textsuperscript{7} INED, 2011
\textsuperscript{8} IRDES, 2011
\textsuperscript{9} INSEE, 2011
\textsuperscript{10} See http://www.senat.fr/rap/r10-679/r10-6791.pdf
2.2 French Healthcare system in numbers

2.2.1 Healthcare expenditures

Total healthcare expenditure in France was estimated to be €208 billion in 2007 representing 11% of GDP\(^\text{11}\) out of which 79% was financed by public budgets. This represented a 3.1 point increase compared to the 2005 level, in spite of continued efforts by the French government to contain expenditure. The reason for such increase has been a higher consumption of care and pricier care. 88% of the total expenditure in 2007 related to personal health care, with an average expense of €2,895 per citizen. Healthcare expenditure has been growing more rapidly than GDP over time, a trend shared with most OECD countries.

For 2007, the total expenditure on healthcare was split as follows:\(^\text{11}\)
- 42.5% for hospital inpatient care in health care institutions in the public and private sectors
- 2.7% for home care
- 29.7% for outpatient care (17.5% provided by doctors, 4.5% dental care and 5% ancillary services)
- 16.3% for drugs
- 4.2% on other medical devices and appliances.

According to a report by the French senate,\(^\text{12}\) total healthcare expenditure increased further to €226 billion in 2009, i.e. 11.6% of GDP placing France 2nd among OECD countries. However according to another OECD ranking taking account of purchasing power parity in calculating the share of healthcare expenses compared to GDP, France was number 7 behind the US, Norway, Switzerland, Canada, Netherlands and Austria, a ranking shared with Belgium, Germany and Denmark. In spite of the continuous increases since 1997 French healthcare expenditure have grown at a slower pace than the OECD average (2.5% vs 4.1% per annum). For 2009 patient related healthcare expenses including hospital care, ambulatory care, medication and medical equipment, sickness and maternity allowances, transport, and residential care for the elderly made up 86% of the total healthcare expenses, reaching €195 billion. The cost of managing the healthcare system on the other hand represented €15 billion corresponding to 6.6% of total expenses. Prevention measures cost €6 billion, while medical research and pharmaceuticals amounted to €7.5 billion.

As mentioned above, the French government has been concerned for decades about containing healthcare expenses and efforts have been undertaken towards that objective. This has led to a stabilisation of healthcare expenditure increases in the beginning of the years 2000. However chronic diseases contribute to 80% of healthcare expenditure increase, simply because of the large number of new patients suffering from these conditions every year. The number of patients with severe conditions has grown 4.6% per year between 2005-2008 compared to 0.7% for other causes. As an illustration the expenses related to CVD have grown 6.7% per year over that period while those of diabetes have increased by 7.2% annually in average.

The ALD regime which provides 100% coverage of care expenses for patients suffering from long term (mostly chronic) diseases has led the government to rethink this regime and


\(^\text{12}\) http://www.senat.fr/rap/10-088-2/10-088-2_mono.html
review the list of conditions included and services reimbursed. As a result transportation costs for ALD patients will not be covered in all cases but depending on the state of the patient while severe hypertension will be withdrawn from the list of conditions covered by the ALD regime, which should allow a €20 million savings. As the Senate report (see footnote 12) underlines, the ALD regime needs to be reformed and has not kept pace with health and social developments.

2.2.2 French Healthcare resources

The number of healthcare professionals in France has never been as high as it is today with the healthcare sector employing 7.6% of the French population. In 2009, there were 216,000 doctors compared with 50,000 in the early sixties and 140,000 at the start of the eighties. The doctor density per 100,000 inhabitants is 290 a figure which is double that of the US and higher than in most EU countries. In spite of this, France is facing healthcare resource shortages: lack of doctors within certain specialities, geographical unbalance with “medical deserts” appearing in some French regions, not to mention the increasing healthcare demand which makes it difficult to match demand with resources.13

While the number of doctors has been rising continuously over the years, the above figure being the highest ever, the number of doctors will decrease by 10% until 2019 before reaching its 2011 level again in 2030. At the same time the French population is expected to rise by 10 % from 2006 to 2030. This means that the ratio of doctors compared to the population will be lower than it has been up to now for quite some time. In parallel to this decrease in the number of doctors per inhabitants, the distribution of doctors over the French territory will be changing significantly between 2006 and 2030.14 In 2010 the density of GPs per 100,000 inhabitants was 162 while that of specialists was 172.15

Table 1 below16 shows the perspective of evolution of the number of doctors per specialty with a general reduction by 2025 compared with 2015 followed by a significant increase towards 2030.

Table 1– No of doctors 2015-2025

<table>
<thead>
<tr>
<th>Specialty</th>
<th>2015</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPs</td>
<td>99 665</td>
<td>97 119</td>
<td>104 559</td>
</tr>
<tr>
<td>Specialists (medical)</td>
<td>54 453</td>
<td>50 595</td>
<td>54 801</td>
</tr>
<tr>
<td>Specialists (surgery)</td>
<td>23 023</td>
<td>21 149</td>
<td>27 229</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>11 008</td>
<td>8 816</td>
<td>11 891</td>
</tr>
<tr>
<td>Medical biology</td>
<td>3 060</td>
<td>3 079</td>
<td>2 448</td>
</tr>
<tr>
<td>Public health &amp; occupational</td>
<td>5 528</td>
<td>5 208</td>
<td>4 666</td>
</tr>
<tr>
<td>Total</td>
<td>196 737</td>
<td>185 966</td>
<td>205 593</td>
</tr>
</tbody>
</table>

Source: INSEE, 2011

There were 477,00017 nurses in 2008, 14.7% being self-employed the rest being salaried mostly working for hospitals. The number of nurses has grown by 3.2% per year on average between 1990 and 2008. As for doctors, this is not sufficient to meet demand and there are

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17 See footnote 11
important geographical differences in nurse density. The average nurse density was 7.1 nurses per 1000 inhabitants in 2006.

Table 9 in Annex 1 shows the number of healthcare facilities providing hospitalisation services. As of 2009 there was a total of 60,774 such facilities, out of which 60% were public and 40% were private. The total number of beds was 488,006 out of which 63% were provided by public institutions. 87.5% of these were full hospitalisation beds.

The number of hospital beds per 100,000 inhabitant has been decreasing steadily from 779.9 in 2001 to 660.5 in 2009. Over the same period of time, the number of beds in nursing and residential facilities per 100,000 inhabitants has increased from 301.2 to 838.6. The reduction in acute care capacity is linked to the transformation of acute beds into rehabilitation and long-term care units as well as the development of ambulatory surgery and home hospitalisation.

From 2000 to 2009 the number of hospital discharges per 100,000 inhabitants decreased from 19,554.5 to 17,069.1. Between 2001 and 2009, the in-patient average length of stay has decreased slowly from 6 to 5.7 until 2007 while figures for 2008 and 2009 could not be confirmed.

2.3 Chronic diseases prevalence and costs

It is estimated that 15 million people i.e. 20 % of the French population suffer from one or more chronic diseases. Section 2.3.1 below gives an overview of the main causes of death before looking into detail at the three chronic diseases relevant to the SIMPHS study, namely COPD, Diabetes and cardiovascular diseases.

2.3.1 Main causes of death

Cancer and cardiovascular diseases (CVD) have been the first main causes of death in France since the 1950s. Since the start of the 80s they have accounted for nearly 60 % of all causes of death for both men and women, albeit with some evolution over time.

CVD accounted for a third of all deaths in 1980 a trend which was reversed towards 2007 when it decreased to 25% of all death causes, representing a 60% reduction. A reason for this seems to be progress made with stroke as well as a reduction of ischemic attacks. During the same period cancer prevalence increased proportionally to the decrease in CVD making cancer the first cause of death in France. Cancer accounts for 35% of all causes of death for men and 32% for women. Cancer has a higher impact on mortality among the 45-65 age group and decreases only slightly after 65 accounting for about half of all deaths.

Further diseases make up the third major cause of death in 2007 which has remained unchanged since 1980, those diseases concerning mainly children and the elderly. Among the 80 years old and over cancer and CVD are the most prominent causes of death.

19 See footnote 11
20 Eurostat 2011
21 INED 2010, see http://www.ined.fr/fichier/t_telechargement/42215/telechargement_fichier_fr_publi_pdf1_conjoncture_3_2010.pdf
Figure 1 – Medical causes of death 2009

Medical causes of death per gender in 2009

Source Inserm, Cépidic

Figure 1 above shows main causes of death per gender in 2009. Further detailed charts on main causes of diseases are available in Annex 1, Figure 7.

2.3.2 Chronic diseases prevalence

Figure 2 below shows the evolution in number of cases for the three chronic conditions that are within the scope of SIMPHS2. The prevalence of each condition has increased since 2005, diabetes representing by far the highest number of cases with 1,885,175 affected people in 2010. The prevalence of diabetes has increased by 43.9% between 2005 and 2010, that of chronic respiratory diseases by 23.8% and of cardiac diseases by 50.7%. A total of 332,912 people were suffering from a chronic respiratory disease in 2010 and 673,815 of a cardiac disease.
2.3.2.1 COPD

The data on COPD presented in this section is based on the information published by the French observatory “Institut de Veille Sanitaire” which contains references to a number of studies that have been published on COPD over the last decade.

As in other European countries, the prevalence of COPD in France is difficult to determine for the following reasons: on the one hand assessing prevalence requires the use of spirometry which is difficult to implement on a large scale, on the other hand the definition of COPD varies across the various studies on the subject.\textsuperscript{22} In addition, assessing COPD prevalence on the basis of self declaration leads to underestimation as COPD is often under-diagnosed.\textsuperscript{23}

In spite of the above difficulties it has been estimated that COPD affects between 4% and 10% of the French population, half of the affected patients having a mild form of the disease, more than one third a moderate form and less than 25% a severe or very severe form of the disease. (Roche et al).

A so called “Confronting COPD” Survey carried out in 2000 estimated COPD prevalence among the French population at 3.2% of the age group 45 years or older having smoked more than 10 packs/year (Rennard, 2002).

A study by the French government in 2003 found out that the prevalence of chronic bronchitis was 3.9% and that of COPD 7.5% of the whole population (Roche, 2008).

In terms of European comparison, the European study ECRHS concluded that COPD prevalence in France was one of the lowest in Europe (de Marco, 2004).


A more recent study published in 2010\textsuperscript{24} estimated that COPD prevalence is 7.5\% of the population. The study further underlines that prevalence seems to stabilise among men while it is increasing among women. COPD is more prevalent in the French North and Eastern regions (North-Calais, Alsace, Lorraine) as well as Brittany. About 200,000 people aged 25 years and over benefitted from the social security coverage for long-term chronic diseases (ALD) for severe or very severe COPD in 2006. At the same time around 93,000 adults were receiving long-term oxygenotherapy treatment.

During the 2000-2008 period, an average of 16,000 deaths were related to COPD, for half of which COPD was mentioned as the main cause of death. In 2008, crude mortality rates for COPD as the main cause of death were 44/100,000 for men and 18/100,000 for women while in 2006 these values were 41/100,000 and 17,000 respectively according to the above 2010 study. In 2006, standardised rates for COPD mortality were much lower in France compared to EU27 (8.2/10,000 vs 19/10,000). COPD related mortality is greater in the winter season. The total number of hospital stays for COPD exacerbation in 2007 was between 69,000 and 112,000 depending on the indicator used.

Figure 8 and Figure 9 show respectively COPD prevalence for the period 1979-2005 and the rate of hospitalisation related to COPD exacerbation from 1998-2007.

Exacerbations account for a large share of the healthcare costs associated with COPD. A 2004 study carried out in France with patients visiting emergency services showed that over 90\% of patients required hospitalisation, 12\% required intensive care and hospital mortality was 7.4\%.

The 2000 SCOPE\textsuperscript{25} study carried out with 285 COPD patients in France found out that the average number of exacerbation per COPD patient was 1.7, these exacerbations accounted for 19\% of treatment costs. COPD accounted for 66\% of all costs incurred by these patients divided between prescription making 31\% of costs (€1,340.60 per patient per year) and hospitalisations which represented 35\% of costs (i.e. €1,509.90 per patient per year). Costs were greater for patients with more severe COPD, as could be expected.

Another 2000 study in 8 countries (Confronting COPD Survey)\textsuperscript{26} showed that for France 22\% of COPD patients required hospitalisation for COPD at least once in their life and 11\% had been hospitalised over the past 12 months. Hospitalisation represented 22\% of direct costs and unscheduled care (hospitalisation, emergency visits or consultations) meant 28\% of the costs. Annual direct costs were estimated at €530 per patient and indirect cost €1,078 per patient. The cost of unscheduled care (€151) was almost double the cost of scheduled care (€82), which suggests that improving management of COPD could help reduce the economic burden of COPD.

### 2.3.2.2 Diabetes

According to the French observatory "Institut de Veille Sanitaire", the prevalence of diabetes reached 4.39\% in France in 2009. This means that 2.9 million people had diabetes out of which 700,000 received insulin treatment. Among the 75-79 age group, prevalence increased to 20\% for men and 14\% for women which corresponds to a 6\% yearly increase since 2000.


Diabetes prevalence is expected to increase even further because of an ageing population, increased life expectancy for diabetic patients and the increasing prevalence of obesity among the French population.

It is estimated that among the 18-74 age group 20% of diabetic people are not diagnosed (estimate based on 2006 data). However this percentage decreases significantly for the 55-74 age group, where it is estimated that 13% people are not diagnosed. The increasing referral of diabetic patients under the ALD programme which provides 100% coverage of treatment for specific chronic diseases may have had an influence on diagnosis improvement.

Diabetes prevalence differs across the French regions, with North and Eastern parts of France as well as some areas of Paris-Isle-of-France being more affected while prevalence is weakest in Brittany. In metropolitan France, diabetes is more prevalent among men than women regardless of the age group.

Complications are not uncommon as 9,000 patients get amputated every year and 12,000 get hospitalised for myocardial infarction while another 3,000 suffer from renal deficiency in terminal phase.

In 2005 diabetes was responsible for more than 32,000 deaths corresponding to 6% of total deaths in France while the crude death rate for diabetes was estimated to be 51/100,000 in 2006.

Cardio-vascular complications are often a cause of increased mortality among diabetes patients, as 60% of death certificates of diabetes patients also refer to cardio-vascular diseases.

In terms of costs, the 2007-2010 ENTRED study (see Box 1 below) showed that the average cost of diabetes in 2008 was €5,431 per patient which corresponds to a total cost to the healthcare system of €12.9 billion. See http://www.invs.sante.fr/surveillance/diabete/entred_2007_2010/diaporamas_2007_2010/diapo_couts_entred_2007.ppt
Box 1- ENTRED study 2007-2010 highlights

The French “Institut de Veille Sanitaire” which is in charge of public health surveillance within the Ministry of Health carried out a study (ENTRED) both in 2001-2003 and 2007-2010 with the aim to assess the health status of diabetic patients, care pathways, quality of treatment, quality of live and the cost of diabetes.

The study estimated that there were 2.4 million diabetics in metropolitan France in 2008, a trend which is on the rise. The diabetic population is mostly composed of elderly people (mean age 66), is economically worse-off than the overall population in the same age group and nearly a fourth of these people were born in a foreign country.

Type 2 diabetes is the most frequent (92 % i.e. 2.2 million people in metropolitan France); 26% of diabetic patients are over 75; 54% of diabetic patients are men, and younger than diabetic women. Before the age of 45, type 1 diabetes is more prevalent with 54% of all diabetes cases, a proportion that gets reversed after 45 to become marginal (1% type 1 diabetes among the 65 and over age group). Nearly half the population of diabetic patients (48%) have suffered from diabetes for 10 years, which means that they have a higher risk of suffering from complications.

Over the years 2001-2007 the risk of cardiovascular diseases decreased noticeably among type 2 diabetes patients. While obesity increased (41 %, + 7 points since 2001), glycemic control improved (HbA1c mean value: 6.9 %, - 0.3 %), and hypertension as well as cholesterol decreased regardless of the age group considered. However, diabetes complications have been more frequent which can be explained by better detection and longer life expectancy among the elderly and an increase in diabetes among the younger population.

In spite of progress with diabetic treatment, glycemic control is still insufficient for 41% of all type 2 diabetes patients, which increases the risk of complications for kidneys, eyes and nerves. This high figure seems to indicate that current treatment recommendations are not followed sufficiently.

Preventative treatment for cardiovascular and kidney diseases have been used more which has had an impact on hypertension and cholesterol between 2001 and 2007. However there is still room for improvement as 49 % of diabetic type 2 patients had too high blood pressure. In spite of important improvements in medical follow up, diabetes screening is still insufficient.

In average, diabetic patients consult their GP 9 times per year, at the GP practice or at home through doctor visits. In addition 10 % of type 2 diabetes patients have consulted an endocrinologist or a specialist in internal medicine over the year considered - a frequency which has been stable since 2001. Consultations with cardiologists have increased from 28% to 37 % between 2001 and 2007.

GPs follow up 87% of type 2 diabetes patients, without referring them to a diabetes specialist, which means that they are key as coordinators of care pathways and key point between the paramedical sector and secondary care.

2.3.2.3 Cardiovascular diseases

Cardiovascular diseases are the first cause of mortality worldwide and the second cause of mortality in France with 147,000 people dying every year of coronary thrombosis or stroke. These are the first chronic conditions in France with 2.8 million people affected. They account for 27% of all healthcare costs associated with chronic diseases, i.e. €18.7 billion.

In spite of a 15% decrease in mortality from 2000 to 2004, cardiovascular diseases account for 26.4 % of deaths among men and 31.7 % among women, making it the first death cause for women. They are also the cause of many hospitalizations with 350,000 people hospitalized in 2004 because of coronary thrombosis (215,500) and stroke (139,600).

A total of €28.7 billion was spent on cardiovascular diseases in 2008 including those registered as chronic disease under the ALD regime and those outside ALD.

A total of 2.8 million people benefitted from the full coverage provided under the ALD regime, i.e. 4.9% of those covered by the social security regime. This figure is constantly increasing (5.9% in 2008). Cardiovascular diseases come first in the ALD regime corresponding to 27% of all ALD expenses or €18.7 billion. Their share represents 38% of the increase in numbers of ALD covered people followed by diabetes with a 32% share and cancer 19%. 1.5 million patients suffer from one of the following conditions: stroke, chronic arteriopathy or coronary disease. It is expected that by 2015, 2.1 million people will be suffering from these three conditions.

A large share of the French population – over 5 million people in 2008 - also follow a treatment for cardiovascular diseases but are not covered by the ALD regime, which represents a cost of €10 billion.

The five cardiovascular diseases covered under the ALD regime (i.e. 100% coverage) are:

- Stroke (ALD n°1)
- artériopathies chroniques avec manifestations ischémiques (ALD n°3)
- Severe CHF, severe cardiac arrhythmia, cardiopathies valvulaires graves, cardiopathies congénitales graves (ALD n°5)
- HTA sévère (ALD n°12)
- Coronary diseases (ALD n°13)

The public health law of 2004 set as a target to decrease mortality and frequency of CHF exacerbations. CHF is the cause of frequent hospitalization which could be avoided through better coordinated care. CHF prevalence is estimated to be around 2-3% in Europe, in-hospital death rate was 8.3% in 2009. The prevalence of CHF may be underestimated because other conditions may be registered as cause of death among CHF patients. The European Study Euro Heart Failure has found a readmission rate after 12 weeks of 24%. The number of deaths with CHF as the main cause of death has decreased by 20% between 1990 and 2008. This figure varies between regions with the North-Calais region being 20% above the French average in term of standardised death rates and Aquitaine, Picardie, Corsica and Languedoc Roussillon lying 10% above average.

Just below 147,000 people required one or more short hospital stays because of CHF in 2008, out of which 19.4% required several hospitalisations which represents a 7.8% increase since 2002. The crude hospitalisation rate was 306.2 stays per 100,000 inhabitants while the standardised rate (taking age into account) was 177.5 per 100,000 inhabitants. 90% of stays were for people aged 65 and over. A third of all stays concerned 84 years old and over. For the period 1997-2008, the number of stays and the crude hospitalisation rates have increase by 35% and 26% respectively, although the age-standardised rate has remained stable during the same period, which shows a clear influence of ageing in the hospitalisation increase.

2.4 Social and Healthcare organisation

2.4.1 Main characteristics the French healthcare system

As described in the first SIMPHS France country study the French Healthcare system is a mix of Beveridge and Bismarck models and is particularly difficult to describe as it involves numerous actors and sources of finance. It is a universal system in which all citizens are

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entitled to coverage, including hospital care, ambulatory care and prescription drugs and a minimal coverage of eye and dental care.

Financing is provided by the State with a certain share of co-payments which are covered by complementary private health insurances. In terms of organisation healthcare is the shared responsibility of the state, the statutory health insurance funds and local communities. The statutory health insurance consists of the agricultural scheme, the non-agricultural self-employed scheme and the general scheme.

Care is provided by a mix of private, fee-for-service doctors, private for profit hospitals, private not for profit hospitals and public hospitals. A so called third sector provides care to the elderly and the disabled alongside the health care and social sector. Outpatient care is largely provided by self-employed doctors often working alone as only 38% of doctors work in a group practice. As doctors are free to practice where they wish, there are great disparities in the distribution of doctors across the French territory. A gate-keeping system ("preferred doctor") was introduced by the 2004 law on public health with the aim to control costs. In order to encourage patients to adopt the gate-keeping system, which was introduced as a voluntary measure, those not using the gate-keeping care pathway are subject to higher co-payments. As of 2006 80% of patients had chosen a preferred doctor. Initial outcomes showed that expected financial savings had been offset by additional payments to doctors. There were also concerns that inequalities in access to specialist care may result from this system. 32

Inpatient care is provided by a mix of public and private hospitals, the latter being further divided into profit and non-for-profit hospitals. A third of all hospital beds are from private for-profit clinics. Home hospitalisation (HAD) which had been introduced some decades ago only formally became an alternative to hospitalisation in recent years.

The regional level has gained increasing importance since the beginning of 2000 when the ARH (regional hospital agencies) – in-between replaced by ARS with broader missions (see below) - were granted more powers to set up networks of healthcare providers - the rationale for such networks was to introduce some form of managed care in order to improve coordination and continuity of care, as well as multidisciplinary care targeted at specific population, diseases or activities. The regional dimension was given further importance with the adoption of the 2009 HPTS law (see section 2.4.3 below).

The first SIMPHS country study for France underlined that the French healthcare system has been suffering from the lack of coordination and continuity of care between hospital care and ambulatory care on the one hand and healthcare and social care on the other, in addition to the coordination difficulties inherent to the important presence of self-employed doctors (liberal practitioners). However the 2009 HPTS law has initiated a profound reform of the healthcare system in an attempt to solve these problems as shown in section 2.4.3.

In terms of organisation, responsibilities for health and social care are shared between several ministries and directorates.

There are two directorates under the Ministry of Labour, Employment and Health (hereafter Ministry of Health):

- The General Directorate for health (DGS) in charge of health policy
- The General Directorate for Healthcare provision (DGOS, see section 2.6.1.2 below) which is responsible for the management of resources across the whole healthcare system

The Social Security Directorate (DSS) which is in charge of financial issues and of the statutory health insurance is under the shared responsibility of the Ministry of Health and the Ministry of Budget.

32 See foot note 11, p.183
The General Secretariat for Social Affairs (SG) is under the shared responsibility of the Ministry of Health and that of the Ministry of Solidarities and Social Cohesion.

There are a number of agencies and further government actors involved in health and social care from an ICT perspective which is addressed in detail in section 2.6.

2.4.2 The growing role of the regions, “départements” and communes in health and social care

The French state is known for its centralised nature. Over decades some attempts have been made to decentralise a number of competencies including in the healthcare area. However as highlighted in a report from the French Senate33 published in 2010 on the relationship between health and social care policy and “territories”, healthcare is the only sector which has been recentralised in France, as earlier attempts to decentralise healthcare policy have been undone.

The report underlines that healthcare as a competency is not the remit of the regional or local level (“collectivités territoriales”) but that of the state which is responsible for healthcare funding including collecting contributions, and deciding upon funding and reimbursement. However within each region, the “départements” have traditionally been responsible for health and social care issues, such as social protection of the family and children. The “Collectivités territoriales” (hereafter CTs) which include communes, “départements”, territories with special status (e.g. Corsica) and regions also have healthcare competencies through specific agreements made with the state. In that respect, the “départements” can participate in the implementation of healthcare programmes like for cancer. The CTs can also take action in the area of vaccination or fighting certain diseases. In this context CTs are part of the governance of health policy.

Prevention is one of the remits of communes, as they are empowered to take specific action to guarantee the well-being of the citizens, which can be directly related to health policy (e.g. promoting healthy food in public schools). Social support is also provided by communal or intercommunal organisations (e.g. CCAS, CIAS). In addition “Départements” are in charge of policy for the disabled and the elderly which may also have a healthcare dimension. Last but not least the regions have been involved in healthcare through their role in research which leads them to participate in healthcare innovation or training (e.g. for social care) for instance.

The Law on “Hospitals, Patients, Health and Territories” (HPST law) of 21 July 2009 (see section 2.4.3 below) which has initiated a profound reorganisation of healthcare delivery foresees the involvement of CTs in two ways, on the one hand through the newly created Regional Health Agencies (Agences régionales de santé - ARS) and on the other in the framework of partnerships with the latter.

Before the above law was passed the CTs were already involved in healthcare governance through their representation in the Regional Hospital Agencies (ARH) and the regional public interest groups (GIP) on health and social care. With the 2009 law which requires Regional Health Agencies (ARS) to make public health action closer to local reality, CTs are now represented in the ARS. The rationale for this is their expertise with health policies and activities undertaken at local level which should contribute to ensuring efficiency of the ARS action. The importance of the integration between the healthcare and social care sectors was a further reason for involving CTs in the ARS through the General councils.

33 “Santé et territoire : à la recherche d’un équilibre”. http://www.senat.fr/rap/r10-600/r10-600_mono.html#toc4
2.4.3 The latest reform: 2009 HPST law

The “Hospital, Patients, Health and Territories” (HPST) law of 21 July 2009 makes the regional/local level a key element of health policies to support the objective of integrating prevention, primary and secondary care as well as social care so as to ensure continuity of care for patients. The law implies a global reform which aims to support institutions and infrastructures in adapting to the new needs of the population. The transversal nature of the law is illustrated by the creation of Regional Health Agencies (ARS). Care coordination by healthcare providers is another key feature of this new law.

The HPST law deals with four main policy areas:
- Organisation of public hospitals
- Access for all citizens to high quality healthcare
- Prevention and public health
- Territorial organisation of the healthcare system.

The fourth objective being the most important to understand the impact of the reform on healthcare organisation and integrated care, which is of relevance for SIMPHS, the following paragraphs focus more specifically on this issue.

To achieve the fourth objective the HPST law mandates the creation of an ARS in each region. Each ARS is in charge of defining and implementing coordinated programmes and actions at regional or intraregional level. These programmes need to fulfill national health policy objectives as well as social and social care principles. They also have to include the implementation of a regional health policy, and the supervision, orientation and organization of healthcare delivery so as to answer needs in health and social care and ensure efficiency of the healthcare system.

The creation of the ARS is an attempt to gather competencies that were hitherto spread out among various actors (including ARH, DRASS, DDASS, URCAM, CRAM, MRS, GSRP) and covering different but related fields (e.g. health at work, health at school, prevention, access to care). These are now all covered by the ARS strategic regional health plan. The ARS thus aim to ensure the coordinated implementation of programmes and actions relating to healthcare, social care (medico-social sector) and social security, gathering three competencies in one. The ARS thus become the main drivers of the regional healthcare systems, without prejudice to the activities of CTs especially in the social care area and of other agencies (e.g. AFSSAPS, ANAP, HAS or InVS amongst others).

**Box 2 - ARS Governance**

The ARS are managed by a director and a supervisory board and are supported by a technical and consultation committee - CRSA (Regional Conference of Health and autonomy) - as well as two coordination commissions providing advice on specific issues.

The Director is in charge of defining the regional healthcare plan including the strategic regional health plan, regional schemes and programmes; signing pluriannual contracts both in terms of objectives to be achieved and financial means available (formerly a responsibility of the ARH); authorizing care services delivery and equipment.

The supervisory board is led by the state representative of the region. The board approves the ARS budget, assesses the strategic regional health plan, the multiannual contract and outcomes of the ARS action, and approves financial accounts.

The CRSA is supported by four committees focusing respectively on prevention, health and social care delivery, patients’ rights and care organisation. Another two coordinating committees have been created to ensure consistency across the various actions. One of them deals with prevention, health
at school, health at work and protection of mothers and children, the other with social care support. These committees have consultation and technical competencies and deal with coordination among actors amongst other things.

Through the HPST law health territories have been created which correspond to a geographical zone that has to be pertinent in terms of health activities, healthcare delivery, primary care, secondary care, and social care. Such a territory can be intraregional, regional or interregional. The territories therefore correspond to the logic of care pathways and needs of healthcare users. The whole health and social care delivery is thus reorganized down to the local level, reflecting the will to break silos between various tiers of care and to ensure accessibility, proximity and flexibility of care delivery adapted to the needs of patients and their conditions. Chronic diseases and ageing are two main drivers for reinforcing the territorial dimension in care.

The law further reinforces the role of HAD (home hospitalization) and improves its integration with other types of care delivery. It also improves coordination between ambulatory care and hospital care.

2.4.4 Decree on telemedicine of 19 October 2010

As foreseen in the HPTS law of 2009 a decree was published in October 2010 to define telemedicine acts and their implementation as well as their reimbursement. The decree defines five acts of telemedicine as follows:

- Teleconsultation (i.e. medical professional and patient in different locations)
- Tele-expertise (doctor to doctor)
- Tele-surveillance (i.e. remote interpretation of patient data to decide upon care, which corresponds to RMT in SIMPHS)
- Teleassistance (remote assistance from healthcare professional to healthcare professional during a medical act)
- Medical response

It also specifies four principles to be respected when implementing telemedicine acts:

- Obligation to inform the patient and get his/her prior consent
- Identification of the actors involved in the telemedicine act (authentication of the healthcare professional and patient identification)
- Registration of the telemedicine act in the patient health record
- Reimbursement of the telemedicine act (when listed in the social security code).

Reimbursement conditions are defined in national agreements made between healthcare professionals and the state. Additionally telemedicine acts may be financed by other funds such as FIQCS (see Box 3 below) and ONDAM\(^{34}\) in the context of social care and support to the elderly.

Telemedicine has to be defined in a programme. This can be a national programme defined by a ministerial decree, a multiannual plan or contract which aims at improving quality of care and care integration, or a specific contract between the ARS director and the healthcare professional concerned. Contracts made at regional level have to be in line with the terms of the regional health plans on the development of telemedicine so as to take into account the

\(^{34}\) ONDAM which stands for "Objectif National de Dépenses d'Assurance Maladie" was defined in the social security financing law of 1996 and introduced in order to better control healthcare expenditure. It is a ceiling imposed on the national statutory health insurance and passed by the Parliament every year.
particular characteristics of the regional healthcare set-up. The organisation of telemedicine also has to take account of the care offering in the given territory and involve practicing healthcare professionals whose capabilities are recognised. The relation between the healthcare professionals and the institutions involved in the telemedicine activity must be ruled by a convention. When data is being stored, the telemedicine act must comply with the principles defined by ASIP Santé. Patient consent is required which can be done electronically. The decree will be implemented 18 months from the date of publication in April 2012.

**Box 3 - The FIQCS fund**

The FIQCS - Fonds d’intervention pour la qualité et la coordination des soins – is state funding earmarked for activities and experiments aiming at:
- Improving quality of care and the coordination of care in cities
- Developing new ways of providing care and new healthcare networks
- Promoting the improvement of care availability (e.g. outside of working hours)
- Supporting the activity of existing or the installation of new healthcare professionals to promote equal access to care across the territory
- Promoting multidisciplinary practices and grouping of healthcare professionals

The funding is managed both at national level for activities of national or inter-regional reach, and regional level by the regional health missions (MRS). €250 million were earmarked for 2011 and provided by the three compulsory healthcare insurances (CPAM, RSI, MSA). ([http://allocpam.fr/info/fonds-intervention-pour-la-qualite-et-la-coordination-des-soins-fiqcs.html](http://allocpam.fr/info/fonds-intervention-pour-la-qualite-et-la-coordination-des-soins-fiqcs.html), accessed 8 Dec.2011)

**2.4.5 Plan national de télémédecine**

As underlined by the French Secretary of State in charge of Medicine in a recent speech, the French government considers telemedicine as a key element to modernise healthcare organisation, alongside a few eHealth priorities including DMP (French EHR) and digital hospitals for instance. The HPST law and the Decree on telemedicine have set the legal basis for wider telemedicine deployment in France which is one of the first countries in Europe to have adopted such a framework. A national telemedicine plan is now being developed which will define clear priorities in order to move beyond small scale pilots towards large scale deployment.

In that context, the government foresees the definition of a strategy including the following elements:
- Improving access to high quality care across the whole territory, including in areas with low medical density
- Improving coordination between health and social care
- Taking account of people’s needs and helping dependent people and chronic patients stay in their home
- Optimising use of healthcare resources by reducing emergency visits and outside of hours consultations or unnecessary hospitalisations.

The interest of the French government in eHealth and telemedicine is not a new phenomenon but dates back to the very early days of telemedicine. As recalled by the HAS in its 2011 report on “Efficiency of Telemedicine” (see section 2.6.2 on HAS), the French state has always shown a great interest in finding out how ICTs could impact care delivery

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and what opportunities they brought for healthcare. Indeed the above study lists about ten reports carried out on behalf of various ministries and government bodies, starting as early as 1993 with a report by the Ministry of Industry which was an attempt to assess the telemedicine market and the impact of telemedicine on industry and healthcare up until two important milestones in 2008 and 2009 with respectively the Acker Report on the “Importance of telemedicine in care organisation”\(^{36}\) commissioned by DHOS (now DGOS) and the Lasbordes Report “Telemedicine – an asset for our well being”\(^{37}\) carried out by a working group from the French Parliament under the aegis of MP Pierre Lasbordes. This report was mandated by the French Prime Minister and the Minister of Health. The report proposed a five year plan for telehealth deployment and made 15 recommendations to develop a coherent and sustainable policy in that area. Four of these recommendations have led to operational statements including on the topic of return from hospital and telemedicine for the elderly and the disabled. Last but not least in 2011 a report commissioned jointly by ASIP Santé and the Federation of Electrical, Electronic and Communications Industries (FIEEC) (See section 2.6.1.3) made a review of telemedicine and telehealth initiatives in Europe to apply lessons learnt to the French context.

The political interest shown over the last two decades and the willingness to develop telehealth applications have culminated with the definition of a three year deployment plan for telemedicine which is currently being developed by DGOS with the help of DSSIS and other ministries.

2.4.6 Independent living – "Mission Vivre chez soi"

The “Living at Home”\(^{38}\) mandate launched by the French State Secretary for the Elderly was carried out in 2010 by the Director General of the National Reference Centre in cooperation with key stakeholders who worked in 6 working groups over a four month period.

The aim of this the work was to develop legal, financial, regulatory, technical and organisational tools to remove existing barriers to living independently.

The six working groups had to provided a state of the art on each of the following themes:

1. Diagnostic autonomie habitat
2. Technologies and services for independent living
3. Mobility and city planning
4. Professions, competencies and training
5. Inclusion and discrimination prevention
6. Service management optimisation

The resulting report highlights the challenges of an ageing population, the relatively high pension incomes the elderly have in France, their interest in technologies and the interesting market perspectives this represents for the “independent living industry.” The work has focused on the needs related to independent living, involving stakeholders from the whole spectrum of the ageing ecosystem to get a comprehensive view of quality of life in this context.

The report contains proposals for action dealing with:

- Improving the living environment of the elderly (e.g. adapting buildings and creating new types of social buildings, financial solutions, mobility checks, preventing discrimination)


- Facilitating access to technologies and services for independent living, promoting the development of adequate services (e.g. awareness campaigns, greater access to internet for the elderly, collaborative R&D, creation of a fund for companies developing ICT based products for independent living)

- Accompanying the modernisation of services to the person (e.g. create a reference centre for jobs and skills for health and social care, support the organisation of services through shared infrastructure, promote the development of multi-services call centres in the social and health care area).

2.5 Disease management programmes

It is estimated that 25% of the French population suffer from one or more chronic diseases. The Law on public health of 9 August 2004 recognising the significant impact of chronic diseases on quality of life defined actions for improving the quality of life of people suffering from chronic diseases. A number of programmes have targeted specific conditions such as diabetes, cardiovascular diseases or Alzheimer for instance. However it is first in 2007 that quality of life became the direct target of government action through a dedicated programme, focusing for the first time on the patient rather than on a specific condition.39

The French healthcare system also introduced a specific scheme for long-term illnesses that provides patients with a 100% coverage. The list of conditions covered by this regime (ALD) comprises 30 illnesses covering mostly chronic diseases or disease groups. Patients eligibility is decided by GPs submitting patients to the statutory health insurance which decides upon their admission into the scheme. In 2009 the ALD regime covered 8 million patients.

This section highlights the main measures that have been taken over the last decade or so to improve chronic disease management and reduce their impact on patients’ lives and healthcare resources consumption.

2.5.1 Public health law of 2004

The public health law of 2004 aimed to ensure better diabetes surveillance in compliance with good practice and recommendations from diabetes associations and government agencies, for 80% of diabetes patients, with a view to reducing the number of complications. A second objective of the law in the area of diabetes was to reduce the frequency and gravity of diabetes complications and more particularly that of cardio-vascular complications. The ENTRED study mentioned earlier in this report has been used to assess the implementation of the above law by following the evolution of a number of indicators. For quality of diabetes surveillance France seems to have performed as well as Italy and the UK, less well than Netherlands, Belgium, Austria, Scotland and Sweden but better than Spain and Ireland. For other indicators, blood pressure control is more satisfactory than in other EU countries, that of HbA1c is slightly more satisfactory while that of cholesterol is less satisfactory in France than in other countries.40

The same law further defined a 5 year plan to reduce mortality linked to specific cardiovascular diseases by 13%; a 13% reduction for men and 10% for women for ischemic heart disease and a 15% reduction for both genders for deep vein thrombosis). The evaluation of outcomes shows that during the 2004-2008 period, mortality for ischemic heart disease decreased by 15% among men and 18% among women. Standardised hospitalisation rates have not decreased as strongly. In 2008 a total of 4,822 people died

from deep vein thrombosis or lung embolism. Standardised death rates moved up and down between 1990 and 2004 before decreasing from 2004 onwards. By 2008, this rate was 17% lower than in 1990.41

2.5.2 Prevention of Cardio vascular diseases among younger population

In May 2010 the French social security (Assurance maladie) launched a programme aiming at improving prevention of cardio vascular cerebral diseases, concerning 2.3 million insured patients and their doctors. The aim was to prevent risk factors and avoid accidents. The programme is linked to the above 2004 law and is endorsed by the Ministry of health, as part of the national plans on chronic diseases and on stroke respectively. The social security already provided services for diabetic patients since 2008 s via the SOPHIA initiative which could be extended to further diseases. This new measure targets people not yet covered by the chronic diseases programme (ALD) and following or not a treatment for cardio vascular risks. It is a primary prevention effort which aims at raising awareness among the French population about the risk of cardio-vascular accidents.

2.5.3 Programme to improve the quality of life of patients with chronic diseases

The above plan which was adopted in 200742 for the period 2007-2011 is composed of 4 main actions (further broken down into 15 measures) as follows:

1) Knowing better your condition to better manage it. This action besides providing information to patients also aims to involve patients in the process of making recommendations for carers, putting the patient at the centre.

2) Expand medical practice to include prevention. This action includes educating patients in handling their condition.

3) Making patients’ daily life easier. This action aims at personalising care, better educate carers, take actions for chronic diseases in the work place as done so far with disabilities, expand the provision of services to care at home or in specialised homes.

4) Better understand needs. This deals with the importance of analysing medical data on chronic disease (epidemiology) and of getting better knowledge on the impact of chronic diseases on quality of life.

These measures reflect the acknowledgement of a number of facts around chronic disease. First of all that the more a patient is involved in his condition, the more care will be efficient and the more complications can be avoided, as patients are aware of the risks inherent to their chronic conditions and trained to handle their condition well. Second that with longer life expectancy and better treatment, more and more people will be suffering from chronic diseases and the healthcare system needs to adapt to their needs. It also recognises that the impact of chronic diseases can be decreased and that there was a need to measure this impact while indicators to measure the impact of public health measures in that area were also lacking.

This 5 year plan foresaw a total funding of €135.7 million in 2007, with a total cost over 5 years of €726.7 million (out of which €10.6 million come from the finance law and €716.1 million from the social security financing law).

2.5.4 National stroke programme

A national stroke programme43 was adopted in April 2010 comprising three main elements:

- A strategy paper based on the findings of a report on stroke prevention and care prepared in 2009 for the Ministry of Health
- An operational plan containing 17 national and regional action programmes to be carried out respectively by the state and national agencies on the one hand, and the ARS on the other
- A toolbox providing methodological guidance for actors involved in stroke care including indicators for evaluation.

The rationale for launching such a plan on the part of the French government is the acknowledgement that stroke is an important cause of mortality, it is underestimated, it has a huge impact on health and social care expenses (€8.4 billion) and it is possible to prevent it by controlling risks especially among the population below 65 which represents a quarter of all stroke patients. The aim is to create stroke care pathways in each health territory to enable a reduction in mortality and morbidity related to stroke. This is the task of the ARS in each region.

The national stroke programme contains general objectives such as:
- Developing prevention and information on stroke
- Improving care organisation for stroke patients from emergency to return from hospital including social care
- Improving rehabilitation services
- Promoting research on stroke
and more specific ones such as:
- Provide care for stroke patients through care pathways that are well coordinated and well defined at territory level
- Reduce time to care from the first symptoms
- Increase treatment by thrombolysis
- Improve the coordination of the various health and social care professionals involved
- Define specific care pathways for children suffering from stroke
- Improve care practice

The programme has been developed in close cooperation with the ARS, the statutory health insurance funds and the HAS amongst others.

2.5.5 New agreement introducing incentives for Chronic Disease Management

An agreement was signed 21 July 2011 between the Assurance maladie (UNCAM) and three unions representing liberal doctors (CSMF, MG France et le SML) putting in place a new incentive system for doctors (both GPs and specialists, “liberal” sector). The aim is to focus on quality of care rather than number of consultations, whereby the basis of the French incentive system is kept (payment by act) complemented with a new type of incentives that allow the involvement of doctors in public health strategies, in the area of prevention, chronic disease surveillance and efficiency of practice.

This new system is based on the accumulation of points by the doctor, depending on the fulfilment of certain predefined indicators relating to the practice organisation, quality of service and quality of care practice.

As such the indicators take account of the DMP implementation, ePrescription use, and IT adoption to enable transmission and use of teleservices. As to surveillance of chronic diseases, certain vital signs measurements and the registration of e.g. diabetes patients are taken into account. In terms of prevention, screening and other public health measures are measured. Finally to measure efficiency, the number of prescriptions for certain medicine is taken into account.

The indicators for quality of medical practice are defined for each specific domain, including chronic diseases with 8 indicators dealing with diabetes and one with hypertension. Other indicators deal with prevention (e.g. vaccination, cancer) and efficiency (e.g. prescriptions of generics compared to total prescriptions for specific types of medicines like antibiotics, statins, antihypertensors).

Looking more specifically at the diabetes indicators, some targets are defined in terms of number of patients out of all patients that have e.g. a HbA1c or a cholesterol measurement below a certain threshold, that have undergone a retinopathy examination etc. The minimum number of patients for the indicator to be taken into account in the remuneration calculation is 10 for each of the indicators, while targets for each indicator vary from 65% to 90% of patients treated. A maximum number of points can be obtained for each indicator corresponding to a 100% fulfilment of the target. A maximum of 250 points can be obtained for the 9 indicators relating for chronic diseases surveillance.

As an example, for a total of 800 patients, a doctor who would reach 100% of the objectives for each indicator in all categories would receive 1,300 points giving him a performance related remuneration of 11.4 euro i.e. € 9,120 for a whole year.

All liberal doctors are concerned by the indicators relating to practice organisation and quality of services while other indicators relating to clinical practice prevention, public health and efficiency only apply to GPs to start with. However the agreement is thought to include doctors from other specialties where justified, such as cardiologists, endocrinologists, gastroenterologists and paediatricians through additional clauses to be defined.

This agreement introducing an innovative incentive systems together with the various programmes on chronic disease management shows how various strategies around chronic diseases crystallize to achieve a better management of healthcare resources while improving health outcomes and quality of life. This also reflects the importance of shifting from care and cure to prevention in order to cope with the challenges of ageing.

2.6 Role of ICT in promoting integrated care

The creation of DSSIS as a new government body, in charge of global ICT strategy for health and care, the reorganisation of state departments like of DHOS into DGOS, to go beyond the traditional hospital centered approach of the organization of care, and the creation of ASIP Santé and ANAP - the first one as the merger of three earlier public interest groups on Health ICTs and the second to strengthen the economical assessment of ITC projects reflect the importance given to ICTs in healthcare reorganization. It also points out the willingness of the French government to improve its governance in that field, while adapting to the challenges posed by applications of ICT in healthcare. These agencies, government or independent bodies often have the competency to grand funding which gives them a prime role in promoting ICTs for integrated care.

Besides these structural changes within the scope of the Ministry for Health, the HAS – as independent body - the Statutory Health Insurance funds organisation (Assurance Maladie), but also agencies and other government actors like DGCIS and CGIET (Ministry of Economy) play a role in prospective, promotion and, evaluation of technological solutions in the health and social care arena. Their work contributes in particular to the growing awareness about the need for impact assessment in order to support the deployment of healthcare ICTs in general and telemedicine or telehealth applications in particular.
Finally the fact that the French government has dedicated a large part of its flagship funding instrument (Grand Emprunt) to the digital economy and within it telehealth is a further sign of the government's willingness to enable a breakthrough for health technologies, for the benefit of the French industry as well as to modernise healthcare delivery.

This section is an attempt to reflect the recent movements and changes that have happened in the governance of health and social care, showing the various actors involved, with a particular emphasis on policies, actions and funding aimed at promoting integrated care through ICTs.

2.6.1 Ministry of Health, Ministry of solidarities and social care and Social Security Directorate

2.6.1.1 DSSIS

The DSSIS (Délégation à la Stratégie des Systèmes d’Information de Santé) is an inter-ministerial body created in May 2011 under the responsibility of the Ministry of Health. It is in charge of the national policy for the digitisation of the health and social care system including the management of the national eHealth action plan, with a view to developing ICT uses across the health and social care field.

The DSSIS plays a central role liaising with the ministers of health, of social security, of solidarity and social cohesion. This body whose activities were just being kicked-off at the time of writing in November 2011 is also in charge of supervising the work of ASIP Santé and of preparing decisions on behalf of the national steering committee for the ARS in the field of information systems as well as looking after their implementation.

DSSIS also plays an important coordination role at national level, with regard to the implementation of health and social care information systems, involving the state, agencies and other organisations, service providers, hospitals and other health and social care facilities as well as the National Fund for Solidarity and Autonomy (CNSA) and CNAMTS.

At international/European level, DSSIS also contributes to the action from the ministries of health and social affairs and further bodies under their responsibilities in the area of ICT and information systems. DSSIS is further involved in the development and follow-up of the "Digital Hospital" plan and the "National telemedicine deployment plan" led by DGOS.

The DSSIS's work programme for 2011-2012 includes the following priorities:

- Relaunch and implementation of EHR (DMP)
- Participation in the two national programmes "Digital hospital" and "Telemedicine deployment"
- Definition of a roadmap for ARS's information systems
- Contribution to the preparation of actions within the "Grand emprunt" (see section 2.6.5)
- French participation in European eHealth policies in cooperation with epSOS

DSSIS is the reference contact of CGIET for missions related to Health and Autonomy sectors. Having jointly noted a lack of eHealth services offering DSSIS asked CGIET in 2010 to set up and lead a working group, gathering medical project leaders, social initiative leaders, scientific leaders and industry experts to study the issue. The Working Group defined several case studies in which environmental factors, success factors and risks were studied with the objective to identify financial and organizational factors as well as economical model / business models. As a result some best practice was defined and

2.6.1.2 DGOS

The "Direction Générale de l’Offre de Soins" (DGOS) within the Ministry of Health was established in 2010 to substitute the former "Direction de l'Hospitalisation et de l'Organisation des Soins (DHOS)". It is part of the new governance of the healthcare system created through the ARS and addresses care from a global perspective going beyond hospitalisation. It aims to foster care delivery which is adapted to patients’ needs and ensure quality and efficiency of care. It is responsible for defining the national strategy for the deployment of telemedicine which will help give visibility to all actors and facilitate the development of new projects while helping existing ones to consolidate.

In November 2011 DGOS produced some methodological guidelines to support the ARS in defining their regional telemedicine programmes. As of November 2011, the ARS of seven regions (Alsace, Burgundy, Brittany, Franche Comté, North-Calais, Provence Alpes Côte d’Azur and Poitou-Charente) had submitted for consultation their respective regional health plans which included a telemedicine programme.

Furthermore the DGOS is also working on best practice recommendations on chronic diseases such as CHF which could benefit from telemedicine applications, in cooperation with HAS (see section 2.6.2 below).

DGOS provides global funding to the ARS (€26 million in 2011) to support the deployment of new or existing telemedicine projects. The aim is to speed up such deployment, promote innovation answering patients needs and build organisation, legal and financial models that are sustainable and reproducible. The conditions for the regions to apply for the above funding in 2011 have been defined by DGOS together with ASIP Santé. All ARS were entitled to receive funding for innovative projects that pursue the objectives defined by DGOS and DSSIS, another delegation of the Ministry of health dealing with strategy for healthcare information systems (see section 2.6.1.1 above).

More precisely DGOS seeks to promote telemedicine along five main themes: imaging and teleradiology for care continuity; stroke (CVD); healthcare in prisons; chronic diseases (including CHF and diabetes) and care provided through social care organisations (medico-social sector) and home hospitalisation.

Out of the total €26 million available in 2011, €14.4 million have been distributed to the 26 ARS according to their respective population size. It is then up to the ARS to select the projects that best fulfil the specific needs of their health territories while bringing the best economic and health outcomes. The remaining €11.6 million have been proposed to 13 ARS for developing telemedicine use in the case of stroke.

These 13 projects offered an innovative approach to stroke care and were presented in answer to a call for tender from ASIP santé (see 2.6.1.3 a) below) by the following regions: Auvergne, Basse-Normandie, Bourgogne, Bretagne, Champagne-Ardenne, Haute-Normandie, Ile-de-France, Franche-Comté, Languedoc-Roussillon, Limousin, Midi-Pyrénées, Nord-Pas-de-Calais et Rhône-Alpes. The projects have to comply with the organisational requirements of the national plan for stroke care and the national plan for telemedicine deployment. DGOS will follow up these projects closely in order to draw lessons from the experiments made in the above regions.

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46 See Dépêche TLCsanté du 1er décembre 2010.
ASIP Santé (see 2.6.1.3 a) below) also provided an additional €5.8 million over 3 years as direct subsidy in its 2011 call for tender to 5 telemedicine projects in 6 regions. One of these projects specifically targets chronic diseases in Languedoc Roussillon. The first two years of the projects should be dedicated to developing use cases, financing models and evaluation of the project (economic and clinical).

2.6.1.3 Agencies

a) ASIP Santé

ASIP Santé – the National Agency for Shared Healthcare Information Systems - is the result of the merger of three Public Interest Groups (GIP) on respectively EHR (GIP DMP), professional health cards (GIP CPS) and interoperability of hospital information systems (GMSIH). Its creation was defined by a decree of September 2009 for a duration of 15 years. As its name indicates the mission of ASIP Santé is to develop shared information systems in health and social care. Telemedicine is one of the key areas of focus of ASIP Santé, together with EHR (DMP), interoperability, health data protection and support to the regions. It also acts as the secretariat for the committee in charge of authorising healthcare data hosting providers.

As recalled by the Director of ASIP Santé on the occasion of the publication of the decree on telemedicine in October 2010, a lot of telemedicine initiatives have developed at local level in France, pushed by motivated champions from a variety of backgrounds, giving rise to a dearth of initiatives which shows it is still an emerging sector, a characteristics that is shared with other European countries. ASIP Santé sees the next five years as a turning point where experimentation will lead to generalisation of new care practices and prevention through such technologies. ASIP Santé whose role is to accompany the development of new care practices through ICT is convinced that telemedicine/telehealth services need be integrated into care pathways if they are to succeed in the long run and provide added value.

The Director of ASIP Santé noted several factors that make the French healthcare sector ripe for the paradigm shift for telemedicine in the short term, including:

- The emergence of a culture of shared medical projects among care providers which is supported by national programmes e.g. on CVD and the ARS regional health plans
- The reform of care organisation as promoted by the 2009 HPST law and the 2010 decree on telemedicine
- The role of structuring projects like EHR (DMP) and the adoption of standards for interoperability
- The legal basis provided through the decree on telemedicine which facilitates the establishment of economic models
- The French government strategy both on ICT and care organisation as well as accompanying measures that promote innovation, support stakeholders, create trust and ensure good management of public funding

In this context the first call within the Telemedicine Programme launched by ASIP Santé (Telemedicine 1) was published in October 2010, aiming to speed up telemedicine deployment and ensure its routine usage. The overall objective of the call was to foster the implementation of telemedicine projects which have the potential to be transferred to other regions fulfilling all legal, clinical, economic, organisational and technical requirements. The call is an acknowledgement that the added-value of telemedicine is already proven but that there is a need to support deployment so as to ensure sustainability of telemedicine

49 See http://esante.gouv.fr/pointsdevue/jean-yves-robin-telemedecine-le-temps-de-la-generalisation#comments
application. It should be noted that this call explicitly excluded "Telesurveillance" applications, i.e. Remote Patient Monitoring type, because such solutions were considered to be difficult to reproduce in different settings, and thus the reproducibility of the experience may not be guaranteed. ASIP Santé was however planning to include these applications in its "Telemedicine 2" call for tender.

In terms of funding, for the Telemedicine 1 call ASIP Santé was entitled to finance up to 80% of the eligible costs of a project. Amongst others, the projects presented had to contain some impact assessment plans, addressing both usage (e.g. nr of users of the applications) and clinical and economic indicators (e.g. reduced length of stay, improved quality of life).

ASIP Santé does not operate in isolation and has signed a number of partnership agreements with relevant stakeholders in the healthcare arena. One of those agreements is the cooperation agreement concluded with ANAP in May 2010 acknowledging that they both pursue complementary objectives aiming to modernise the French healthcare system and the social care sector while providing better quality services to citizens. In that framework they identified projects for cooperation in the area of information systems development or organisational impact of the implementation of such systems.

ASIP Santé concluded a further agreement in May 2010 with FNEHAD with the aim to ensure the good use, consistency, performance, interoperability and security of information exchange and data sharing in the health domain as implemented in HAD facilities. This partnership aims to address the challenges emerging from the increasing importance of home hospitalisation in the French care organisation. More particularly the partnership will seek to promote solutions for EHR access and telehealth applications at home, which could benefit the development of remote patient monitoring.

Further agreements have been made with a variety of stakeholders, such as InVS or the National Cancer Institute for instance showing the commitment of the French government to improve data sharing for better decision making in healthcare and ultimately better care provision, supported by modern and interoperable information systems.

In 2010 ASIP Santé together with the Federation of Electrical, Electronic and Communications Industries (FIEEC) launched a European Study 50 on the development of telemedicine and telehealth applications with the aim to provide a state of the art of these applications in Europe, identify success factors and draw lessons for France.

The study analysed 10 telemedicines and telehealth experiences in 6 countries (Belgium, Germany, Denmark, The Netherlands, Norway and the UK), and looked more specifically at governance and organisation, infrastructure and technologies, economic and clinical impact and acceptance by healthcare professionals and patients of these solutions. It concluded that many experiences have been deployed within a clear framework with a national or regional strategy, following a top-down or bottom up approach depending on the governance and healthcare system set-up, with a strong influence of the state even in regional initiatives. Each experience answered specific needs related either to users (both healthcare professionals and patients), to the provision of equal access to care (e.g. in remote areas) or to the improvement of healthcare organisation. It also concluded on the importance of engaging a variety of stakeholders and how in the experiences reviewed this was done through different pilot organisation structures. Further lessons were drawn on the size of the experiments, coordination at national level, economic evaluation and clinical outcomes as well as the need for long-term efforts as the cycle from R&D to pilot, deployment and scaling up requires about 10 years.

Out of the above findings ASIP Santé and FIEEC concluded that telemedicine and telehealth offer a double opportunity for France as a) they provide patients and healthcare

50 Etude sur la Telesanté et Télémédecine en Europe, 2011
http://esante.gouv.fr/sites/default/files/etude_europeenne_Telesante_FIEEC_ASIPSante_0.pdf
professionals optimised services thanks to technology at a reasonable cost, also enabling dependent patients to stay home longer, b) they support value added creation in a number of industries including electronic components, domotics, medical technologies, ICT, security and healthcare software development.

b) ANAP

ANAP (Agence nationale d’appui à la performance des établissements de santé et médico-sociaux) has been created by the HPST law. ANAP’s role is to support healthcare and social care professionals in providing better services to patients and citizens, by making recommendations and providing tools helping healthcare providers improve performance and manage their organisation better so as to control costs. As such it supports the efforts of healthcare facilities in optimising their performance through information systems. Quality of care is one of the key performance indicators in that context.

ANAP cooperates closely with the ARS, providing them with methodologies and references to help them carry out their mission. ANAP has set up a network with ARS at regional level and with health and social care professionals at national level to foster exchange and promote competences. ANAP has defined its work programme around six main performance axes which should help improve efficiency of health and social care provision. Eleven programmes encompassing 32 projects have been defined which are expected to have a high impact on the provision of care for patients, citizens, professionals and institutions. As an example, ANAP is working with ARS on developing innovative care pathways that will break silos between care providers and ensure continuity of care thus avoiding extra costs linked to lack of coordination. ANAP supports the implementation of health technologies (ICT, imaging, equipment etc.) alongside other dimensions that contribute to better performance of health and social care provision and also carries out benchmarking in that area.

ANAP signed a partnership agreement with SNITEM (Medical technologies industry union) aiming to promote telemedicine, support its deployment and contribute to assessing implemented solutions and organizations, as well as to share knowledge.51

c) ARS

As seen in section 2.4.3, the HPST law of 2009 has led to the creation of Regional Health Agencies (ARS). They play an important role in the deployment of ICT for health are they are in charge of developing plans for the deployment of telemedicine and telehealth on the territories, i.e. down to the local level. They do so through their regional telemedicine plans. In the Burgundy and Picardie regions, such plans are ready giving a new impetus to initiatives such as keeping patients at home. In Burgundy a Task Force has been set up to deal with that issue.

2.6.2 HAS

The HAS (Haute autorité de Santé) was established in 2004 by the French government as an independent public body in charge of activities aiming at improving quality of care and ensure equal access to healthcare for patients. As part of its remit it carries out assessment of drugs, medical devices and procedures and published guidelines and accreditation of healthcare organisations and doctors certification. It further provides information to health authorities to facilitate decisions on reimbursement, promotes good practice among health professionals and users, contributes to improving quality of medical information and provides information to citizens. The HAS is also responsible for software accreditation: in particular it

carries out accreditation of prescription support software (both for independent GPs and hospital doctors), and provides accreditation of websites providing health related information to the general public. Last but not least it carries out an important role in evaluation of practices.

In June 2011 the HAS published a guidance document (so called "Note de cadrage") on the "Efficiency of Telemedicine - State of the art in international literature and evaluation framework" to support policy makers and further stakeholders involved in telemedicine development. The aim of this guidance document is to help define priorities for telemedicine deployment based on identified efficient pilots and experiments, propose an evaluation framework based on a classification of telemedicine projects and identify economic models to guide policy makers with funding issues around telemedicine. The study has been carried out by a working group which based on a literature review and interviews carried out with relevant stakeholders proposed evaluation methods to assess clinical and economic outcomes, and provided food for thought on the funding of telemedicine. The work has been done in cooperation between the HAS and the national steering group on telemedicine upon request from DGOS.

2.6.3 Statutory Health Insurance funds

2.6.3.1 CNAM TS

As mentioned in section 2.4.1, the French social security or statutory health insurance (Caisse Nationale d'Assurance Maladie des Travailleurs Salariés – CNAM TS) consists of three main schemes: the agricultural scheme, the non-agricultural self-employed scheme and the general scheme. The CNAM TS is in charge of the sickness and work accident fund. It plays a role in the digitisation of healthcare claims, the French ambulatory care being based on upfront payment by patients who later claim reimbursement of a share of their expenses from the statutory health insurance fund.

Following the 2004 reform, the CNAM TS received further competencies which enables it to optimise care pathways. The CNAM TS is responsible for the coordination of care pathways in which the GP plays a central role, it is also responsible for the efficient use of public resources in healthcare, and is a key actor in the French healthcare system.

As part of its strategy to manage risks and offer new services as well as improve the relation between administrative and medical networks within the healthcare organisation, CNAM TS has set up a project with the aim to implement an ePrescription system for all healthcare professionals who have the technical means to digitise supporting documents required for the reimbursement of services provided to patients covered by the statutory health insurance. This project thus encompasses all statutory health insurance funds included in the SESAM Vitale system. The project is currently in a pilot stage.

2.6.3.2 CNSA - Autonomy funding scheme

The National solidarity fund for autonomy (CNSA) is a health insurance fund which was created in 2004 following the heat wave of 2003 to support the elderly and the disabled in an acknowledgement that providing suitable care facilities and services for people in lack of

53 www.ameli.fr
54 SESAM-Vitale is an Economic Interest Group gathering statutory health insurance funds and complementary health insurance funds. It is involved in particular in the digitisation of information exchange between healthcare professionals and health insurance funds. The use of an individual chip card for identifying patients is at the core of its digitisation strategy.
55 http://www.cnsa.fr/article.php3?id_article=664
independence required additional funding. In the ICT for health area, it runs an observatory of technology based services provided at home and aiming to support people who are losing autonomy.

The CNSA fund is financed by employers’ social contributions and taxes and the total CNSA budget in 2008 amounted to €16 billion. The services target children, adults and the elderly and may be delivered at home or in residential care.

CNSA pursues three major goals, funding services and residences for dependent people (€14 billions) and contributing to local authorities’ expenses for special allowances (2 billions euros), ensuring equal treatment across the whole territory and provide expertise towards its partners.

The funding can be channelled through the health insurance which delegates the distribution of funding to CNSA. As to the disabled, government and local authorities cover other costs, for the elderly local authorities bear care expenses and accommodation costs in case where the elderly have insufficient means. CNSA also finances the APA (Personalised Autonomy allocation) which is targeted at 60 years and over losing independence. The level of funding depends on the degree of dependence and the CNSA covers up to 33% of the APA, the rest being carried by the local authorities ("département" level). The APA budget in 2010 was €3.2 billion. Another benefit is the PCH (disability compensation benefit) which targets people below 60 with a disability. It is allocated by local authorities and covered 98% by CNSA. Out-of-pocket payments for care in residential facilities was €1,500 per month on average in 2010, an amount whose increase has been a concern for the French state. As noted in the 2010 WHO Health in transition series56: "a report issued in 2007 (Gisserot, Grass 2007) estimated that, on top of the funding through Statutory Health Insurance, an additional €250 to €430 million will be required every year for the next 20 years for financing the expected needs of the elderly and dependent population.

CNSA supports projects focusing on ICT for independent living, selecting projects through call for tenders in cooperation with other government bodies like the French National Research Agency (ANR).

In that context over the last few years CNSA has promoted a number of projects relating to telehealth and telecare through the following open calls for tenders:

- TecSan2007 with projects like TeleResp (RMT for respiratory diseases), Reactive (Stroke patients reeducation), QuoVadis (Alzheimer patients safety and cognitive stimulation)
- TechSan2008 including the Miras (Home robot) and Navig (for visually impaired people) projects
- AAL 2008 (Ambient Assisted Living) including Domeo (platform for integrated personalised services), Hera (platform for Alzheimer patients), Pamap (mobile surveillance patients for the elderly).

It has also promoted "T-Seniority" a TV based solution to include the dependent elderly through information services (ICT-PSP CIP project) , a demonstrator of telehealth (ambient intelligence) and projects dealing with technologies for the elderly.

2.6.4 Ministry of Economy, Finance and Industry

Technology innovation has always been high on the agenda of French governments even if des-industrialisation has strongly modified the industrial landscape over the last decades. As underlined by an expert from the French Economic Observatory (OFCE) in an interview in 2009,57 the French industry share of GDP decreased from 18% to 12% from 1997 to 2007,

56 See footnote 11
57 http://lexpansion.lexpress.fr/economie/quelle-politique-industrielle-pour-la-france_203757.html
although value added has remained stable showing great productivity increases. In terms of strength of the French industry, there are a number of national champions in specialised fields such as nuclear energy, aerospace and increasingly high technology industries with strong value added.

The French President himself is strongly committed to maintaining industrials skills and resources in France and founded his economic policy on the basis of a strong support to industry, including as a leverage to overcome the economic crisis. The "Investing in the Future" funding programme (see 2.6.5 below) is a direct outcome of this strong commitment and the fact that two calls for tenders within this programmes have addressed eHealth shows that French policy makers are well aware of technology innovation and its potential, not only to promote the French ICT industry and contribute to growth but also to reorganise health and social care in light of the pressing challenges it faces. The difficulty France is struggling with in this area is no different than that faced by other European countries trying to promote eHealth development: technology innovation is not a problem per se, the problem is about integrating technology into healthcare processes and thus enabling process innovation as well as service innovation in that field. The difficulties inherent to healthcare, particularly policy and regulatory constraints, make it a particularly complex environment. Nonetheless, as seen earlier, France has taken a strong lead on this.

The Ministry of Finance is also currently analysing the area of "Services to people" ("Services à la Personne"), as significant public money is being spent on such services which are provided to e.g. the elderly through people visiting them at home. It is estimated that around 10-15% of the costs incurred by the "Services à la personne" are lost in administration which is why the Ministry would like to get a better understanding of activities in this field so as to make the delivery of these services more efficient.

2.6.4.1 DGCIS

The DGCIS, within the Ministry of Economy, Finance and Industry, plays an important role in economic and industrial development. Together with DATAR58 the DGCIS coordinates the activities of the inter-ministerial working group (GTI) in charge of the follow up of the competitiveness poles policy, whose role is to promote innovation. The DGCIS coordinates selection processes through call for tenders, for R&D projects seeking funding from the "Fonds unique interministériel" (FUI).

In December 2008, a call for tender was launched by the Minister in charge of Industry to create a reference centre for care at home and independent living, which would allow all actors (industry, academia, users, healthcare professionals) to work together, set up projects and promote new usages in this field. On 22 May 2009, the Minister announced the creation of this "Centre for health at home and independent living" (CNR SDA, see section 2.6.4.3). This national reference centre was set-up in cooperation with the Ministry of Health and the CNSA.

Further, on 22 April 2010 the Minister launched a call for tender with a €3 million funding, targeted at the improvement of independent living for people suffering from chronic diseases. ICT players were invited to propose innovative solutions to the DGCIS, for patients staying at home to be able to keep in touch with healthcare professionals on a continuous basis.

The DGCIS which is responsible for the above actions within the Ministry of Industry is also a key stakeholder involved in the preparation, management and follow-up of calls for tenders relating to ICT for health within the "Investing in the future" programme (see section 2.6.5).

58 Délégation interministérielle à l'Aménagement du Territoire et à l'Attractivité Régionale
2.6.4.2 CGIET

The General Council for Industry, Energy and Technologies (CGIET) is an advisory body under the responsibility of the Ministries of Economy, Finance and Industry and that of Electronic Communications. It is in charge of analyzing economic and industrial development, ICT and related technologies as well as energy. It focuses on technology, research, industry, services, training amongst other topics.

Over the last couple of years, CGIET has published a series of reports focusing on ICT and the Social care sector which show the relevance of that sector in the context of ageing and the transformation of care but also highlights the difficulties encountered with developing ICT based services in the social care sector. In particular the 2010 study on the "Characterisation of the social care sector for the development of ICT services" provides an analysis of the impact of ICT in the social care sector and defines recommendation for fostering the use of ICT in that sector.

A further 2009 CGIET study focused on the analysis of the offer and demand for ICT in the health, autonomy and services area making a number of recommendation on governance, the need for taking a more scientific approach to evaluation in that sector as well as the benefit of carrying out regular surveys on needs for ICT for health and autonomy.

After having published in January 2011 the results of the Business model approach launched in 2010 (in relation with DSSIS), CGIET’s work in the health domain focuses on value creation, assessment and Living Lab’s open innovation process for the Health and Independent living sectors.

As underlined below in the context of the "Investing in the future" funding programme, call for tenders have a strong evaluation component. This reflects a general trend as evaluation starts to play an increasing role in French eHealth initiatives. The work led by the Ministry of Finance/CGIET in that field, in close cooperation with DSSIS, aims at ensuring that economic models and related impact assessments are included in eHealth projects.

Indeed in light of the lack of consensus on evaluation mechanisms for the social care sector and the drawbacks of existing evaluation methods (adopted from e.g. the pharma sector) whose applicability to the health and social care sector has limitations, French experts from CGIET and Telecom Bretagne have developed a new, multidimensional ICT evaluation model - GEMSA (Multidimensional Evaluation Grid for Health and Autonomy) - based on five specific categories: strategy, technology, quality and usage, organization and economics, thus adding to the technical and health-economic/clinical parameters, some organisational and usage parameters. This framework thus enables to identify the value of ICTs for the health and social care sector, and compare such value to that of traditional care or lack of care. This model goes beyond the HTA framework and the MAST toolkit enlarging its scope to include aspects like project management and technology management amongst others. GEMSA has been used in French national call for tenders for chronic diseases monitoring, for the "Grand Emprunt" eSanté consultation, and it is also being tested in a EU INTERREG IV Project (Sudoe).

2.6.4.3 CNR Santé à Domicile et Autonomie (CNR SDA)

CNR Santé à Domicile et Autonomie (CNR SDA) is, as explained before, another recently created body, with an association statute, whose action should contribute to the overall government objectives of facilitating innovation through ICTs in care pathways and social

60 Le Goff-Pronost, Myriam; Picard, Robert: "Need for ICTs Assessment in the Health Sector: A Multidimensional Framework". COMMUNICATIONS & STRATEGIES (Issue No. 83, 3Q 2011)
61 http://www.cnr-sante.fr/
care in the face of the decreasing healthcare workforce, increased life expectancy, economic challenges and societal needs in terms of autonomy and mobility.

Launched at the end of 2009 by the Ministry of Industry and located in Nice, CNR SDA is a centre of reference for healthcare and autonomy offering a forum for citizens (e.g. for the elderly, families, industry) and so called "effectors" (i.e. those taking decisions and promoting initiatives). The purpose of CNR SDA is to promote health technologies and services, by acting as a partner of choice for the whole range of national stakeholders (from the State, to CTs, to ARS) in the field of health at home and autonomy, and to help them define priorities and needs. As such it aims at creating a network of expertise and innovation and coordinate a national network of relay centres operating at local level.

The type of services and products in its field of action include:

- Telemedicine and telehealth
- Homes that promote better health and autonomy
- Services to the people and home care
- Home objects and technology for the elderly
- Remote monitoring system for self-care and chronic disease self management

The overall objective is to promote new ICT usages in the field of services for health and autonomy at home in order to improve the quality of life of patients and citizens, facilitate the emergence of more efficient organisation of care, and develop ICT economic competitiveness.

The services offered by CNR SDA encompass:

- Techno economic observatory on health at home and autonomy
- Training
- Information services
- Expertise and project development support

CNR SDA has selected four areas also called poles (Nice, Grenoble, Limoges, Toulouse) where activity at regional level has to be coherent and reproducible.

CNR SDA launched two call for tenders at the end of 2011 respectively on the set up of expert centres and relay centres. Expert centres are instrumental in building expertise in the field of action of CNR SDA (telehealth, technologies for independent living). Relay centres have as an objective to identify local actors and local initiatives so as to provide a mapping of actors. Relay centres have to involve a wide range of stakeholders including technology and service providers, users, experts from academia, territorial entities, institutions, clusters and poles.

As an example the Val de Lorraine relay centre focuses on health and autonomy at home. An institute was created for the training of ergotherapists tailored to the needs of the elderly at home. The initiative includes adaptation of the home to the needs of the elderly, training of their relatives or carers, organisation of assistance to the elderly. The initiative includes a medical economic evaluation element.

The creation of the CNR SDA shows the importance given to the local level in supporting the deployment of healthcare ICTs.
2.6.5 ICT for health Funding – “Investing in the future”

The French programme "Investissement d’avenir" (Investing in the future) is part of the French "Grand Emprunt" launched in 2010 by the French government to raise a total of €35 billion funding on financial markets. This funding aims at promoting innovation in France and stimulate economic growth.

As part of this funding scheme, €4.5 billion have been earmarked for the development of the digital economy, out of which €2.5 billion have been reserved for the development of new digital services, usages and contents with another €2 billion dedicated to speeding up the national deployment of very high bandwidth. The "new usages" theme or action has been the subject of two call for tenders for a total of €40 million in 2011, the first call was for about €10 million while the second should be about €30 million. The first one closed in April 2011 and the second one is planned to close end January 2012. Both calls aim to facilitate and support the creation of new services based on ICTs to support dependent people in their homes.

This action is funded by the National Fund for the digital Economy and coordinated by the "Commissariat Général à l’Investissement" under the responsibility of the Prime Minister. The results of a consultation carried out in 2010 on how to best use this funding fed into the definition of the themes for calls for tenders under this action.

As a result a first eHealth call was launched in January 2011 to fund the development of innovative communication solutions (e.g. sensors, healthcare solutions, domotics solutions) for better health, wellbeing, autonomy and prevention as well as to reduce the impact of dependency in care facilities. The funding could be either in the form of a subsidy or as a loan to be refunded. Funding ceilings were 45% of eligible costs for SMEs, 30% for Medium sized companies, and 25% for large companies. For research institutes and associations the ceiling was 40% of eligible costs. The calls include a requirement of ROI for the French state.

The second call within eHealth under the "New usages" theme has been postponed upon request from project owners, with new deadlines for expression of interest 14 November 2011 and for submission of tenders 30 January 2012. The second call goes beyond the first one as it aims at fostering the emergence of economic models in the eHealth area through the implementation of demonstrators of a representative scale, involving the provision of groups of services and involving a large number of partners. The aim is to support 10 to 15 projects with a total government funding of €30 million.

The second call for tender specifies the rationale for supporting demonstrators which relates to the high cost involved in such undertakings, their experimental nature and the time required until a market can develop. The demonstrator is understood as a step beyond experimentation but before commercialisation of a product or service, which serves to optimise a technology or overcome economic or societal barriers. The fields to be covered by the proposed services or products have to include at least one of the following: health, well being, independent living, patient education and involvement, prevention and support for independent living. Proposals may address prevention, care pathways or care delivery. Each demonstrator will have to include a consortium of partners representing the whole value chain down to the final users (patients or healthcare professionals).

Solutions to be developed may relate to:

- patient information and education
- support to people living at risk or losing autonomy
- prevent or limit loss of autonomy

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63 [http://investissement-avenir.gouvernement.fr/sites/default/files/user/AAP%20e-sant%C3%A9%20-%20FSN_0.pdf](http://investissement-avenir.gouvernement.fr/sites/default/files/user/AAP%20e-sant%C3%A9%20-%20FSN_0.pdf)
- improve care of people with chronic diseases
- improve well being and safety of the elderly or dependent people
- facilitate relationships between various tiers of care and patients
- improve the cost/benefit of healthcare provision

Projects may also address various fields of healthcare around a common objective.

Impact assessment is a key element that has to be included in proposals covering economic and societal impact as well as quality of care, quality of life and ethics. The call even specifies the need for a health economist in the team so as to cover the health economics impact. The evaluation of the project will have to be multidisciplinary i.e. going beyond patient or users acceptance including value added and organisational impacts.

In the second call funding ceilings have been defined for R&D expenses and for commercial or usage innovation expenses, with varying ceilings depending on the type of organisation.

The "Investing in the future" funding programme with the two eHealth calls described above clearly illustrates the strategic importance given by the French government to the deployment of eHealth applications in tackling the challenges of ageing, chronic diseases and healthcare reorganisation towards integrated care. While the first call clearly promotes the development of RMT type of solutions for prevention, independent living and well being, the second call illustrates another dimension of the French eHealth strategy which is to move away from small scale pilots to larger scale, multi-disciplinary and reproducible demonstrators including a sustainable economic model. This confirms the strategy underlined by the Director of ASIP Santé and reported in section 2.6.1.3. The importance given to the impact assessment dimension is a further translation of the objective of bringing viable solutions into the market since only solutions with proven socio economic benefits have a chance to succeed under market conditions. The ROI condition included in the first call foresees additional funding in case of significant ROI for the state which is an innovative way to encourage project owners to develop viable business models. This condition does not appear as such in the second call but while the first call only addresses R&D expenses, the second call also aims to cover commercialisation expenses, which again reinforces the strategy pursued by the French government to promote initiatives capable of bringing products and services to market. Last but not least, the significant amount of funding made available in the second call, which is four time that of the first call reinforces the importance of the market dimension.

Finally both calls stress the need for solutions to be integrated in care pathways, showing that technology is a key element in the current thinking on the reorganisation of the French health and social care system.

A total of €77 million have been made available by the French government in 2011 for telemedicine projects (the "Investing in the Future" funding making up over half of this amount) corresponding to a total investment of €180 million.

### 2.6.6 Living Labs for health and autonomy

The Living Labs concept is a research approach based on user participation from the early stages of technology development, often through open innovation processes, and which focuses on four main activities:

- Co-creation by users and producers
- Exploration of scenarios and new usages
- Experimentation in real life settings
- Evaluation of socio economic, socio ergonomic and socio cognitive parameters
Participants in Living Labs include public and private stakeholders, companies, associations, and individuals. The European Network of Living Labs (ENoLL) which gathers 274 members to date grants labels to entities passing defined qualification criteria.

A study by the French CGIET\textsuperscript{64} (see above section 2.6.4) has analysed the potential of Living Labs in the health and social care sector in France and other countries. In particular in France, ten Living Labs dealing with health and autonomy could be identified, out of which three had been granted a healthcare label. Generally, these Living Labs seem to explore a great variety of fields in terms of type of users targeted in the experiments, geographical coverage (e.g. regional vs. local reach), specialisation (e.g. elderly, pathology), and user recruitment (e.g. clinical vs. market approach) leading to valuable outcomes.

The study further analysed the benefit of the Living Lab approach in health and social care and concluded that Living Labs enable to address specific challenges inherent to this particular sector, for the following reasons:

\begin{itemize}
  \item[a)] The complexity of the ecosystem requires understanding needs from various types of users (e.g. patient, relatives, professionals) which can be gathered by asking these users about their experience of the ecosystem
  \item[b)] For users to see value in new solutions, they need to be helped in understanding the potential of these solutions
  \item[c)] For a solution to answer healthcare professionals' needs, feedback from them is needed
  \item[d)] There is a need for new participatory models including patients in creating solutions for their own health or autonomy.
\end{itemize}

The study also underlined challenges that Living Labs need to address in order to reap the benefits of this approach, such as the need to combine clinical approaches with ergonomic considerations, to define a clear framework and/or good practices to set-up Living Labs experiment especially addressing user issues (e.g. conflict of interest, limiting participation to avoid professionalization of users etc.) and to address IPR issues as Living Labs lead to the co-production and creation of knowledge and data. The importance of funding which requires the legal structure to be decided upon carefully, the need to define conditions for recruiting users, and the need to organise the work and define roles clearly are also crucial.

The study concluded that the Living Lab approach is suited to the field of health and autonomy and would benefit from greater dissemination of good practices and learning from existing experiences. It also highlights the importance of addressing legal issues, opening up Living labs to wider user and associations' participation through existing networks, promoting further Living Labs initiatives for health and autonomy, addressing evaluation issues and building up a specific network at EU level of Living Labs for health and autonomy.

### 2.7 Status on telehealth/telecare deployment

#### 2.7.1 Overview of telecare market

According to data by AFRATA\textsuperscript{65}, the association of French telecare operators, whose members cover about 76% of all telecare users in France (ca 390,000 users), there have been 2.5 million calls treated in 2009, 240,000 of these leading to intervention (hence 2,260,000 calls without intervention), 122,000 relating to falls and 1.5% of calls requiring emergency services. Further over 70% of all users are 80 years or older.\textsuperscript{66} 50% of calls and 25% of calls respectively related to involuntary calls or comfort calls, only 2,3% of calls

\footnotesize{\textsuperscript{64} http://www.cgiet.org/documents/2011_10_05_2010_46_CGIET_SG_LL.pdf \hfill \textsuperscript{65} http://www.afrata.org/IMG/pdf/4_Afrata_100610_VR.pdf \hfill \textsuperscript{66} http://www.afrata.org/IMG/pdf/3_Afrata_100610_MS_MC.pdf}
relating to medical issues. The market is estimated to grow by 10% every year. The first two providers hold a 40% share of the market while the first five represent 70% of the market, making it a rather concentrated market.

Telecare systems are often sold by social association at local or regional level (see ADMR – Association d’aide à domicile en milieu rural). They are not linked to medical organizations. There was a peak in telecare deployment in France a while ago but it decreased as the services did not fulfil expectations. The level of sophistication of telecare services is often very basic which has led some large telcos to withdraw from such markets on grounds that too little added value could be provided. In particular the issue of call handling in case of emergency made it difficult to set up services. Some operators have chosen to offer mobile and interactive TV based services but even so they do not always have an official healthcare business strategy, for reasons of liability. This may explain to some extent the lack of visibility of IPHS activities which may be developed at local and regional level (e.g. collectivités territoriales) but without national visibility.

There are three main models of telecare provision in France. 67 for 8% of users the telecare services are directly managed by local authorities (e.g. at department level), for another 32% the public telecare services are subcontracted to private operators via open call for tenders, and for the remaining 60% the services are privately purchased with financial subsidy from the "départements". The trend noted by AFRATA is one of rolling back of Collectivités Territoriales (CTs) from direct management of telecare services.

2.7.2 Large scale telehealth projects

The following initiatives are recent examples of large scale telehealth deployment promoting integrated care. However these initiatives being too recent to be addressed as case studies they are summarised here for reference.

2.7.2.1 SOPHIA

The SOPHIA68 programme was set up by the French Statutory healthcare insurance. Initially created with chronic patients in mind, it is currently mainly dealing with adult diabetes patients covered by the ALD regime. SOPHIA aims to improve the quality of life of diabetes patients through personalisation of care and patient education, improve treatment compliance and reduce healthcare resources utilisation, as information and advice provided to patients through SOPHIA help reduce complications or worsening of their condition. While acceptance by patients is good the SOPHIA project has not been subject to an independent evaluation yet. Furthermore, the fact that it is a voluntary programme has slowed down its implementation.

Nevertheless SOPHIA has been deployed in 19 French departments and a total of 400,000 diabetes patients to date, and 15,200 doctors are involved in its implementation. Before the deployment phase, a 30 month pilot took place covering 140,000 diabetes patients and 6,000 GPs. The development of the Diabetes disease management programme for the pilot was carried out by a technology provider called HealthDialog through a €12 million contract. The success of the pilot is largely related to the involvement of GPs both in the patient recruitment phase and in the service delivery. As result in 2011 Altran and Healthways were granted a four year contract for managing the nationwide deployment of SOPHIA. There are plans to include new conditions like respiratory and cardiac diseases in the future.

67 [http://www.afrata.org/IMG/pdf/3_Afrata_100610_MS_MC.pdf](http://www.afrata.org/IMG/pdf/3_Afrata_100610_MS_MC.pdf)
2.7.2.2 VIGISANTE

Another project is Vigisanté which could be key in defining the future of Chronic Disease Management. It is being funded by ASIP Santé and the Ministry of Industry and carried out by the complementary insurances Malakoff Mederic, Vauban Humanis and D&O – three private health insurance funds. The project was awarded following an open call for tender. It targets hypertension, involving employees, insurance services, GPs and hospitals to offer home care services. It started in Lille with triage for employees and offered home care services. It offers a complete chain of coordinated services, based on ICT based medical tools enabling the exchange of patient vital signs, an internet and phone based medical platform and an intelligent system facilitating follow-up by the GP. With the support from the CNAM TS and the North-Calais ARS, it aims to improve chronic disease care both from a clinical and economic point of view.

Further partners include:
- A hospital group from Lille
- Two innovative ICT SMEs
- A medical platform (Europ Assistance)
- Two research labs (Inserm U936 and Telecom Bretagne).

The Vigisanté project is planned to be deployed over two years from 2011 to 2013 in the North Calais region, offered to 13,500 insured. Generalisation of the experiment is expected to lead to a reduction of healthcare expenses.

2.7.2.3 CERITD

The CERITD is a non-profit organisation whose aim is to improve diabetes prevention and treatment. It carries out research activities, including clinical trials, and has launched DIABEO a telemonitoring service for diabetes patients, in cooperation with VOLUNTIs and Orange.

2.7.3 Identifying telecare and telehealth cases

As seen in previous chapters, the French government has taken a number of measures aiming at promoting telehealth, from reinforcing the governance for ICT for health to adopting new legislation to providing funding schemes. However the role of industry should not be overlooked as industry stakeholders in France have always played an important role in developing and promoting technological devices and related services for help, with a strong focus in recent years on services and applications helping to keep the elderly living at home safely. This section will focus on initiatives that originate from the industry but have led to adoption by public health and social care organisations.

2.7.3.1 Methodology

Innovative ideas often emerge from start-ups or SMEs and the health ICT sector is no exception in that respect. During the past 15 years, the French administration has been seeking to foster the development of such activities in SMEs and large groups at national, regional or local level by providing financial support through financial schemes that may be divided into two main categories:

a) Support to technical and industrial projects

69 www.ceritd.fr/presentation/origine
- Top-down innovation funding stream: R&D or industrial projects may be funded through coordinated action (“Actions concertées incitatives”) and led by various ministries, national agencies or R&D poles

- Bottom-up innovation funding streams: Start-ups or SMEs investment from own budget lines or via loan for private companies monitored through OSEO, a funding organisation under the French Ministry of Economy, Finance and Industry, and the Ministry of Research).

b) Experimental approach on selected territories: partial funding from the Regions (responsible for education, University R&D, industrial deployment and employment) or other territorial administration authorities such as “département” (social action) or municipalities (housing, the elderly…).

Taking into account these two main funding streams, information has been gathered through contacts originated through two coherent and non-exclusive channels:

- For the industrial and technology approach, taking OSEO case studies as a reference, contacts have been established with start-ups and SMEs which obtained financial support from OSEO in the field of telemedicine, telecare or remote monitoring.

- For the territorial approach, building upon the results of a national study conducted by the French National Assembly in 200970 (see section 2.4.5) which contained 28 case studies, contact have been established with key industrial actors in the telecare and remote patient monitoring area.

As a result of the above approach, a list of companies providing technology and services in the field of telecare and/or remote monitoring was defined. This list has been put in perspective with the list of companies audited by the French National Assembly in 2009, which at the time indicating having a special interest if not a clear company strategy around home services (including e-health, and telealarm or telecare).

At the end of the above identification process, 26 selected organisations (mainly industry actors) have been contacted and asked to provide information about their business and strategic approach. Moreover these companies were offered to present a regional case study, provided that the actual deployment of their service offering was sufficient to include various parameters, such as information on business model.

In addition, the "Centre National de Référence Santé à Domicile & Autonomie" CNRSDA, mentioned in section 2.6.4.3, has been formally contacted about the SIMPHS study and the list of selected companies was reviewed together with the CNRSDA General Manager, M. Bruno CHARRAT, and double-checked against the most relevant on-going territorial initiatives known and supported by the CNRSDA. In order to verify project relevance with CNRSDA vision, CNRSDA directly contacted 2 additional companies, in charge of projects mature enough to gather statistical parameters necessary to select case studies.

As a result of the above steps, 28 companies or organisations dealing with home services, telecare, telealarms and more general e-Health services have been identified. The full list is available in Annex 2.

2.7.3.2 Current offering, classification in 5 market segments

Based on the above data collection, and taking account of the classification presented in the French National Assembly as well as that of the General Council for Industry, Energy and Technologies (CGIET) - Ministry of Industry - the survey outcomes have been classified according to the following four categories of service offering:

1. Home security (linked to home automation)

2. Healthcare – e-care @ home
3. Communication and social link
4. Home comfort (linked to home automation).

Considering the available data on some economic parameters, a 5th complementary market segment has been added: mobility devices to help monitor, manage and coordinate care service staff visiting elderly patients at home. Indeed such functionalities have been identified by the French government, at the level of the Prime Minister’s cabinet, as a potential source of human resources usage optimisation and hereby financial optimisation of social services staff managed at the level of “Départements”.

The collected information on relevant initiatives reveals that the French industry seems to be investing in innovative ways to provide communication and social link (segment 3 above):

- through service offered together with devices developed for the elderly, focusing on adapted ergonomic and ease of use. For example: offerings from Technosens (interactive television or e-television), Ubiquiet (an innovative concept based on RFID, traditional radio sets and phone call automation), Tikeasy (a tablet system dedicated to elderly people)

- through devices aiming to facilitate the mobility and coordination of carers coming to the home of the elderly. For example: Orange (France Telecom) “Mobile and badge” offering, PRYLOS or MEDISYS NFC and mobile phones geolocalisation; as well as the innovative Kayentis electronic pen, allowing to automatically register patient data on a secure patient database by simply filling-up paper forms at patient home).

More traditionally, the French industry also appears to be investing in e-care @ home for RMT (segment 2). Some applications e.g. targeting patient behaviour are very sophisticated (LINK CARE Service for elderly people movement analysis in the case of Alzheimer treatment follow-up; VIVAGO wrist ring to gather biological or behaviour parameters at home).

In this field, several industry segments seem to be focusing on the concept of home platform, from the provision of connectivity devices and local boxes (SRETT, e-devices, Capsule) to ICT data handling at home consistent with regional platforms (ALTRAN, AXON) or medical organisation and service provision (VOLUNTIS, H2AD).

Table 2 below presents an overview of every initiative identified in the survey, for each of the segments addressed:

<table>
<thead>
<tr>
<th>Segment 1 - Home security (linked to home automation)</th>
<th>Project activity</th>
<th>Company</th>
<th>Type</th>
<th>Products &amp; Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESOPPE</td>
<td>LE (Limoges)</td>
<td>Large</td>
<td>Teleassistance as well as home automation devices (smoke detection, security access checking)</td>
<td></td>
</tr>
<tr>
<td>DOMOCARE</td>
<td>ALTRAN, AXON</td>
<td>Large</td>
<td>Security access, moves control, telealarm</td>
<td></td>
</tr>
<tr>
<td>Telecare</td>
<td>Orange - France Telecom</td>
<td>Large</td>
<td>Telealarm offering c/o telecommunication infrastructure</td>
<td></td>
</tr>
<tr>
<td>Telecare</td>
<td>AFRATA</td>
<td>Association</td>
<td>Telealarm and teleassistance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Segment 2 - Healthcare – e-care @ home</th>
<th>Project activity or company</th>
<th>Type</th>
<th>Products &amp; Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESOPPE</td>
<td>LEGRAND</td>
<td>Large</td>
<td>Behavioural parameters home platform, including patient fall monitoring and alerting devices</td>
</tr>
<tr>
<td>Domomédecine project</td>
<td>ALTRAN, PICADO</td>
<td>Large</td>
<td>Dedicated captors for multi-pathology and multi–cases patients, including weight, fall indicators, nutritional</td>
</tr>
<tr>
<td>Project activity</td>
<td>Company</td>
<td>Type</td>
<td>Products &amp; Services</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Chronic renal failure project</td>
<td>PHARMAGEST</td>
<td>Large</td>
<td>Treatment compliance at home</td>
</tr>
<tr>
<td>Alzheimer control at home</td>
<td>LINK CARE SERVICE</td>
<td>SME</td>
<td>A monitoring and neutral watch automatic device system is based upon “neutral cameras” (i.e. software analysis accessing behavioural analysis and artificial intelligence sending an alert message; image is activated after the security center answers and registers on the alert signal).</td>
</tr>
<tr>
<td>Mainstreamed service</td>
<td>H2AD</td>
<td></td>
<td>A home data-platform linked to regional service organization for alert feedback and follow-up</td>
</tr>
<tr>
<td>Diabeo</td>
<td>VOLUNTIS, a software house, in cooperation with AXON, ALTRAN and SANOFI</td>
<td>SME</td>
<td>Various medical applications organization at home starting with diabetics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td></td>
</tr>
<tr>
<td>Segment 3 - Communication and social link</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project activity</td>
<td>Company</td>
<td>Type</td>
<td>Products &amp; Services</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>ALTRAN, AXON</td>
<td>Large</td>
<td>Telealarm linked to territorial platform (database of people to be called in case of emergency, including various emergency levels); possibility to send a qualified social service representative, in case of emergency</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>LEGRAND Intervox</td>
<td>SME</td>
<td>Delivery of tablets with ergonomics especially designed for elderly people</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>TECHNOSENS</td>
<td></td>
<td>Full service based upon interactive (or connected) TV. The ergonomics is designed for elderly people, with various impairments e.g. hearing or sight; the system ergonomics is based on a 4-button remote control device</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>UBIQUIET (start-up)</td>
<td>SME</td>
<td>Development of a device allowing telecommunication process, based on RFID technology in order to propose an intuitive ergonomic for elderly people.</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>TIKEASY (Start-up)</td>
<td>SME</td>
<td>Offers special tablets with ergonomics adapted to elderly people</td>
</tr>
<tr>
<td>Segment 4 - Home comfort (linked to home automation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project activity</td>
<td>Company</td>
<td>Type</td>
<td>Products &amp; Services</td>
</tr>
<tr>
<td>Direct sale Devices for the elderly</td>
<td>AXON</td>
<td>Large</td>
<td>Home services including home temperature monitoring</td>
</tr>
<tr>
<td>Home automation</td>
<td>LEGRAND</td>
<td>Large</td>
<td>Various home automation devices such as automatic lighting in secure environment for fall prevention, help for household and home maintenance, temperature monitoring, shade monitoring etc.</td>
</tr>
<tr>
<td>Segment 5 - Social resources coordination and management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project activity</td>
<td>Company</td>
<td>Type</td>
<td>Products &amp; Services</td>
</tr>
<tr>
<td>“Mobile and Badge” solution</td>
<td>Orange (France Telecom)</td>
<td>Large</td>
<td>NFC mobile phone usage at home to record visits and service representative presence</td>
</tr>
<tr>
<td>Carers coordination</td>
<td>PRYLOS</td>
<td>SME</td>
<td>NFC systems for service people coordination</td>
</tr>
<tr>
<td>“electronic pen”</td>
<td>KAYENTIS</td>
<td>SME</td>
<td>Enables automatic filling-up of sharable patient database by care service staff writing visit report in the home book. Software application is provided for</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Service</th>
<th>Provider</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carers coordination</td>
<td>PHARMAGEST</td>
<td>Large</td>
<td>Software package for medical actors coordination at home</td>
</tr>
<tr>
<td>Alzheimer syndrome control</td>
<td>LINK CARE SERVICE</td>
<td>SME</td>
<td>Link with a management system helping to coordinate service people intervention at home</td>
</tr>
<tr>
<td>“Mobile and Tag”</td>
<td>MEDISYS</td>
<td>SME</td>
<td>A product complementing various Healthcare management software services</td>
</tr>
</tbody>
</table>
3 Zooming into selected IHPS/RMT case studies

It is possible to split the projects which have been mentioned by the companies contacted in two categories:

- Experimentations led through devices or technology drivers, in a single institution;
- General deployment underway at the level of a territory, focussing on services.

3.1 Technology led experimentation

Among experimentations leveraging technology devices, three cases are highlighted below. The three selected cases deal with actual deployment on territories, as part of a coherent strategy with both dimensions of technical/industrial offer, and territorial vision for service organization.

For technology driven initiatives, industry stakeholders appear to focus on experimentations, proposed to selected medical or social actors. We assume that such strategies are related to practical commercial reasons, approaching one or two hospitals, one or two retirement houses for elderly people, a healthcare network acting on a well-defined medical speciality.

Example 1: Technosens e-lio offering - social link through connected TV

<table>
<thead>
<tr>
<th>e-lio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong>: Prove the benefits of e-lio, a highly intuitive, ergonomic and easy-to-use video communication system to link users living at home to health professionals, service employees and family.</td>
</tr>
<tr>
<td><strong>Geographical scope</strong>: national</td>
</tr>
<tr>
<td><strong>Stakeholders involved</strong>: Private</td>
</tr>
<tr>
<td><strong>Number of users/patients served</strong>: 350</td>
</tr>
<tr>
<td><strong>Main Customer</strong>: The retirement house named Centre Hospitalier de Douai (CHD) gathers 164 rooms equipped with the e-lio solution. This solution enhances the relationships between the residents, their families and the medical staff.</td>
</tr>
</tbody>
</table>

e-lio is an example of actual product deployment, as shown by the number of systems currently installed in one geriatric department of a public hospital (“long stay” beds, or retirement house). However, the deployment is very recent and the economic model is not demonstrated yet – hence it will not be possible to use this example as an exhaustive case study.

Further on the issue of marketing and sales strategy, Technosens is a young SME start-up created in 2007 with limited marketing and commercial resources. Technosens is presently investigating new distribution channels with large telecommunication operators, which would help to stabilise their economic model from the point of view of the end-user (the elderly) and intermediate actors in the ecosystem such as retirement houses, or “Départements” social services organisations promoting the use of dedicated social links systems. One of the bottlenecks of such market is linked to the “go to market” sales strategy, pushing SMEs to identify alliance opportunities and team up with large groups for generalisation of their services.

Example 2: Kayentis “Digital Paper Pen” for information registration at home

Under the same category of product development leveraged through ICT, the Kayentis “Electronic pen device for coordination at home” is worth mentioning since this tool may be easily parameterised through advanced possibilities developed around medical specialities.
For example, the Kayentis Electronic pen is used in a Healthcare network for pain monitoring at home: technical and medical service for perfusion, nutrition and diabetics insulin injection.

**Domothéra**

*Pain monitoring (Morphinic PCA pumps) and information collected by caregivers at patient’s home with HAD du Nord*

- **Focus**: Morphinic PCA pumps, multiple sclerosis
- **Geographical scope**: local hospitalization organisation at home in the North (Lille), South West (Toulouse)
- **Stakeholders involved**: Private
- **Number of users/patients served**: From 10 to 300

The Digital Pen Paper solution is a concept developed for healthcare which does not require any specific skills to use the application solutions and devices. In the Domothéra example, the aim of the Kayentis solution is to provide a management tool for pain treatment, with an early-warning system with real time access and action traceability (audit trail in the solution). Medical devices such as morphine injection pumps are provided and delivered through the Domothéra service organisation. Prescription and medical follow up are carried out by physicians, based on information written electronically by caregivers on the booklets kept at the patient's home, hence not requiring re-entering such information. The “Electronic pen” input leads to instant recovery of critical information, with traceability. No training is necessary.

**Example 3: LINK CARE Service Alzheimer video security system**

**LINK CARE Security at home for Alzheimer patients**

- **Focus**: ensure that an elderly person, suffering from Alzheimer syndrome, may stay at home in security. A “passive” telealarm system based upon cognitive analysis on video images sends alert signals to a local call centre for e-health applications. Such a video image is not directly accessible to the e-health centre, for patient related privacy reasons.
- **Geographical scope**: national
- **Stakeholders involved**: Private (start-up, 2006)
- **Number of users/patients served**: almost 1,000 homes equipped today

### 3.2 Territorial development

The second category of projects (territorial development) is more directly dealing with a territorial approach, at regional or “Départements” level. Such projects are led by large groups like LEGRAND, ALTRAN, AXON, SANOFI, SPIE and PHARMAGEST (new project under investigation) in partnership with dedicated and specialised SMEs like VOLUNTIS, KAYENTIS, and LINK CARE. From the documentation sent by projects stakeholder, the “living lab” concept appears as a critical success factor, from monitoring specification to deployment, maintenance & enhancement, and evaluation process. This second category is considered as a priority for the selection of SIMPHS case studies.

The next three sections present three case studies based on information obtained from industrial stakeholders which belong to the territorial approach category.

It should be noted that the French government is presently investing in a major initiative to promote new services at home: the “Investissement d’avenir – développement de services de l’Sconomie Numérique” programme is focussing on ICT for Healthcare and autonomy. Some 83 projects have been recently submitted (closing date was October 2011) and projects will be selected during the 1st quarter 2012. The candidate projects must have a strong territorial approach, and must include a clear economic model as a prerequisite. If the SIMPHS study was to be conducted at the end of 2012, it would probably lead to different
results, since the investments of consortium leveraged through “Investissement d’avenir” incentive will certainly boost the deployment of new projects, presently too recent to show any health impact assessment or and any economic results.

3.3 Case study 1 - Home security and Home comfort - Limousin

<table>
<thead>
<tr>
<th>ESOPPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus:</strong> Home automation package coupled to teleassistance service</td>
</tr>
<tr>
<td><strong>Geographical scope:</strong> Limousin Region - Département de la Corrèze</td>
</tr>
<tr>
<td><strong>Stakeholders involved:</strong> Legrand (Industrial company), Limoges University Hospital and regional poles and expertise center, and Corrèze territorial administration</td>
</tr>
<tr>
<td><strong>Number of users/patients served:</strong> 196 adults over 65 years old, living at home, in Corrèze Département</td>
</tr>
</tbody>
</table>

The main purpose of the ESOPPE prospective study was to evaluate the efficacy of a simple home automation pack coupled to a teleassistance service for preventing falls at home among the frail elderly population losing autonomy. The second priority was to evaluate the service efficiency both in terms of reduced number of falls at home and associated admission to hospital emergency.

The ESOPPE programme is one of the regional Geriatrics expertise centre of the Limousin region, conducted in cooperation with the Limoges University and the Limousin ecosystem which includes: Autonom’Lab, University of Limoges, CHU Limoges, Limousin Region, and territorial administrations (Conseil régional du Limousin, Départements de la Corrèze et de la Creuse).

3.3.1 Background

3.3.1.1 Territorial dimension

The project is taking place as part of a long term strategy originated at the Limousin regional level, gathering:

- territorial administration at regional and département level (Limousin, in Massif Central, with a population of 750,000 inhabitants as of 2011 (1.20 % of the French metropolitan population)
- University and R&D centres for geriatrics (CHU Limoges, Limoges University, Elopsys pole, Autonom’lab and “living lab”)
- LEGRAND, a major French industry player.

3.3.1.2 Stakeholders involved: initiators and funders

LEGRAND has been established in Limoges since 1860. LEGRAND’s production and industrial strategy has been focussing on electrical devices since 1949. Today, LEGRAND is one of the major French industrial players, with 31,000 employees worldwide, and a turnover of €3.9 billions in 2010, specialised in manufacturing and servicing electrical devices (small devices) and wiring technology.

Through home care automation, LEGRAND is now focussing one of its key activities around keeping elderly people safely at home. The strategy implies home adaptation to elderly people’s needs, through better ergonomics and better accessibility, and the “home care pack” which is being tested through the ESOPPE programme.

LEGRAND is well aware of the four market segments for safely keeping elderly people at home. As to the 5th segment - social link - , LEGRAND acquired Intervo in January 2011, a
company devoted to social links with family or relatives, as well as providing a telealarm platform.

3.3.1.3 Rationale and objectives of the project

The project fits within a territorial strategy to help the elderly live safely and comfortably at home; it is also part of Legrand's long term strategy and local service organizations' strategy to deliver home automation coupled with patient care services.

The context for the service is loss of autonomy which is related at least partially to ageing, but also more generally to diseases (regardless of age).

The ESOPPE project is about providing a home automation system which helps to prevent elderly people falling especially when they get up during night, through automatic lighting devices adapted to home layout; and to control and monitor possible falls through fall captors with added-value telealarm environment (i.e. active captors).

It is important to note that the ESOPPE project is one element of the Limousin regional strategy, which has defined coherent strategies to validate and generalise service offering as follows:

- Home care automation targeting 3,200 installations in the Creuse Department by 2014
- Training and support for 30 electrician shops to install and maintain home care automation device
- Social care offering distributed by Intevox, a SME recently acquired by Legrand.

Home security devices include lighting devices, smoke detection, gas leak detection, water leak detection, home intrusion, temperature control failure. Historically, since the 1950s Legrand has been focusing on the home from a building perspective, while it is now moving its focus to the person, i.e. the inhabitant himself (herself) providing added value telealarm button control, and fall monitoring – the central device of the ESOPPE program.

The next chapters describe the ESOPPE programme environment and assessment methodology as reported by Pr Thierry DANTOINE, the coordinator of the R&D medical activity for ESOPPE.

3.3.1.4 The ESOPPE programme

The growth of the elderly population was associated with the loss of autonomy and the increase of physical, psychological and social dependence problems. Fall incidents are the third cause of chronic disablement in older persons according to the World Health Organization (WHO) [Murray CJ et al, 1996]). Falls were one of the major risk factors for entering in dependence [2]. Falls are a common and serious problem in older people, affecting about nearly one in three adults aged over 65 [(Sayer AASH et al, 2006)] fall each year and one in two are aged over 80, half of whom fall again in the following year [(Tinetti M et al, 1998), Snijder MB et al, 2006)].

In this population, falls are a leading cause of mortality and morbidity [(Sattin RW et al, 1992), Lilley JM et al,1995)]. The consequences of falling are severe: 5% of the falls lead to a fracture and 5% of the falls lead to serious injuries, about one in four having experienced a fall consult a hospital emergency room or primary care physician after such fall [(Stel VS et al, 2004)]. In Britain, over 300,000 older people attend Accident and Emergency Department after falling at home, and of these 1,500 die as a direct result of falling [Lightbody E et al, 2002]. In France, 12,000 die annually and 55,000 fractures are directly due to falls [Insee].

The pathogenesis of falling is multifactorial [(Nevitt MC et al, 1989), (Tinetti ME et al, 1989)]. Causes of falling include impairments in balance, gait, muscle strength, visual acuity and cognition, chronic diseases and use of psychotropic medication [(de Boer MR et al, 2004),
Interventions to reduce the risk of falling have been successful to a varying degree. Home visits by nurses were found to be ineffective [Leipzig RM et al, 1999]. The real challenge now and for the future is to elaborate prevention strategies that will allow old people to stay at home as long as possible while reducing the incidence of falling at home. Fortunately, the recent progress with home technologies and medical care allow to think of new ways to apply these tools to reduce and prevent falling at home. However, they are no studies on the efficacy of these technologies on falls worldwide. Thus, the main purpose of this prospective study was to evaluate efficacy of simple home automation packs coupled with a teleassistance service for preventing falls at home among the frail elderly population losing autonomy. Secondly, the efficacy on falling at home with regard to admission to hospital emergency was also evaluated.

3.3.1.5 Time horizon
The ESOPPE R&D study is now completed but product deployment is on-going in the Limousin region, with focus on Corrèze and Creuse departments –around Guéret for the latter, the main town of the department (14,000 inhabitants).

3.3.2 Technology
The system consists of an overall home care automation system with electrical devices and Local Area Network (LAN) technology for home applications. LAN may include wireless protocols.

The ESOPPE programme is based on a series of home automation and e-health devices such as:
- fall control bracelets
- home automation lighting control
- cognitive behaviour analysis in case of calls from elderly people.

These control devices are linked to a home “box” gathering information at home, before the data gets transmitted to the telealarm centre through a secured WAN using Internet VPN technology.

3.3.3 Service & organisation
The telealarm centre is monitored in a R&D environment (University hospital, Ellopsys pole, Autonom’Lab geriatric expertise centre). The medical community is involved through the Limoges University Hospital (Geriatrics department, Pr. Thierry DANTOINE)

3.3.4 Stakeholders involved
The stakeholders involved are those involved from the beginning of the project.

3.3.5 Assessment methodology
**Design:** The study is a longitudinal prospective cohort study.

**Setting:** the study covers the community of the Corrèze province council.

**Participants:** the sample population consisted of 196 adults aged 65 and over living at home or in residential care and who were registered on an autonomy allocation list.

**Intervention:** the intervention group was equipped with a simple home automation pack coupled with a teleassistance service while the control group had no equipment. The home automation pack included gas and smoke detector and light monitoring device, and teleassistance. Devices included an electronic strap or necklace, bathroom alarm and over all connection to teleassistance centre.
Main outcomes: The primary outcome was the cumulative incidence of elderly falls over 12 months, recorded through monthly diaries in the two groups. Secondary outcomes were the rate of home falls with admission to emergency services, daily living index and Fried frailty scale at baseline and the acceptability rate of home automation pack in the intervention group. The analysis was by multivariate logistic regression model.

Results: Ninety eight people were allocated to each group. The simple home automation pack acceptability rate was 97.9% (96/98) in the intervention group. The home falls diaries were analyzed for 96 persons year in the intervention group and 98 persons year in the control group. Results showed 77 (40.5%) elderly falling at home with 29 (30.9%) in the intervention group and 48 (50.0%) in the control group. The simple pack was significantly associated with the reduction of falls at home (odd ratio = 0.33 IC95% [0.17 – 0.65] p value = 0.0012). To avoid one elderly falling at home, one will have to equip five. The use of the simple pack was also associated with the reduction of elderly falling at home requiring admission to emergency (odd ratio = 0.30 IC95% [0.12 – 0.74] p value = 0.0081).

Conclusion: The use of the simple home automation pack coupled with teleassistance service reduced significantly the incidence of falls among the frail elderly at home. A simple home automation pack coupled with teleassistance service and individual home adaptation of persons with a high risk of recurrent falling will lower the risk of falling and consequently lead to reduced incidence and costs of falls.

3.3.6 Costs/funding

Costs data are not available at the point of writing, for 98 installations followed-up in the ESOPPE study: the R&D study has been conducted in accessing both LEGRAND equity, and territorial administration budget lines from Conseil Général de Corrèze participating in home automation and active telealarm installations in 98 homes selected in Département de la Corrèze, with support from the territorial administration.

3.3.7 Generalisation of the innovation

The ESOPPE project is part of a long term strategy sponsored by the Limousin regional authorities. For example, the 2006-2011 healthcare plan is handling a decision by which every person aged 75 and over is entitled to get telealarm and teleassistance at home.

The LEGRAND home automation pack target is to equip 3,200 homes in Corrèze, by end 2014.

3.4 Case study 2: systemic approach for living at home – e-care @ home

DOMOCARE

Focus: Systemic approach for living at home
Geographical scope: Local - Champagne-Ardenne region example
Stakeholders involved: Industrial company + service organisation
Number of users/patients served: Senioralerte device: 400 installations, France Domocare deployment, Champagne Ardenne: N.A.

The DOMOCARE project is part of a phased approach, through major development and deployment in the Champagne Ardenne Region. DOMOCARE includes a telealarm application as a first service offering. A simple alarm signal service (alarm buttons) is enhanced with added-value applications around patient behaviour at home.
3.4.1 Background

3.4.1.1 Territorial dimension

The DOMOCARE Project corresponds to a long-term partnership strategy led by industrial groups providing a product and services integrated on an ICT platform, proposed in a phased approach through an industrial offer strategy planned in liaison with the territorial administration.

To sum-up and simplify the go-to-market scheme linked to the territorial deployment, three main phases have been identified:

- **Phase 1** – offered today: local deployment focussing on telealarm devices, to be monitored at local level by a service company (SENIORALERTE input)

- **Phase 2** – offered today: territorial or regional deployment currently proposing various added-value services, called DOMOCARE, from classical telealarm buttons to home controls and personal behaviour control at home.

- **Phase 3** – on-going development and pilot deployment called PICADO: e-health devices as captors added on top of telealarm functions, based upon overall regional service platform; major 3-year project, €4.1 funding, partially covered through administration budget, led by ALTRAN, a large industry stakeholder.

The on-going phase 1 has been established after first contacts between AXON and SENIORALERTE in 2010. The SENIORALERTE service was initially focussed on the Lyon region. The DOMOCARE project is currently commercialised nationwide, with a specific focus on the Champagne Ardenne region. Phase 3 (i.e. the PICADO project) corresponds to a bi-regional approach supported by the French administration, aiming at pilot deployment in the Isle of France and Champagne Ardenne regions (representing around 22% of the French population – Champagne Ardenne having an ageing population).

3.4.1.2 Stakeholders involved: initiators and funders

**Industrial partners** for current DOMOCARE offering:

1. The AXON Company was established in 1965. It has 1,600 employees, and a €100 million turnover, with headquarters and main factory in the Champagne Ardenne region. Axon designs and manufactures innovative cabling, interconnection solutions, cable assemblies, connectors and miniature systems for high tech applications

2. Senioralerte is a start-up company created in 2008, with 3 employees, providing telealarm services in the Lyon region. Senioralerte was created for personal family reasons as the founder of Senioralerte was asked to provide reliable telealarm system for elderly people alone at home.

The aim of Domocare in a two year horizon is to offer one of the services proposed within the future Domomedecine project: regional deployment called PICADO (see case 1 above), a joined development sponsored by the two regions of Isle of France and Champagne Ardenne. The aim is to help keeping 10,000 elderly safely at home.

**Territorial partners:**

Although AXON is the key stakeholder for commercializing the current phase 1 and phase 2 offering, and although a large group such as ALTRAN is clearly identified as leader for the PICADO- Domomedecine phase, regional deployment for phase 3 must involve territorial stakeholders and R&D institutions linked to healthcare organization for the elderly which is why INSERM, the Reims University, and the Technology Institute of Troyes are key stakeholders.
3.4.1.3 Rationale and objectives of the project

The project originated from the industry and services side: until recently the French telealarm market segment was not fulfilling the expectations of the population – especially that of families, worried by the level of control and action efficiency in case of incoming calls from one of the user of the telealarm service. The economic model proved difficult, for instance telealarm subscription fees had to be lowered, and thus it turned out impossible to reach an acceptable level of intervention capabilities in case of difficulties. In some cases, the monthly fees proposed by the service organization turned out to be less than €10 per month – but the action service was probably inadequate.

The strategic answer, built up by the Senioralerte start-up combined with AXON's home-cabling and LAN technical expertise, is aiming to deliver added-value services monitored through a 24-hours call centre reached through telealarm, based upon behaviour signals from the elderly people at home.

The final objective is “to cover 80% of safety and comfort issues raised around an elderly person staying at home”. According to the preliminary study performed by the industrial stakeholders, classical telealarm button leads to efficient results in only 25% of cases - i.e. when an elderly person need assistance, the telealarm device is available and capable to transmit an efficient signal to the call centre in only 25% of cases. The “active telealarm control” service offering aims to deliver an emergency signal and adequate follow-up from the call centre in 80% of the emergency cases.

3.4.1.4 Time horizon

- Phase 1 (telealarm) and phase 2 (DOMOCARE added-value for active alarm and control) are presently distributed on a local basis
- Phase 3 (PICADO, i.e. e-health applications combined with DOMOCARE telealarm) is a 3-year regional project started in 2011.

3.4.2 Technology

The system is based on:

- Local Area Network (LAN) technology for home applications: Wireless protocols, mainly Blue Tooth, at present date; - Various captors, with wireless connectivity to a local “box”.
- Wide area network (WAN) between the home “box” and the alarm call centre (usually, ADSL with the most common ADSL protocol in use, through Internet VPN).
- Key feature: “mobility” for captor installation (through wireless network) and overall connectivity from home to the alarm call centre through standard Internet liaison.

3.4.3 Service & organisation

The DOMOCARE strategic answer, for phase 1 and 2, is linked to offering service packages at three levels:

- “classical pack” including "Basic offer" i.e. telealarm button and home relay to service platform
- “Active offer” which is telealarm plus movement detection (movement of the person and door opening)
- “Prevention offer” which is the same as the above plus a monitoring device for temperature control, medicine observance, and refrigerator access.

1) The service installation process is packaged to be as little invasive as possible: no physical cabling, captors functioning through batteries whose energy level is monitored through the alarm platform; “box” installed and connected to Internet.
2) The service organisation in case of emergency calls is based on the following options:
   - Contact through mobile phone, fixed phone or e-mail, to family members or relatives
   - Alarm escalation to the call centre
   - Additional service offered by the alarm centre by which home keys are kept in a safe; the alarm call centre may send a service employee in case of escalation request (this service means additional fees)

For phase 3: for e-health monitoring, the medical service implies that

1) Doctors (such as general practitioners, or geriatrics specialists) participate in the 24-hour alarm centre duty

2) Hospitals, or local health organisations (such as nurses’ network) are organized through formal process to participate in healthcare delivery and control at home.

3.4.4 Stakeholders involved

For phase 1 and 2 (classical telealarm and “active” telealarm) stakeholders are mainly from the technology side and service organization (AXON) with telealarm service focus (Senioralerte).

Other industry partners are involved in the platform development – e.g. DICSIT, a software house dealing with employee resources management for organizing and scheduling employees delivering services at the home of elderly people.

Phase 3 (e-health and home monitoring) implies a partnership with a medical institution:

- Reims University Hospital CHU Reims (undernutrition, diabetics)
- CARINNA – Regional agency for research and industrial innovation in Champagne Ardennne – promoted by the Conseil Régional de Champagne Ardenne
- Troyes Technology University
- Territorial collectivities such as Région Champagne Ardenne (dealing with education, R&D, and industrial town and country planning), Conseil Général de la Marne (dealing with social funding), Communauté de Communes de le Brie Champenoise,

Further industry partners participate in the PICADO consortium, which is coordinated by ALTRAN.

3.4.5 Assessment methodology

For phase 1 and 2, the main parameter regarding service benefit is measured through customer satisfaction - i.e. the customer or his/her family continue the service subscription, through annual renewal. A customer survey is undertaken by the industry stakeholders.

For phase 3, i.e. for e-health telemonitoring around elderly people, the assessment study has been delegated to MADOPA, a geriatrics expertise centre. MADOPA is linked to the Troyes Technology University. As of 2012 MADOPA is focussing its activity, on geriatrics service evaluation. A seminar has been organized in December 2011 to help define the evaluation process:

- Evaluation: challenges and needs, as perceived by elderly people
- Service follow-up (activity parameters) and service quality (customer satisfaction)
- Parameters to quantify medical and service synchronisation
- Autonomy parameters
- Economic and business models
- “Living lab” principles.
The economic model will be studied through a research program conducted by the Reims university management school.

3.4.6 Costs/funding

Phase 1 and 2: product and service development has been funded on both AXON and Senioralerte shareholders’ equity.

The service itself is paid directly by the customer on a monthly fee basis, following a fixed price list:
- “classical pack”: €24.90 per month
- “Active offer”: €44.90 per month
- “Prevention offer”: €54.90 per month.

Note: the pricing of €10.00 per month for simple “telealarm button” service based upon a local phone call centre organization should be borne in mind.

For phase 3, various administrations provide funding (at national, regional and local levels) allowing to increase the financial budget by €1.7 million to a total of €4.1 million for project development.

At the same time, to speed-up phase 3, the industrial consortium submitted an application file to the “Investissement d’avenir” national industrial programme for innovation and Internet usage. Applications should be selected during 1st quarter 2012.

3.4.7 Generalisation of the innovation

Plans to generalise the experimentation at regional and national levels are currently underway, through the PICADO DOMOMEDECINE bi-regional projects which foresees to serve 10,000 homes and via the “Investissement d’avenir” to speed-up the “go to market” strategy with industrial partnership service focus on digital usage.

Internet VPN has been identified as the key backbone technology, leveraging the concept of “Telemedecine operator” checking and controlling service availability and platform liability. Regarding the DOMOCARE commercialization, simple advertising on the Internet appears to be sufficient to capture a market segment representing some 2,000 homes.

For phase 3, the sales strategy will leverage system openness: new services will be incorporated through behaviour analysis. Customer needs and service delivery will be updated through the “living lab” approach, on a step-by-step basis.

3.5 Case study 3: home security and service staff coordination in mobility

<table>
<thead>
<tr>
<th>Y-DOM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong>: Social resources coordination and management: mobility device for home service employees</td>
</tr>
<tr>
<td><strong>Geographical scope</strong>: Nationwide commercialization</td>
</tr>
<tr>
<td><strong>Stakeholders involved</strong>: Industrial Company (software house, and dedicated phone manufacturer)</td>
</tr>
<tr>
<td><strong>Number of users/patients served</strong>: 60 associations in the social sector, representing potential of 6,500 users</td>
</tr>
</tbody>
</table>

The Y-DOM concept is developed and commercialised by the DORO/PRYLOS company – a French start-up created in 2003, dedicated to social resources coordination and management. It is based upon android smartphone usage and an ICT platform service.
3.5.1 Background

3.5.1.1 Territorial dimension

The Y-DOM offering aims to commercialize mobility devices based upon smartphones, to help monitor, manage and coordinate service staff coming to the home of elderly patient. The impulse is coming from a start-up software house dedicated to smartphone environment and usage, PRYLOS, which was created in 2003 (and later acquired by DORO). Key customers are the local service organizations in charge of taking care of elderly people staying at home. Such organizations are largely funded by the Conseil Général of each department. The Y-DOM product has been generated through the “Appel à projet Service à la Personnes” project, led by the Ministry of Industry (DGCIS) in 2008, to promote mobile applications. Later, a new project called “Tel & Age” has been launched under the “Proxima Mobile” initiative sponsored by the French government (Education and Research Ministry). DORO/PRYLOS participated in “Tel & Age” in cooperation with a telecommunication company and an insurance company, to propose a package gathering three potential applications

- Social link
- Healthcare monitoring
- Service management (key segment for Y-DOM).

The sales activity is nationwide with some key customers in the Rhône Alpes region.

3.5.1.2 Stakeholders involved: initiators and funders

- DORO/PRYLOS, a French start-up company created in 2003, dedicated to social resources coordination and management based upon android smartphone usage and ICT platform service. 2010 turnover: 1,2 M€ on the French market. In July 2011, PRYLOS has been acquired by DORO, a Swedish company created in 1973, specialised on phone systems adapted for elderly or handicapped people. 2010 turnover: 71 M€ - 75 employees by 3rd quarter 2011.

- Ministry of industry, Ministry of Education and Research: The Y-DOM solution obtained the “Proxima Mobile” label about mobility and digital usage.

3.5.1.3 Rationale and objectives of the project

Organisations in charge of local services to help elderly people are one of the economic sectors which create local employment. However, in spite of growing needs, this sector is faced with severe financial difficulties: social budgets now represent some 50% of the Conseil Général's financial lines. On many occasions the French government pointed out the need to upgrade the management process of such organisations. Dedicated devices aimed at social service staff scheduling optimisation have been identified as a necessary cost control tool.

The DORO/PRYLOS Y-DOM approach offers benefits to three categories of actors:

- The service employee in first line, who is able to better organise his (her) own time and optimise time spent at homes of elderly people, generating income;
- The association staff, organising service duties for employees and centralising calls in case of absence of employees or of modifications request from elderly people;
- The administration fund providers – mainly the Conseil Général providing budget to the local associations.
3.5.1.4 Time horizon

Y-DOM is currently being commercialised. From a decentralisation point of view, the French government is helping to coordinate mutualisation projects between the Départements.

3.5.2 Technology

The system is based on
- Smartphone systems; NFC or 2D badges are placed at home for each elderly person served;
- Added value applications developed in JAVA ME environment (for Y-DOM) and Android environment (for DORO Experience line);
- Telecommunications: use of normal mobile phone telecommunication infrastructure, on a non-exclusive basis [Note: DORO/PRYLOS signed a sale agreement with one of the 3 major mobile phone companies on the French market].

3.5.3 Service & organisation

- The service association has to appoint a project leader, who must buy-in the possibility of leveraging hi-tech ICT for day to day usage and management.
- When a contract is signed between DORO/PRYLOS and the service associations, a formalised process is used to prepare service deployment and employee training:
  - Exhaustive manuals and product environment documentation are provided, including CNIL registration file (Commission Nationale Informatique et Liberté - IT and freedom national committee).
  - Association staff: one-day training (5 people per session, maximum) on overall platform architecture and service procedures; on process to install NFC or 2D badge at the home of elderly people
  - Employees training: half-a-day training (10 people per session, maximum) on how to use the mobile phone and dedicated application for home registration; on mobile phone delivery;
  - Overall project engineering / project management: liaison and support to set up contracts with mobile telecommunication operator; training on how to access DORO/PRYLOS platform indicators and IT records;
  - Hot-line and support, accessible to employees, and maintenance.

3.5.4 Stakeholders involved

PRYLOS was acquired by a larger (although SME) Swedish company, DORO. DORO is focussing on the phone segment dedicated to elderly people, including the manufacturing or integration of telephone especially designed for elderly people. The company strategy appears to switch from fixed phone offering, to mobile phones, now representing 75% of its revenues in 2010.

3.5.5 Assessment methodology

The Y-DOM offering is mainly addressing associations' management. Key parameters are linked to service productivity:
- for employees, ratio between period of time corresponding to actual income, vs. time spent for the association
- for association staffing: control of actual schedule for each employee; productivity for management employees regarding reporting control and invoicing, including follow-up for employee salary and reimbursement by local administration.
3.5.6 Costs/funding

Monthly rental cost per mobile phone (i.e. per employee of the service association) is set between €15 to €20 (phone rental + DORO/PRYLOS platform service access + phone line). A service employee works 80 hours per month for the association, on an average basis. Thus, Y-DOM service costs represents around €0.25 per hour.

Some studies performed by PRYLOS show that productivity increase should lead to a better efficiency, larger than €0.25 per hour. However the main difficulty for such a strategy is the financial crisis impact on social budget.

3.5.7 Generalisation of the innovation

- Every “Conseil Général” in the 100 French “Départements” are presently investigating in cost control tools for service people coming at home.

- However, in the face of the financial crisis, it appears to be necessary to mutualise such investments on a broader scale (e.g. larger number of users, such as nurses coming at home, or home delivery services employees) with additional added-value services (e.g. geolocalisation to optimise daily travel organisation; or employees schedule synchronisation to optimise elderly people security).

- The “Tel & Age” project represents the first step for the “DORO Experience” product line, an offer based on tablets or android smartphones. Such an approach is linked to generalised usage in ICT environment, for which the economical model is not necessarily linked to social action funding from the Government.
4 Findings on integrated care and IPHS deployment

4.1 Diffusion of innovation

4.1.1 Findings from the case studies

For each selected cases - 3 examples of technology led projects and 3 case studies generalised at a territorial level - product and service diffusion appears to be passive spread.

For the Technosens e-lio and connected TV devices, the “go to market” scheme and the identification of patients ready to access the new system (in this example: social link market segment) happens through a local territorial administration (Villard de Lens Townhouse for a similar connected TV-project, and Douai geriatric hospital for additional service offered through the geriatric hospitalization).

In the case of the Kayentis digital paper pen, distribution is occurring through an e-Health network medical organization. It is interesting to note that in the example presented, for morphine pain control system at home, two different technologies are accessed to build-up a coherent innovative and secure system: the digital paper pen, a pure ICT device used for data collection from a high-tech device such as “intelligent morphine pump” – the intelligence is embarked in the pump systems which may be monitored through connectivity to the service platform database: a M2M (machine to machine) application.

As to the LINKCARE service and Alzheimer patients security again, distribution requires the involvement of an e-Health medical network. The alarm call centre must rely upon a strict process, whenever the decision must be taken to intervene at home. Note that in this example, the technology device may be also considered as a kind of M2M application – i.e. the video image capture system is monitored through artificial intelligence or expert software to identify cases where alert signals must be transferred to the call centre.

From the three case studies with a territorial deployment dimension, it appears that service generalisation is greatly facilitated when regional authorities are taking an active role, as a stakeholder. Of course, medical institutions also appear to play a key role (starting from Regional University Hospitals, which are presently investing on HAD – Hospitalisation à domicile – concept)

Research and university institutes, depending on regional funding, are also playing a critical role for territorial diffusion, as soon as innovative devices and innovative services are put in place. In case study 1, home automation is linked to e-health control through active telealarm – and regional R&D institutions are playing a key role. In case study 2 “systemic approach for living at home”, local universities are in charge of both evaluation assessment and economic model. However, no institutional involvement appears to be necessary for case study 3: home security and service staff coordination in mobility. In that case, it is the social care organisations that are involved.

4.1.2 Role of policies in promoting innovation

The telehealth initiative regarding health systems within DGCIS together with the actions promoting telehealth within the "Investing in the future" programme have given a strong push to the development of innovative added-value telehealth solutions. The involvement of the Ministry of economics, Finance and Industry has given further signals to the market about the need to search for new economic models outside of the traditional compulsory healthcare insurance schemes. Market players have been gradually encouraged to move into that direction by means of various instruments:

A prior participatory consultation exercise involving industry was undertaken by the CGIET within the Ministry of Economy, in cooperation with the Ministry of Health and some Agencies to discuss innovative solutions, emerging needs and eventually new business models. This work is the result of initial steps taken by CGIET under the request of the Ministry of Health
and that of Industry back in 2006. The reports presenting the outcomes of the work have been widely disseminated upon request from both the Ministry of Health and the Ministry of Industry.

Shortly after, in 2008, DGCIS reinforced its activity on Information Systems for health and autonomy, and subsequently established the CNR SDA while launching call for tenders for health and autonomy projects (Remote monitoring, followed by those of “Investing in the Future”) within a new evaluation framework, giving out of hospital care and new business models a prominent role. This framework has been supported from the start by both private and public stakeholders as well as by institutional actors such as ASIP Santé and ANAP.

At the same time, this strong message was taken up by competitiveness poles dealing with health technologies such as those of Lyon, Toulouse, Grenoble and Limoges to mention a few.

Last but not least, since its establishment DSSIS has been playing a federating and amplifying role with the support of CGIET as needed. DSSIS now seems to be in a leadership position in this area, playing a cooperation/coordination role with ASIP Santé, ANAP, DGOS on the healthcare side, and DGCIS, CGIET and CNR SDA on the industry side.

4.1.3 Living labs

As presented in section 2.6.6, a French study by CGIET\textsuperscript{71} reveals that there are a number of Living Labs focusing on health and autonomy in France with a wide variety of dimensions addressed. The concept of Living Lab is seen as a positive contribution to innovation in the field of health and autonomy especially as they help understand better users needs (including end users, their relatives and healthcare professionals), they allow identifying the value for users of new technology solutions, they help take account of feedback from healthcare professionals on their practices so as to integrate this knowledge in new solutions, and they enable open innovation in the field of health and social care.

4.2 Governance

4.2.1 Administrative and financial governance at project level

Insurance companies and the French social security are more and more involved in home care strategy. The DORO-PRYLOS case study was performed in cooperation with Europe Assistance; and one of the key projects in France, VIGISANTE, is conducted with Malakoff Mederic, an insurance company. However such projects appear to be too recent to show clear results and health impact assessment.

The projects candidates to the “Investissement d’avenir” financial scheme, targeting territorial deployment, will certainly provide interesting administration governance schemes – but again, it is too early to be analysed or even mentioned. From the medical organisation perspective, the ARS (Agence régionale de santé) will play an important role by defining regional schemes – with a link to financial schemes through medical act reimbursement. And the local GCS e-santé (in charge of regional e-health platform coherency) will participate in the exercise of e-health platform operator, at least in terms of defining the functions of secured patient information data base management and ITC interoperability.

4.2.2 Technical governance

Through the use of innovative devices such as the ones mentioned in the three technology led examples, the SME or start-up company is playing a key role to promote and to support each system, during the first trial installations.

\textsuperscript{71} See footnote 64
However, when considering the three case studies, very clearly (and under contractual basis) large companies take over project governance as soon as deployment is organised at a territory level:

- For case 1, LEGRAND is in first line (in that case, including also the acquisition of Intervox Company for social link application).
- For case 2, ALTRAN is taking a leadership position for e-Health application, helping AXON (a 1800 employee company) to organize ICT infrastructure at regional level for e-Health application.

This shows that larger scale telecare or telehealth deployment requires the emergence of an ecosystem of small and large enterprises whose complementary capabilities and skills can be leveraged through alliances, partnerships or, as shown in the case of DORO PRYLOS through take over.

4.2.3 Role of healthcare professionals

In each of the examples (both technology led and territorial case studies), as soon as a medical dimension is foreseen through an e-Health application, the corresponding service MUST BE governed by the medical community. This is an absolute MUST, which has been pointed out as compulsory by the French Parliament mission for e-Health (see footnote 37) pointing out the prerequisite for organising a medical operator for e-Health service, including the identification of a e-Health doctor coordinator.

There are still many on-going discussions between Telemedicine or e-Health organisations about the roles of

- The first line medical actors interfacing with the patient such as the referent physician member of a medical network dealing with patient healthcare at home,
- The reference medical actors such as the specialist in charge of the geriatric service in the local hospital,
- and the e-Health medical coordinator, whose duty is to ensure medical protocols usage adequacy and overall systems security and ethics.

One decision is clear: medical governance is a must, and must be ensured by a doctor clearly entitled to follow-up e-Health organization and deployment.

4.2.4 Institutional level

Governance in the field of health IT in France is currently undergoing a complete transformation. Historically the statutory healthcare insurance (CNAM) has had a stronghold both in terms of policy and funding, which made it a key actor in the decision making process regarding any significant use of healthcare resources. As a result of budgetary strains and the related difficulty to keep its budget under control on the one hand, and under the increasing pressure from complementary healthcare insurances on the other, the health IT context has changed significantly.

While the CNAM is still seen as the regulator of the healthcare sector, in reality it seems that it cannot act as such any longer. This is particularly true of the area of health technologies, especially for the social and health care sector, where the CNAM has always played a less prominent role.

Until recently and before the HPST law was passed, only a handful of actors were in a position to play a role in governance, particularly in the field of ICT, and those who did only had a limited influence. As an example, hospital organisation was decentralised and left to the level of the hospitals themselves. As to the social care sector, social care organisation was managed by the department and local levels, whereby the penetration of ICTs for health was very low, except for telecare systems. The latter were still relatively underdeveloped compared to other EU countries. The creation of the ARS and ASIP Santé reflect the
willingness of the French government to better coordinate the implementation and use of ICT tools and services within health and social care. However, the coordination and mutualisation of resources as well as the adoption of common solutions across the various ARS seems to have remained limited in this area. In addition, the relation between DGOS which is in charge of organisation of care and hence deals with computerisation of healthcare processes and ASIP Santé, which is in charge of shared healthcare information systems, have been rather ambiguous for lack of clearly defined roles and responsibilities in the ICT for health area.

During this transition period, ASIP santé might have emerged as a strong actor in the area of governance, in light of its relative independence and its ability to commit significant funding to support large national projects such as the DMP (French EHR). One of the best examples of this de facto governance role is the responsibility of ASIP Santé – and not that of the Ministry for Health - for the health data storage providers authorisation process, within the Ministry of Health. ASIP also as the operator of shared Information Systems in healthcare is therefore combining a regulator role to that of an operator. Besides this ambiguity ASIP Santé appears to put a greater focus towards hospital information systems and telemedicine, at the expense of telehealth, without this prioritisation being the result of a transparent process.

The creation of DSSIS at the crossroads of two ministries, namely the Ministry of Health and the Ministry of Solidarities, is likely to change the landscape. Formally the DSSIS is in charge of supervising the ARS in the area of Information systems, while from an institutional point of view it is responsible for the coordination with the Ministry of Economy, Finance and Industry.

4.3 Impact assessment

This is one of the key difficulties for e-Health market segment, and strategic intelligence on personal e-Health system: since this market segment is still very young, it is difficult to gather exhaustive evaluation studies, including both medical impact (see ESOPPE case study 1) and economic impact. In France, the current scheme of “Telemedecine and e-Health” is launched through “Investissement d’avenir”. Regional deployments started in 2011 (“Telemedecine 1”) and first significant results and survey will be completed not earlier than end 2012.

In terms of public policy, the analysis of the impact health technologies have on the health and social care sector is likely to become the next big area of focus, as a new step in the evolution of the ICT for health context in France. DSSIS is poised to play a central role in this field, with the support of CGIET whose remit in the field of economic analysis is currently being reinforced.
5 Conclusions

Recent reforms, legislation and policy measures adopted by the French government with a view to modernising health and social care delivery show a strong willingness to tackle the challenges of healthcare and ageing leveraging the potential of ICT. Together with a series of studies mandated by various Ministers or Members of Parliament addressing ICT for health and social care, telehealth, living well and autonomy, these reforms show how high ICT for health stand on the French political agenda. In parallel with or as a consequence of these measures, a number of government bodies and independent agencies have been created over the last few years, tasked with promoting ICT for health from different, complementary perspectives.

While the institutional landscape that emerges at first sight can appear overly complicated, the review of these stakeholders and their roles in promoting ICT for health reveals a deep understanding of the potential of ICT in reforming care delivery and the challenges this entails. The allocation of significant funding through various schemes including instruments like "Investissement d'Avenir" dedicated to the development of the digital economy and within it the development of digital services, usages and contents, further shows the understanding on the part of the French government of the barriers faced by industry when trying to deploy telehealth as well as the importance of the public-private dimension in implementing telehealth and facilitating wider market development. Even if further progress needs to be made, the evolution of the legal and institutional landscape leads to a framework that is conducive of further telehealth and ICT for health implementation in France.

Moving from the institutional context to actual IPHS developments, the field research shows that the French industry is very active both through large and smaller companies, including start-ups especially in the telecare and ambient assisted living segments. Like in other European Member States, many pilots and projects have taken place at local and regional level for many years, without leading to large scale deployment. However the reforms and funding schemes mentioned earlier have given a new impetus to change this and turn away from small experiments to promote initiatives having strong evaluation components and viable business plans. As a result a number of promising IPHS initiatives are underway, addressing chronic disease management, remote monitoring and autonomy amongst other but whose results will first be available in a couple of years from now.

The case studies analysed in this report focusing on telecare and helping the elderly live at home longer show that industry initiatives have been successful in France, initiated by SMEs and start-up or large industry players alike. However the cases selected show that successful SMEs face high barriers when it comes to "go to market" strategies and they normally need to establish partnerships with larger players in order to create a market unless they get taken over by a larger player. Further cases where public authorities or medical networks have been involved show greater deployment and faster innovation diffusion, highlighting the importance of the public-private partnership in succeeding with telecare. The telecare market further shows that it is possible to establish business models without relying solely in reimbursement models, a feature that is not shared by telehealth experiments to date whereby the issue of reimbursement is a recurring barrier mentioned by both payers and industry players.

The French cases show that there is something to be learnt from the telecare area: joined offerings in the field of the four identified segments of Home security (linked to home automation), Healthcare – e-care @ home (RMT segment), Communication and social link, Home comfort (linked to home automation), help to define a new service that is attractive for the elderly people at home and their family. Communication and social link appear to be a key factor and possibly a trigger factor for acceptance of these systems, positively viewed by the user himself (herself) and the carers helping the elderly person.
6 Annexes

6.1 Annex 1

Table 3 – Population age structure by age group and gender in %

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15</td>
<td>17.5</td>
<td>19.6</td>
<td>18.5</td>
</tr>
<tr>
<td>15-19</td>
<td>5.8</td>
<td>6.4</td>
<td>6.1</td>
</tr>
<tr>
<td>20-24</td>
<td>6.1</td>
<td>6.6</td>
<td>6.3</td>
</tr>
<tr>
<td>25-29</td>
<td>6.0</td>
<td>6.3</td>
<td>6.2</td>
</tr>
<tr>
<td>30-34</td>
<td>6.0</td>
<td>6.3</td>
<td>6.1</td>
</tr>
<tr>
<td>35-39</td>
<td>6.6</td>
<td>6.9</td>
<td>6.8</td>
</tr>
<tr>
<td>40-44</td>
<td>6.8</td>
<td>7.0</td>
<td>6.9</td>
</tr>
<tr>
<td>45-49</td>
<td>6.8</td>
<td>7.1</td>
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</tr>
<tr>
<td>50-54</td>
<td>6.6</td>
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<td>6.7</td>
</tr>
<tr>
<td>55-59</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
</tr>
<tr>
<td>60-64</td>
<td>6.3</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>65-69</td>
<td>4.2</td>
<td>4.1</td>
<td>4.1</td>
</tr>
<tr>
<td>70-74</td>
<td>4.0</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>75 and over</td>
<td>10.9</td>
<td>6.8</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: INSEE 2011, population estimates (provisional results, end 2010).

Table 4 – Population evolution per age group

<table>
<thead>
<tr>
<th>Year</th>
<th>Population as of 1 January (in thousand)</th>
<th>Share of total population (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;20</td>
<td>20 - 59</td>
</tr>
<tr>
<td>2001</td>
<td>15,651.1</td>
<td>32,850.6</td>
</tr>
<tr>
<td>2007</td>
<td>15,924.8</td>
<td>34,173.8</td>
</tr>
<tr>
<td>2008</td>
<td>15,948.9</td>
<td>34,134.9</td>
</tr>
<tr>
<td>2009 (p)</td>
<td>15,959.6</td>
<td>34,100.9</td>
</tr>
<tr>
<td>2010 (p)</td>
<td>15,968.5</td>
<td>34,063.9</td>
</tr>
<tr>
<td>2011 (p)</td>
<td>15,984.1</td>
<td>34,024.1</td>
</tr>
</tbody>
</table>

(p) provisional data
Source: INSEE 2001-2011
Table 5 – Average age and mean age of the French population

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>39.5</td>
<td>38.0</td>
<td>40.9</td>
<td>37.9</td>
<td>36.4</td>
<td>39.3</td>
</tr>
<tr>
<td>2007</td>
<td>39.7</td>
<td>38.1</td>
<td>41.1</td>
<td>38.1</td>
<td>36.7</td>
<td>39.6</td>
</tr>
<tr>
<td>2008 (p)</td>
<td>39.8</td>
<td>38.3</td>
<td>41.3</td>
<td>38.3</td>
<td>36.9</td>
<td>39.8</td>
</tr>
<tr>
<td>2009 (p)</td>
<td>40.0</td>
<td>38.4</td>
<td>41.4</td>
<td>38.5</td>
<td>37.1</td>
<td>40.1</td>
</tr>
<tr>
<td>2010 (p)</td>
<td>40.1</td>
<td>38.6</td>
<td>41.6</td>
<td>38.8</td>
<td>37.3</td>
<td>40.3</td>
</tr>
<tr>
<td>2011 (p)</td>
<td>40.4</td>
<td>38.9</td>
<td>41.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p: provisional data  r: revised data. (1): half the population is younger, half is older.
Source: INSEE 2011

Figure 3 – Life expectancy since 1946

Table 6 – Life expectancy per gender, 2000-2010 (in years)

<table>
<thead>
<tr>
<th>Year</th>
<th>Male expectancy at birth</th>
<th>Female expectancy at birth</th>
<th>Male expectancy at 60</th>
<th>Female expectancy at 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>75.3</td>
<td>82.8</td>
<td>20.4</td>
<td>25.6</td>
</tr>
<tr>
<td>2001</td>
<td>75.5</td>
<td>82.9</td>
<td>20.6</td>
<td>25.7</td>
</tr>
<tr>
<td>2002</td>
<td>75.7</td>
<td>83.0</td>
<td>20.8</td>
<td>25.8</td>
</tr>
<tr>
<td>2003</td>
<td>75.9</td>
<td>82.9</td>
<td>20.8</td>
<td>25.6</td>
</tr>
<tr>
<td>2004</td>
<td>76.7</td>
<td>83.8</td>
<td>21.5</td>
<td>26.5</td>
</tr>
<tr>
<td>2005</td>
<td>76.8</td>
<td>83.8</td>
<td>21.4</td>
<td>26.8</td>
</tr>
<tr>
<td>2006</td>
<td>77.2</td>
<td>84.2</td>
<td>21.8</td>
<td>26.7</td>
</tr>
<tr>
<td>2007</td>
<td>77.4</td>
<td>84.4</td>
<td>21.9</td>
<td>26.9</td>
</tr>
<tr>
<td>2008(p)</td>
<td>77.6</td>
<td>84.4</td>
<td>22.0</td>
<td>26.9</td>
</tr>
<tr>
<td>2009 (p)</td>
<td>77.8</td>
<td>84.5</td>
<td>22.2</td>
<td>27.0</td>
</tr>
<tr>
<td>2010 (p)</td>
<td>78.1</td>
<td>84.8</td>
<td>22.4</td>
<td>27.2</td>
</tr>
</tbody>
</table>

Metropolitan France. (p) provisional.
Source: INSEE, 2011
Figure 4 – French population structure 2011

Source: INSEE population estimates, 2011

Figure 5 – French population age structure projection 2060

Source: INSEE population estimates, 2011
Table 7 – Population projections 2060 by age group

<table>
<thead>
<tr>
<th>Year</th>
<th>Population as of 1 January</th>
<th>Below 20</th>
<th>20 - 59</th>
<th>60 - 74</th>
<th>75 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>64.5</td>
<td>24.2</td>
<td>51.0</td>
<td>15.5</td>
<td>9.3</td>
</tr>
<tr>
<td>2020</td>
<td>66.0</td>
<td>23.9</td>
<td>49.6</td>
<td>17.0</td>
<td>9.4</td>
</tr>
<tr>
<td>2025</td>
<td>67.3</td>
<td>23.5</td>
<td>48.4</td>
<td>17.2</td>
<td>10.9</td>
</tr>
<tr>
<td>2030</td>
<td>68.5</td>
<td>23.0</td>
<td>47.5</td>
<td>17.1</td>
<td>12.3</td>
</tr>
<tr>
<td>2035</td>
<td>69.7</td>
<td>22.6</td>
<td>46.7</td>
<td>17.1</td>
<td>13.6</td>
</tr>
<tr>
<td>2040</td>
<td>70.7</td>
<td>22.4</td>
<td>46.6</td>
<td>16.3</td>
<td>14.7</td>
</tr>
<tr>
<td>2050</td>
<td>72.3</td>
<td>22.3</td>
<td>45.9</td>
<td>15.9</td>
<td>16.0</td>
</tr>
<tr>
<td>2060</td>
<td>73.6</td>
<td>22.1</td>
<td>45.8</td>
<td>15.9</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Source: INSEE population projections 2007-2060, 2011

Table 8 – Old-age dependency ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>Old-age dependency ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>61.3</td>
</tr>
<tr>
<td>2001</td>
<td>62.0</td>
</tr>
<tr>
<td>2002</td>
<td>62.8</td>
</tr>
<tr>
<td>2003</td>
<td>63.5</td>
</tr>
<tr>
<td>2004</td>
<td>63.9</td>
</tr>
<tr>
<td>2005</td>
<td>64.6</td>
</tr>
<tr>
<td>2006</td>
<td>65.0</td>
</tr>
<tr>
<td>2007</td>
<td>65.2</td>
</tr>
<tr>
<td>2008</td>
<td>65.9</td>
</tr>
<tr>
<td>2009</td>
<td>66.7</td>
</tr>
<tr>
<td>2010</td>
<td>67.5</td>
</tr>
<tr>
<td>2011</td>
<td>68.2</td>
</tr>
</tbody>
</table>

Source: Eco-Santé France 2011, Drees

Figure 6 – The 22 French regions and 101 French “départements”
### Table 9 – Hospitals statistics

<table>
<thead>
<tr>
<th>Type of institution</th>
<th>No. of Institutions or legal entities</th>
<th>Total No. of beds &amp; places</th>
<th>No of beds (full hospitalisation)</th>
<th>No of places excluding HAD (i.e. excl. home hospitalisation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Hospital (CHR/CHU)</td>
<td>31</td>
<td>85,060</td>
<td>77,052</td>
<td>8,008</td>
</tr>
<tr>
<td>Hospital</td>
<td>506</td>
<td>161,740</td>
<td>147,898</td>
<td>13,842</td>
</tr>
<tr>
<td>Hospital with psychiatry specialisation</td>
<td>90</td>
<td>42,063</td>
<td>27,725</td>
<td>14,338</td>
</tr>
<tr>
<td>Local hospital</td>
<td>322</td>
<td>16,749</td>
<td>16,695</td>
<td>54</td>
</tr>
<tr>
<td>Other institutions</td>
<td>17</td>
<td>1,843</td>
<td>1,687</td>
<td>156</td>
</tr>
<tr>
<td><strong>Total public institutions</strong></td>
<td>966</td>
<td>307,455</td>
<td>271,057</td>
<td>36,398</td>
</tr>
<tr>
<td>Short-term care institution</td>
<td>742</td>
<td>94,442</td>
<td>81,422</td>
<td>13,020</td>
</tr>
<tr>
<td>Cancer care centre (CLCC)</td>
<td>20</td>
<td>3,589</td>
<td>2,890</td>
<td>699</td>
</tr>
<tr>
<td>Mental diseases care institution</td>
<td>240</td>
<td>22,993</td>
<td>17,649</td>
<td>5,344</td>
</tr>
<tr>
<td>Mid-term and long term stay institution</td>
<td>748</td>
<td>57,306</td>
<td>52,267</td>
<td>5,039</td>
</tr>
<tr>
<td>Care follow-up and rehabilitation institution</td>
<td>673</td>
<td>53,175</td>
<td>48,161</td>
<td>5,014</td>
</tr>
<tr>
<td>Long-term care institution</td>
<td>75</td>
<td>4,131</td>
<td>4,106</td>
<td>25</td>
</tr>
<tr>
<td>Other institutions</td>
<td>35</td>
<td>2,221</td>
<td>1,947</td>
<td>274</td>
</tr>
<tr>
<td><strong>Total private institutions</strong></td>
<td>1,785</td>
<td>180,551</td>
<td>156,175</td>
<td>24,376</td>
</tr>
<tr>
<td><strong>Total institutions (public &amp; private)</strong></td>
<td>2,751</td>
<td>488,006</td>
<td>427,232</td>
<td>60,774</td>
</tr>
</tbody>
</table>

Source: Annual statistics on healthcare institutions until 31 December 2010, Drees 2011.

### Table 10 – Healthcare spendings

<table>
<thead>
<tr>
<th>Use of care goods and services (in € billion)</th>
<th>2000 basis</th>
<th>2005 basis</th>
<th>2005 basis onwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital care</td>
<td>47.6</td>
<td>52.7</td>
<td>67.6</td>
</tr>
<tr>
<td>Ambulatory care</td>
<td>26.8</td>
<td>31.2</td>
<td>40.9</td>
</tr>
<tr>
<td>GPs</td>
<td>13</td>
<td>15.2</td>
<td>19.1</td>
</tr>
<tr>
<td>Medical assistants</td>
<td>5.2</td>
<td>6.3</td>
<td>8.9</td>
</tr>
<tr>
<td>Dentists</td>
<td>6</td>
<td>6.7</td>
<td>8.7</td>
</tr>
<tr>
<td>Medical analysis</td>
<td>2.4</td>
<td>2.8</td>
<td>4</td>
</tr>
<tr>
<td>Thermal care</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Patient transport</td>
<td>1.5</td>
<td>1.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Medicine</td>
<td>18.5</td>
<td>23.6</td>
<td>31.5</td>
</tr>
<tr>
<td>Other</td>
<td>3.7</td>
<td>5.7</td>
<td>8.4</td>
</tr>
<tr>
<td><strong>Total use of care resources</strong></td>
<td>98</td>
<td>115</td>
<td>151</td>
</tr>
</tbody>
</table>

Figure 7 – Main causes of death per gender and age (2008)

Source: IRDES, 2008
Figure 8 – COPD prevalence until 2005, standardised rates*/100,000

*standardisation French population 2006
Source: CépicDc-inserm

Figure 9 – Rates of Hospitalisation for COPD exacerbation

Hospitalisations for COPD exacerbation, 1998-2007, metropolitan France, adults aged 25 years or more, standardised rates*

* Standardised rates according to age, French population 2006 (Insee)
Source: PMSI-ATIH

Source: InVS, 2008
Table 11 – Reimbursement distribution of diabetes patients (ENTRED 2007-2010)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>7,985</td>
</tr>
<tr>
<td>Average</td>
<td>€5,431</td>
</tr>
<tr>
<td>Confidence interval (95%)</td>
<td>[5,206-5,656]</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>€10,051</td>
</tr>
<tr>
<td>1st quartile</td>
<td>€1,285</td>
</tr>
<tr>
<td>Mean</td>
<td>€2,412</td>
</tr>
<tr>
<td>3rd quartile</td>
<td>€5,080</td>
</tr>
</tbody>
</table>

*Yearly reimbursement < €150 € for 13 patients ; Yearly reimbursement > €100 000 € for 15 patients*

Source : ENTRED Study 2007-2010

Figure 10 – Diabetes reimbursement curve

Source : ENTRED Study 2007-2010

Figure 11 – Expenditure structure per age group, ENTRED 2007-2010

ENTRED 2007-2010 Economics aspects

Expenditures structure by age
Figure 12 – Expenditure evolution 2001-2007

ENTRED 2007-2010 Economics aspects

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>238</td>
<td>229</td>
<td>-4%</td>
<td>-0.6%</td>
<td>-0.7</td>
</tr>
<tr>
<td>Specialist</td>
<td>155</td>
<td>181</td>
<td>17%</td>
<td>2.7%</td>
<td>2.2</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>70</td>
<td>92</td>
<td>32%</td>
<td>4.7%</td>
<td>1.8</td>
</tr>
<tr>
<td>Nurse</td>
<td>369</td>
<td>497</td>
<td>35%</td>
<td>5.1%</td>
<td>10.4</td>
</tr>
<tr>
<td>Biology</td>
<td>115</td>
<td>150</td>
<td>30%</td>
<td>4.5%</td>
<td>2.8</td>
</tr>
<tr>
<td>Pharma</td>
<td>1 026</td>
<td>1 416</td>
<td>38%</td>
<td>5.5%</td>
<td>31.8</td>
</tr>
<tr>
<td>Transport</td>
<td>98</td>
<td>150</td>
<td>53%</td>
<td>7.3%</td>
<td>4.2</td>
</tr>
<tr>
<td>Lpp</td>
<td>254</td>
<td>396</td>
<td>56%</td>
<td>7.6%</td>
<td>11.5</td>
</tr>
<tr>
<td>Private Hospital</td>
<td>415</td>
<td>324</td>
<td>-22%</td>
<td>-4.1%</td>
<td>-7.5</td>
</tr>
<tr>
<td>Public Hospital</td>
<td>1 312</td>
<td>1 683</td>
<td>28%</td>
<td>4.2%</td>
<td>30.2</td>
</tr>
<tr>
<td>Total</td>
<td>4 130</td>
<td>5 357</td>
<td>30%</td>
<td>4.4%</td>
<td>100</td>
</tr>
</tbody>
</table>

In €, 2007 rate

Source: ENTRED 2007-2010

Table 12– Key figures ENTRED study

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (INSEE, in thousand)</td>
<td>59,249</td>
<td>61,771</td>
</tr>
<tr>
<td>Prevalence all causes (in %)</td>
<td>2.9</td>
<td>3.85</td>
</tr>
<tr>
<td>No of treated diabetic patients (in million)</td>
<td>1.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Average costs in €</td>
<td>4,130</td>
<td>5,431</td>
</tr>
<tr>
<td>Direct medical costs (in € billion)</td>
<td>7.1</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Source: ENTRED 2007-2010
### 6.2 Annex 2

List of companies contacted in SIMPHS field study.

<table>
<thead>
<tr>
<th>CONTACT</th>
<th>COMPANY NAME</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AFRATA Association (telealarm)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Air Liquide - Vitalaire</td>
<td>Large group</td>
</tr>
<tr>
<td>3</td>
<td>ALTRAN</td>
<td>Large group</td>
</tr>
<tr>
<td>4</td>
<td>ARCAN</td>
<td>SME</td>
</tr>
<tr>
<td>5</td>
<td>AXON CABLE</td>
<td>Large group</td>
</tr>
<tr>
<td>6</td>
<td>CAPSULE</td>
<td>SME</td>
</tr>
<tr>
<td>7</td>
<td>CNAM (National Social Security)</td>
<td>Sophia National Program</td>
</tr>
<tr>
<td>8</td>
<td>DICSIT (*)</td>
<td>SME</td>
</tr>
<tr>
<td>9</td>
<td>e-device</td>
<td>SME</td>
</tr>
<tr>
<td>10</td>
<td>GCS e-santé Alsace</td>
<td>Regional agency</td>
</tr>
<tr>
<td>11</td>
<td>H2AD</td>
<td>SME</td>
</tr>
<tr>
<td>12</td>
<td>Hippocad</td>
<td>SME</td>
</tr>
<tr>
<td>13</td>
<td>Kayentis</td>
<td>SME</td>
</tr>
<tr>
<td>14</td>
<td>LEGRAND</td>
<td>Large group</td>
</tr>
<tr>
<td>15</td>
<td>LinkCare Services</td>
<td>SME</td>
</tr>
<tr>
<td>16</td>
<td>Malakoff Mederick (*)</td>
<td>Large group (insurance)</td>
</tr>
<tr>
<td>17</td>
<td>Orange</td>
<td>Large group</td>
</tr>
<tr>
<td>18</td>
<td>Pharmagest</td>
<td>Large group</td>
</tr>
<tr>
<td>19</td>
<td>Prylos – Doro</td>
<td>SME</td>
</tr>
<tr>
<td>20</td>
<td>SANOFI (*)</td>
<td>Large group (pharmaceutical)</td>
</tr>
<tr>
<td>21</td>
<td>SRETT</td>
<td>SME</td>
</tr>
<tr>
<td>22</td>
<td>TAGSYS</td>
<td>SME</td>
</tr>
<tr>
<td>23</td>
<td>TAM Services</td>
<td>SME</td>
</tr>
<tr>
<td>24</td>
<td>Technosens</td>
<td>SME</td>
</tr>
<tr>
<td>25</td>
<td>TIKEASY</td>
<td>SME (start-up)</td>
</tr>
<tr>
<td>26</td>
<td>Ubiquiet</td>
<td>SME (start-up)</td>
</tr>
<tr>
<td>27</td>
<td>Vivago</td>
<td>SME</td>
</tr>
<tr>
<td>28</td>
<td>Voluntis</td>
<td>SME</td>
</tr>
</tbody>
</table>

(*) Contacted through CNRSDA

It must be noted that two industrial associations have been associated to the field study:

- **AFRATA (« Association FRAnçaise de TéléAssistance »)**, umbrella organisation representing 75% of the market for telealarm services in France;
- **ASIPAG ("Association Solutions Innovantes Pour l’Autonomie et Gérontechnologies")**, an association for innovative solutions for autonomy and gerontotechnology which gathers various SMEs which were also contacted directly.
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