

# JRC SCIENTIFIC AND POLICY REPORTS

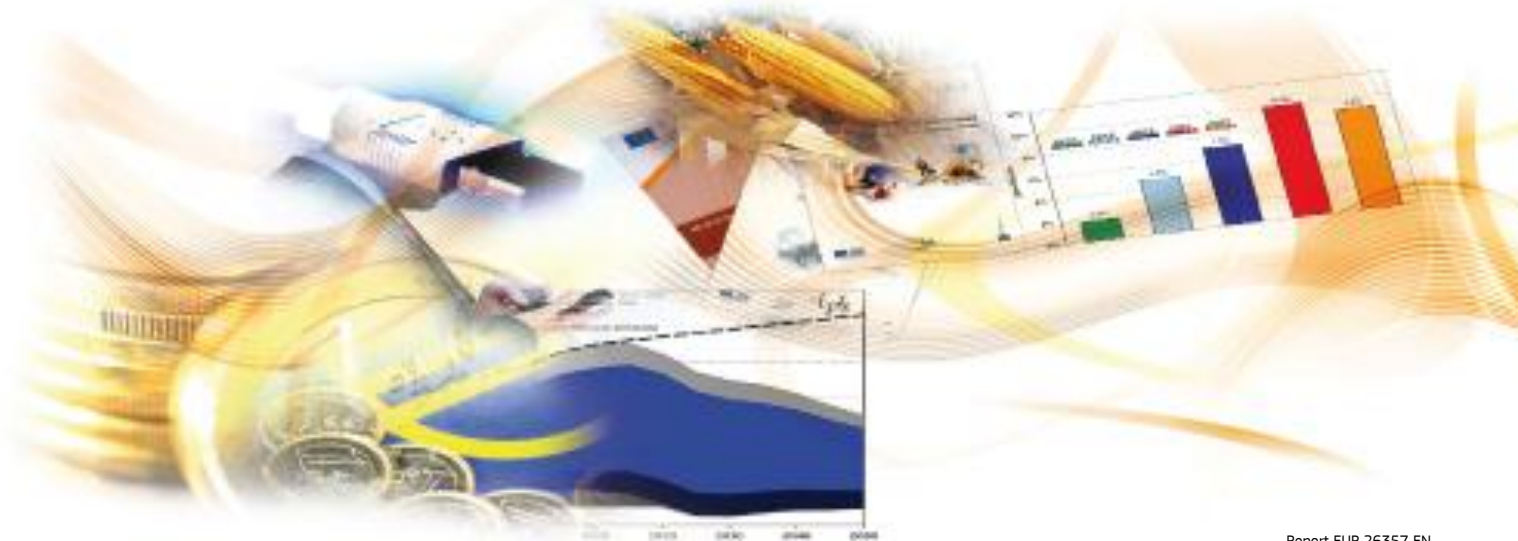
## European Hospital Survey: Benchmarking Deployment of e-Health Services (2012–2013)

### Country Reports

Author: Ramon Sabes-Figuera

Editor: Fabienne Abadie

2013



Report EUR 26357 EN

European Commission  
Joint Research Centre  
Institute for Prospective Technological Studies

Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)  
E-mail: [jrc-ipts-secretariat@ec.europa.eu](mailto:jrc-ipts-secretariat@ec.europa.eu)  
Tel.: +34 954488318  
Fax: +34 954488300

<http://ipts.jrc.ec.europa.eu>  
<http://www.jrc.ec.europa.eu>

This publication is a Scientific and Policy Report by the Joint Research Centre of the European Commission.

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Europe Direct is a service to help you find answers to your questions about the European Union  
Freephone number (\*): 00 800 6 7 8 9 10 11

(\*): Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.  
It can be accessed through the Europa server <http://europa.eu/>.

JRC85927

EUR 26357 EN

ISBN 978-92-79-34778-8 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/55973

Luxembourg: Publications Office of the European Union, 2013

© European Union, 2013

Reproduction is authorised provided the source is acknowledged.

Printed in Spain

## **Preface**

A widespread uptake of eHealth technologies is likely to benefit European Healthcare systems both in terms of quality of care and financial sustainability and European society at large. This is why eHealth has been on the European Commission policy agenda for more than a decade. The objectives of the latest eHealth action plan developed in 2012 are in line with those of the Europe 2020 Strategy and the Digital Agenda for Europe.

This report, based on the analysis of the data from the "European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)" project, presents policy relevant results and findings for each of the 28 EU Member States as well as Iceland and Norway.

The results highlighted here are based on the analysis of the survey descriptive results as well as two composite indicators on eHealth deployment and eHealth availability and use that were developed based on the survey's data.



## Table of Contents

<b>Preface</b> .....	<b>1</b>
<b>Country Report Austria</b> .....	<b>9</b>
1. Background.....	11
2. Sample analysis.....	11
3. Descriptive statistics and indicators.....	12
4. Composite indicators.....	16
<b>Country Report Belgium</b> .....	<b>18</b>
1. Background.....	19
2. Sample analysis.....	19
3. Descriptive statistics and indicators.....	20
4. Composite indicators.....	23
<b>Country Report Bulgaria</b> .....	<b>25</b>
1. Background.....	27
2. Sample analysis.....	27
3. Descriptive statistics and indicators.....	28
4. Composite indicators.....	31
<b>Country Report Croatia</b> .....	<b>35</b>
1. Background.....	37
2. Sample analysis.....	37
3. Descriptive statistics and indicators.....	38
4. Composite indicators.....	41
<b>Country Report Cyprus</b> .....	<b>43</b>
1. Background.....	44
2. Sample analysis.....	44
3. Descriptive statistics and indicators.....	45
4. Composite indicators.....	49
<b>Country Report Czech Republic</b> .....	<b>51</b>
1. Background.....	52
2. Sample analysis.....	52
3. Descriptive statistics and indicators.....	53
4. Composite indicators.....	56
<b>Country Report Denmark</b> .....	<b>58</b>
1. Background.....	59
2. Sample analysis.....	59

3. Descriptive statistics and indicators.....	60
4. Composite indicators.....	63
<b>Country Report Estonia.....</b>	<b>65</b>
1. Background.....	66
2. Sample analysis.....	66
3. Descriptive statistics and indicators.....	67
4. Composite indicators.....	70
<b>Country Report Finland.....</b>	<b>72</b>
1. Background.....	73
2. Sample analysis.....	73
3. Descriptive statistics and indicators.....	74
4. Composite indicators.....	77
<b>Country Report France.....</b>	<b>79</b>
1. Background.....	80
2. Sample analysis.....	80
3. Descriptive statistics and indicators.....	81
4. Composite indicators.....	84
<b>Country Report Germany.....</b>	<b>87</b>
1. Background.....	88
2. Sample analysis.....	88
3. Descriptive statistics and indicators.....	89
4. Composite indicators.....	92
<b>Country Report Greece.....</b>	<b>95</b>
1. Background.....	96
2. Sample analysis.....	96
3. Descriptive statistics and indicators.....	97
4. Composite indicators.....	100
<b>Country Report Hungary.....</b>	<b>103</b>
1. Background.....	104
2. Sample analysis.....	104
3. Descriptive statistics and indicators.....	105
4. Composite indicators.....	108
<b>Country Report Iceland.....</b>	<b>111</b>
1. Background.....	112
2. Sample analysis.....	112
3. Descriptive statistics and indicators.....	113

4. Composite indicators.....	116
<b>Country Report Ireland.....</b>	<b>118</b>
1. Background.....	119
2. Sample analysis.....	119
3. Descriptive statistics and indicators.....	120
4. Composite indicators.....	123
<b>Country Report Italy.....</b>	<b>126</b>
1. Background.....	127
2. Sample analysis.....	127
3. Descriptive statistics and indicators.....	128
4. Composite indicators.....	131
<b>Country Report Latvia.....</b>	<b>134</b>
1. Background.....	135
2. Sample analysis.....	135
3. Descriptive statistics and indicators.....	136
4. Composite indicators.....	139
<b>Country Report Lithuania.....</b>	<b>142</b>
1. Background.....	143
2. Sample analysis.....	143
3. Descriptive statistics and indicators.....	144
4. Composite indicators.....	147
<b>Country Report Luxembourg.....</b>	<b>149</b>
1. Background.....	150
2. Sample analysis.....	150
3. Descriptive statistics and indicators.....	151
4. Composite indicators.....	153
<b>Country Report Malta.....</b>	<b>155</b>
1. Background.....	156
2. Sample analysis.....	156
3. Descriptive statistics and indicators.....	157
4. Composite indicators.....	159
<b>Country Report The Netherlands.....</b>	<b>161</b>
1. Background.....	162
2. Sample analysis.....	162
3. Descriptive statistics and indicators.....	163
4. Composite indicators.....	166

<b>Country Report Norway.....</b>	<b>169</b>
1. Background.....	170
2. Sample analysis.....	170
3. Descriptive statistics and indicators.....	171
4. Composite indicators.....	174
<b>Country Report Poland .....</b>	<b>177</b>
1. Background.....	178
2. Sample analysis.....	178
3. Descriptive statistics and indicators.....	179
4. Composite indicators.....	182
<b>Country Report Portugal.....</b>	<b>185</b>
1. Background.....	186
2. Sample analysis.....	186
3. Descriptive statistics and indicators.....	187
4. Composite indicators.....	190
<b>Country Report Romania .....</b>	<b>193</b>
1. Background.....	194
2. Sample analysis.....	194
3. Descriptive statistics and indicators.....	195
4. Composite indicators.....	198
<b>Country Report Slovakia.....</b>	<b>201</b>
1. Background.....	202
2. Sample analysis.....	202
3. Descriptive statistics and indicators.....	203
4. Composite indicators.....	206
<b>Country Report Slovenia.....</b>	<b>209</b>
1. Background.....	210
2. Sample analysis.....	210
3. Descriptive statistics and indicators.....	211
4. Composite indicators.....	213
<b>Country Report Spain.....</b>	<b>216</b>
1. Background.....	217
2. Sample analysis.....	217
3. Descriptive statistics and indicators.....	218
4. Composite indicators.....	221



**Country Report Sweden .....224**

- 1. Background..... 225
- 2. Sample analysis..... 225
- 3. Descriptive statistics and indicators..... 226
- 4. Composite indicators..... 229

**Country Report United Kingdom .....232**

- 1. Background..... 233
- 2. Sample analysis..... 233
- 3. Descriptive statistics and indicators..... 234
- 4. Composite indicators..... 237



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Austria**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>1</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>2</sup>.

This document reports the results of this project for **Austria**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Austria are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

242 hospitals were identified in Austria. Within this rough universe 201 (83%) completed the screener part of the questionnaire and 132 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (7% vs. 21%) and there were more hospitals of private, profit and non-profit, ownership (52% vs. 36%). Out of the Austrian universe, 43 acute hospitals (33%) completed the survey.

**Table 1: Austrian sample breakdown by size of acute care hospitals**

Austria	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
2012 Census	132	9	60	46	14	3
		7%	45%	35%	11%	2%
2012 sample	43	2	21	16	4	-
		5%	49%	37%	9%	-
2010 sample	15	1	9	5	-	-
		7%	60%	33%	-	-

<sup>1</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>2</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 2: Austrian sample breakdown by ownership type**

Austria	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>132</b>	55 42%	25 19%	35 27%	17 13%
<b>2012</b>	<b>43</b>	20 47%	7 16%	14 33%	2 5%
<b>2010</b>	<b>15</b>	10 67%	2 13%	3 20%	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Austrian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with more private and larger hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

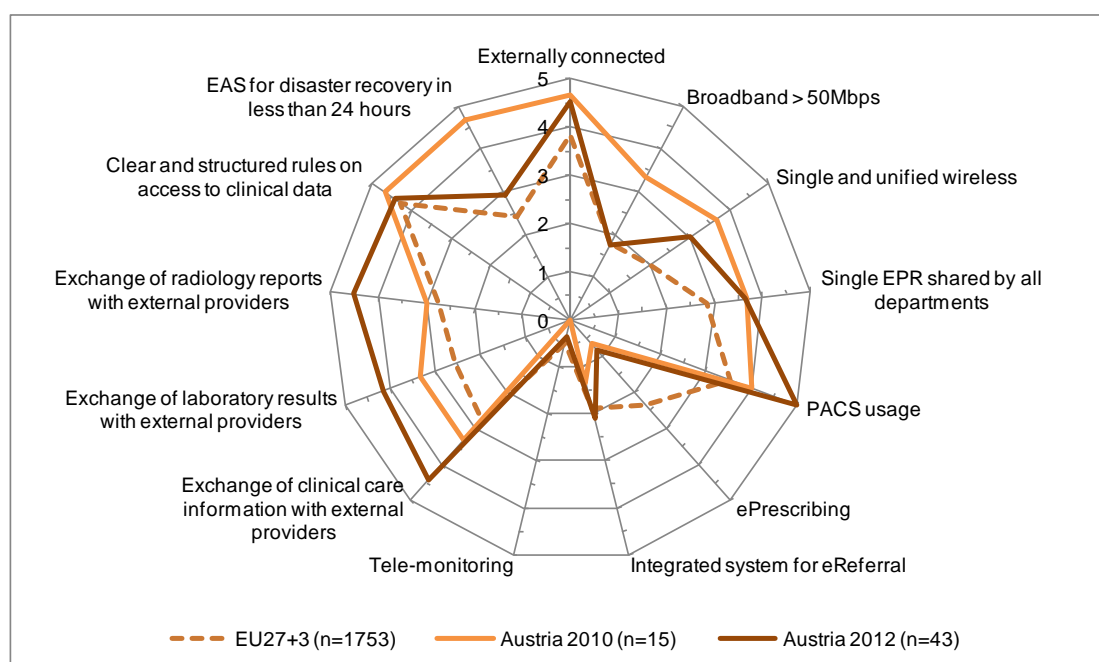
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring.

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 1: Austrian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 3 – eHealth indicators Austria**

eHealth indicators - Austria	Valid N	% hospitals	2012 difference Austria vs.EU27+3	Austria evolution, 2012 vs. 2010 <sup>3</sup>
<b>Infrastructure</b>				
Externally connected	43	91%	14%	-3%
Broadband > 50Mbps	40	35%	-1%	-32%
Single and unified wireless	43	60%	20%	-13%
Single EPR shared by all departments	41	73%	16%	0%
<b>Applications</b>				
PACS usage	43	100%	29%	20%
ePrescribing	43	16%	-30%	3%
Integrated system for eReferral	43	42%	4%	15%
Tele-monitoring	43	7%	-3%	7%
<b>Integration</b>				
Exchange of clinical care information with external providers	43	88%	33%	22%
Exchange of laboratory results with external providers	41	83%	32%	16%
Exchange of radiology reports with external providers	43	91%	36%	31%
<b>Security</b>				
Clear and structured rules on access to clinical data	43	88%	3%	-5%
EAS for disaster recovery in less than 24 hours	43	58%	10%	-35%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>3</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Austrian eHealth profile within EU27+3

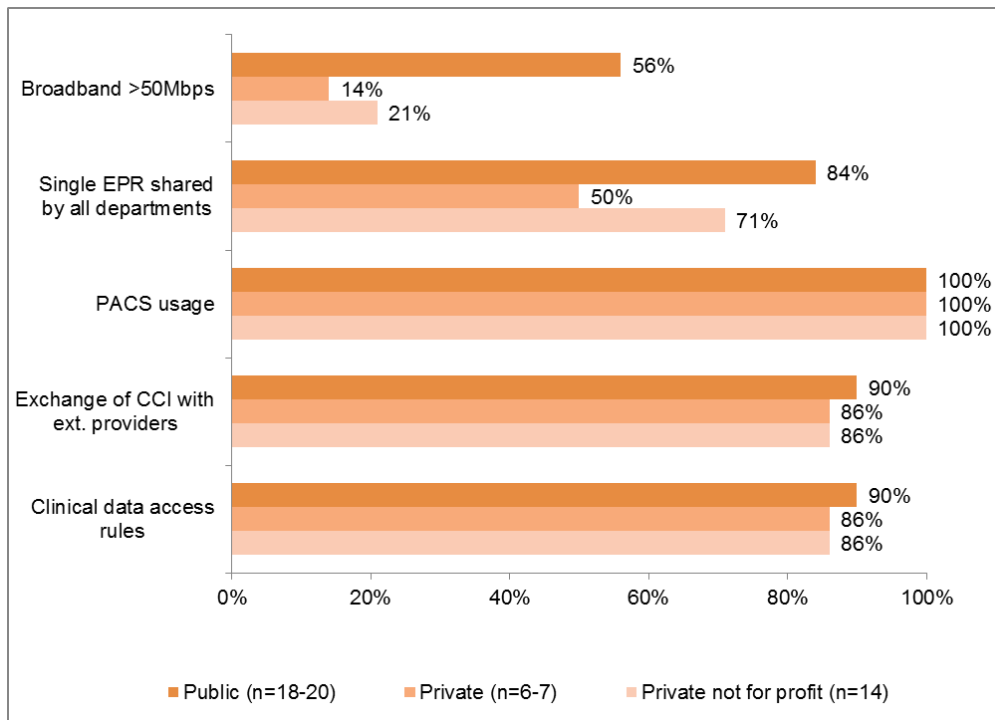
Austria noticeably scores better than the average EU27+3 in four main areas: “Exchange of radiology reports with external providers”, “Exchange of laboratory results with external providers”, “Exchange of clinical care information with external providers” and “PACS usage”. In each of these areas, Austrian results exceed EU average by a 32% to 36%. In most other areas, Austria's results corresponds more or less to the European average, with the exception of “ePrescribing”- where the country’s results appear to be significantly lower (-30%), suggesting room for improvement.

Changes in the Austrian eHealth profile

Since 2010, Austria appears to have improved in many of the areas where its results are higher than European averages; “Exchange of radiology reports with external providers”, “Exchange of laboratory results with external providers”, “Exchange of clinical care information with external providers” and “PACS usage”. However, this is not a general trend, as three values recorded in 2010 were higher than the corresponding 2012 values: “EAS for disaster recovery in less than 24 hours”, “Broadband > 50Mbps” and “Single and unified wireless”. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

**Figure 2: Austrian acute hospitals eHealth profile by ownership**



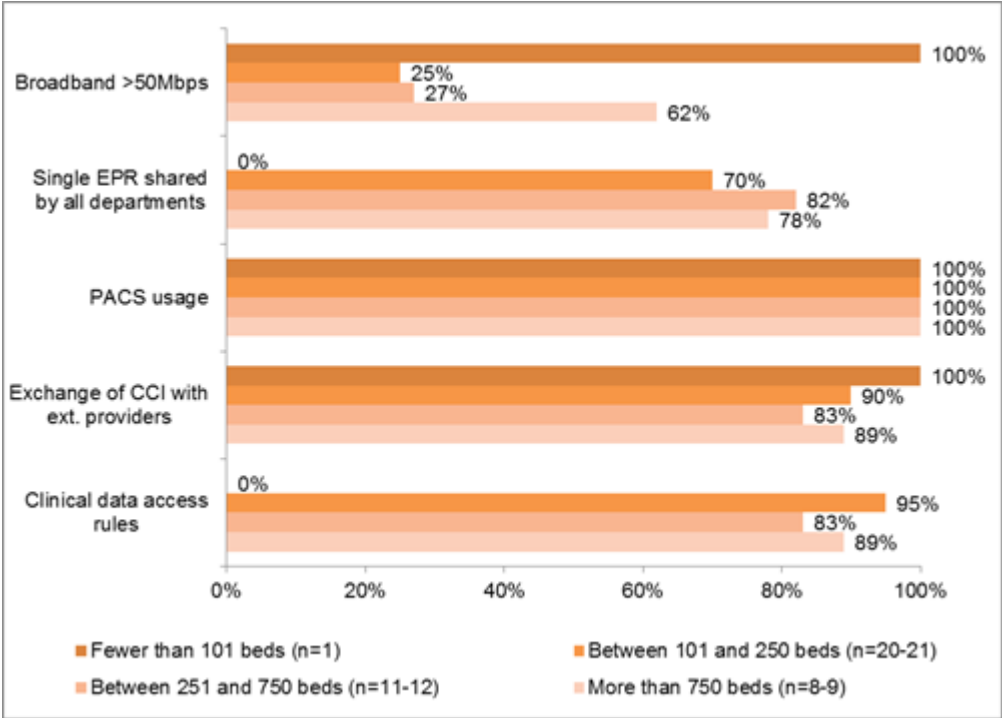
*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Taking ownership type into account we observe that “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data” all reach high scores across acute hospitals regardless of ownership type. Additionally, “PACS usage” appears to be universal among Austrian acute hospitals, with 100% deployment across all ownership categories.



Results differ markedly for two other areas, “Broadband > 50Mbps” and “Single EPR shared by all departments”. For these, broad variations can be observed depending on the ownership category. 56% of Public hospitals enjoyed broadband access above the 50Mbps threshold, while only 1 out the 7 Private hospitals gave a similar statement. Similarly, 16 out of the 19 Public acute hospitals had a “Single EPR shared by all departments”, contrasting with 3 out of 6 for Private hospitals and 10 out of 14 for Private not for profit institutions.

**Figure 3: Austrian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Taking the size of the hospitals into account, again we find that in most areas, there does not seem to be any difference among Austrian acute hospitals across most of the examined categories.

The only significant differences can be seen in the area of “Broadband > 50Mbps” where small and medium size hospitals (two categories which have between 101 and 750 beds) have a markedly lower broadband penetration, with only 5 out of 20 and 3 out of 11 hospitals respectively having high broadband penetration vs. 5 out of 8 hospitals for the very large hospitals (over 750 beds).

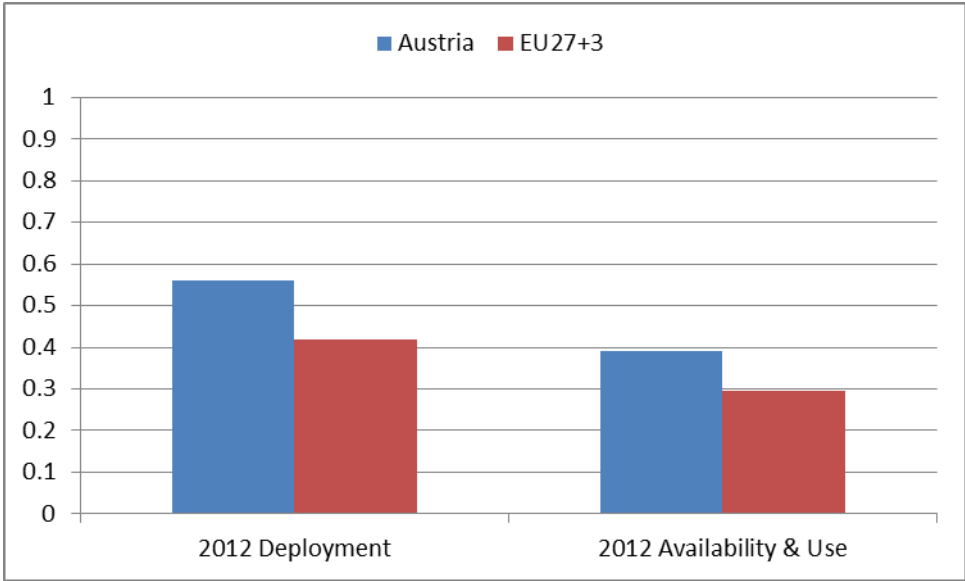
### 4. Composite indicators

The following section reports the results for Austria on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Austria's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Austria's eHealth Deployment indicator is based on data from 43 hospitals, while the Availability and Use indicator was built from the information provided by 35 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

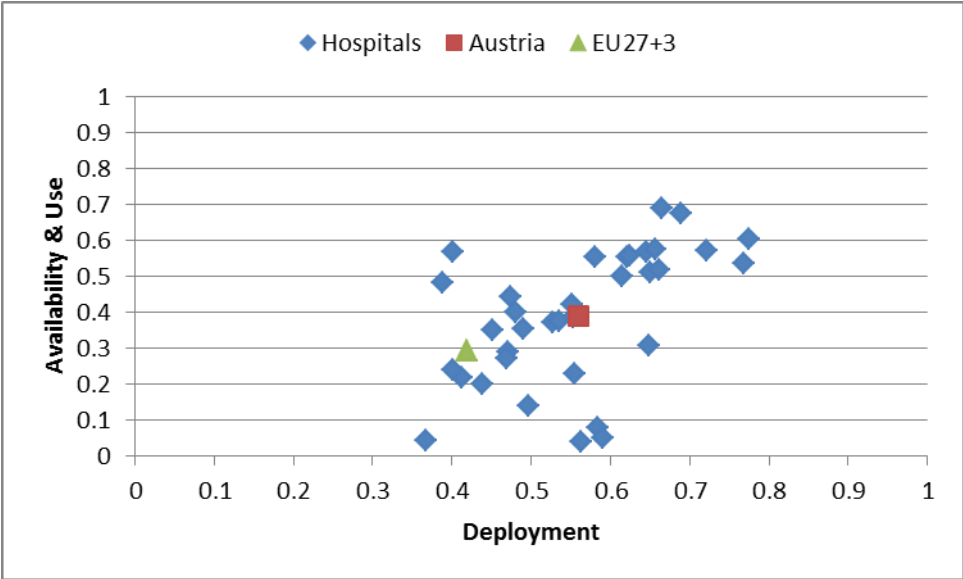
**Figure 4: Austria eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 15 hospitals) for Austria was 0.49, while the 2012 value was 0.56, which shows an increase of 7% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Austria and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a group of six hospitals with deployment above 0.5 but Effective use below 0.3. Only 3 hospitals were below EU+3 average for both composite indicators.

**Figure 5: Austria's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Belgium**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>4</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>5</sup>.

This document reports the results of this project for **Belgium**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Belgium are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

436 hospitals were identified in Belgium. Within this rough universe 243 (56%) completed the screener part of the questionnaire and 120 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (3% vs. 21%) and there were more hospitals of private, profit and non-profit, ownership (56% vs. 36%). Out of the Belgian universe, 50 acute hospitals (42%) completed the survey.

**Table 4: Belgian sample breakdown by size of acute care hospitals**

Belgium	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>120</b>	3 3%	25 21%	49 41%	25 21%	18 15%
<b>2012</b>	<b>50</b>	1 2%	10 20%	23 46%	10 20%	6 12%
<b>2010</b>	<b>23</b>	-	7 30%	11 48%	5 22%	-

<sup>4</sup> his criteria was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>5</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 5: Belgian sample breakdown by ownership type**

Belgium	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>120</b>	47 39%	25 21%	36 30%	12 10%
<b>2012</b>	<b>50</b>	23 46%	13 26%	13 26%	1 2%
<b>2010</b>	<b>23</b>	8 35%	-	14 61%	1 4%

The final sample of hospitals included in the survey has a similar structure to the one of the Belgian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has more than doubled, with more public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

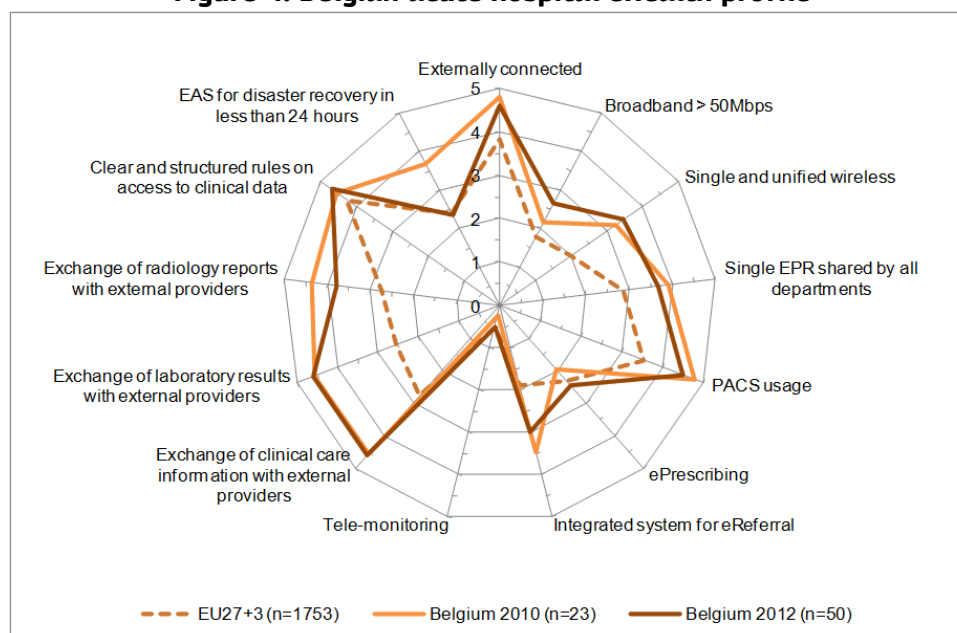
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 4: Belgian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 6: eHealth indicators Belgium**

eHealth indicators - Belgium	Valid N	% hospitals	2012 difference Belgium vs.EU27+3	Belgium evolution, 2012 vs. 2010 <sup>6</sup>
<b>Infrastructure</b>				
Externally connected	50	92%	16%	-4%
Broadband > 50Mbps	45	53%	18%	10%
Single and unified wireless	49	69%	29%	4%
Single EPR shared by all departments	49	73%	16%	-5%
<b>Applications</b>				
PACS usage	50	90%	19%	-6%
ePrescribing	47	49%	2%	10%
Integrated system for eReferral	47	60%	22%	-10%
Tele-monitoring	49	10%	0%	6%
<b>Integration</b>				
Exchange of clinical care information with external providers	49	92%	37%	1%
Exchange of laboratory results with external providers	49	92%	41%	1%
Exchange of radiology reports with external providers	50	76%	21%	-11%
<b>Security</b>				
Clear and structured rules on access to clinical data	50	94%	9%	3%
EAS for disaster recovery in less than 24 hours	49	47%	-1%	-27%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

#### Position of the Belgian eHealth profile within EU27+3

Belgium scores better than the European average most notably in the following areas: “Externally connected”, “Broadband > 50Mbps”, “Single and unified wireless”, “Single EPR shared by all departments”, “PACS usage”, “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers”. In particular “Exchange of clinical care information with external providers” and “Exchange of laboratory results with external providers” enjoy a substantial lead over the European average, with these areas having a 37% and 41% lead. However, with respect to “EAS for disaster recovery in less than 24 hours”, “Tele-monitoring” and “ePrescribing”, Belgium either slightly lags behind the average or is very close to the average.

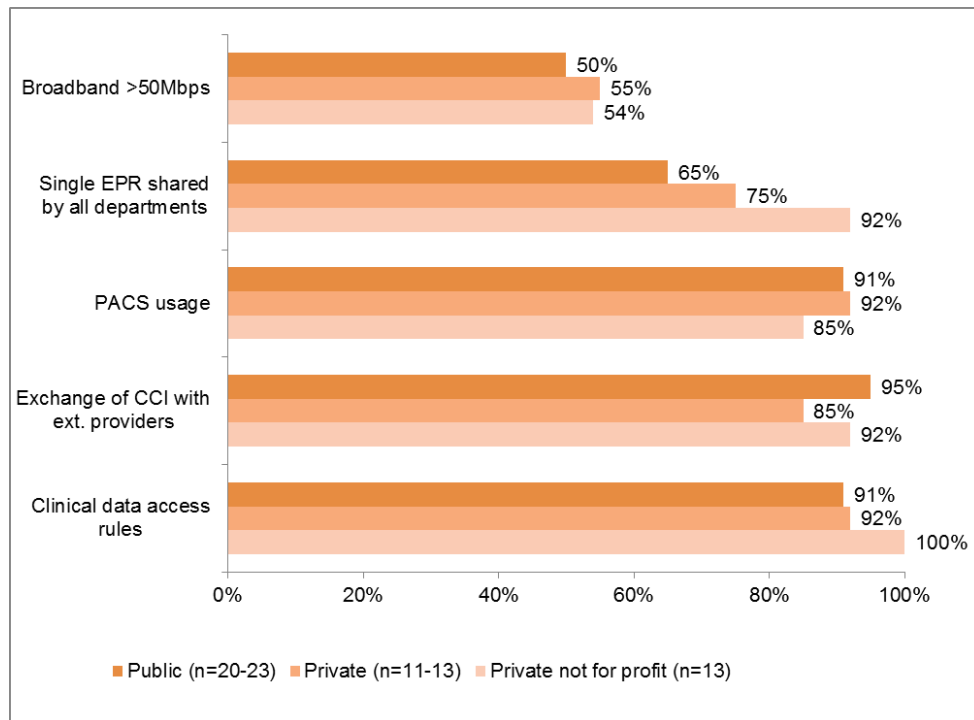
#### Changes in the Belgian eHealth profile

In the intervening period between this study and the last, it appears that Belgium’s eHealth profile has remained largely unchanged. With the exception of “EAS for disaster recovery in less than 24 hours”, which recorded a decrease relative to the 2010 results, most other values occupy a similar range. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

<sup>6</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

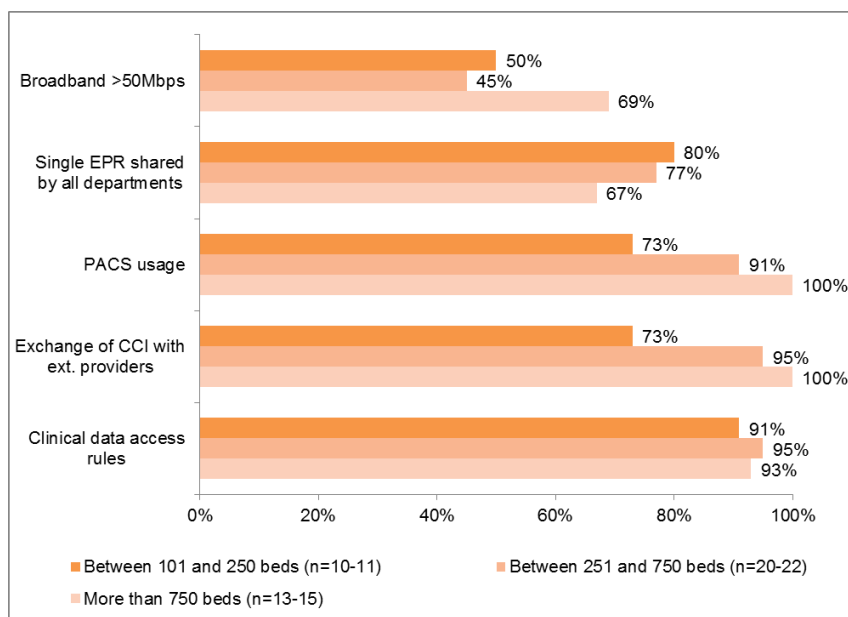
**Figure 5: Belgian acute hospitals eHealth profile by ownership**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Looking at the ownership types of Belgian hospitals, we can see a generally close range for the majority of the indicators. For “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”, that the variation in percentage penetration is 10% or less in all three indicators. “Exchange of clinical care information with external providers” has the largest variation of these three categories with a 10% variation between Public hospitals (95%) and Private hospitals (85%). Differences are more pronounced for “Single EPR shared by all departments”, with differences of 27 percentage points can be seen depending on the ownership type.

**Figure 6: Belgian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.



When we take hospital scale into consideration we can see more differentiation across multiple areas. With the exception of “Clear and structured rules on access to clinical data”, all other areas show a large disparity between eHealth profile values. “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage” and “Exchange of clinical care information with external providers” all display relevant variations. However, it does not appear that scale is by itself a determinant of penetration in this context. For example, while the largest acute hospitals (over 750 beds) have 100% usage of “PACS usage” and “Exchange of clinical care information with external providers” and 69% of “Broadband > 50Mbps”, when we examine “Single EPR shared by all departments” the largest hospitals actually lag behind the smaller ones.

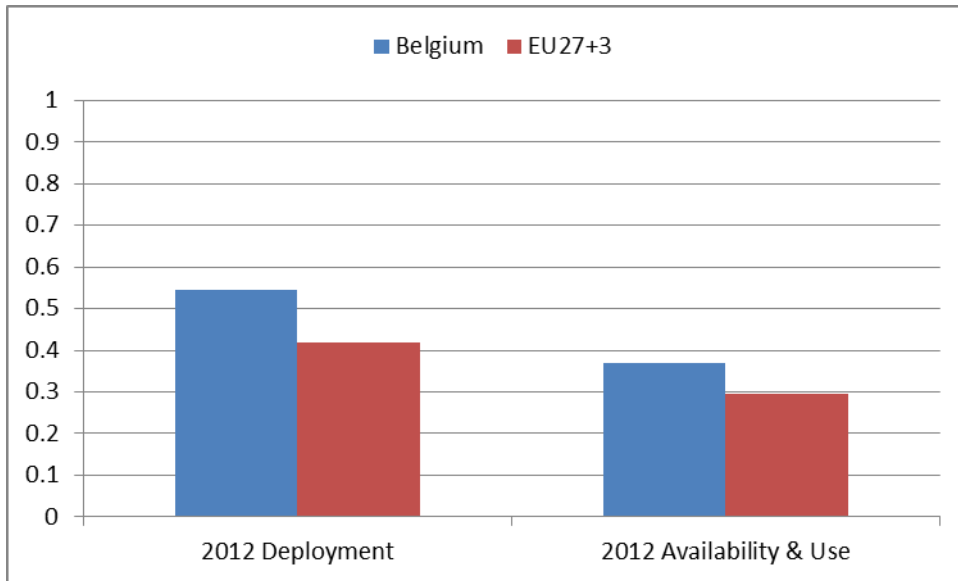
#### **4. Composite indicators**

The following section reports the results for Belgium on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Belgium's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Belgium's eHealth Deployment indicator is based on data from 48 hospitals, while the Availability and Use indicator was built from the information provided by 43 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

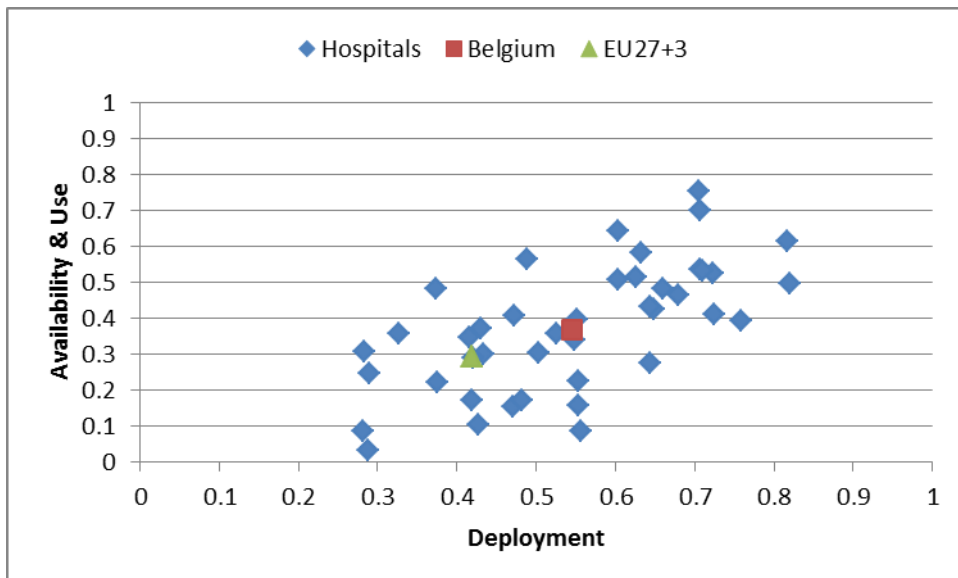
**Figure 4: Belgium eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 23 hospitals) for Belgium was 0.51, while the 2012 value was 0.55, which shows an increase of 4% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Belgium and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a group of 4 hospitals with deployment above 0.5 but Effective use below 0.3. Only 5 hospitals were below EU+3 average for both composite indicators.

**Figure 5: Belgium's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Bulgaria**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>7</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>8</sup>

This document reports the results of this project for **Bulgaria**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Bulgaria are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

388 hospitals were identified in Bulgaria. Within this rough universe 207 (53%) completed the screener part of the questionnaire and 109 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (34% vs. 21%) and there were more hospitals of public ownership (74% vs. 64%). Out of the Bulgarian universe, 62 acute hospitals (57%) completed the survey.

**Table 7: Bulgarian sample breakdown by size of acute care hospitals**

Bulgaria	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
Census	109	35	32	30	6	6
		32%	29%	28%	6%	6%
2012	62	22	17	18	3	2
		35%	27%	29%	5%	3%
2010	15	5	3	4	3	-
		33%	20%	27%	20%	-

<sup>7</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>8</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 8: Bulgarian sample breakdown by ownership type**

Bulgaria	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	109	73	24	1	11
		67%	22%	1%	10%
2012	62	43	14	-	5
		69%	23%	-	8%
2010	15	11	3	1	-
		73%	20%	7%	-

The final sample of hospitals included in the survey has a similar structure to the one of the Bulgarian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has quadrupled, with a lower proportion of very large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

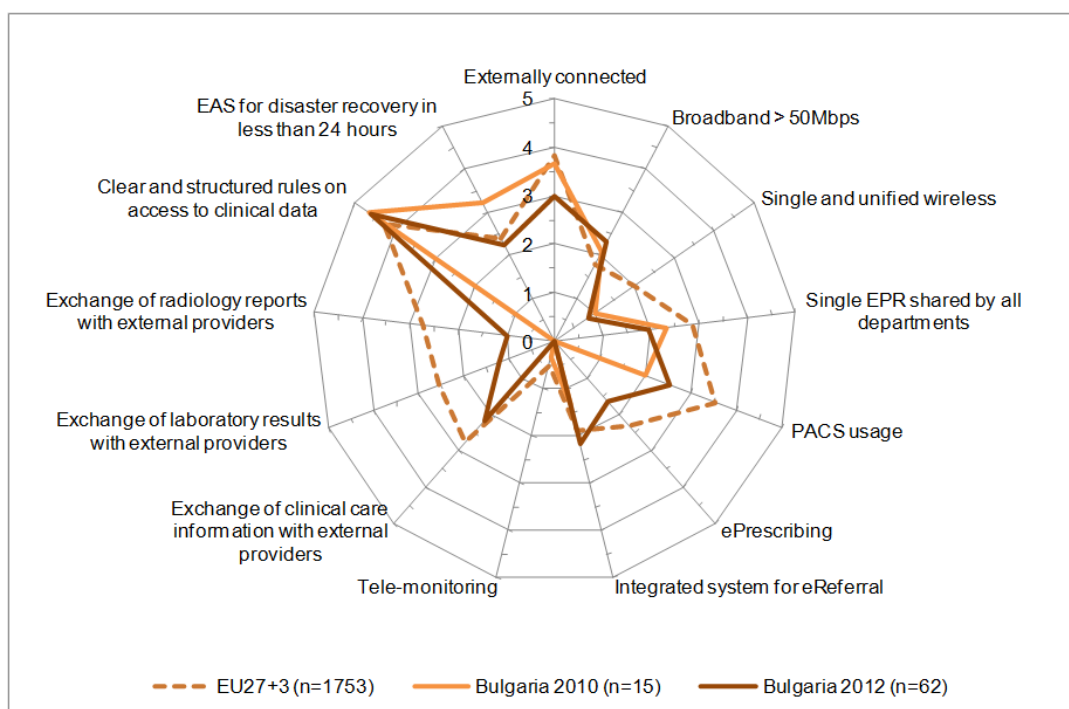
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 7: Bulgarian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 9: eHealth indicators Bulgaria**

eHealth indicators - Bulgaria	Valid N	% hospitals	2012 difference Bulgaria vs.EU27+3	Bulgaria evolution, 2012 vs. 2010 <sup>9</sup>
<b>Infrastructure</b>				
Externally connected	62	60%	-17%	-14%
Broadband > 50Mbps	52	46%	11%	4%
Single and unified wireless	58	17%	-23%	-3%
Single EPR shared by all departments	61	39%	-18%	-7%
<b>Applications</b>				
PACS usage	59	51%	-20%	11%
ePrescribing	39	33%	-13%	33%
Integrated system for eReferral	39	44%	6%	17%
Tele-monitoring	49	0%	-10%	-7%
<b>Integration</b>				
Exchange of clinical care information with external providers	57	44%	-11%	44%
Exchange of laboratory results with external providers	57	25%	-27%	25%
Exchange of radiology reports with external providers	56	20%	-35%	20%
<b>Security</b>				
Clear and structured rules on access to clinical data	62	92%	7%	-1%
EAS for disaster recovery in less than 24 hours	60	45%	-3%	-19%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>9</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Bulgarian eHealth profile within EU27+3

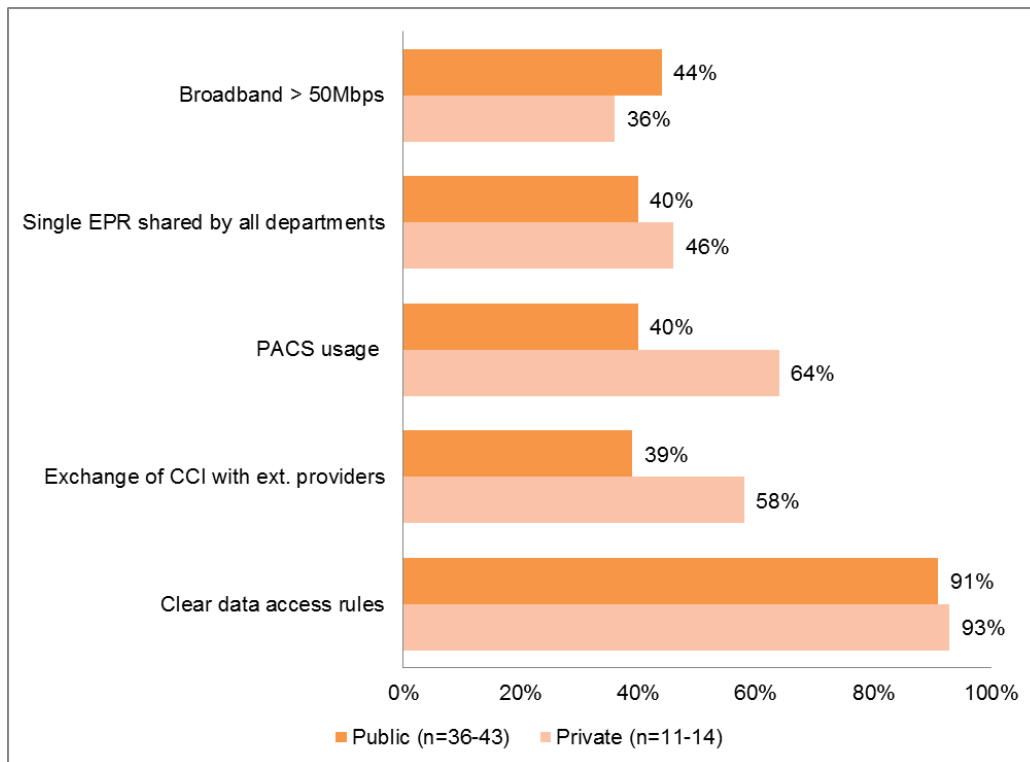
Bulgaria noticeably scores worse than the average EU27+3 in many areas; “Exchange of radiology reports with external providers”, “Exchange of laboratory results with external providers” and “PACS usage” are the areas with largest discrepancies. However, other areas fared better, with “Clear and structured rules on access to clinical data”, “Broadband > 50Mbps” and “Integrated system for eReferral” all very close to the European average.

### Changes in the Bulgarian eHealth profile

While Bulgaria scores worse than the European average, it has shown some significant advances within a two-year period. These advances are most noteworthy in the areas of “Exchange of radiology reports with external providers” (+20%), “Exchange of clinical care information with external providers” (+44%) and also “ePrescribing” (+33%). Two areas appear to have suffered contraction: “EAS for disaster recovery in less than 24 hours” and “Externally connected”. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

**Figure 8: Bulgarian acute hospitals eHealth profile by ownership**

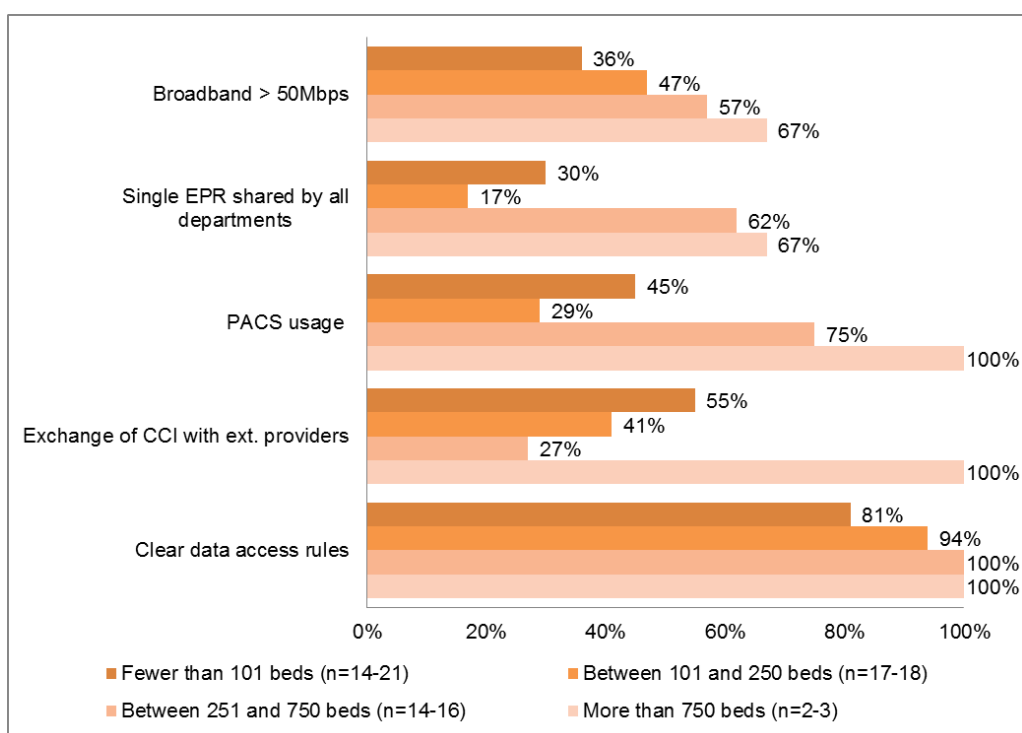


*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Areas as “Broadband > 50Mbps”, “Exchange of clinical care information with external providers” and “PACS usage”) show important differences. between Public and Private hospitals. Looking across ownership types, Private hospitals appear to be generally better endowed with respect to eHealth facilities, with the exception of “Broadband > 50Mbps”, where Private hospitals lag behind Public hospitals



**Figure 9: Bulgarian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

The clearest differences in eHealth profile become apparent when Bulgarian hospitals are differentiated by size. In every single category, hospitals with more than 750 beds outperform or equal hospitals of a smaller size segment. However, when looking at the other hospital size categories, the relationship between scales is less pronounced. For example, hospitals of between 251 and 750 beds score better than smaller hospitals in most categories, but they have low scores in the “Exchange of clinical care information with external providers” category. Below this level, the relationship between scale and take-up is not clear, as hospitals with between 101 and 250 beds score higher than hospitals with fewer than 101 beds in only two categories

#### 4. Composite indicators

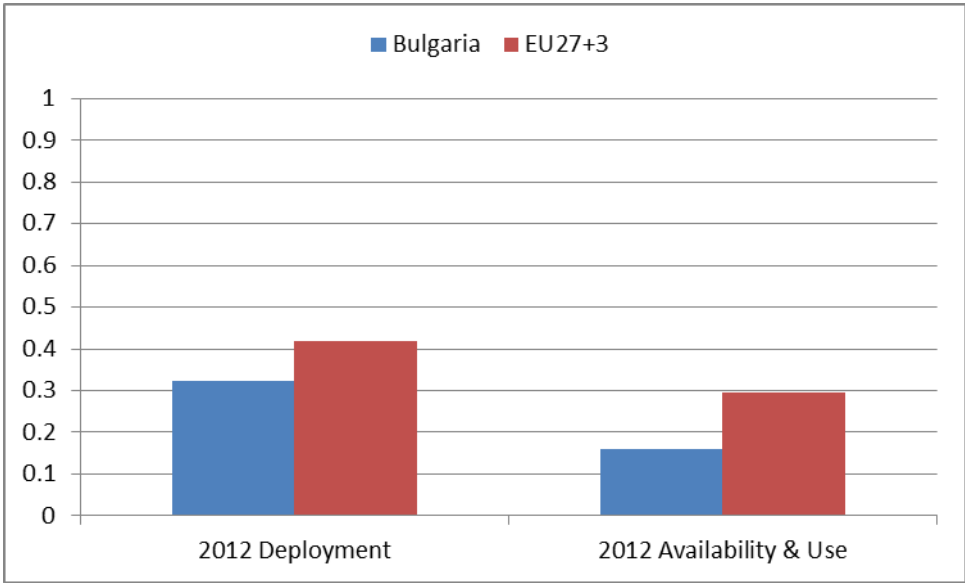
The following section reports the results for Bulgaria on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4

categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Bulgaria’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Bulgaria's eHealth Deployment indicator is based on data from 51 hospitals, while the Availability and Use indicator was built from the information provided by 59 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

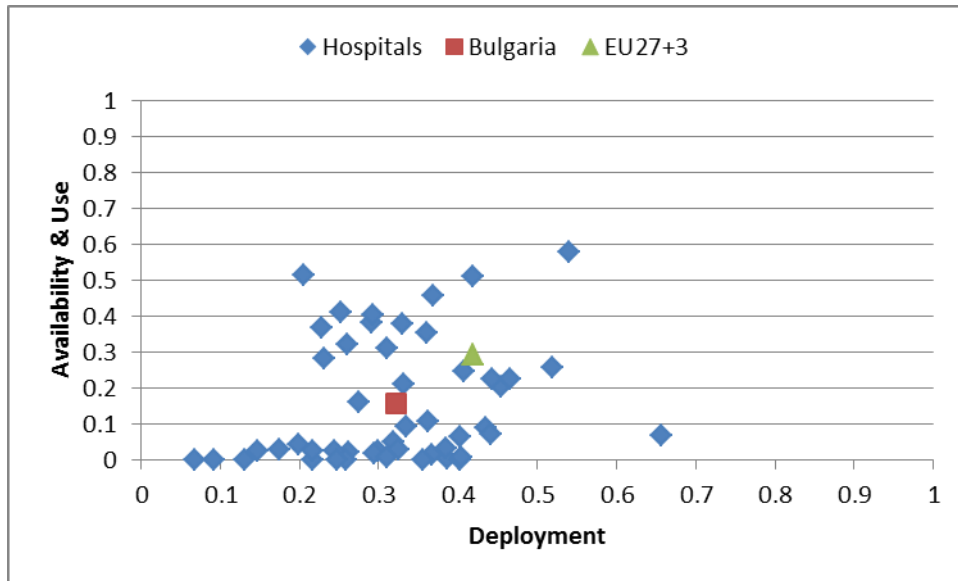
**Figure 4: Bulgaria eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 11 hospitals) for Bulgaria was 0.22, while the 2012 value was 0.32, which shows an increase of 11% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Bulgaria and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a large group of hospitals with almost no effective use at various levels of deployment. Only 2 hospitals were above EU+3 average for both composite indicators.

**Figure 5: Bulgaria's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Croatia**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>10</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>11</sup>

This document reports the results of this project for **Croatia**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Croatia are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

75 hospitals were identified in Croatia. Within this rough universe 32 (43%) completed the screener part of the questionnaire and 22 qualified as acute care hospitals. There were no hospitals with less than 100 beds among these hospitals, while the proportion of this type of hospitals among the universe of acute Hospitals at EU27+3 level was 21%. All the Croatian hospitals that qualified as acute were of public ownership (64% at EU27+3 level). Out of the Croatian universe, 11 acute hospitals (57%) completed the survey.

**Table 10: Croatian sample breakdown by size of acute care hospitals**

Croatia	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
Census	22	-	4	9	6	3
		-	18%	41%	27%	14%
2012	11	-	2	6	2	1
		-	18%	55%	18%	9%
2010	4	-	2	2	-	-
		-	50%	50%	-	-

<sup>10</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>11</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 11: Croatian sample breakdown by ownership type**

Croatia	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	22	20	-	-	2
		91%	-	-	9%
2012	11	11	-	-	-
		100%	-	-	-
2010	4	4	-	-	-
		100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Croatian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with a lower proportion of very small hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

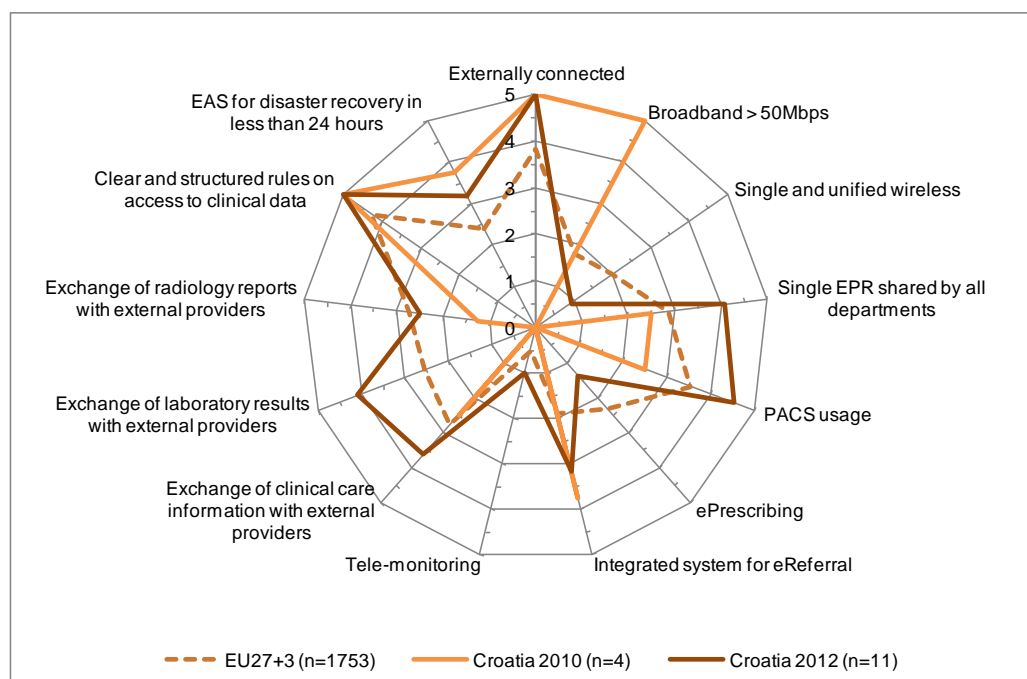
Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.



**Figure 10: Croatian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 12 – eHealth indicators Croatia**

eHealth indicators - Croatia	Valid N	% hospitals	2012 difference Croatia vs.EU27+3	Croatia evolution, 2012 vs. 2010 <sup>12</sup>
<b>Infrastructure</b>				
Externally connected	11	100%	24%	0%
Broadband > 50Mbps	11	27%	-8%	-73%
Single and unified wireless	11	18%	-22%	18%
Single EPR shared by all departments	11	82%	25%	32%
<b>Applications</b>				
PACS usage	11	91%	20%	41%
ePrescribing	11	27%	-19%	27%
Integrated system for eReferral	11	64%	26%	-11%
Tele-monitoring	10	20%	10%	20%
<b>Integration</b>				
Exchange of clinical care information with external providers	11	73%	17%	23%
Exchange of laboratory results with external providers	11	82%	31%	82%
Exchange of radiology reports with external providers	10	50%	-5%	25%
<b>Security</b>				
Clear and structured rules on access to clinical data	11	100%	15%	0%
EAS for disaster recovery in less than 24 hours	11	64%	16%	-11%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here.

<sup>12</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Croatian eHealth profile within EU27+3

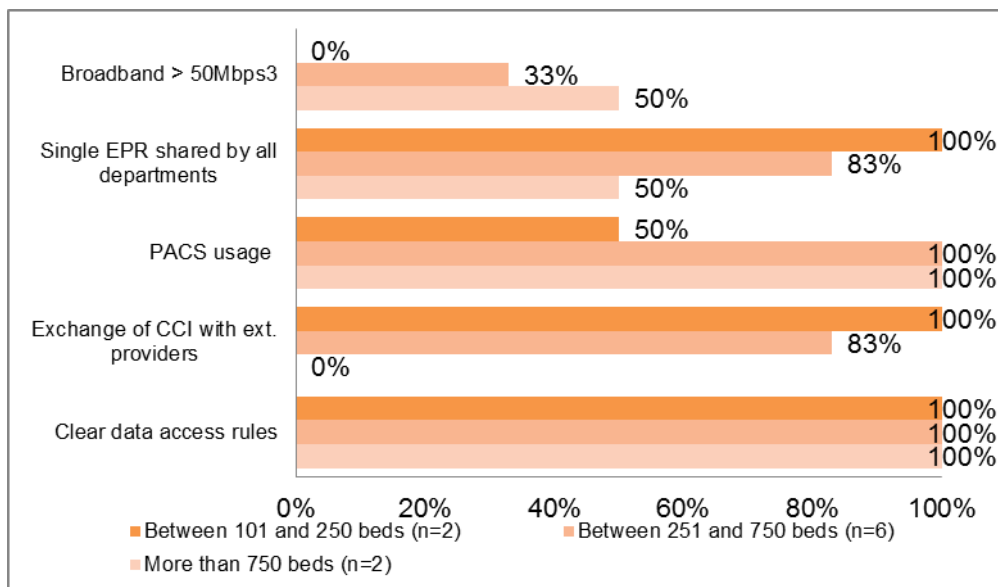
Croatia remains close to the European average regarding the development of its eHealth profile, with variability across the range of examined indicators. Areas where Croatia performs better than the average EU27+3 include: “Externally connected”, “Single EPR shared by all departments”, “PACS usage”, “Integrated system for eReferral”, “Tele-monitoring”, “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers”, “Clear and structured rules on access to clinical data” and “EAS for disaster recovery in less than 24 hours”. Compared the EU27+3 average, areas with lower scores included “Broadband > 50Mbps”, “Single and unified wireless”, and “ePrescribing”.

Changes in the Croatian eHealth profile

Interestingly, the development of Croatia’s eHealth profile has been strong between 2010 and 2012. Croatia demonstrated a healthy growth in eHealth endowment across the acute hospital sector. Five areas in particular recorded high growth: “Single EPR shared by all departments”, “PACS usage”, “ePrescribing”, “Exchange of clinical care information with external providers” and “Exchange of laboratory results with external providers”. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size of the hospitals.

**Figure 2: Croatian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

When taking the size of hospitals into account, we can see very good penetration of “Clear and structured rules on access to clinical data” across all size segments. Otherwise the results do not show any strong patterns.

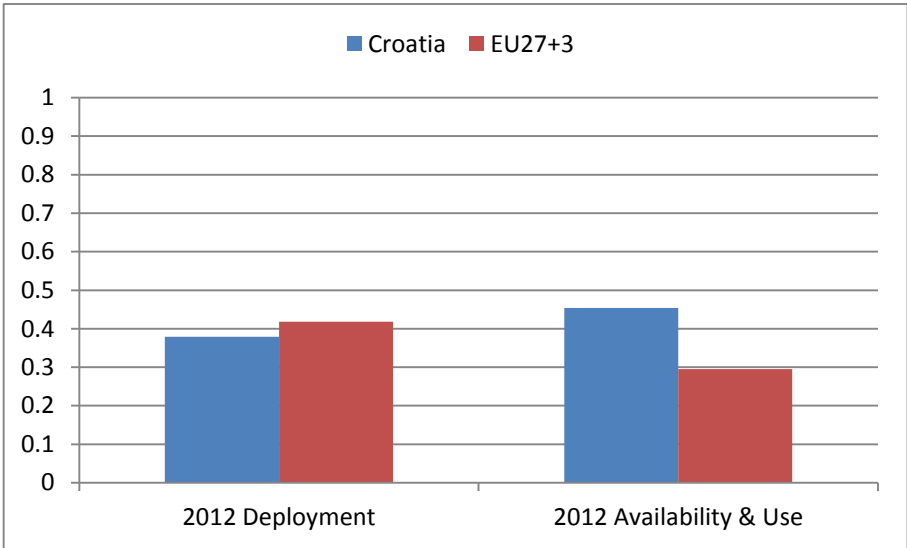
### 4. Composite indicators

The following section reports the results for Croatia on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Croatia's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Croatia's eHealth Deployment indicator is based on data from 8 hospitals, while the Availability and Use indicator was built from the information provided by 7 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

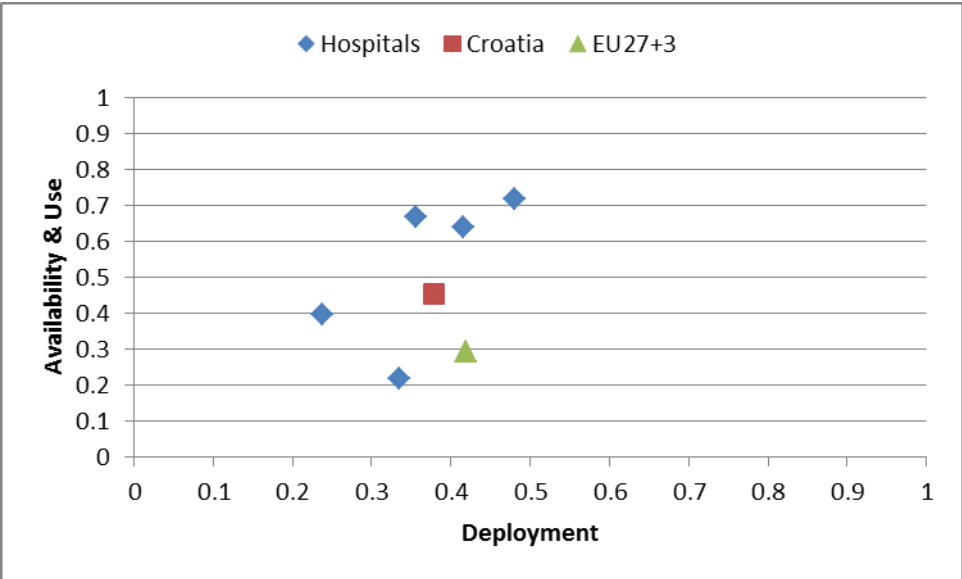
**Figure 3: Croatia eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 4 hospitals) for Croatia was 0.36, while the 2012 value was 0.38, which shows an increase of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Croatia and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that Only 1 hospital is below EU+3 average for both composite indicators.

**Figure 4. Croatia's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Cyprus**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>13</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>14</sup>

This document reports the results of this project for **Cyprus**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Cyprus are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

70 hospitals were identified in Cyprus. Within this rough universe 54 (77%) completed the screener part of the questionnaire and 22 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was considerably higher compared to the universe of acute Hospitals at EU27+3 level (89% vs. 21%) and there were less hospitals of public ownership (10% vs. 64%). Out of the Cypriot universe, 13 acute hospitals (59%) completed the survey.

**Table 13: Cypriot sample breakdown by size of acute care hospitals**

Cyprus	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
Census	22	17	2	-	-	3
		77%	9%	-	-	14%
2012	13	9	2	-	-	2
		69%	15%	-	-	15%
2010	8	5	-	1	-	2
		62%	-	12%	-	25%

<sup>13</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>14</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 14: Cypriot sample breakdown by ownership type**

Cyprus	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	22	2	19	-	1
		9%	86%	-	5%
2012	13	1	12	-	-
		8%	92%	-	-
2010	8	4	4	-	-
		50%	50%	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Cypriot universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has increased, with a larger proportion of private hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

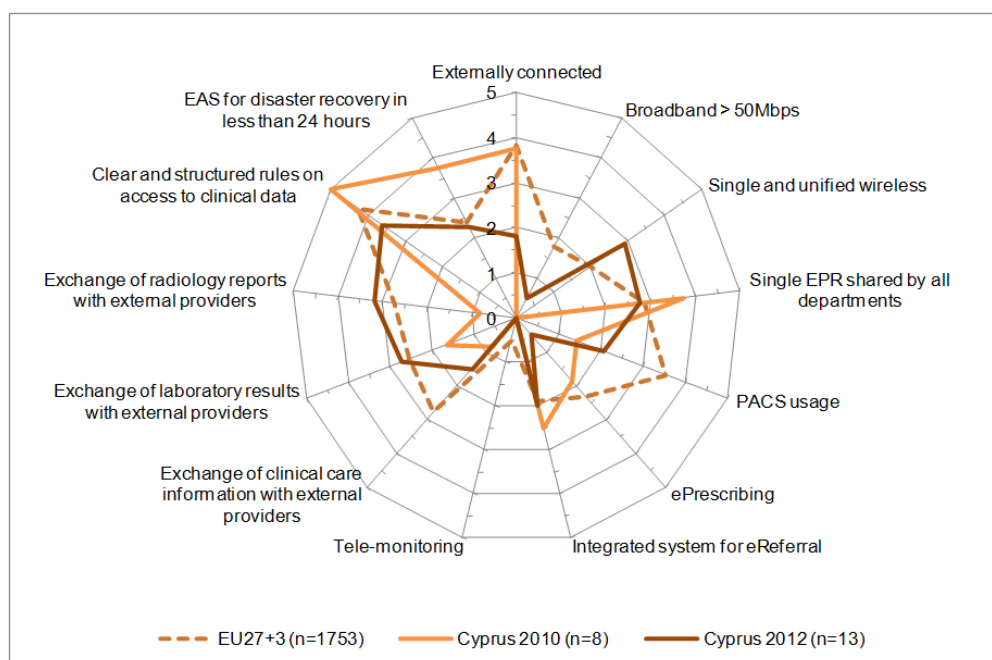
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 11: Cypriot acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 15 – eHealth indicators Cyprus**

eHealth indicators - Cyprus	Valid N	% hospitals	2012 difference Cyprus vs.EU27+3	Cyprus evolution, 2012 vs. 2010 <sup>15</sup>
<b>Infrastructure</b>				
Externally connected	11	36%	-40%	-39%
Broadband > 50Mbps	10	10%	-26%	10%
Single and unified wireless	12	58%	18%	58%
Single EPR shared by all departments	9	56%	-1%	-19%
<b>Applications</b>				
PACS usage	12	42%	-29%	13%
ePrescribing	10	10%	-37%	-28%
Integrated system for eReferral	10	40%	2%	-10%
Tele-monitoring	9	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	10	30%	-25%	13%
Exchange of laboratory results with external providers	11	55%	3%	21%
Exchange of radiology reports with external providers	11	64%	9%	47%
<b>Security</b>				
Clear and structured rules on access to clinical data	11	73%	-13%	-27%
EAS for disaster recovery in less than 24 hours	11	45%	-3%	-30%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>15</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.



Position of the Cypriot eHealth profile within EU27+3

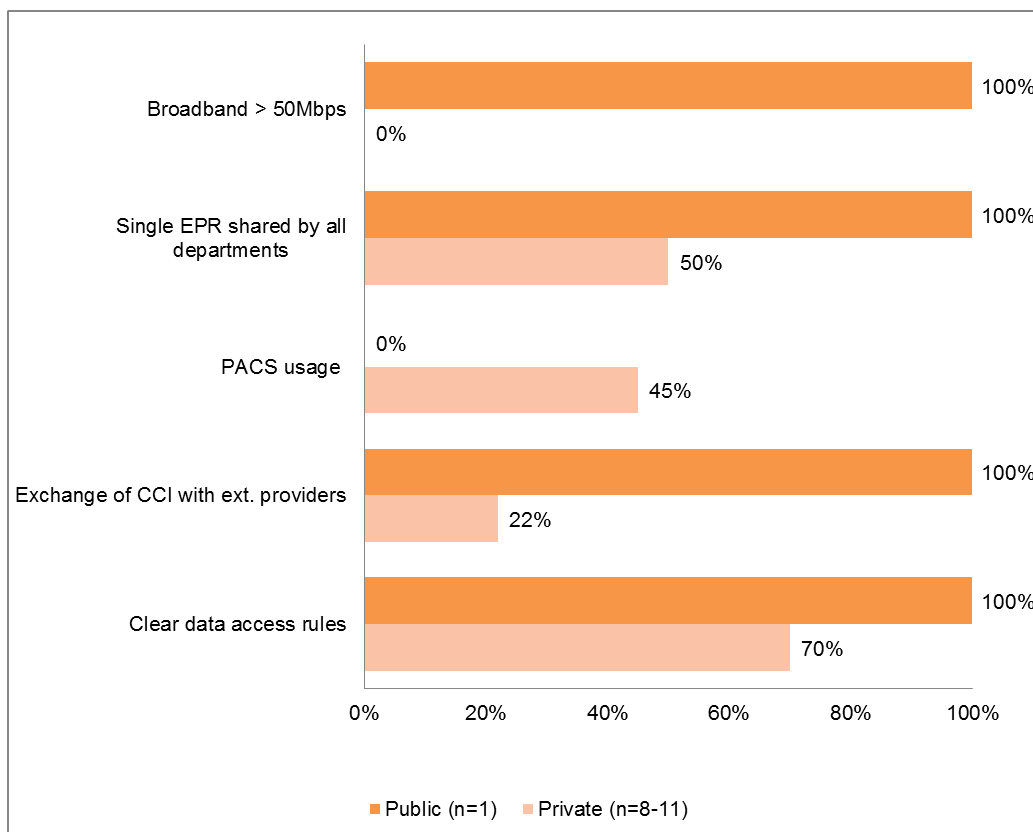
Cyprus remains below the European average in many areas. Of the 13 indicators under review, Cyprus was behind in 9 of these. The largest gaps were recorded in “Externally connected”, “Broadband >50Mbps”, “PACS usage”, and “ePrescribing”.

Changes in the Cypriot eHealth profile

Cyprus’s aggregate eHealth score has changed little between 2010 and 2012. However, the distribution of the individual values comprising the aggregate profile appears to have changed significantly. Of the 13 indicators considered, six have recorded positive growth, six have recorded negative growth, while one value remained unchanged. The most important growth areas were “Single and unified wireless” and “Exchange of radiology reports with external providers”, while contracting areas included “Externally connected” and “EAS for disaster recovery in less than 24 hours”. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

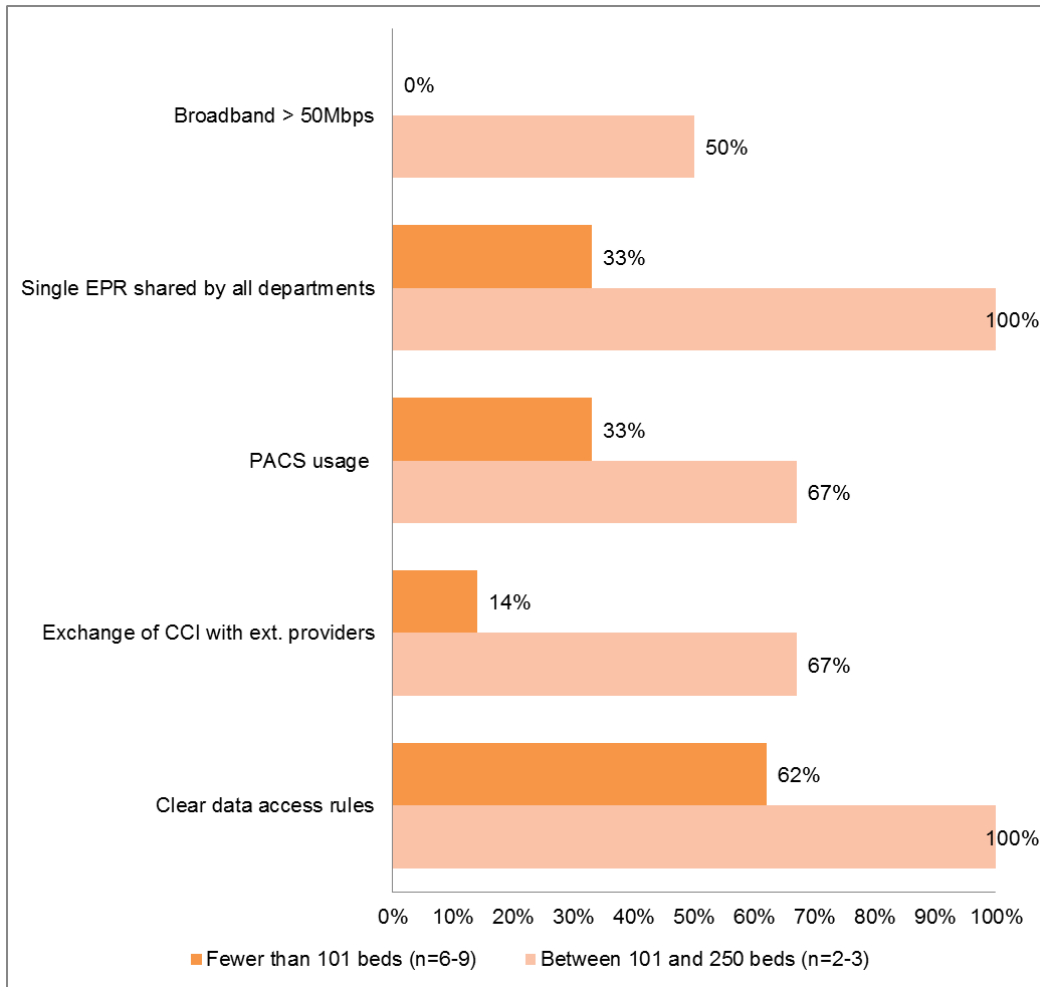
**Figure 12: Cypriot acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Values for one Public and eight to eleven Private acute hospitals have been recorded for Cyprus. The sole Public hospital and 7 out of 10 Private hospitals declared having “Clear and structured rules on access to clinical data”, whereas half of the private hospitals have a “Single EPR shared by all departments” and 2 out of 9 “Exchange of clinical care information with external providers”. While the sole Public hospital declared having access to all services except for “PACS usage”, this last service was available in almost half of Private hospitals.

**Figure 13: Cypriot acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

As Cyprus is one of the smallest European states, it is not surprising that no values were returned for the size segments of 'Between 251 and 750 beds' and 'More than 750 beds'. Therefore our analysis is confined to the smaller categories, namely 'fewer than 101 beds' and 'between 101 and 250 beds'. Within this grouping, the larger hospitals tend to lead in all five categories. In addition, the disparity between Cyprus's larger and smaller hospitals is striking, with "Single EPR shared by all departments", "PACS usage", "Exchange of clinical care information with external providers" and "Clear and structured rules on access to clinical data" registering relevant differences.

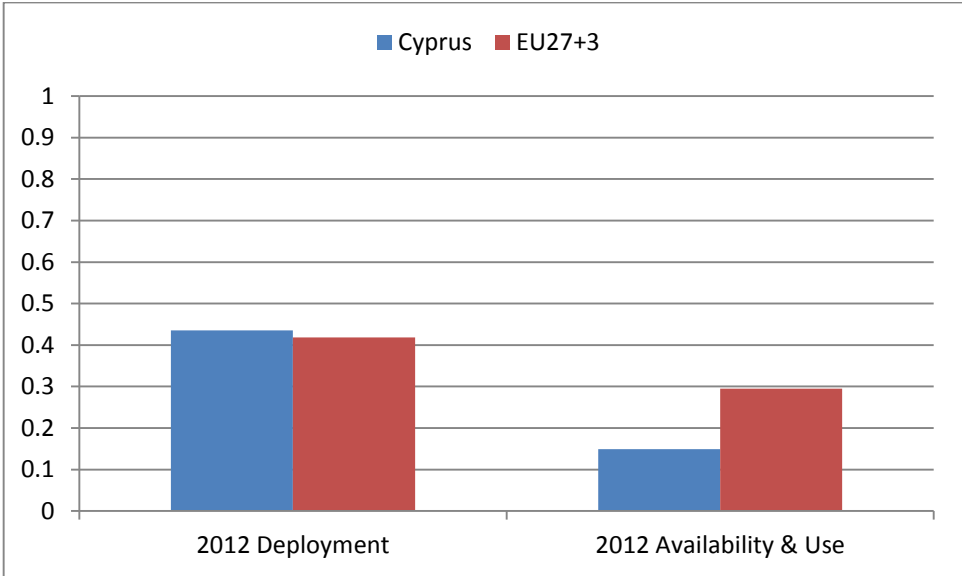
### 4. Composite indicators

The following section reports the results for Cyprus on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Cyprus's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Cyprus's eHealth Deployment indicator is based on data from 7 hospitals, while the Availability and Use indicator was built from the information provided by 9 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

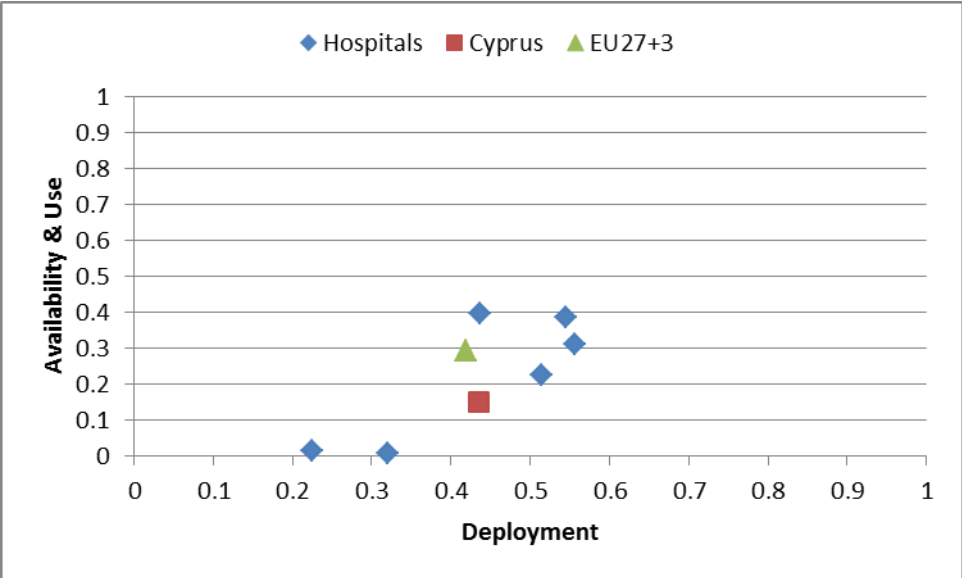
**Figure 4: Cyprus eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 4 hospitals) for Cyprus was 0.34, while the 2012 value was 0.43, which shows an increase of 9% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Cyprus and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there are 2 hospitals with low levels of deployment and no effective use that lower Cyprus average values of the indicators.

**Figure 5. Cyprus's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Czech Republic**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>16</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>17</sup>.

This document reports the results of this project for **Czech Republic**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Czech Republic are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

470 hospitals were identified in Czech Republic. Within this rough universe 269 (57%) completed the screener part of the questionnaire and 142 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (9% vs. 21%) and there were similar proportion hospitals of public ownership (68% and 64%). Out of the Czech universe, 40 acute hospitals (28%) completed the survey.

**Table 16: Czech sample breakdown by size of acute care hospitals**

Czech Republic	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>142</b>	10 7%	45 32%	44 31%	16 11%	27 19%
<b>2012</b>	<b>40</b>	3 8%	12 30%	11 28%	6 15%	8 20%
<b>2010</b>	<b>15</b>	1 7%	4 27%	3 20%	6 40%	1 7%

<sup>16</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>17</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 17: Czech sample breakdown by ownership type**

Czech Republic	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>142</b>	89 63%	37 26%	5 4%	11 8%
<b>2012</b>	<b>40</b>	25 62%	11 28%	2 5%	2 5%
<b>2010</b>	<b>15</b>	10 67%	3 20%	1 7%	1 7%

The final sample of hospitals included in the survey has a similar structure to the one of the Czech universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with a lower proportion of very large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

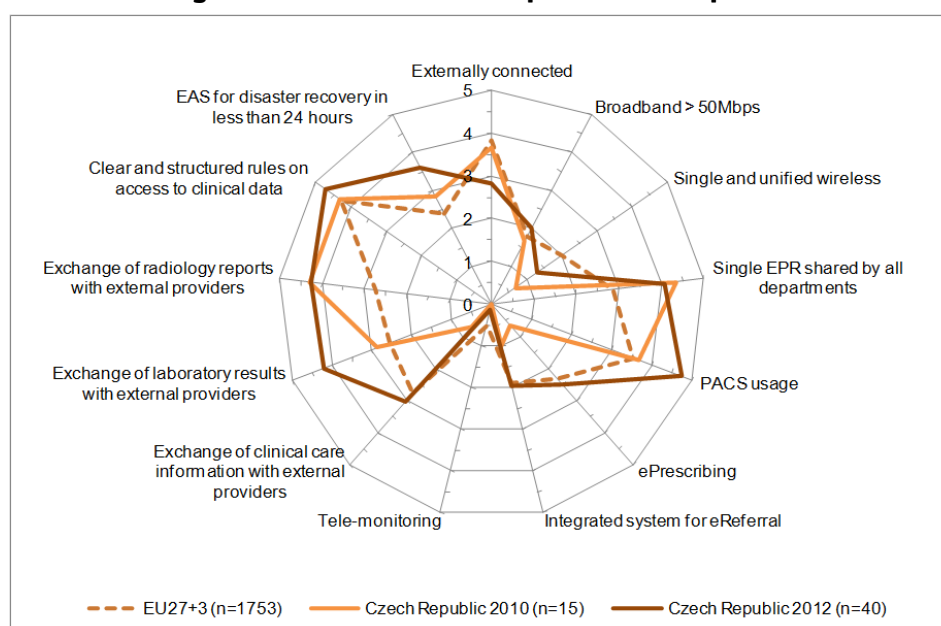
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 14: Czech acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 18 – eHealth indicators Czech Republic**

eHealth indicators - Czech Republic	Valid N	% hospitals	2012 difference Czech Republic vs.EU27+3	Czech Republic evolution, 2012 vs. 2010 <sup>18</sup>
<b>Infrastructure</b>				
Externally connected	39	56%	-20%	-17%
Broadband > 50Mbps	37	41%	5%	7%
Single and unified wireless	39	26%	-14%	12%
Single EPR shared by all departments	38	82%	25%	-5%
<b>Applications</b>				
PACS usage	40	95%	24%	22%
ePrescribing	36	50%	3%	37%
Integrated system for eReferral	36	39%	1%	19%
Tele-monitoring	39	3%	-8%	3%
<b>Integration</b>				
Exchange of clinical care information with external providers	36	61%	6%	47%
Exchange of laboratory results with external providers	38	84%	33%	27%
Exchange of radiology reports with external providers	40	85%	30%	-1%
<b>Security</b>				
Clear and structured rules on access to clinical data	40	95%	10%	8%
EAS for disaster recovery in less than 24 hours	39	72%	24%	15%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

#### Position of the Czech eHealth profile within EU27+3

The Czech Republic scores better than the average EU27+3 score in eHealth profile indicators, in particular in the areas of “Single EPR shared by all departments”, “PACS usage”, “Exchange of laboratory results with external providers”, “Exchange of radiology reports with external providers” and “EAS for disaster recovery in less than 24 hours”. Areas in which the country has worse scores than the average were “Externally connected”, “Single and unified wireless” and “Tele-monitoring”..

#### Changes in the Czech eHealth profile

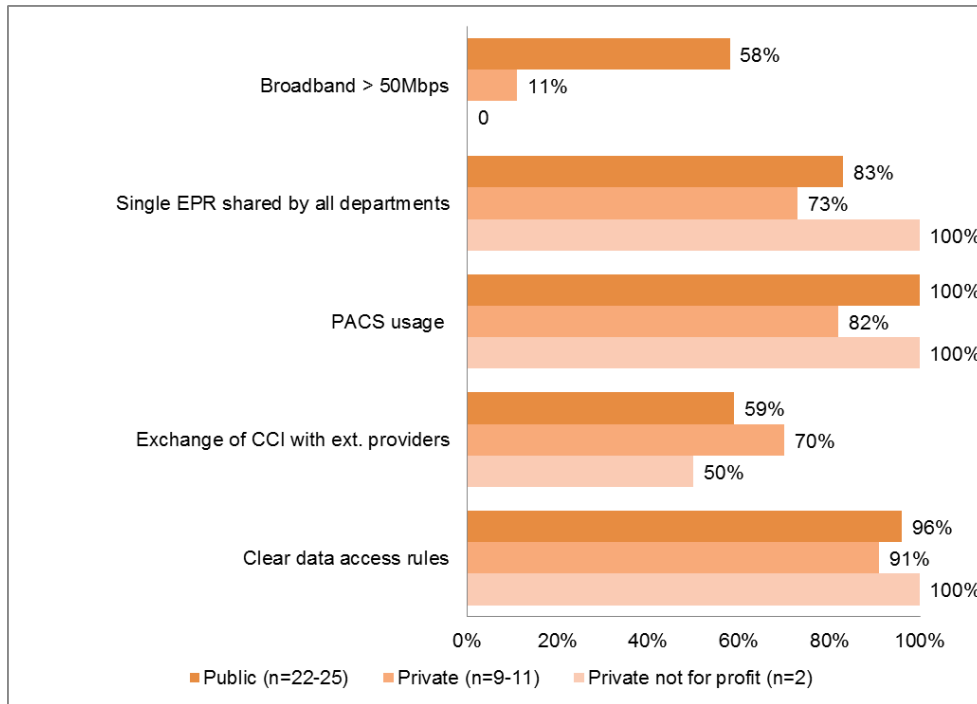
The Czech eHealth profile has expanded considerably since 2010. Areas which have seen the most gain include “ePrescribing” (+37%), “Exchange of clinical care information with external providers” (+47%) and “Exchange of laboratory results with external providers” (+27%). Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

<sup>18</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.



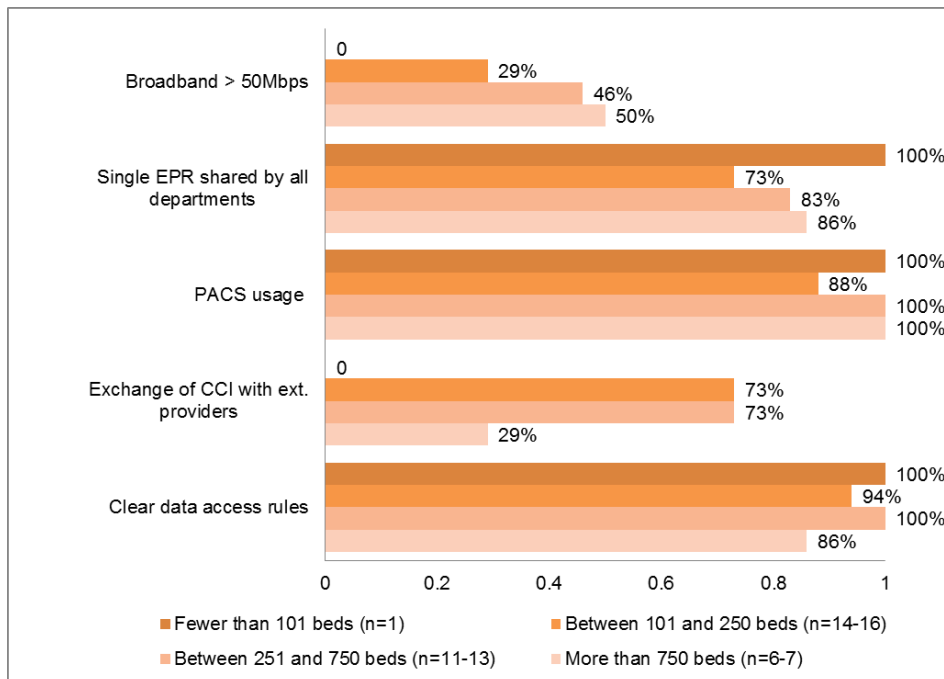
**Figure 15: Czech acute hospitals eHealth profile by ownership**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Some patterns can be seen with respect to ownership of acute hospitals and performance within eHealth. Although the Private not for profit hospitals category (only 2 hospitals) had the maximum score in three of the five categories (“Single EPR shared by all departments”, “PACS usage” and “Clear and structured rules on access to clinical data”), they did not have “Broadband > 50Mbps” and were the lowest performer in “Exchange of clinical care information with external providers”. When comparing the Public and Private hospital segments a 47 percentage point difference was observed for “Broadband > 50Mbps”.

**Figure 16: Czech acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

They were not relevant differences between hospitals according to their size in their scores. Only in the category “Exchange of clinical care information with external providers”, large hospitals perform worse than hospitals in other categories.

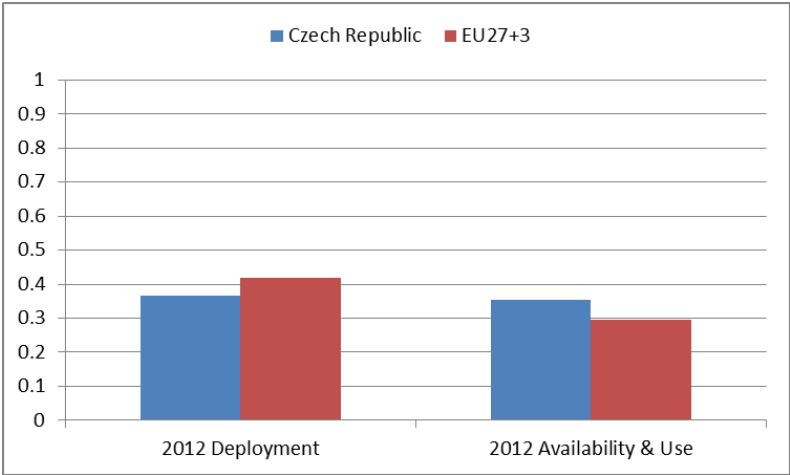
**4. Composite indicators**

The following section reports the results for Czech Republic on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e.to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Czech Republic’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Czech Republic’s eHealth Deployment indicator is based on data from 39 hospitals, while the Availability and Use indicator was built from the information provided by 34 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

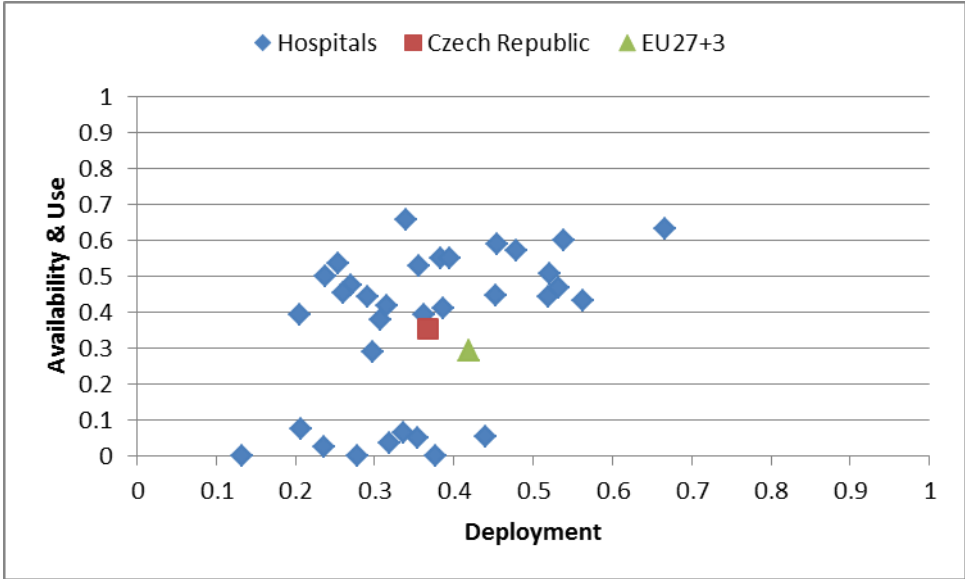
**Figure 4: Czech Republic eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 14 hospitals) for Czech Republic was 0.36, while the 2012 value was 0.36, which shows no variation over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Czech Republic and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a significant group of hospitals (9) with almost no effective use at various levels of deployment while the rest of Czech hospitals have use scores higher than the EU27+3 average.

**Figure 5: Czech Republic's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Denmark**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>19</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>20</sup>.

This document reports the results of this project for **Denmark**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Denmark are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

270 hospitals were identified in Denmark. Within this rough universe 126 (47%) completed the screener part of the questionnaire and 54 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (40% vs. 21%) and there were more hospitals of public ownership (76% vs. 64%). Out of the Danish universe, 16 acute hospitals (30%) completed the survey.

**Table 19: Danish sample breakdown by size of acute care hospitals**

Denmark	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>54</b>	17 31%	3 6%	14 26%	8 15%	12 22%
<b>2012</b>	<b>16</b>	5 31%	-	5 31%	3 19%	3 19%
<b>2010</b>	<b>8</b>	-	1 12%	4 50%	3 38%	-

<sup>19</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>20</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 20: Danish sample breakdown by ownership type**

Denmark	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>54</b>	38 70%	11 20%	1 2%	4 7%
<b>2012</b>	<b>16</b>	11 69%	4 25%	1 6%	-
<b>2010</b>	<b>8</b>	8 100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Danish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has doubled, with higher proportion of small and private hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

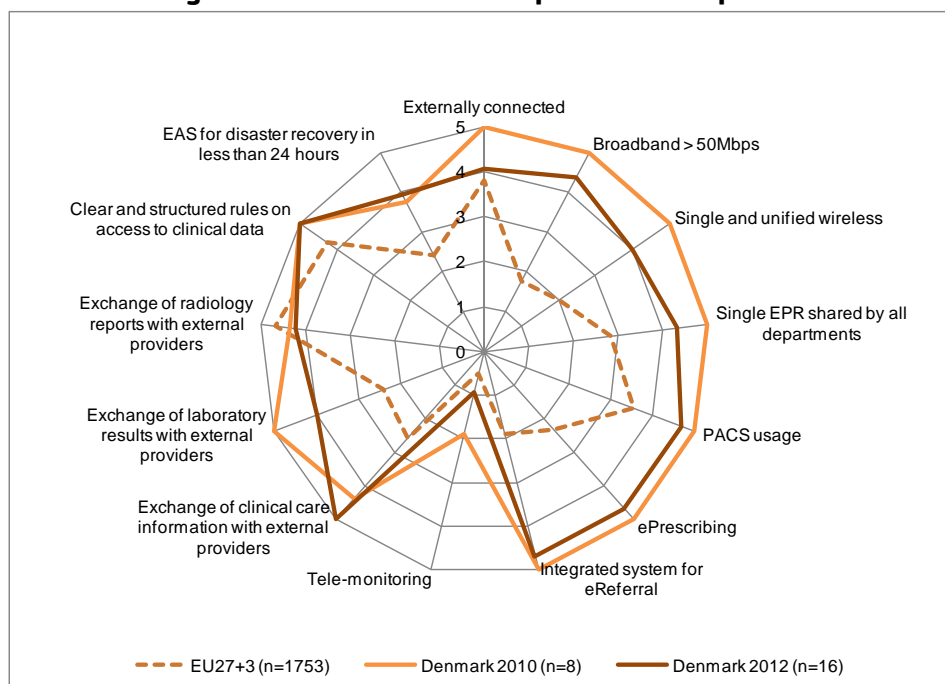
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 17: Danish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 21: eHealth indicators Denmark**

eHealth indicators - Denmark	Valid N	% hospitals	2012 difference Denmark vs.EU27+3	Denmark evolution, 2012 vs. 2010 <sup>21</sup>
<b>Infrastructure</b>				
Externally connected	16	81%	5%	-19%
Broadband > 50Mbps	8	88%	52%	-12%
Single and unified wireless	15	80%	40%	-20%
Single EPR shared by all departments	15	87%	30%	-13%
<b>Applications</b>				
PACS usage	16	94%	23%	-6%
ePrescribing	16	94%	47%	-6%
Integrated system for eReferral	16	94%	56%	-6%
Tele-monitoring	16	19%	9%	-19%
<b>Integration</b>				
Exchange of clinical care information with external providers	15	100%	49%	13%
Exchange of laboratory results with external providers	15	80%	32%	-20%
Exchange of radiology reports with external providers	14	93%	-9%	-3%
<b>Security</b>				
Clear and structured rules on access to clinical data	16	100%	15%	0%
EAS for disaster recovery in less than 24 hours	14	79%	30%	4%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>21</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Danish eHealth profile within EU27+3

Denmark noticeably scores better than the average EU27+3 in all areas but Exchange of radiology reports with external providers”. “The performances for “Integrated system for eReferral” and “Broadband > 50Mbps” were particularly outstanding, registering respectively 56% and 52% higher than EU27+3 scores.

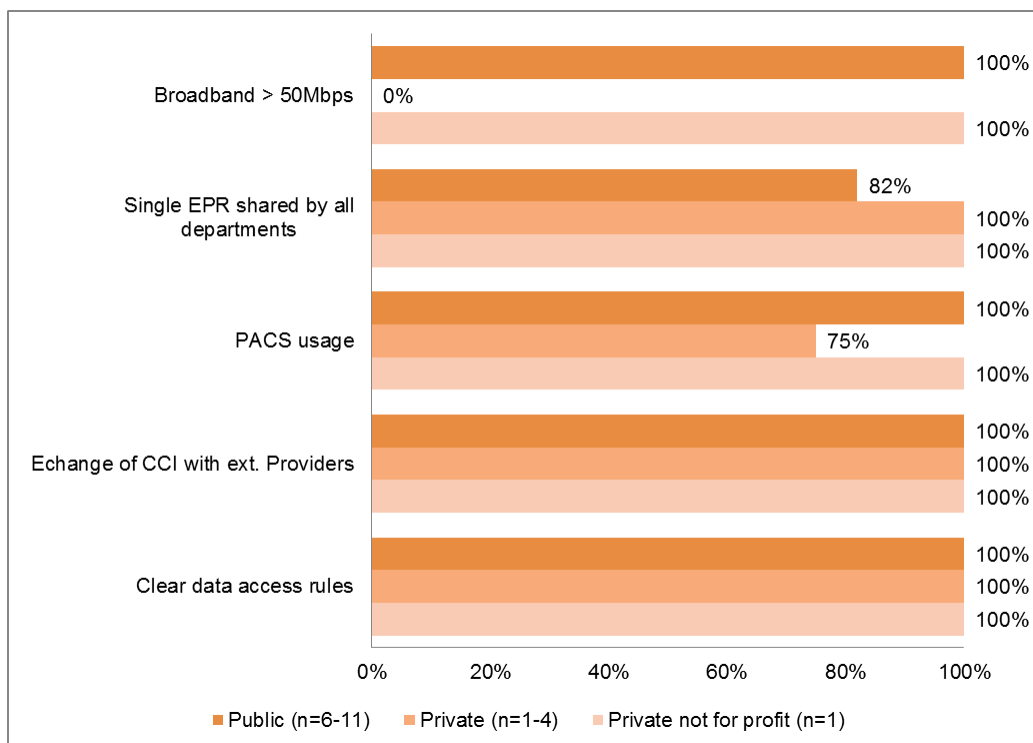
. However, other areas fared better, with “Clear and structured rules on access to clinical data”, “Broadband > 50Mbps” and “Integrated system for eReferral” all very close to the European average.

Changes in the Danish eHealth profile

The lower average scores recorded by Denmark’s eHealth indicators between 2010 and 2012 can be partly explained by the doubling of the sample and its increased representativeness. Indeed, all but two eHealth indicators (“Exchange of clinical care information with external providers” and “EAS for disaster recovery in less than 24 hours”) dropped over the period under review. However, this evolution has to be seen in the context of the already high 2010 scores for all indicators. Nevertheless, these results should be taken with caution as mentioned. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

**Figure 18: Danish acute hospitals eHealth profile by ownership**

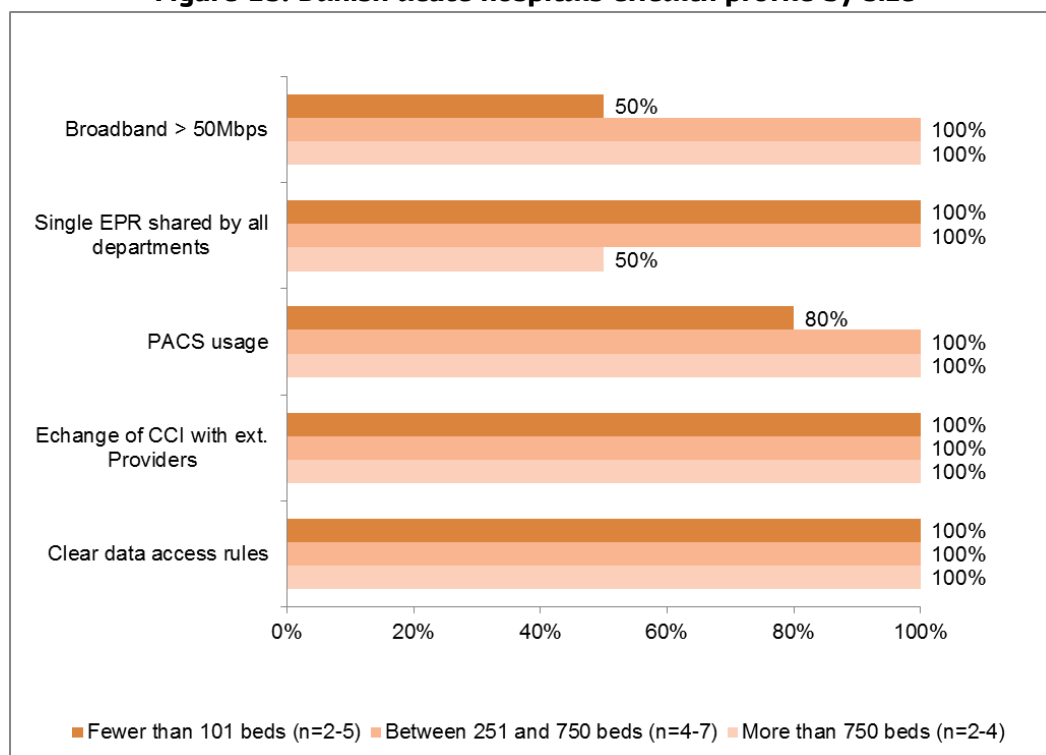


*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Danish eHealth indicators generally scored high across all ownership categories. While “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data” were the most widely implemented indicators across all hospital types, “Broadband > 50Mbps” was not implemented at all by the sole Private hospital interviewed. All the other indicators registered high implementation rates in both Private and Public hospitals.



**Figure 19: Danish acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

In terms of hospital size, there were almost no differences in the scores between categories.

#### 4. Composite indicators

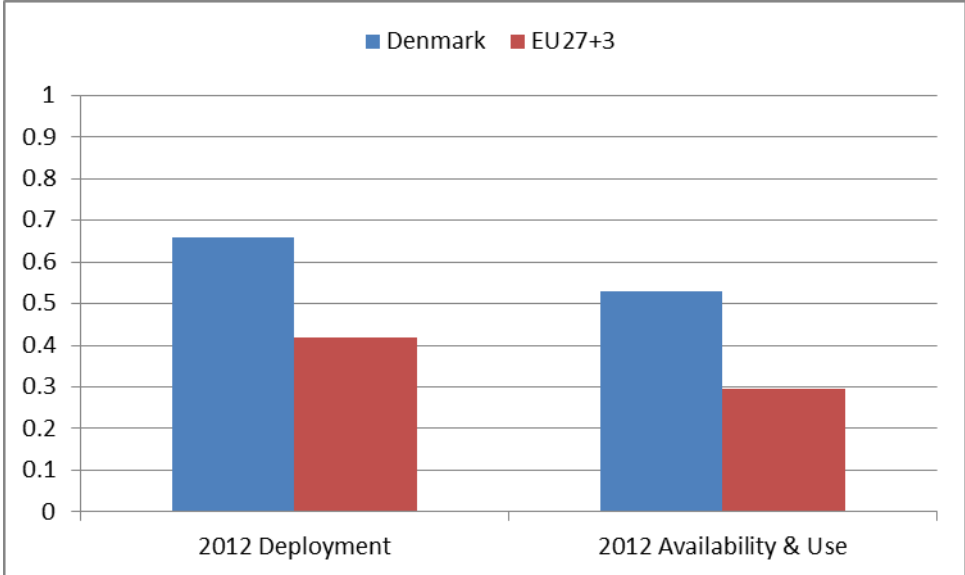
The following section reports the results for Denmark on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Denmark's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals.

Denmark's eHealth Deployment indicator is based on data from 13 hospitals, while the Availability and Use indicator was built from the information provided by 10 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

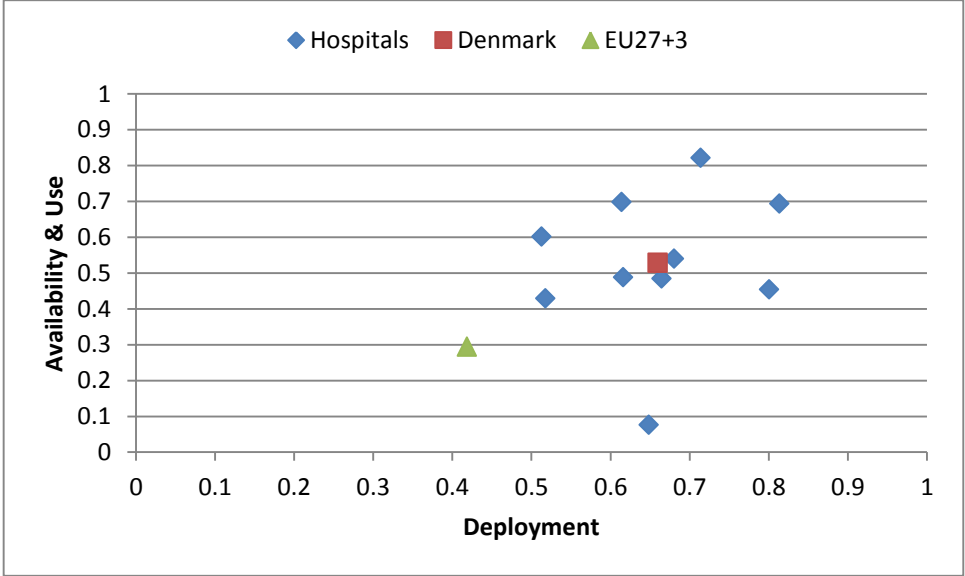
**Figure 4: Denmark eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 8 hospitals) for Denmark was 0.64, while the 2012 value was 0.66, which shows an increase of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Denmark and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that for most of the hospitals there is a clear relationship between levels of deployment and of effective use. Only 1 hospital was below EU27+3 average for one of the composite indicators.

**Figure 5: Denmark's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Estonia**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>22</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>23</sup>.

This document reports the results of this project for **Estonia**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Estonia are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

136 hospitals were identified in Estonia. Within this rough universe 90 (66%) completed the screener part of the questionnaire and 25 qualified as acute care hospitals. The proportion of hospitals of between 100 and 250 beds was higher compared to the universe of acute Hospitals at EU27+3 level (43% vs. 31%) and there were more hospitals of public ownership (88% vs. 64%). Out of the Estonian universe, 12 acute hospitals (48%) completed the survey.

**Table 22: Estonian sample breakdown by size of acute care hospitals**

Estonia	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>25</b>	4	10	5	4	2
		16%	40%	20%	16%	8%
<b>2012</b>	<b>12</b>	1	5	4	2	-
		8%	42%	33%	17%	-
<b>2010</b>	<b>3</b>	-	1	-	2	-
		-	33%	-	67%	-

<sup>22</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>23</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 23: Estonian sample breakdown by ownership type**

Estonia	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>25</b>	21 84%	1 4%	2 8%	1 4%
<b>2012</b>	<b>12</b>	11 92%	- -	1 8%	- -
<b>2010</b>	<b>3</b>	3 100%	- -	- -	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Estonian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has quadrupled, with a lower proportion of very large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

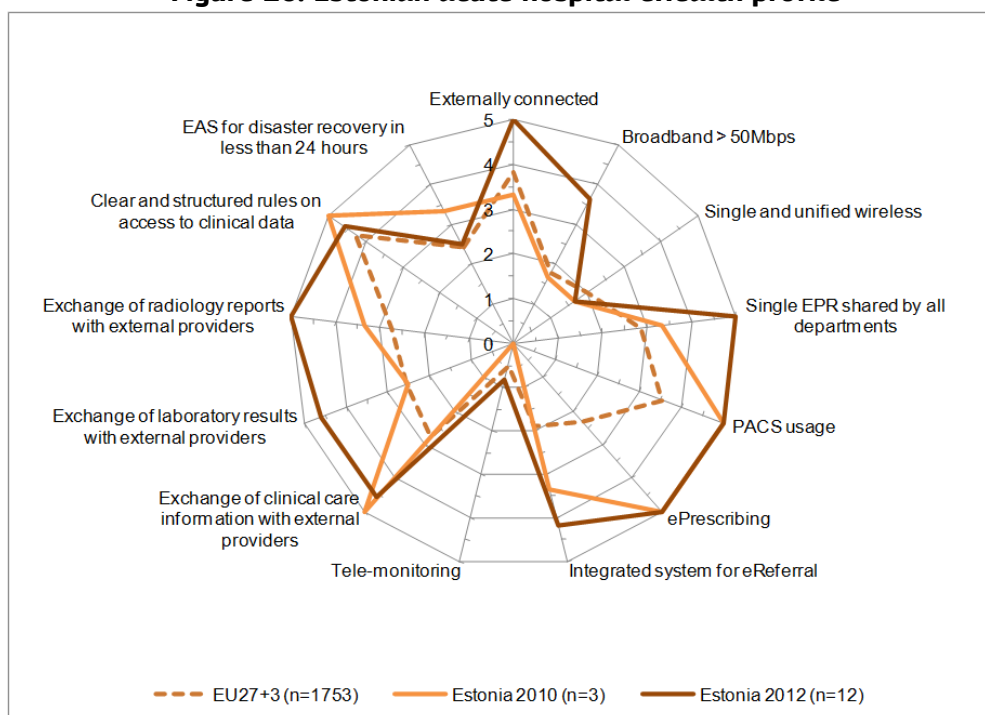
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 20: Estonian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 24: eHealth indicators Estonia**

eHealth indicators - Estonia	Valid N	% hospitals	2012 difference Estonia vs.EU27+3	Estonia evolution, 2012 vs. 2010 <sup>24</sup>
<b>Infrastructure</b>				
Externally connected	12	100%	24%	33%
Broadband > 50Mbps	11	73%	37%	39%
Single and unified wireless	12	33%	-7%	0%
Single EPR shared by all departments	12	100%	43%	33%
<b>Applications</b>				
PACS usage	12	100%	29%	0%
ePrescribing	12	100%	53%	0%
Integrated system for eReferral	12	83%	46%	17%
Tele-monitoring	12	17%	6%	17%
<b>Integration</b>				
Exchange of clinical care information with external providers	12	92%	36%	-8%
Exchange of laboratory results with external providers	12	92%	40%	42%
Exchange of radiology reports with external providers	12	100%	45%	33%
<b>Security</b>				
Clear and structured rules on access to clinical data	12	92%	6%	-8%
EAS for disaster recovery in less than 24 hours	12	50%	2%	-17%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>24</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Estonian eHealth profile within EU27+3

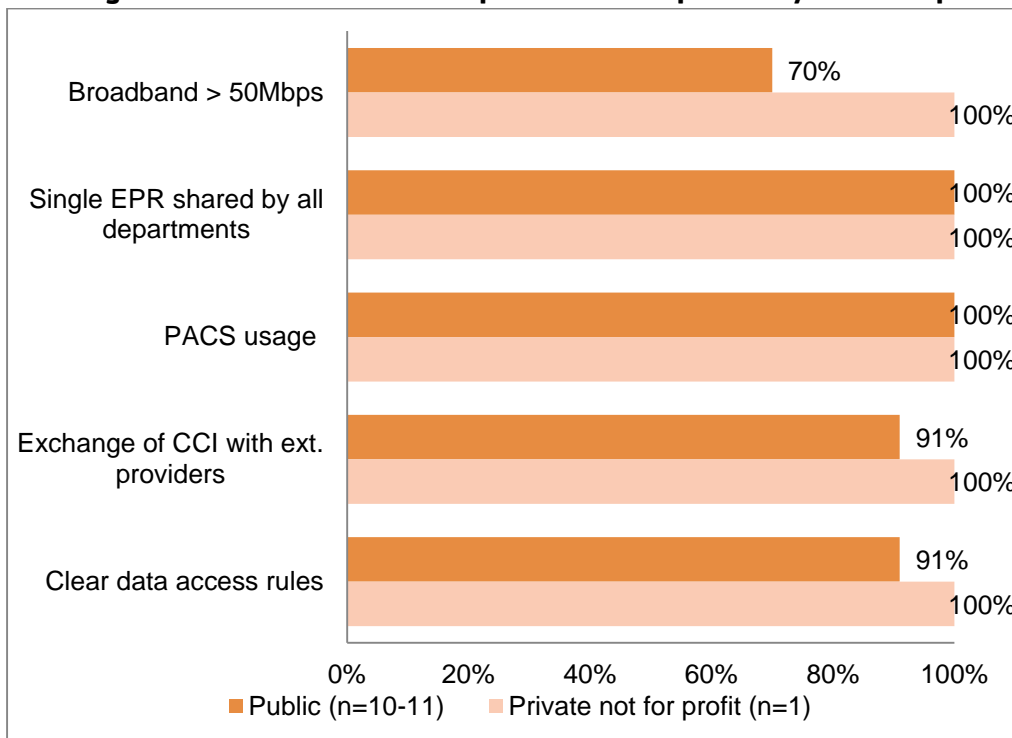
Estonia scores better than the EU27+3 average by at least 40% in five of the 13 eHealth indicators under review. These five areas are “Single EPR shared by all departments”, “ePrescribing”, “Integrated system for eReferral”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers”. Only one Estonian indicator was below the European average: “Single and unified wireless”

### Changes in the Estonian eHealth profile

Estonia has grown from an already strong performance in 2010 to an even stronger eHealth position in 2012. “Externally connected”, “Broadband > 50Mbps”, “Single EPR shared by all departments”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers” have increased by between 33% and 42% over the period. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

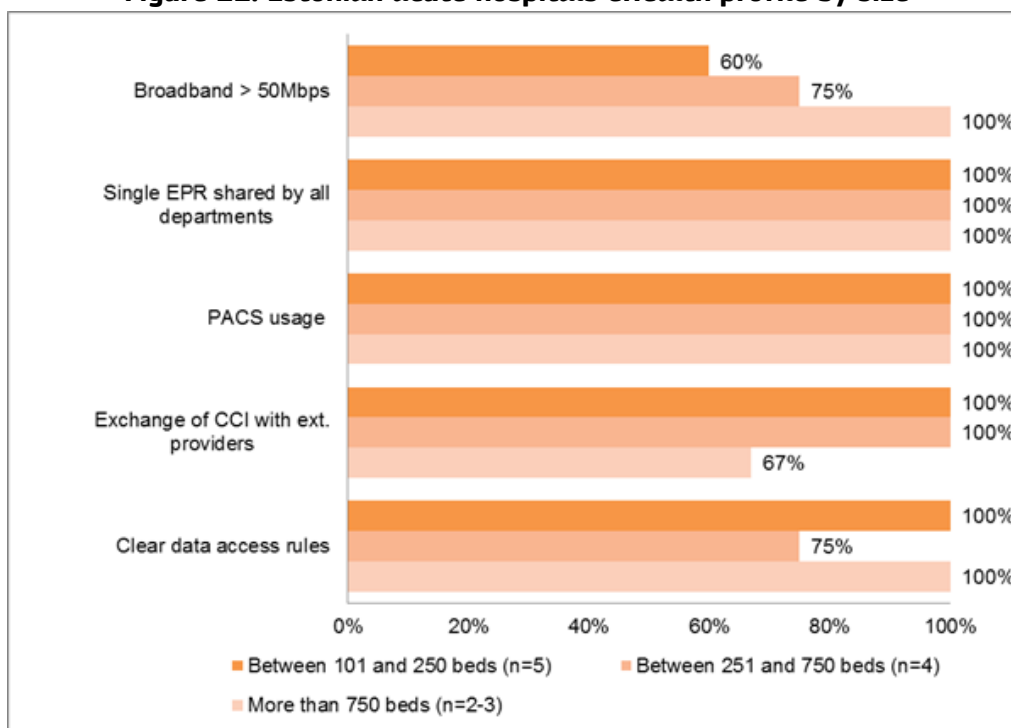
**Figure 21: Estonian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

As all of the hospitals but one belong to the public ownership category, this level of analysis and differences found is not very relevant.

**Figure 22: Estonian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Two of the five indicators (“Single EPR shared by all departments” and “PACS usage”) were fully implemented across all categories and for the other indicators there is no clear pattern according to the size of the hospital.

#### 4. Composite indicators

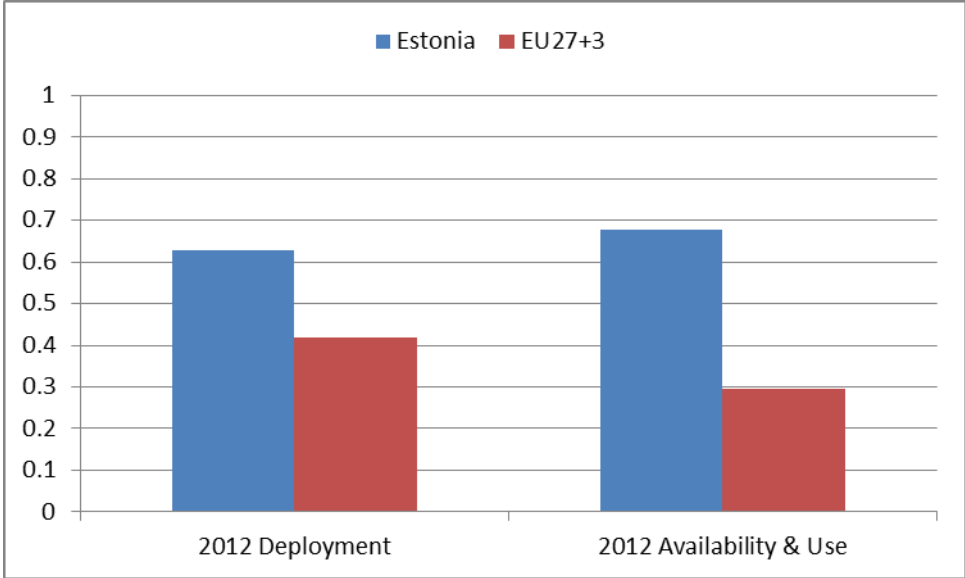
The following section reports the results for Estonia on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.



The following graph displays the average values of these indicators in Estonia’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Estonia's eHealth Deployment indicator is based on data from 12 hospitals, while the Availability and Use indicator was built from the information provided by 7 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

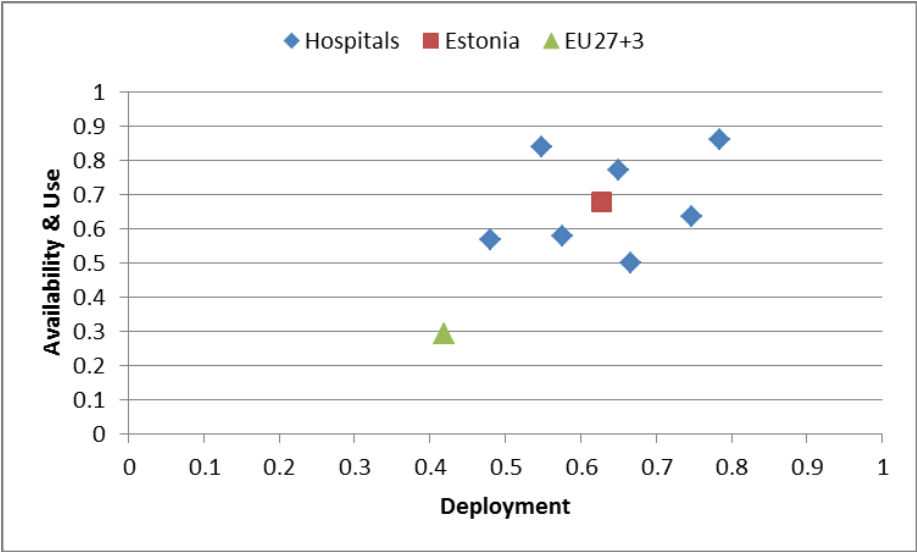
**Figure 4: Estonia eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (however based on data from only 1 hospital ) for Estonia was 0.43, while the 2012 value was 0.63, which shows an increase of 20% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Estonia and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that all Estonian hospitals were above EU27+3 average for both composite indicators

**Figure 5: Estonia's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Finland**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>25</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>26</sup>.

This document reports the results of this project for **Finland**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Finland are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

620 hospitals were identified in Finland. Within this rough universe 486 (78%) completed the screener part of the questionnaire and 46 qualified as acute care hospitals. The proportion of hospitals of between 100 and 250 beds was higher compared to the universe of acute Hospitals at EU27+3 level (50% vs. 31%)and there were more hospitals of public ownership (89% vs. 64%). Out of the Finnish universe, 26 acute hospitals (57%) completed the survey.

**Table 25: Finnish sample breakdown by size of acute care hospitals**

Finland	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>46</b>	10	18	6	2	10
		22%	39%	13%	4%	22%
<b>2012</b>	<b>26</b>	4	12	4	1	5
		15%	46%	15%	4%	19%
<b>2010</b>	<b>15</b>	3	7	5	-	-
		20%	47%	33%	-	-

<sup>25</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>26</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 26: Finnish sample breakdown by ownership type**

Finland	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	46	39	5	-	2
		85%	11%	-	4%
2012	26	24	2	-	-
		92%	8%	-	-
2010	15	15	-	-	-
		100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Finnish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost doubled, with a slightly lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

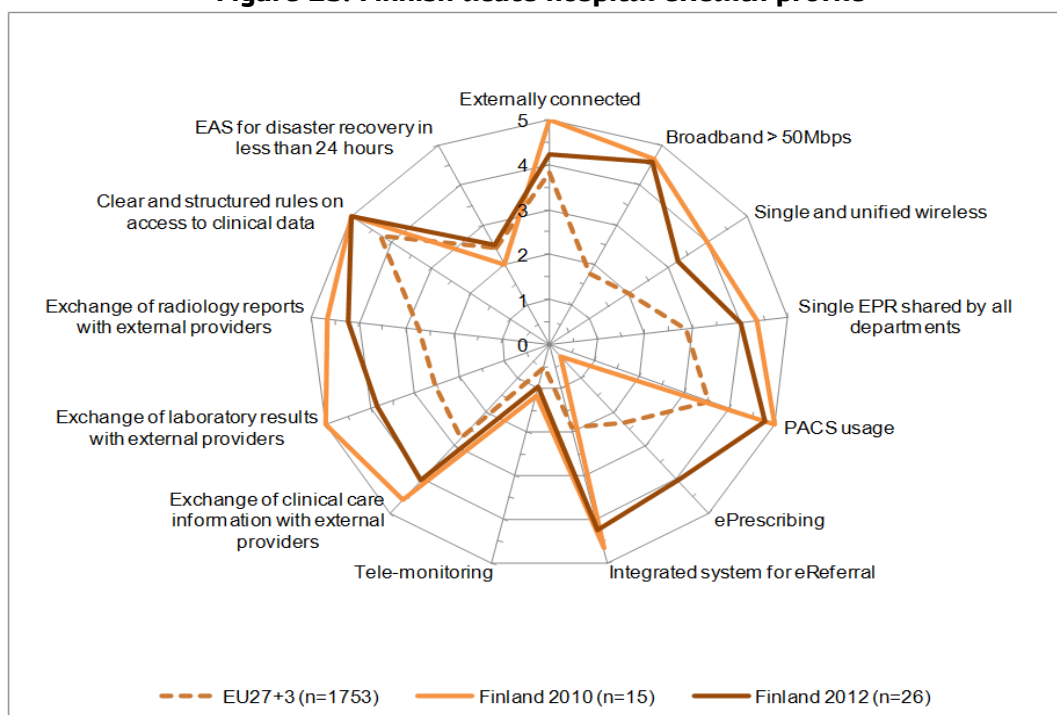
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 23: Finnish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 27 – eHealth indicators Finland**

eHealth indicators - Finland	Valid N	% hospitals	2012 difference Finland vs.EU27+3	Finland evolution, 2012 vs. 2010 <sup>27</sup>
<b>Infrastructure</b>				
Externally connected	26	85%	8%	-15%
Broadband > 50Mbps	24	92%	56%	-2%
Single and unified wireless	26	65%	25%	-15%
Single EPR shared by all departments	25	80%	23%	-7%
<b>Applications</b>				
PACS usage	26	96%	25%	-4%
ePrescribing	26	81%	34%	74%
Integrated system for eReferral	26	85%	47%	-9%
Tele-monitoring	26	19%	9%	-4%
<b>Integration</b>				
Exchange of clinical care information with external providers	26	81%	25%	-12%
Exchange of laboratory results with external providers	26	77%	26%	-23%
Exchange of radiology reports with external providers	26	85%	29%	-9%
<b>Security</b>				
Clear and structured rules on access to clinical data	26	100%	15%	0%
EAS for disaster recovery in less than 24 hours	26	50%	2%	10%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>27</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Finnish eHealth profile within EU27+3

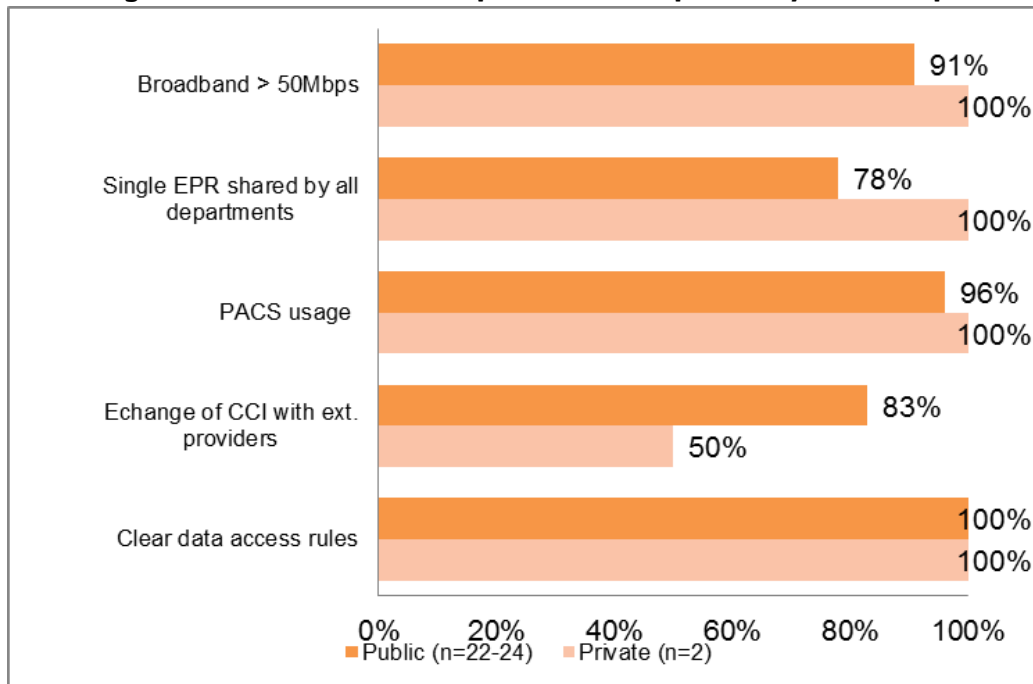
Finland's eHealth profile in the European context can be currently considered to be excellent. It displays high value positive difference in every single one of the 13 values examined – essentially having higher scores than the EU average in all areas. The two highest performing areas, “Broadband > 50Mbps” and “Integrated system for eReferral” score 56% and 47% respectively.

### Changes in the Finnish eHealth profile

Less positive for Finland is the decrease in eHealth values in the overall period between 2010 and 2012: it has in fact recorded negative growth in 11 of 13 areas. Mostly the negative growth has been less than -15%; however the sharp increase in the area of “ePrescribing” (74% growth) and to a lesser extent “EAS for disaster recovery in less than 24 hours” (10% growth) have been enough to offset the losses in other categories. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

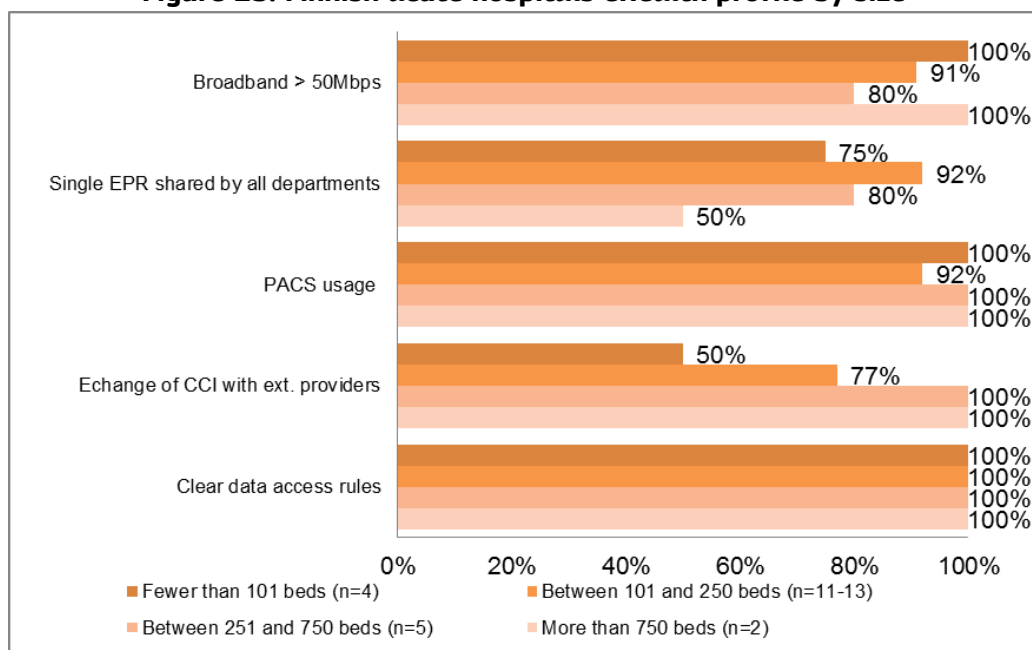
**Figure 24: Finnish acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

The two Finnish Private hospitals included score better than their Public counterparts in four of the five areas under examination; “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage” and “Clear and structured rules on access to clinical data”.

**Figure 25: Finnish acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

A scale advantage might be relevant when examining Finnish acute hospitals in terms of size. Hospitals which have in excess of 750 beds have perfect scores in four of five categories evaluated however hospitals between 101 and 250 beds have them only in a single category.

#### 4. Composite indicators

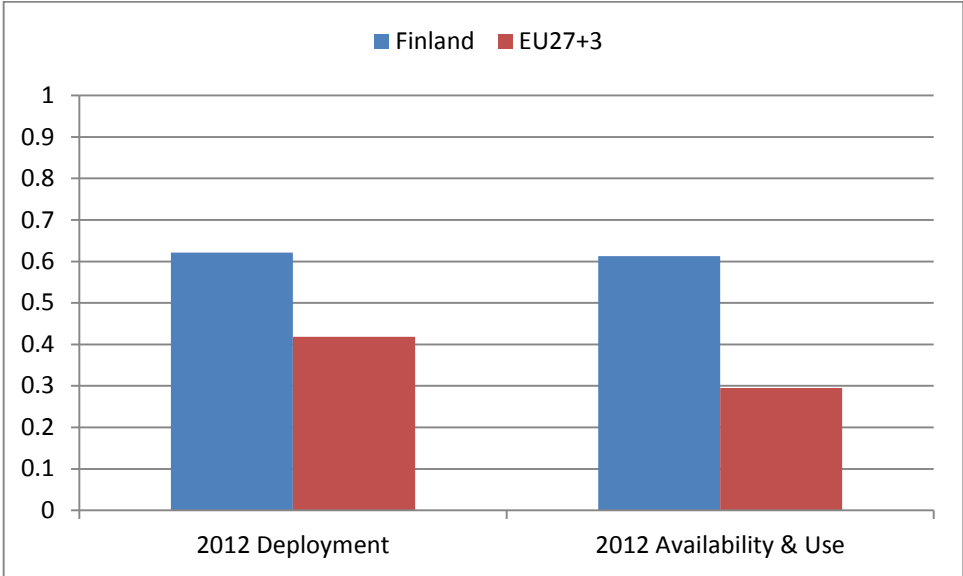
The following section reports the results for Finland on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Finland's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Finland's eHealth Deployment indicator is based on data from 26 hospitals, while the Availability

and Use indicator was built from the information provided by 25 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

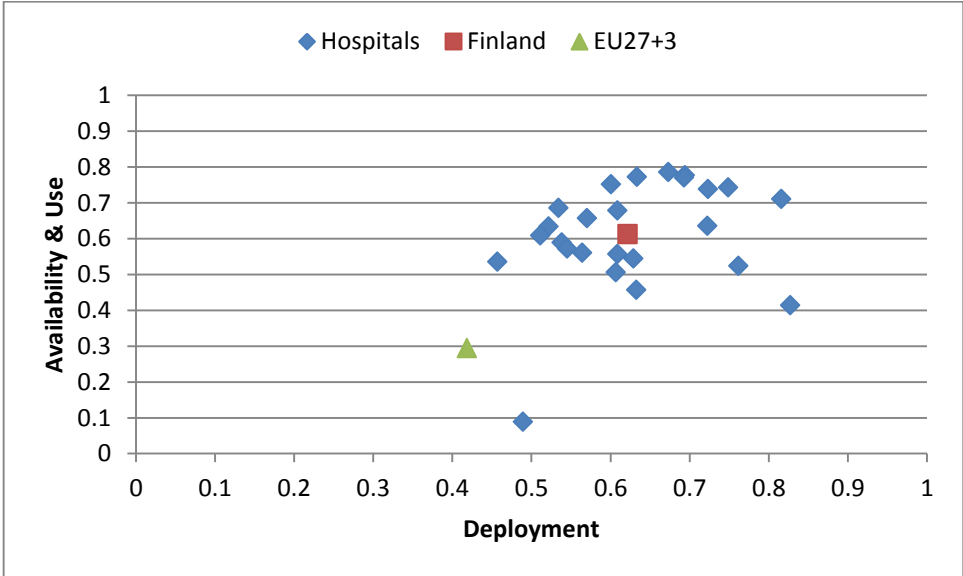
**Figure 4: Finland eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 12 hospitals) for Finland was 0.60, while the 2012 value was 0.62, which shows an increase of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Finland and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows only one hospital with low level of effective use while the others have scores in deployment and effective use considerable higher than the EU27+3 average

**Figure 5: Finland's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report France**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>28</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>29</sup>.

This document reports the results of this project for **France**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for France are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

7649 hospitals were identified in France. Within this rough universe 2461 (32%) completed the screener part of the questionnaire and 997 qualified as acute care hospitals. The size and ownership characteristics of these hospitals was very similar to the ones of the universe of acute Hospitals at EU27+3 level. Out of the French universe, 319 acute hospitals (32%) completed the survey.

**Table 28: French sample breakdown by size of acute care hospitals**

France	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
Census	997	140	225	322	145	165
		14%	23%	32%	15%	17%
2012	319	63	90	108	33	25
		20%	28%	34%	10%	8%
2010	150	46	59	41	4	-
		31%	39%	27%	3%	-

<sup>28</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>29</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 29: French sample breakdown by ownership type**

France	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	997	718	143	72	64
		72%	14%	7%	6%
2012	319	241	44	32	2
		76%	14%	10%	1%
2010	150	76	18	53	3
		51%	12%	35%	2%

The final sample of hospitals included in the survey has a similar structure to the one of the French universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has more than doubled, with a large proportion of very large hospitals and of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

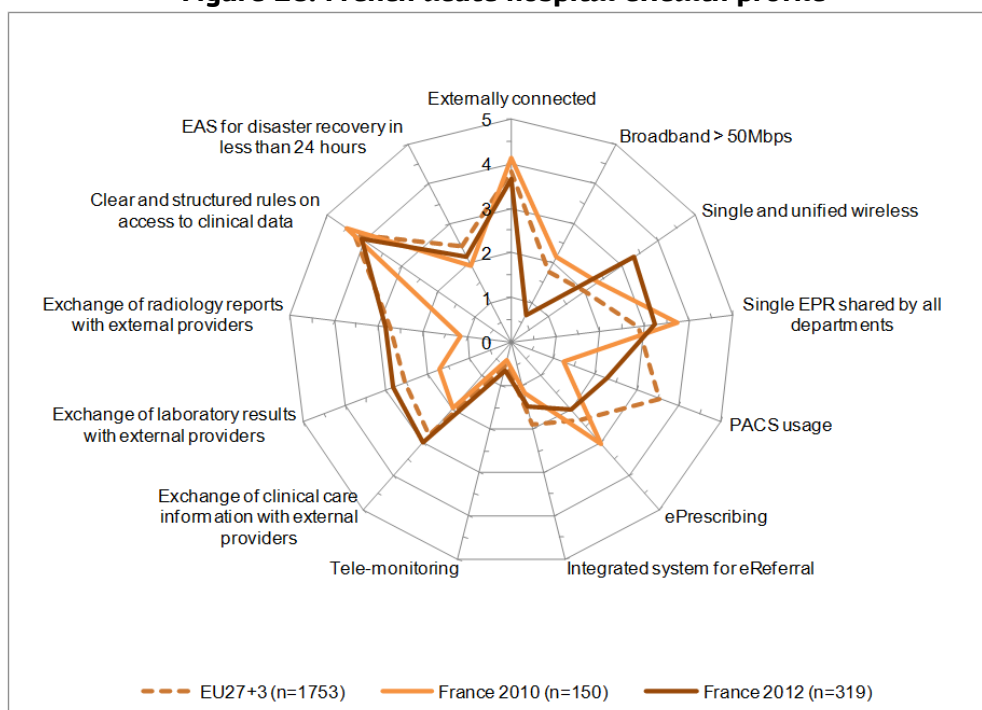
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 26: French acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 30: eHealth indicators France**

eHealth indicators - France	Valid N	% hospitals	2012 difference France vs.EU27+3	France evolution, 2012 vs. 2010 <sup>30</sup>
<b>Infrastructure</b>				
Externally connected	315	73%	-3%	-10%
Broadband > 50Mbps	299	14%	-21%	-29%
Single and unified wireless	316	67%	27%	19%
Single EPR shared by all departments	311	65%	8%	-10%
<b>Applications</b>				
PACS usage	314	46%	-25%	21%
ePrescribing	310	41%	-6%	-20%
Integrated system for eReferral	310	29%	-8%	6%
Tele-monitoring	312	13%	3%	5%
<b>Integration</b>				
Exchange of clinical care information with external providers	311	60%	4%	20%
Exchange of laboratory results with external providers	310	56%	5%	22%
Exchange of radiology reports with external providers	315	57%	1%	34%
<b>Security</b>				
Clear and structured rules on access to clinical data	310	81%	-4%	-8%
EAS for disaster recovery in less than 24 hours	313	43%	-5%	5%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>30</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the French eHealth profile within EU27+3

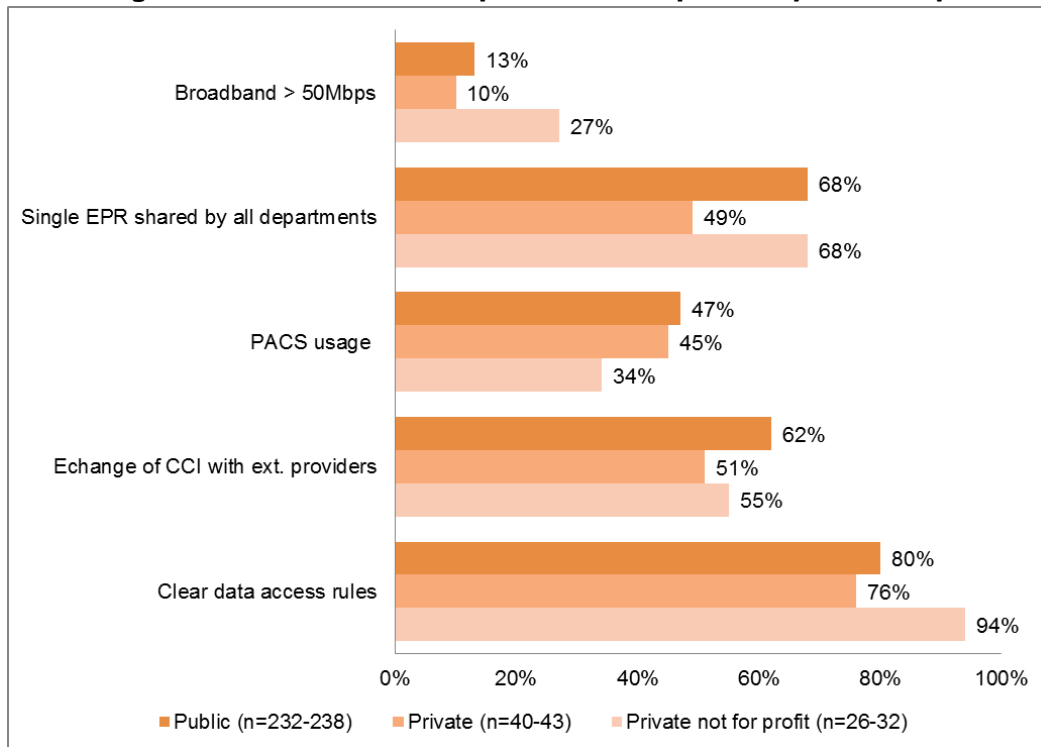
France is slightly behind the European average of eHealth implementation. Despite this, there are no large outliers, with only two areas “Broadband > 50Mbps” and “PACS usage” registering differences in excess of -20%. In the area of “Single and unified wireless” France scores significantly better than the European average, 27% of difference.

Changes in the French eHealth profile

While France has generally increased its eHealth profile since 2010, the increase has not been very significant. This growth has come predominantly from four areas, “PACS usage”, “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers”, which all posted growth values in excess of 20%. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

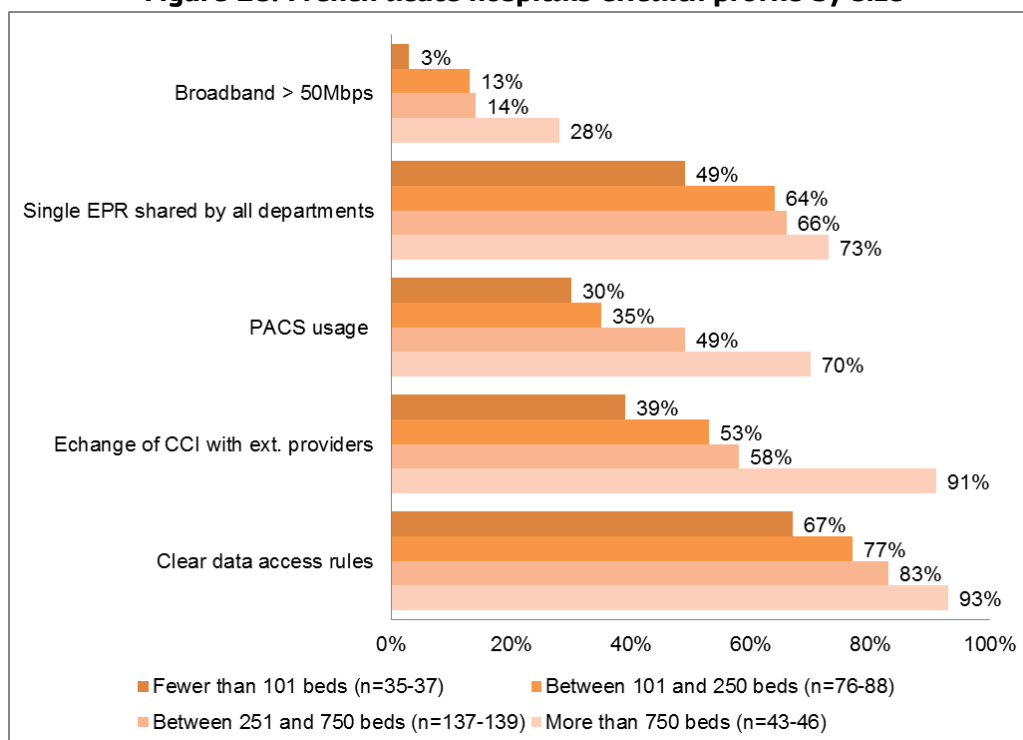
**Figure 27: French acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Ownership type does not appear to very important to the development of eHealth in French acute hospitals. For example, while Public and Private not for profit hospital categories lead in three of five categories each (, the lead values tend not to vary widely. For example, no hospital type leads its counterparts by more than 19% in any eHealth area.

**Figure 28: French acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In contrast to ownership type (see above), when scale considerations are taken into account, we can see that a very definite advantage is enjoyed by French acute hospitals which have more than 750 beds. This category of hospital leads in all five areas examined, and additionally leads by significant margins in three of these categories (14% in “Broadband > 50Mbps”, 24% in “PACS usage” and 32% in “Exchange of clinical care information with external providers”). Even more significantly, the link between increased scale and greater eHealth capabilities is evident in all the categories, with smaller hospital segments recording progressively lower capabilities in each category under review.

#### 4. Composite indicators

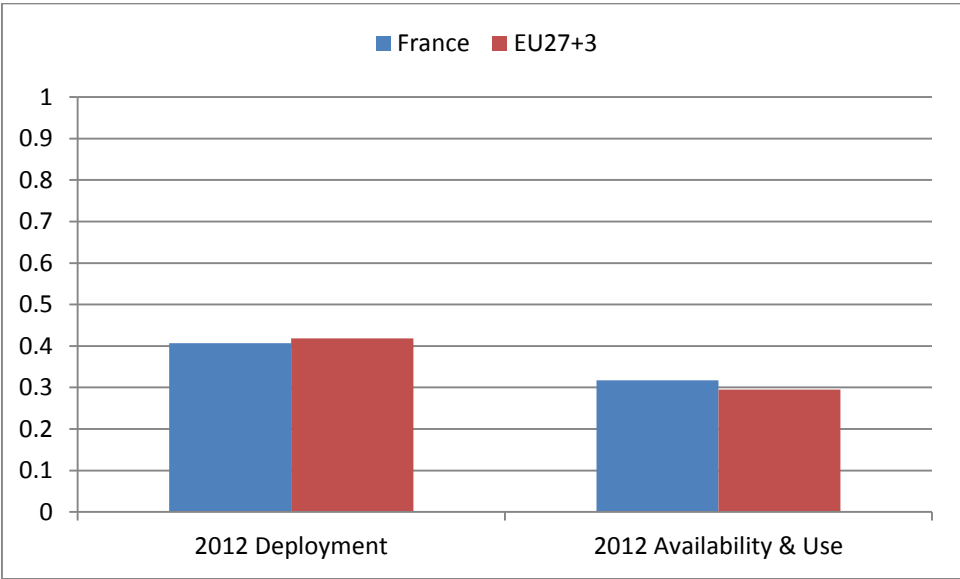
The following section reports the results for France on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information

Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in France’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. France’s eHealth Deployment indicator is based on data from 312 hospitals, while the Availability and Use indicator was built from the information provided by 269 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

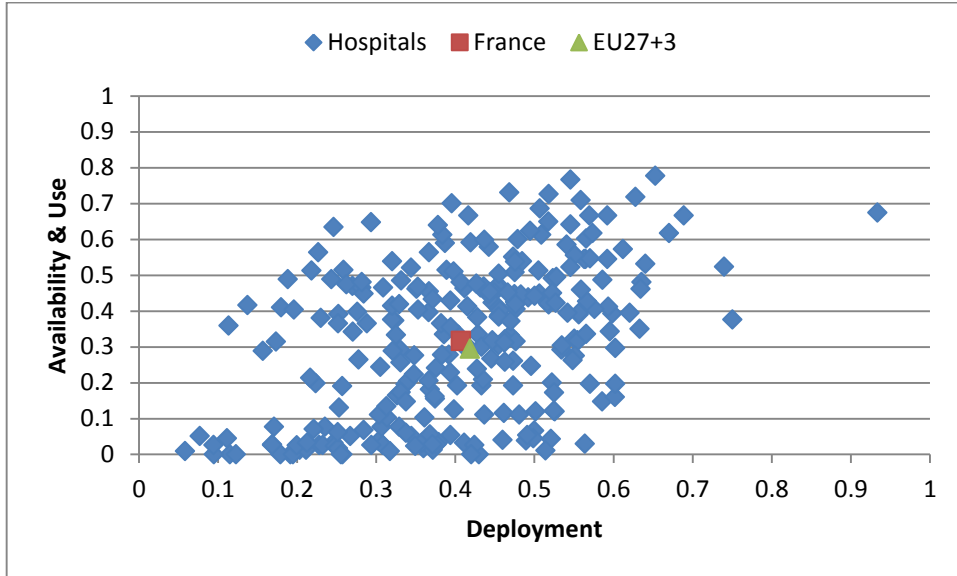
**Figure 4: France eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 139 hospitals) for France was 0.37, while the 2012 value was 0.41, which shows an increase of 4% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for France and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that, as expected given that French average scores are very similar to the EU27+3 average, there are a similar number of hospitals with better scores (36%) than the EU27+3 average than with worse ones (30%).

**Figure 5: France's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Germany**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>31</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>32</sup>.

This document reports the results of this project for **Germany**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Germany are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

3847 hospitals were identified in Germany. Within this rough universe 2534 (61%) completed the screener part of the questionnaire and 1295 qualified as acute care hospitals. The size and ownership characteristics of these hospitals was very similar to the ones of the universe of acute Hospitals at EU27+3 level. Out of the German universe, 201 acute hospitals (16%) completed the survey.

**Table 31: German sample breakdown by size of acute care hospitals**

Germany	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>1295</b>	193	411	486	117	88
		15%	32%	38%	9%	7%
<b>2012</b>	<b>201</b>	43	68	71	16	3
		21%	34%	35%	8%	1%
<b>2010</b>	<b>150</b>	36	58	45	11	-
		24%	39%	30%	7%	-

<sup>31</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>32</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 32: German sample breakdown by ownership type**

Germany	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	1295	387	357	373	178
		30%	28%	29%	14%
2012	201	70	59	56	16
		35%	29%	28%	8%
2010	150	90	33	26	1
		60%	22%	17%	1%

The final sample of hospitals included in the survey has a similar structure to the one of the German universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has increased a 34%, with a lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

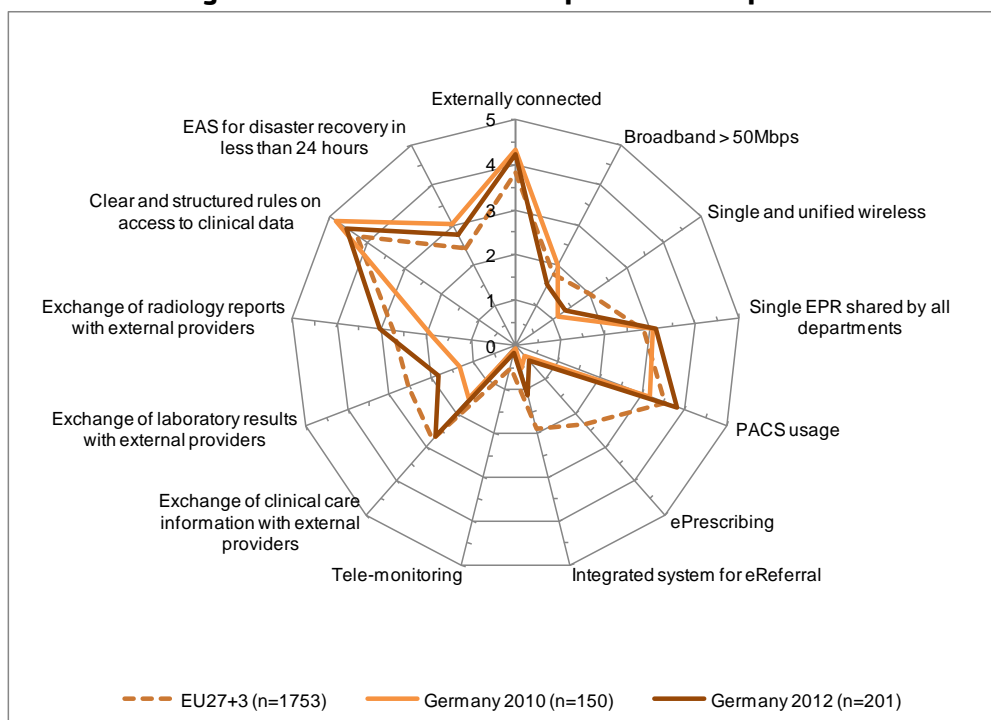
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 29: German acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 33: eHealth indicators Germany**

eHealth indicators - Germany	Valid N	% hospitals	2012 difference Germany vs.EU27+3	Germany evolution, 2012 vs. 2010 <sup>33</sup>
<b>Infrastructure</b>				
Externally connected	200	85%	8%	-2%
Broadband > 50Mbps	183	31%	-5%	-10%
Single and unified wireless	196	27%	-13%	4%
Single EPR shared by all departments	191	63%	6%	1%
<b>Applications</b>				
PACS usage	201	77%	6%	13%
ePrescribing	194	9%	-37%	3%
Integrated system for eReferral	194	23%	-15%	13%
Tele-monitoring	193	4%	-7%	2%
<b>Integration</b>				
Exchange of clinical care information with external providers	192	54%	-2%	22%
Exchange of laboratory results with external providers	192	37%	-14%	11%
Exchange of radiology reports with external providers	196	61%	6%	23%
<b>Security</b>				
Clear and structured rules on access to clinical data	195	91%	6%	-5%
EAS for disaster recovery in less than 24 hours	194	55%	7%	-6%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>33</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the German eHealth profile within EU27+3

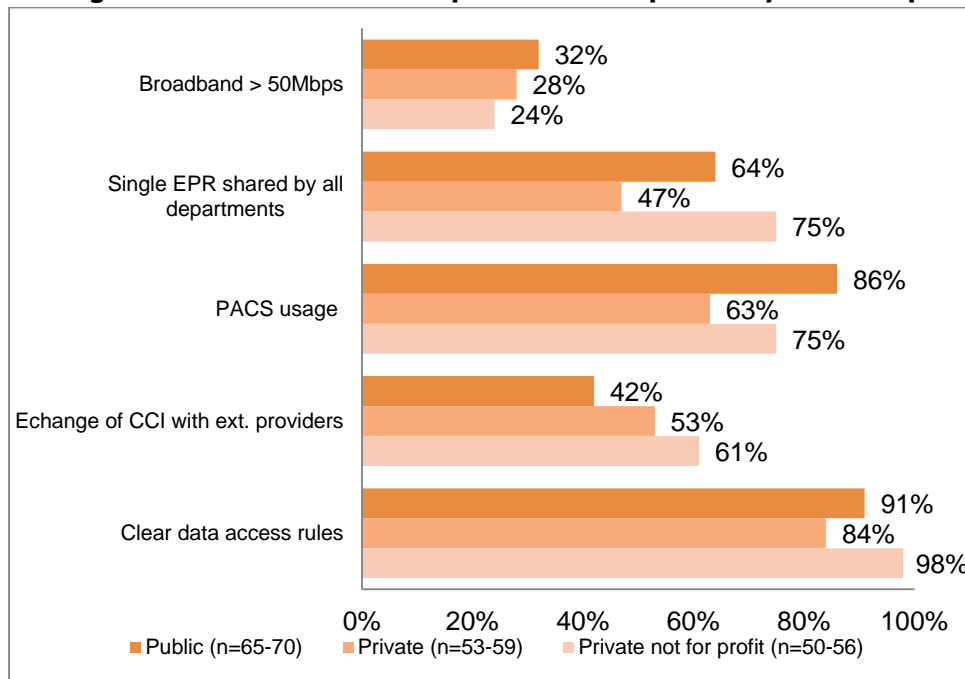
Germany does not reach the European average in terms of eHealth adoption. The most notable lag occurs in the area of “ePrescribing” which is 37% behind the European average. In all other areas, the differences, both positive and negative, are less relevant. .

Changes in the German eHealth profile

Other than for “Exchange of clinical care information with external providers” and “Exchange of radiology reports with external providers” (which gained 22% and 23% respectively over the period under review), all gains have been marginal and lower than 15% in each category. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

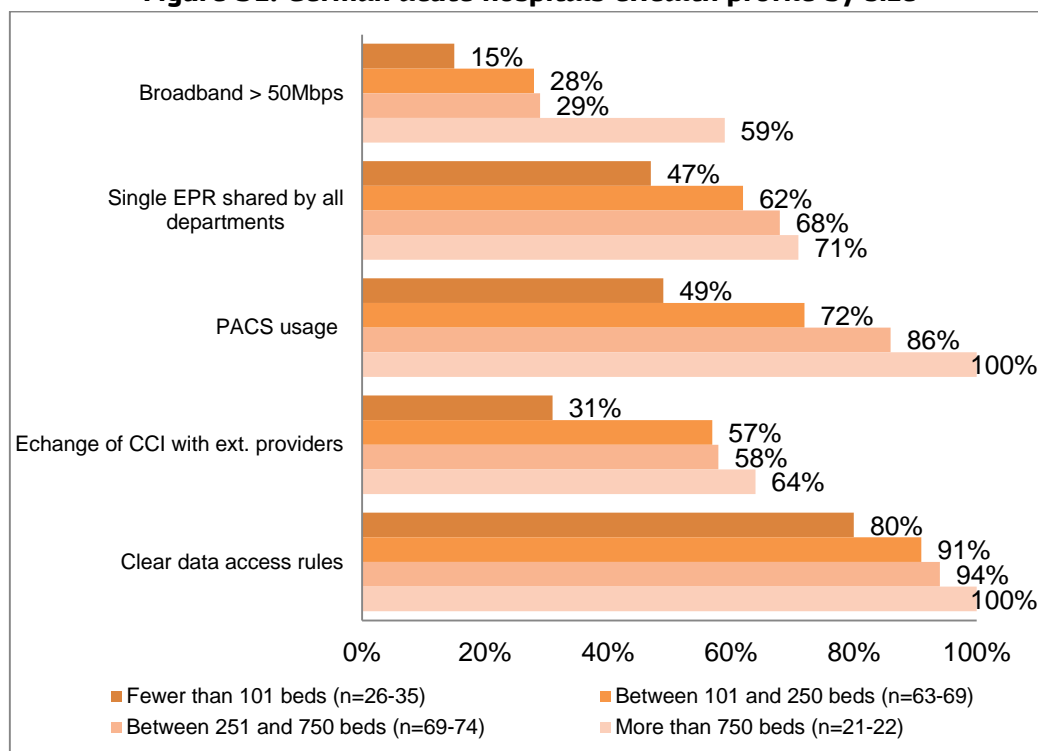
**Figure 30: German acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Public hospitals in Germany lead in two of the five areas investigated, namely “Broadband > 50Mbps” and “PACS usage”. Private acute hospitals, by contrast, underperform in all five areas, most notably in “Single EPR shared by all departments” where Private hospitals have only 47% penetration, a full 28 percentage points behind the lead value of 75%. Private not for profit acute hospitals lead in three areas, “Single EPR shared by all departments”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”.

**Figure 31: German acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In Germany, scale advantages can be observed across all eHealth indicators under review. In all five areas, “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”, acute hospitals over 750 beds in size led. For smaller size segments, the ranking is also commensurate with scale: the larger the hospital, the better it is equipped for eHealth (although in some cases the advantage was marginal).

#### 4. Composite indicators

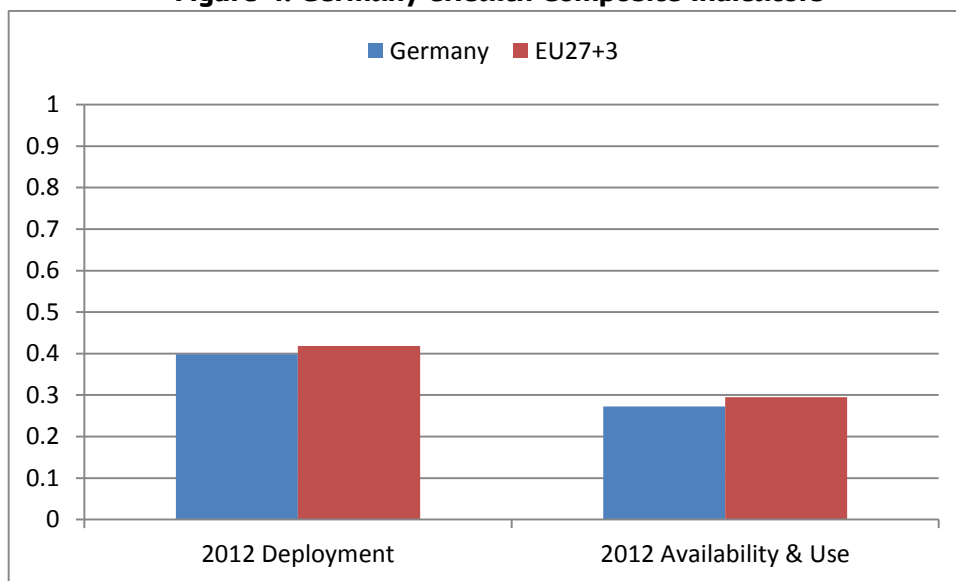
The following section reports the results for Germany on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information

Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Germany's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Germany's eHealth Deployment indicator is based on data from 188 hospitals, while the Availability and Use indicator was built from the information provided by 168 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

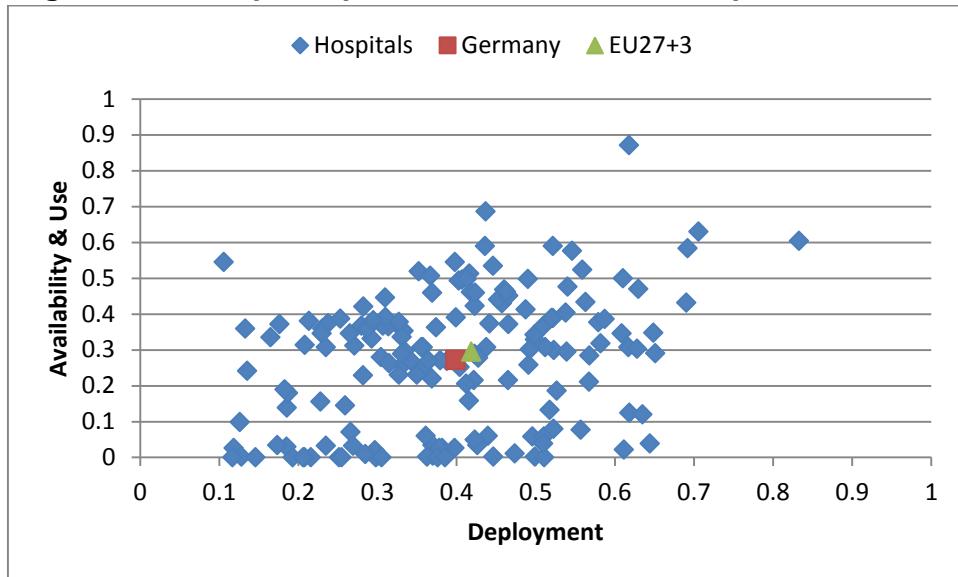
**Figure 4: Germany eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 148 hospitals) for Germany was 0.36, while the 2012 value was 0.40, which shows an increase of 4% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Germany and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a significant large group of hospitals (27%) with almost no Effective use at various levels of deployment. In contrast, an equal proportion of hospitals (27%) are above EU27+3 average in both indicators.

**Figure 5: Germany's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Greece**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>34</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>35</sup>.

This document reports the results of this project for **Greece**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Greece are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

687 hospitals were identified in Greece. Within this rough universe 398 (58%) completed the screener part of the questionnaire and 120 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (36% vs. 21%) and there were more hospitals of public ownership (80% vs. 64%). Out of the Greek universe, 68 acute hospitals (57%) completed the survey.

**Table 34: Greek sample breakdown by size of acute care hospitals**

Greece	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>120</b>	32	28	25	3	32
		27%	23%	21%	3%	27%
<b>2012</b>	<b>68</b>	18	16	18	2	14
		26%	24%	26%	3%	21%
<b>2010</b>	<b>26</b>	5	11	7	3	-
		19%	42%	27%	12%	-

<sup>34</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>35</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 35: Greek sample breakdown by ownership type**

Greece	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	120	85	20	1	14
		71%	17%	1%	12%
2012	68	59	8	1	-
		87%	12%	1%	-
2010	26	24	1	1	-
		92%	4%	4%	-

The final sample of hospitals included in the survey has a similar structure to the one of the Greek universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with a lower proportion of very large (more than 750 beds) and intermediate (Between 101 and 250 beds) hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

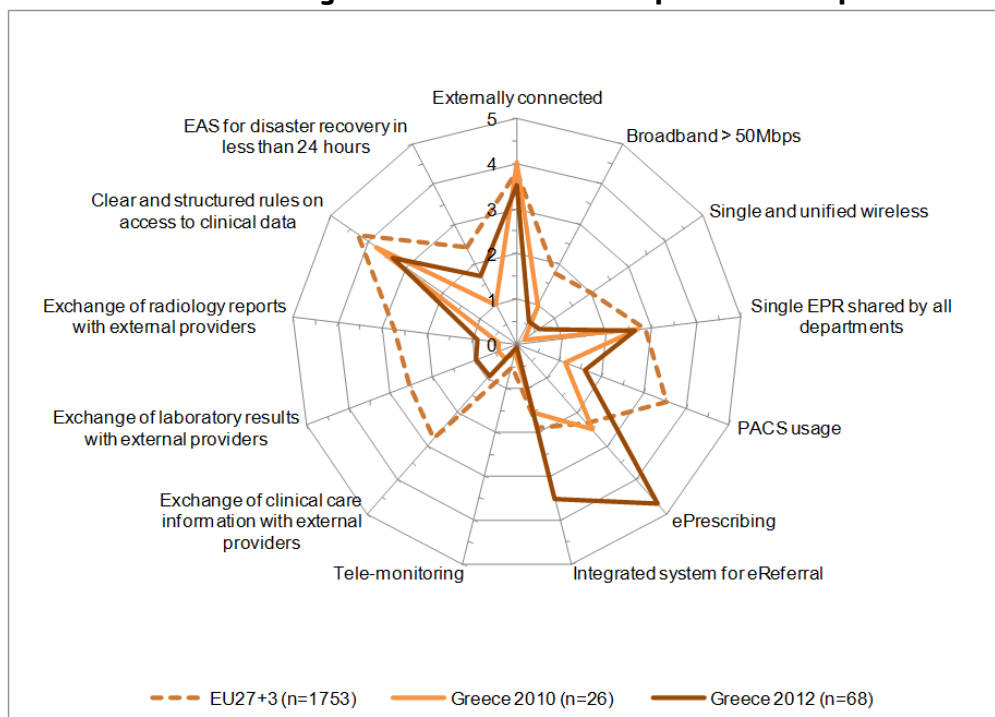
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 32: Greek acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 36 – eHealth indicators Greece**

eHealth indicators - Greece	Valid N	% hospitals	2012 difference Greece vs.EU27+3	Greece evolution, 2012 vs. 2010 <sup>36</sup>
<b>Infrastructure</b>				
Externally connected	67	70%	-6%	-11%
Broadband > 50Mbps	61	11%	-24%	-8%
Single and unified wireless	68	12%	-28%	8%
Single EPR shared by all departments	63	52%	-5%	-1%
<b>Applications</b>				
PACS usage	65	32%	-39%	9%
ePrescribing	68	94%	47%	44%
Integrated system for eReferral	68	71%	33%	40%
Tele-monitoring	62	2%	-9%	-3%
<b>Integration</b>				
Exchange of clinical care information with external providers	64	19%	-37%	10%
Exchange of laboratory results with external providers	66	20%	-32%	11%
Exchange of radiology reports with external providers	63	17%	-38%	9%
<b>Security</b>				
Clear and structured rules on access to clinical data	61	67%	-18%	-9%
EAS for disaster recovery in less than 24 hours	64	34%	-14%	14%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>36</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Greek eHealth profile within EU27+3

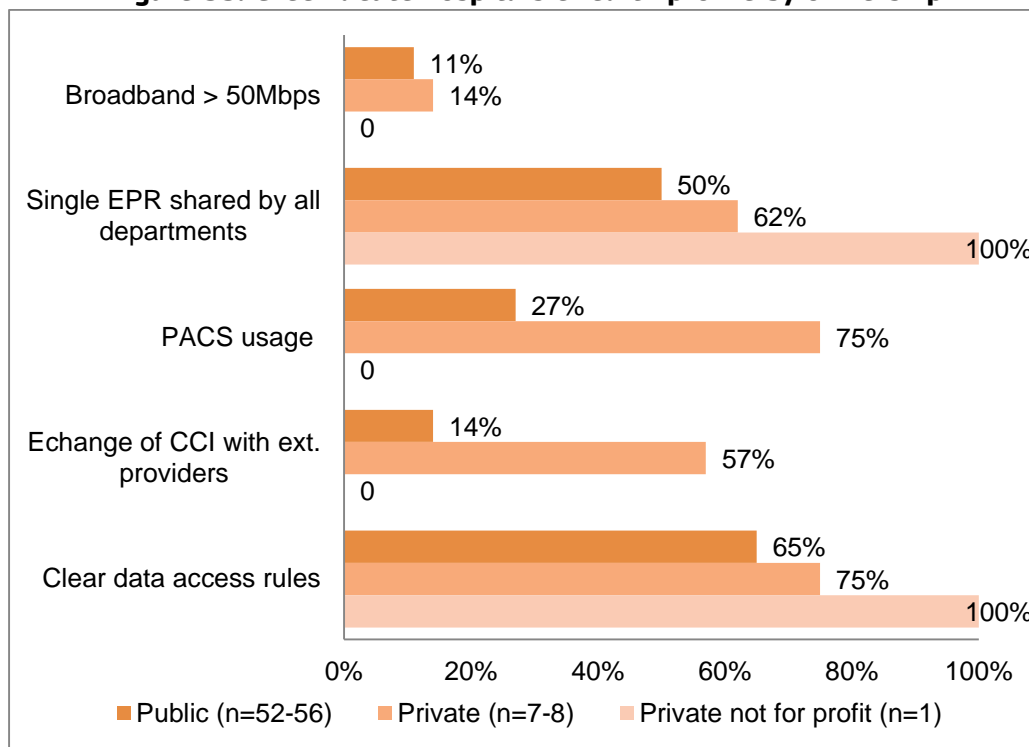
Greece is behind the European average in terms of eHealth development. The areas which contribute the most to this lag are “PACS usage” (-39%), “Exchange of clinical care information with external providers” (-37%), “Exchange of laboratory results with external providers”, (-32%) and “Exchange of radiology reports with external providers” (-38%). Greece, however, exceeds the European average in “ePrescribing” (47%) and “Integrated system for eReferral” (33%).

Changes in the Greek eHealth profile

Despite lagging behind the European average, Greece has in fact made significant progress over its previous eHealth profile as evaluated in 2010. The country improvements are mainly due to the two areas in which it exceeds the average, “ePrescribing” and “Integrated system for eReferral. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

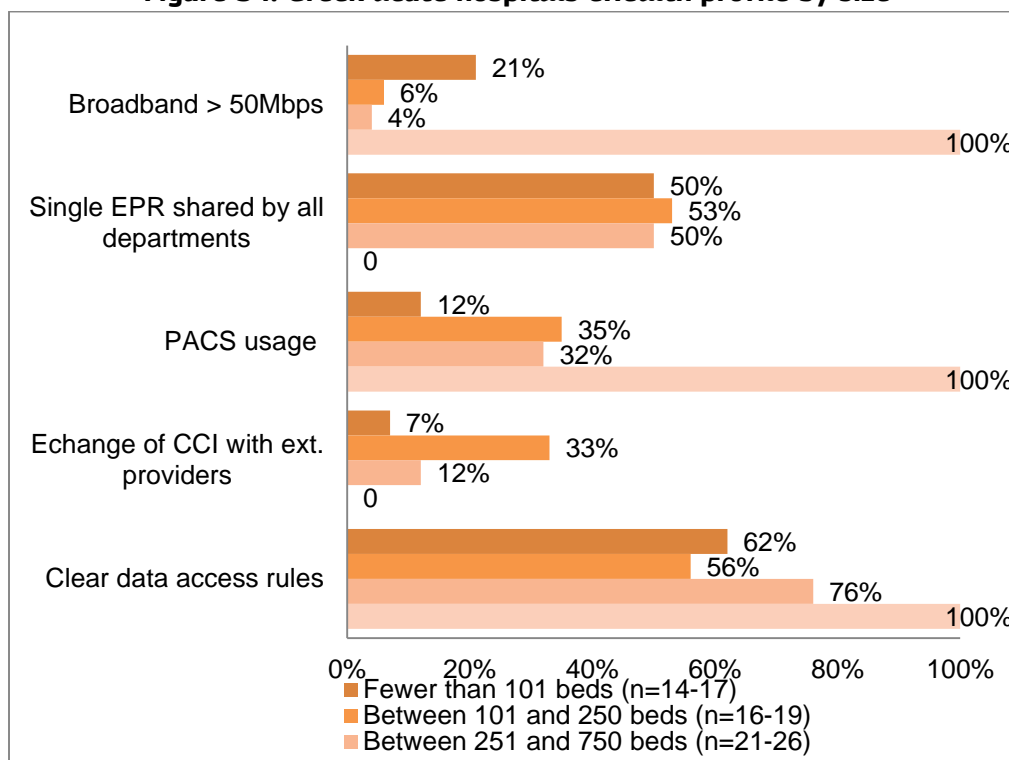
**Figure 33: Greek acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Greece’s Public acute hospitals underperform in all areas examined and consistently rank equal to or behind the average values for all indicators. Private hospitals fare much better, exceeding the average value in all areas, sometimes by a wide margin, for example in “PACS usage”.

**Figure 34: Greek acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Considering the scale of acute hospitals in Greece, the only hospital with more than 750 beds has good scores in the categories where data is available. However, the lack of representativeness prevents from any generalization. The results for the others categories do not show a clear relationship between size and performance in the indicators evaluated..

#### 4. Composite indicators

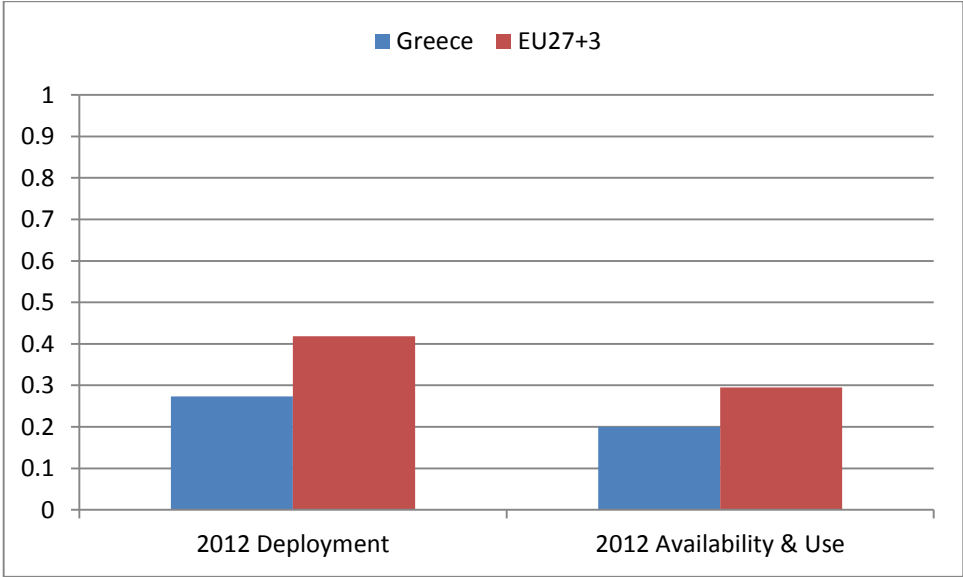
The following section reports the results for Greece on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the

Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Greece's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Greece's eHealth Deployment indicator is based on data from 63 hospitals, while the Availability and Use indicator was built from the information provided by 59 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

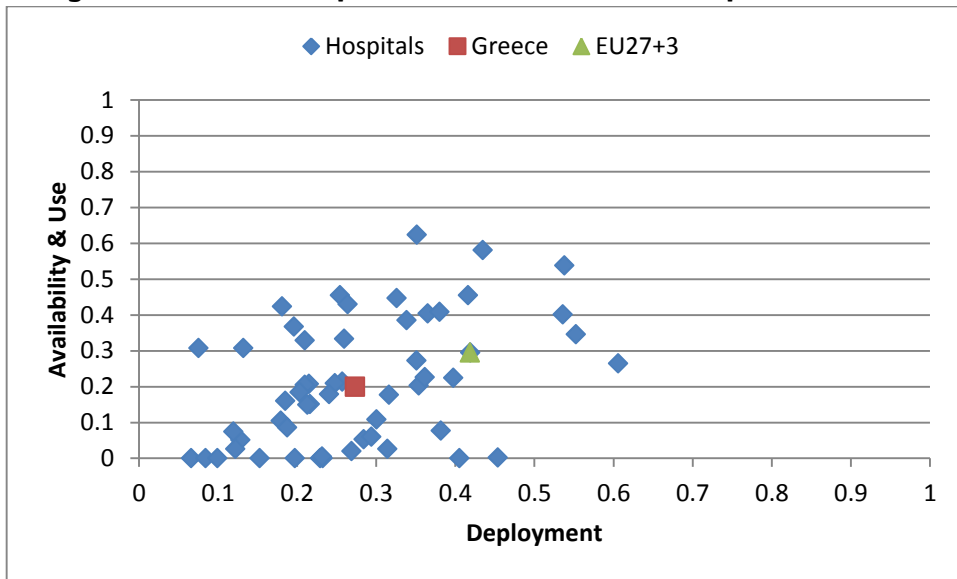
**Figure 4: Greece eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 24 hospitals) for Greece was 0.25, while the 2012 value was 0.27, which shows an increase of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Greece and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a group of hospitals with no effective use at various (low) levels of deployment. Only 5 hospitals were above EU27+3 average for both composite indicators.

**Figure 5: Greece's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Hungary**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>37</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>38</sup>.

This document reports the results of this project for **Hungary**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Hungary are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

492 hospitals were identified in Hungary. Within this rough universe 279 (57%) completed the screener part of the questionnaire and 102 qualified as acute care hospitals. The proportion of hospitals with more than 750 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (25% vs. 12%) and there were more hospitals of public ownership (92% vs. 64%). Out of the Hungarian universe, 43 acute hospitals (42%) completed the survey.

**Table 37: Hungarian sample breakdown by size of acute care hospitals**

Hungary	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>102</b>	15	20	34	23	10
		15%	20%	33%	23%	10%
<b>2012</b>	<b>43</b>	6	7	17	8	5
		14%	16%	40%	19%	12%
<b>2010</b>	<b>10</b>	-	2	7	1	-
		-	20%	70%	10%	-

<sup>37</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>38</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 38: Hungarian sample breakdown by ownership type**

Hungary	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	102	90	7	1	4
		88%	7%	1%	4%
2012	43	40	1	1	1
		93%	2%	2%	2%
2010	10	9	-	-	1
		90%	-	-	10%

The final sample of hospitals included in the survey has a similar structure to the one of the Hungarian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has quadrupled, with a lower proportion of large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

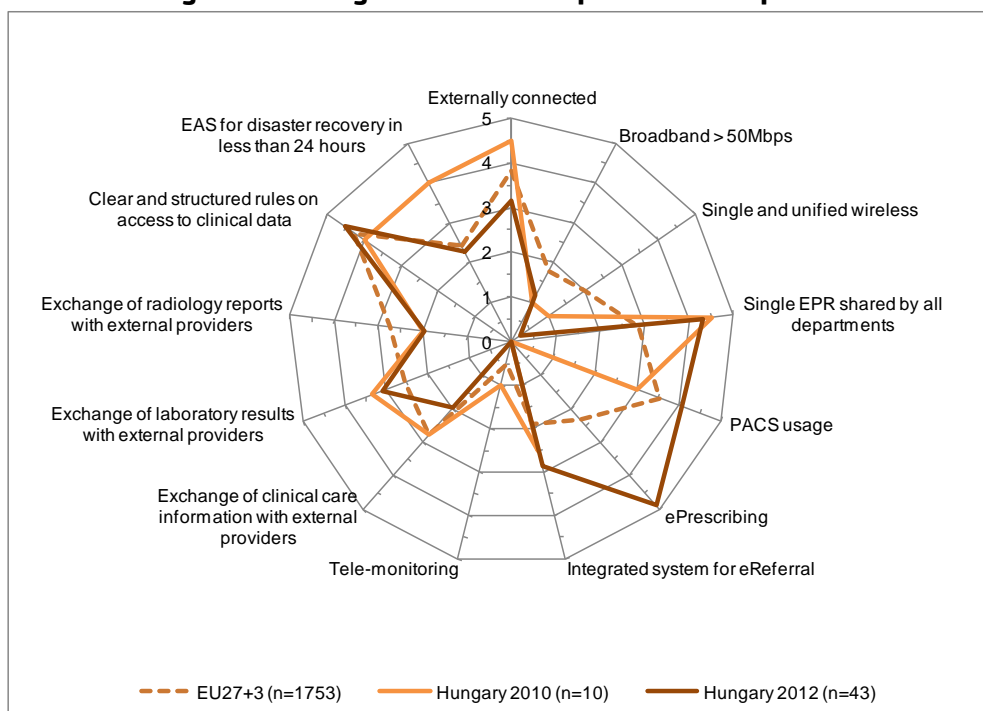
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 35: Hungarian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 39 – eHealth indicators Hungary**

eHealth indicators - Hungary	Valid N	% hospitals	2012 difference Hungary vs.EU27+3	Hungary evolution, 2012 vs. 2010 <sup>39</sup>
<b>Infrastructure</b>				
Externally connected	43	63%	-14%	-27%
Broadband > 50Mbps	43	23%	-12%	3%
Single and unified wireless	43	5%	-35%	-15%
Single EPR shared by all departments	43	86%	29%	-4%
<b>Applications</b>				
PACS usage	43	81%	11%	21%
ePrescribing	42	98%	51%	98%
Integrated system for eReferral	42	57%	19%	7%
Tele-monitoring	43	0%	-10%	-20%
<b>Integration</b>				
Exchange of clinical care information with external providers	43	40%	-16%	-16%
Exchange of laboratory results with external providers	42	62%	11%	-5%
Exchange of radiology reports with external providers	43	40%	-16%	0%
<b>Security</b>				
Clear and structured rules on access to clinical data	43	91%	5%	11%
EAS for disaster recovery in less than 24 hours	42	45%	-3%	-35%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>39</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Hungarian eHealth profile within EU27+3

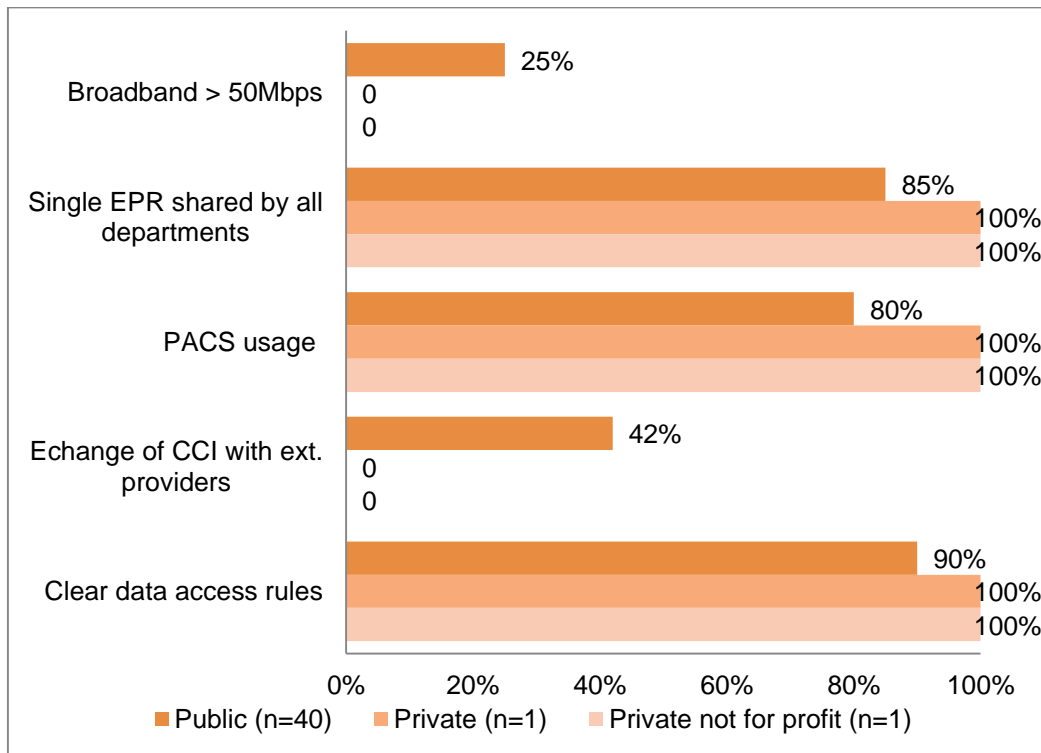
Hungary lies close to the European average in terms of its eHealth indicators. The areas with scores significantly higher than the European average were “Single EPR shared by all departments” (29%), “ePrescribing” (51%) and “Integrated system for eReferral” (19%). Leads in all other areas are relatively marginal

### Changes in the Hungarian eHealth profile

The whole Hungary’s eHealth profile has not risen significantly since 2010. However growth has been uneven over the period under review with, of the 13 areas, 7 registering negative growth. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

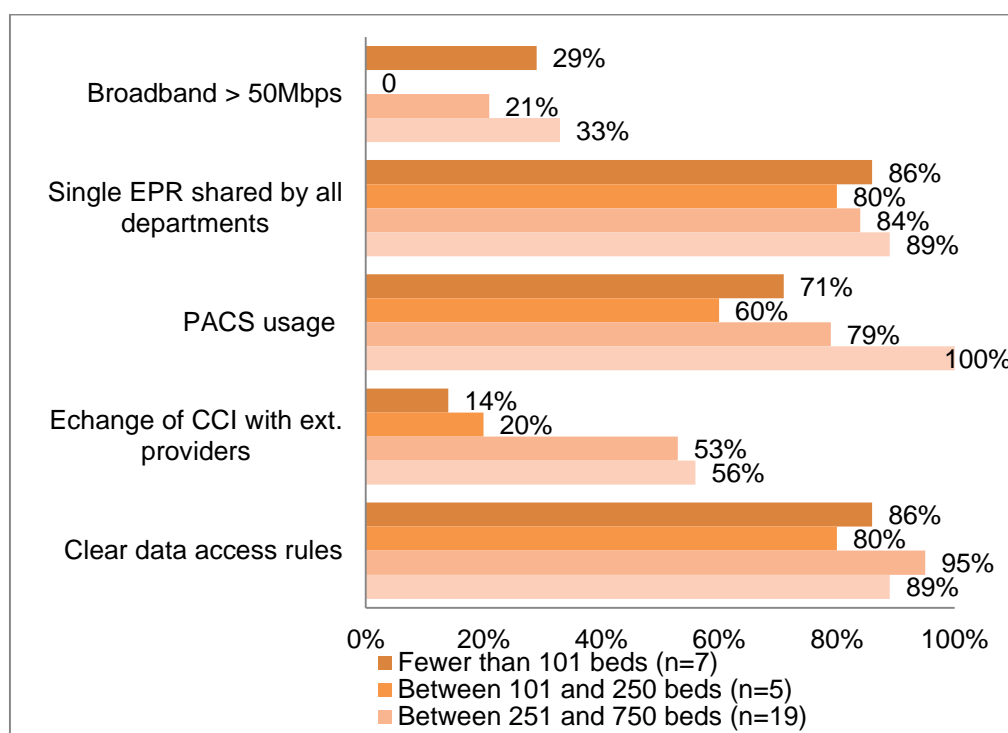
**Figure 36: Hungarian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

There were not enough hospitals belonging to the private (for profit and not for profit) category to allow the analysis by ownership to draw any relevant message.

**Figure 37: Hungarian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Scale does not appear have a clear influence on the results of eHealth progress in Hungarian acute hospitals. In two areas, “Single EPR shared by all departments” and “Clear and structured rules on access to clinical data”, although larger hospitals tend to have higher scores, this lead is not dramatic and overall values are closely grouped

#### 4. Composite indicators

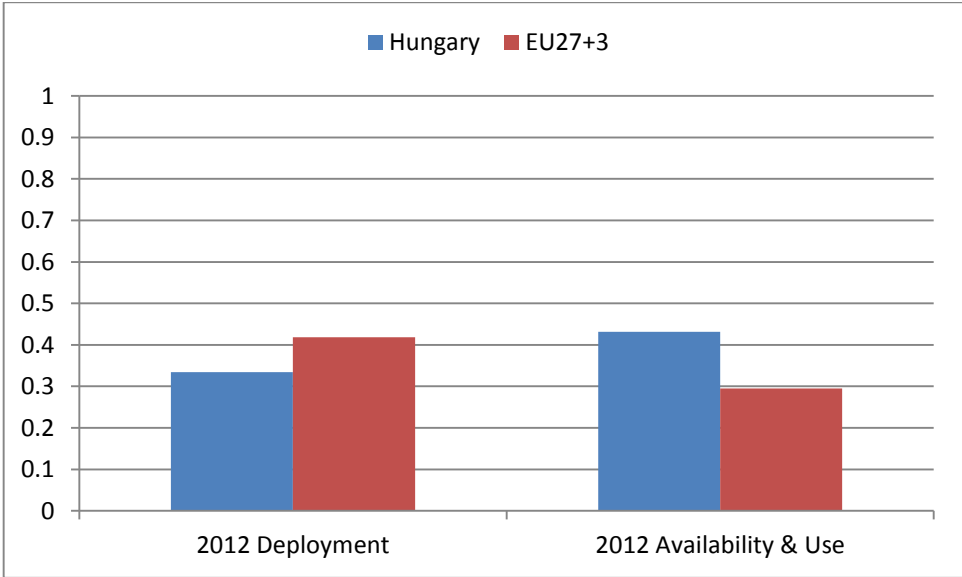
The following section reports the results for Hungary on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e.to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which

all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Hungary's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Hungary's eHealth Deployment indicator is based on data from 41 hospitals, while the Availability and Use indicator was built from the information provided by 42 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

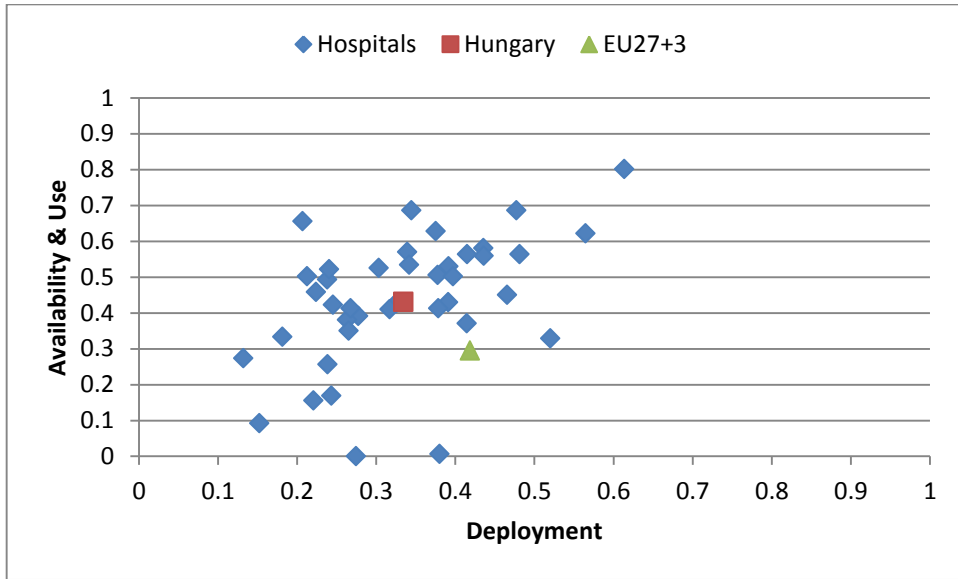
**Figure 4: Hungary eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 9 hospitals) for Hungary was 0.36, while the 2012 value was 0.33, which shows a negative growth of 3% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Hungary and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that, besides two hospitals with no effective use, hospitals with highest levels of deployment have as well higher levels of availability and of use.

**Figure 5: Hungary's hospitals values of eHealth Composite Indicators**





European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Iceland**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>40</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>41</sup>.

This document reports the results of this project for **Iceland**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Iceland are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

14 hospitals were identified in Iceland. Within this rough universe 11 (79%) completed the screener part of the questionnaire and 10 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (78% vs. 21%) and all the hospitals were of public ownership compared with a 64% among the universe of acute Hospitals at EU27+3 level. Out of the Icelandic universe, 9 acute hospitals (90%) completed the survey.

**Table 40: Icelandic sample breakdown by size of acute care hospitals**

Iceland	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>10</b>	7	1	1	-	1
		70%	10%	10%	-	10%
<b>2012</b>	<b>9</b>	7	1	1	-	-
		78%	11%	11%	-	-
<b>2010</b>	<b>3</b>	2	1	-	-	-
		67%	33%	-	-	-

<sup>40</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>41</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 41: Icelandic sample breakdown by ownership type**

Iceland	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>10</b>	9 90%	- -	- -	1 10%
<b>2012</b>	<b>9</b>	9 100%	- -	- -	- -
<b>2010</b>	<b>3</b>	3 100%	- -	- -	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Icelandic universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has tripled.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

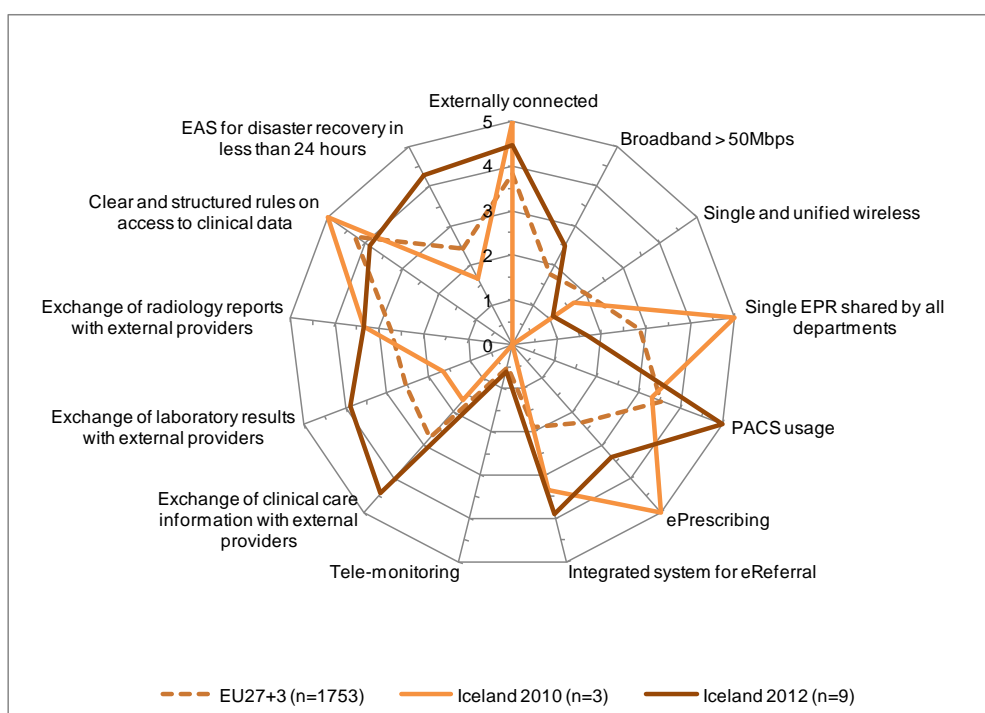
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 38: Icelandic acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 42 – eHealth indicators Iceland**

eHealth indicators - Iceland	Valid N	% hospitals	2012 difference Iceland vs.EU27+3	Iceland evolution, 2012 vs. 2010 <sup>42</sup>
<b>Infrastructure</b>				
Externally connected	9	89%	13%	-11%
Broadband > 50Mbps	8	50%	14%	50%
Single and unified wireless	9	22%	-18%	-11%
Single EPR shared by all departments	9	33%	-24%	-67%
<b>Applications</b>				
PACS usage	9	100%	29%	33%
ePrescribing	9	67%	20%	-33%
Integrated system for eReferral	9	78%	40%	11%
Tele-monitoring	8	13%	2%	13%
<b>Integration</b>				
Exchange of clinical care information with external providers	9	89%	34%	56%
Exchange of laboratory results with external providers	9	78%	27%	44%
Exchange of radiology reports with external providers	9	67%	12%	0%
<b>Security</b>				
Clear and structured rules on access to clinical data	9	78%	-8%	-22%
EAS for disaster recovery in less than 24 hours	7	86%	38%	52%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>42</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Icelandic eHealth profile within EU27+3

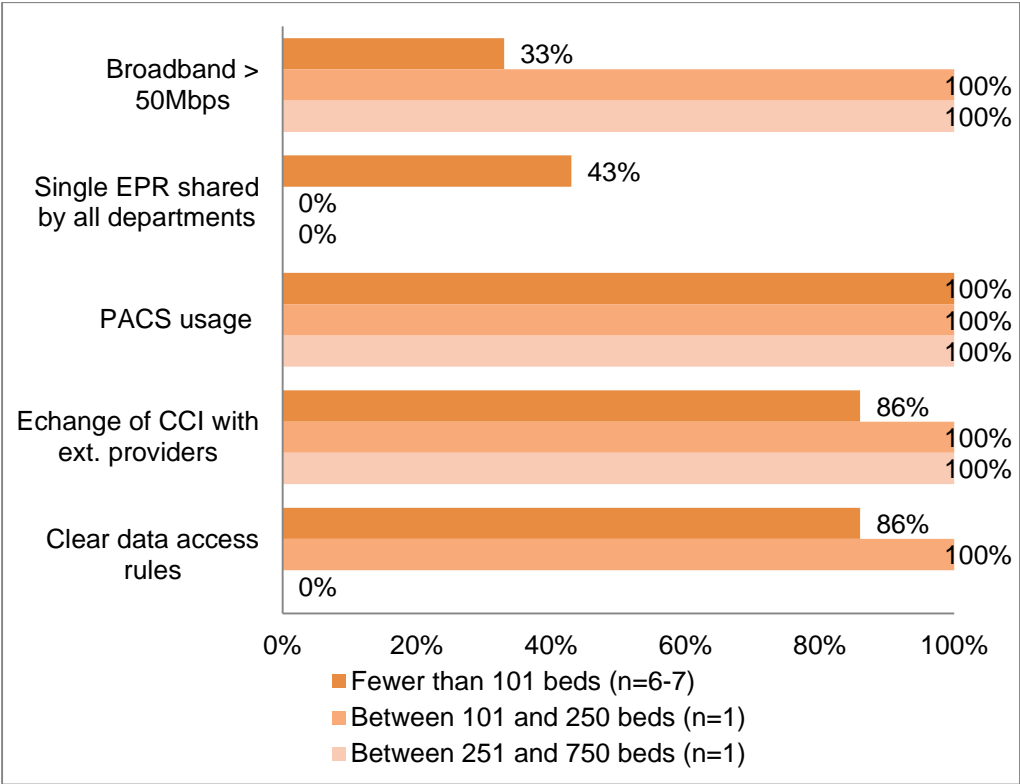
Iceland noticeably scores better than the average EU27+3 as regards eHealth. The lead values are also well distributed, with an outperformance of around 12% to 27% for most indicators. The most successful Icelandic areas of eHealth appear to be “Integrated system for eReferral” (40%), “Exchange of clinical care information with external providers” (34%) and “EAS for disaster recovery in less than 24 hours” (38%). Additionally, only three indicators out of 13 posted a negative value: “Single and unified wireless”, “Single EPR shared by all departments” and “Clear and structured rules on access to clinical data” scoring -18%, -24% and -8% respectively.

Changes in the Icelandic eHealth profile

Iceland’s eHealth profile has grown significantly since 2010. The highest gains were posted in the areas of “Broadband > 50Mbps”, “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers” and “EAS for disaster recovery in less than 24 hours”, which all grew in excess of 50%. However, “Single EPR shared by all departments” dropped by 67% in the same period. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size of the hospitals.

**Figure 2: Icelandic acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

There were not enough hospitals belonging to the size categories of between 101 and 250 beds and between 251 and 750 beds to allow the analysis by size to draw any relevant message.

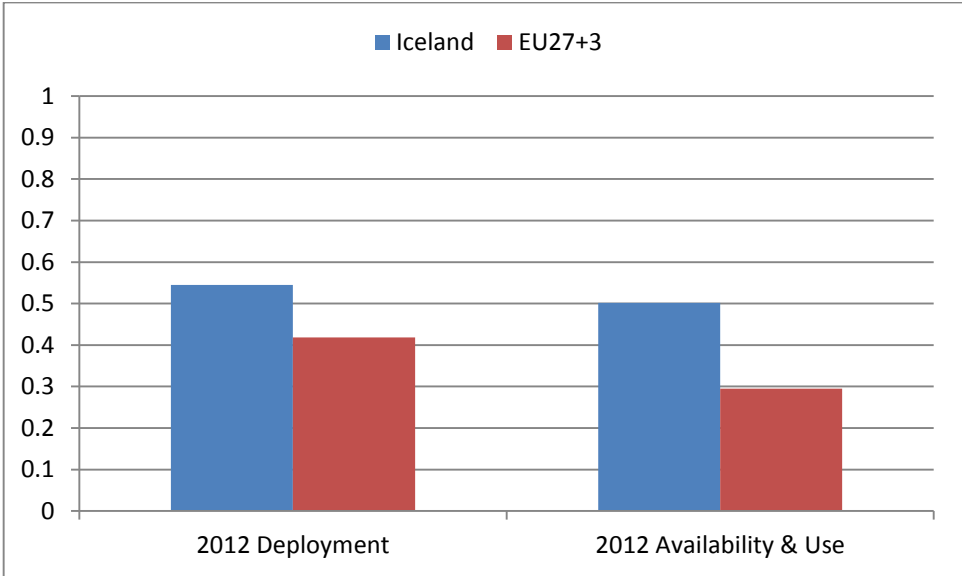
### 4. Composite indicators

The following section reports the results for Iceland on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Iceland's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Iceland's eHealth Deployment indicator is based on data from 8 hospitals, while the Availability and Use indicator was built from the information provided by 7 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

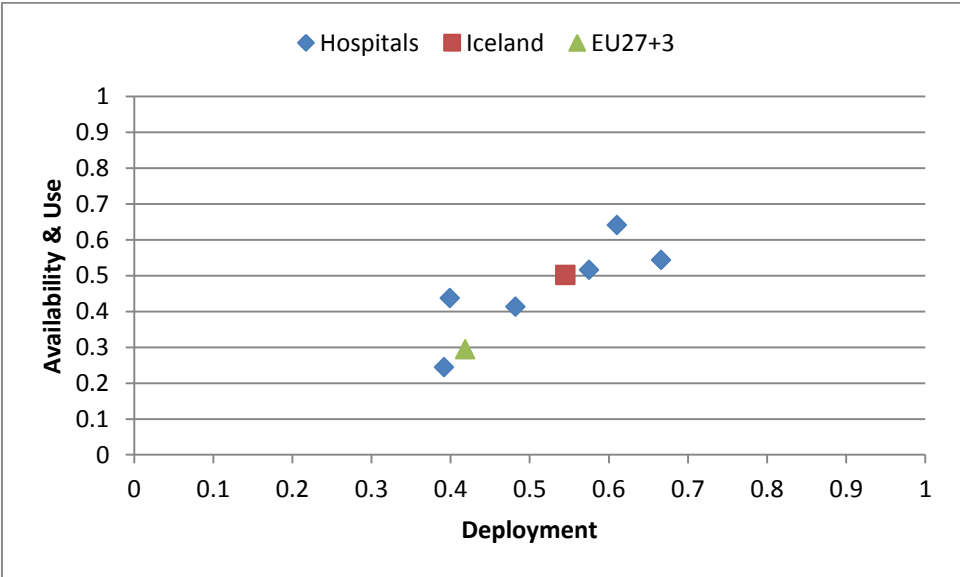
**Figure 3: Iceland eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 3 hospitals) for Iceland was 0.45, while the 2012 value was 0.55, which shows an increase of 10% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Iceland and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a clear positive relationship among Icelandic hospitals between level of deployment and of availability and use. Only 1 hospital was below EU27+3 average for both composite indicators.

**Figure 4: Iceland's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Ireland**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>43</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>44</sup>.

This document reports the results of this project for **Ireland**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Ireland are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

492 hospitals were identified in Ireland. Within this rough universe 358 (73%) completed the screener part of the questionnaire and 42 qualified as acute care hospitals. The proportion of hospitals with less than 250 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (66% vs. 52%). Out of the Irish universe, 23 acute hospitals (55%) completed the survey.

**Table 43: Irish sample breakdown by size of acute care hospitals**

Ireland	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>42</b>	6	20	13	-	3
		14%	48%	31%	-	7%
<b>2012</b>	<b>23</b>	5	11	7	-	-
		22%	48%	30%	-	-
<b>2010</b>	<b>8</b>	-	1	4	3	-
		-	12%	50%	38%	-

<sup>43</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>44</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 44: Irish sample breakdown by ownership type**

Ireland	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>42</b>	27 64%	9 21%	3 7%	3 7%
<b>2012</b>	<b>23</b>	16 70%	6 26%	1 4%	- -
<b>2010</b>	<b>8</b>	8 100%	- -	- -	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Irish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with a significantly higher proportion of hospitals with less than 250 beds and non public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

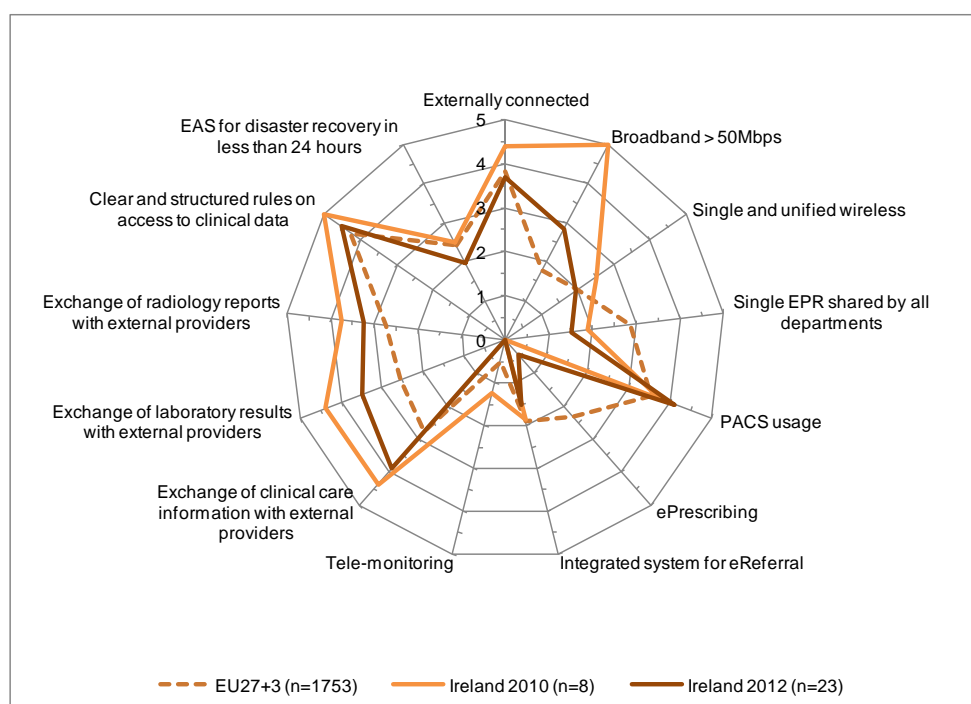
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 39: Irish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 45 – eHealth indicators Ireland**

eHealth indicators - Ireland	Valid N	% hospitals	2012 difference Ireland vs.EU27+3	Ireland evolution, 2012 vs. 2010 <sup>45</sup>
<b>Infrastructure</b>				
Externally connected	23	74%	-2%	-14%
Broadband > 50Mbps	21	57%	22%	-43%
Single and unified wireless	23	39%	-1%	-11%
Single EPR shared by all departments	23	30%	-27%	-7%
<b>Applications</b>				
PACS usage	23	83%	12%	8%
ePrescribing	23	9%	-38%	9%
Integrated system for eReferral	23	30%	-7%	-7%
Tele-monitoring	21	0%	-10%	-25%
<b>Integration</b>				
Exchange of clinical care information with external providers	23	78%	23%	-9%
Exchange of laboratory results with external providers	23	70%	18%	-18%
Exchange of radiology reports with external providers	23	65%	10%	-10%
<b>Security</b>				
Clear and structured rules on access to clinical data	21	90%	5%	-10%
EAS for disaster recovery in less than 24 hours	23	39%	-9%	-11%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>45</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Irish eHealth profile within EU27+3

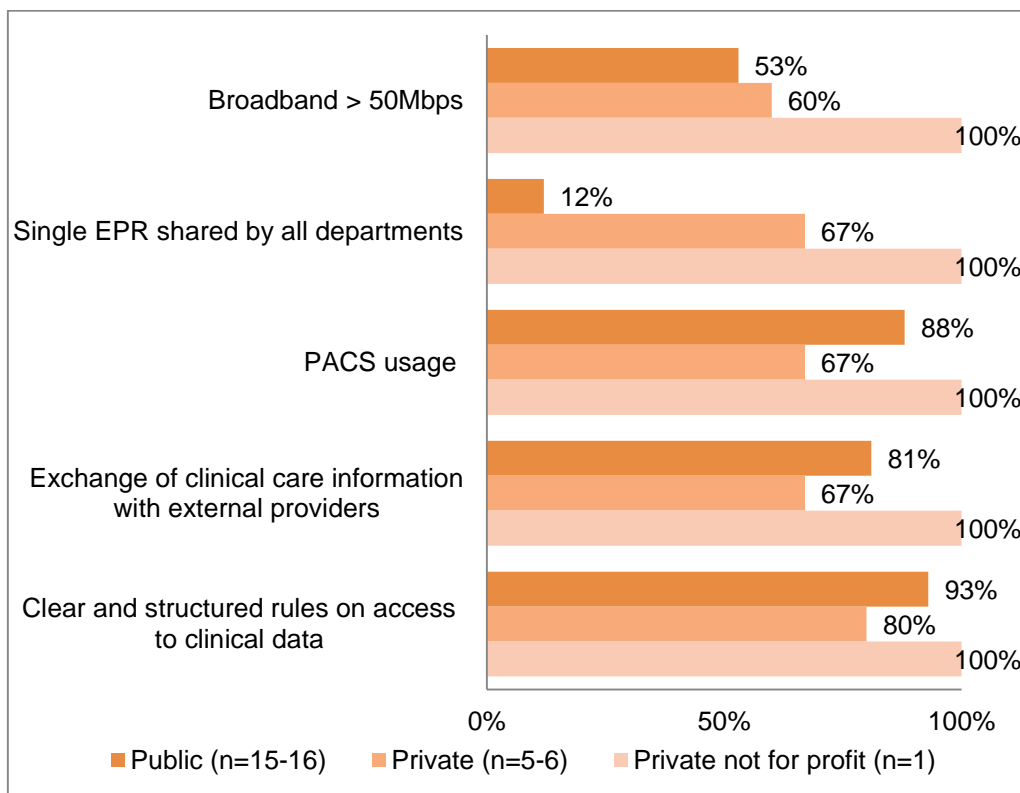
In 2012 Ireland was largely in line with the European average with respect to eHealth indicators. In 6 of them, Ireland scores higher than the average EU27+3 and worse in 7. Those with the highest negative differences are “eprescribing” (38%) and “Single EPR shared by all departments” (27%). The category “Exchange of clinical care information with external providers” is where positive differences are higher (23%).

Changes in the Irish eHealth profile

Ireland has made negative progress since 2010 as regards its eHealth profile. The largest drops occurred in the areas of “Broadband > 50Mbps” and “Tele-monitoring”, which registered drops of -43% and -25% respectively. Ireland has fallen in 11 of the 13 categories since 2010. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

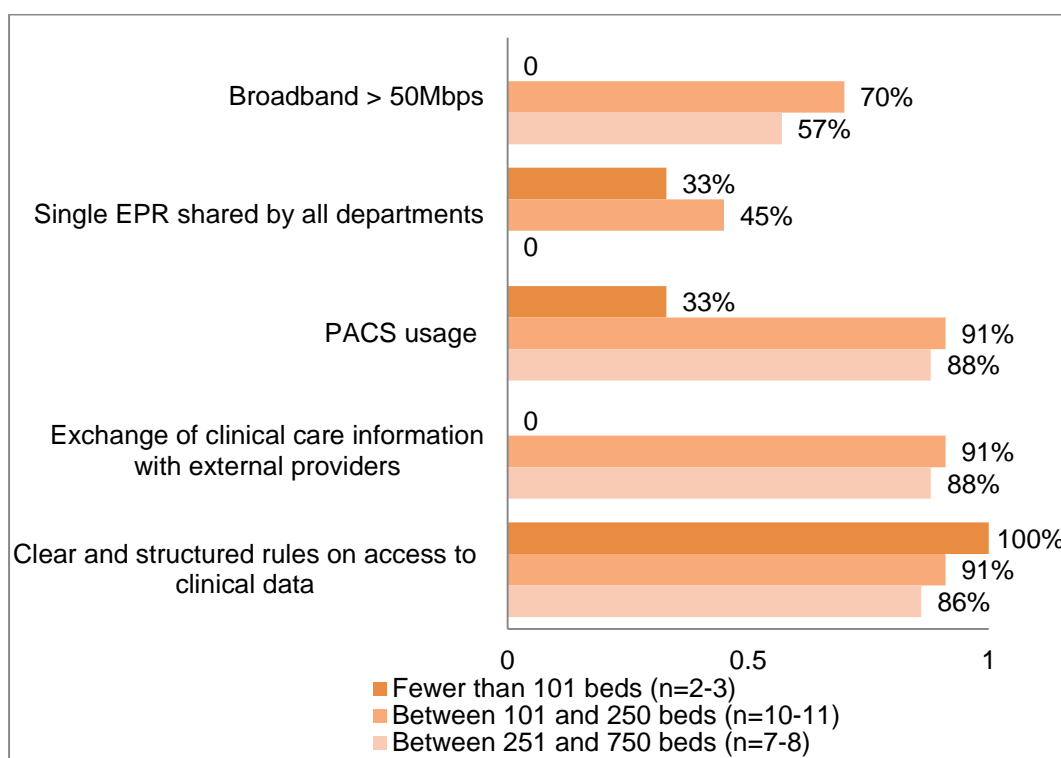
**Figure 40: Irish acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Areas as “PACS usage” and “Single EPR shared by all departments” show important differences between Public and Private hospitals. However, it is not clear what type of hospitals performs better (as there is only one hospital belonging to the category not for profit, this category has not been considered)

**Figure 41: Irish acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In terms of hospital size, Ireland returned no values for establishments with over 750 beds. The values reported tend to be roughly evenly grouped, although the medium-sized and larger hospital segments (between 101 and 250 beds, and from 251 beds to 750 beds) tend to lead in four of the five areas: “Broadband > 50Mbps”, “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”.

#### 4. Composite indicators

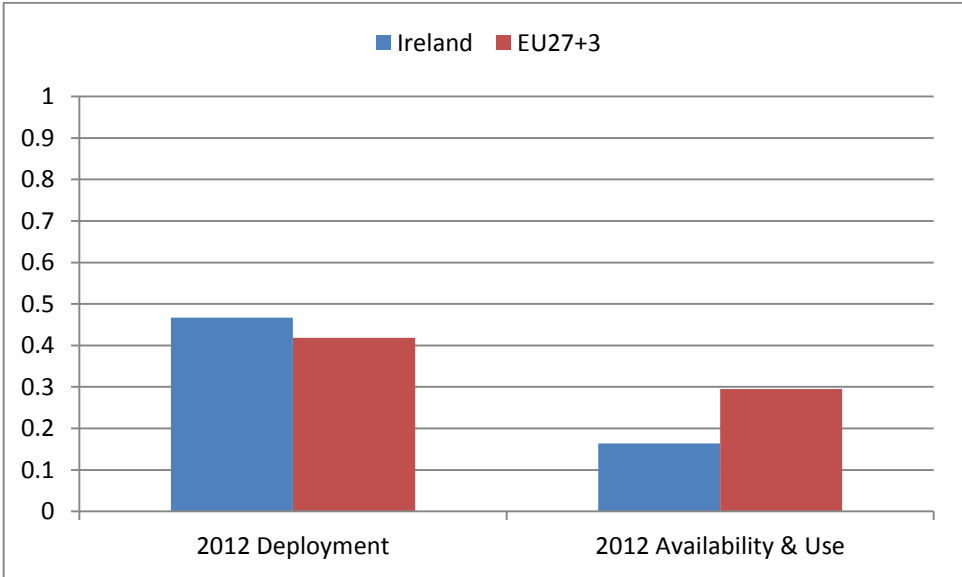
The following section reports the results for Ireland on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that,

for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Ireland’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Ireland’s eHealth Deployment indicator is based on data from 22 hospitals, while the Availability and Use indicator was built from the information provided by 19 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

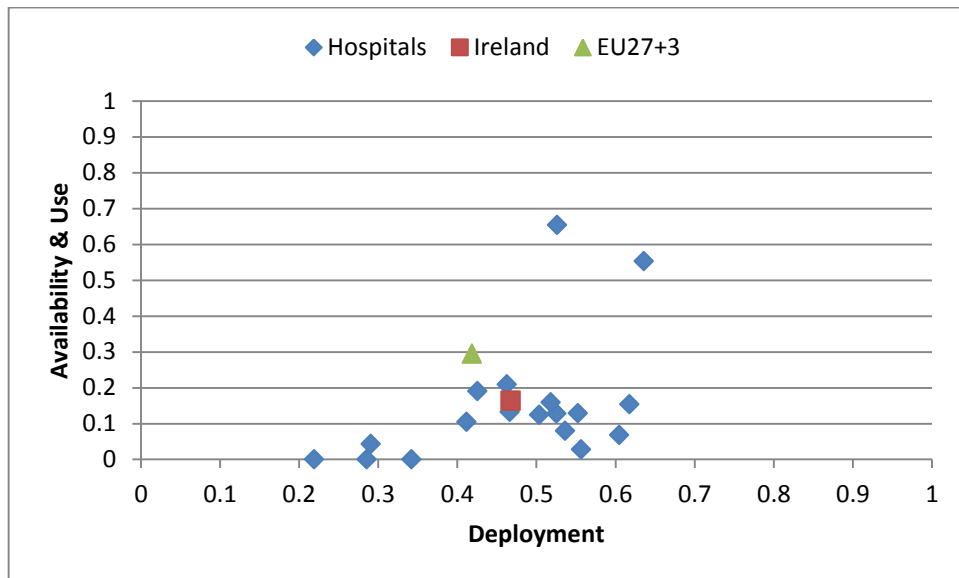
**Figure 4: Ireland eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 7 hospitals) for Ireland was 0.65, while the 2012 value was 0.47, which shows a negative growth of 18% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Ireland and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows the low level of effective use, independently of the level of deployment, among all but 2 hospitals. These 2 hospitals were the only ones above EU27+3 average for both composite indicators.

**Figure 5: Ireland's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Italy**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>46</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>47</sup>.

This document reports the results of this project for **Italy**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Italy are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

2517 hospitals were identified in Italy. Within this rough universe 1063 (42%) completed the screener part of the questionnaire and 497 qualified as acute care hospitals. The proportion of public hospitals among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (75% vs 64%). Out of the Italian universe, 196 acute hospitals (39%) completed the survey.

**Table 46: Italian sample breakdown by size of acute care hospitals**

Italy	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>497</b>	87	96	143	55	116
		18%	19%	29%	11%	23%
<b>2012</b>	<b>196</b>	39	37	67	21	32
		20%	19%	34%	11%	16%
<b>2010</b>	<b>90</b>	29	26	21	10	4
		32%	29%	23%	11%	4%

<sup>46</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>47</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 47: Italian sample breakdown by ownership type**

Italy	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>497</b>	342 69%	106 21%	11 2%	38 8%
<b>2012</b>	<b>196</b>	136 69%	51 26%	9 5%	- -
<b>2010</b>	<b>90</b>	47 52%	29 32%	14 16%	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Italian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has more than doubled, with a lower proportion of small and private hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

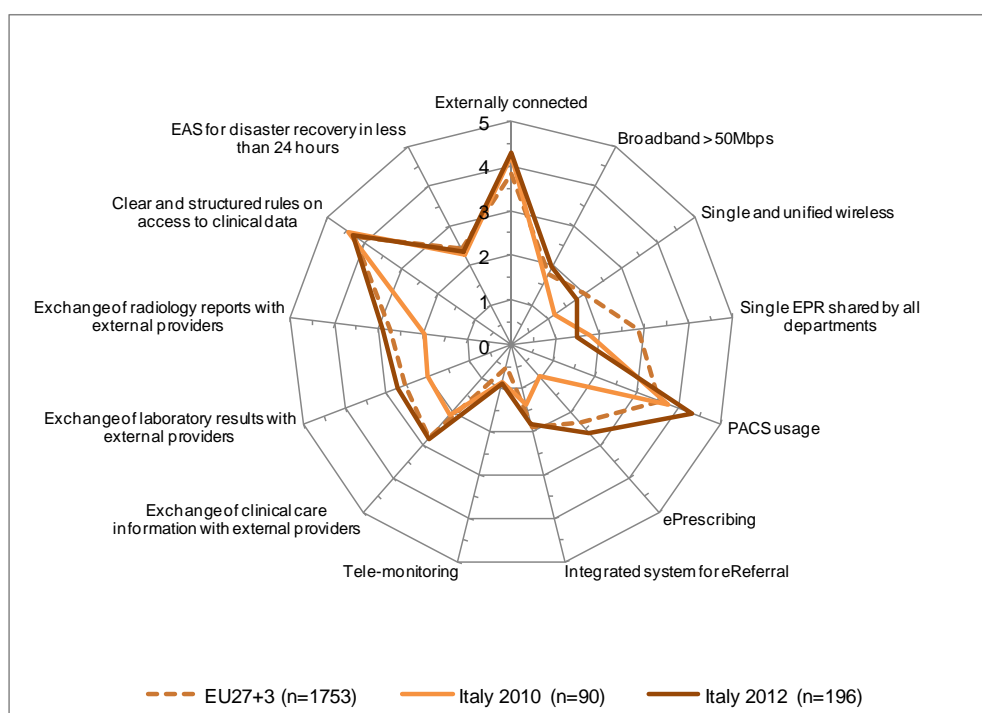
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 42: Italian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 48 – eHealth indicators Italy**

eHealth indicators - Italy	Valid N	% hospitals	2012 difference Italy vs.EU27+3	Italy evolution, 2012 vs. 2010 <sup>48</sup>
<b>Infrastructure</b>				
Externally connected	196	86%	9%	1%
Broadband > 50Mbps	187	39%	3%	6%
Single and unified wireless	194	36%	-4%	12%
Single EPR shared by all departments	191	30%	-27%	-6%
<b>Applications</b>				
PACS usage	196	86%	15%	11%
ePrescribing	188	53%	6%	34%
Integrated system for eReferral	188	37%	-1%	9%
Tele-monitoring	191	18%	8%	1%
<b>Integration</b>				
Exchange of clinical care information with external providers	192	56%	1%	15%
Exchange of laboratory results with external providers	193	54%	3%	14%
Exchange of radiology reports with external providers	190	58%	3%	19%
<b>Security</b>				
Clear and structured rules on access to clinical data	190	86%	1%	-2%
EAS for disaster recovery in less than 24 hours	192	47%	-1%	1%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>48</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Italian eHealth profile within EU27+3

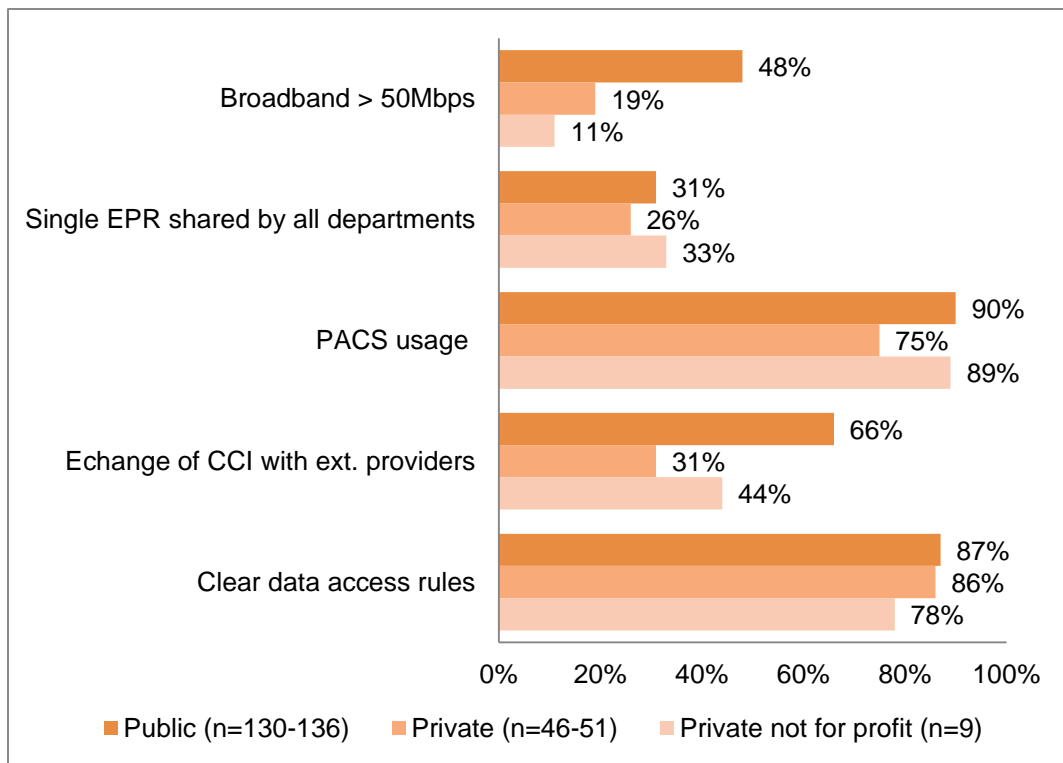
Italy closely resembles the European average in eHealth. Of 13 areas considered, only one, “Single EPR shared by all departments”, showed a significant difference with the EU27+3 average (-27%). All other areas track the European average very closely, with only marginal discrepancies.

Changes in the Italian eHealth profile

Italy’s eHealth profile has progressed well from its 2010 position. In addition to this, the distribution has been relatively even, with only one of 13 areas posting a growth level in excess of 10%, being “ePrescribing” with a growth of 34%. All other growth areas were marginal, and of all areas examined, only two areas displayed negative growth, which was also marginal. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

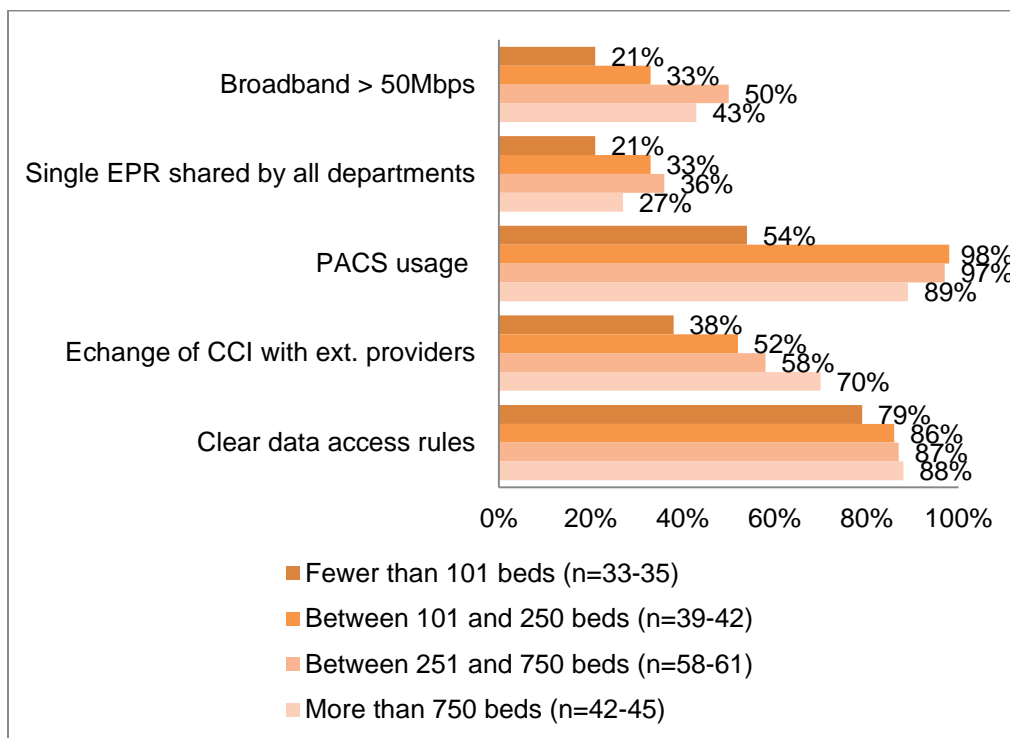
**Figure 43: Italian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Public acute hospitals in Italy appear to enjoy the best penetration of eHealth capabilities, leading in four of five areas. The distribution of eHealth capabilities also appears to be roughly similar across Private and Private not for profit acute hospitals, with Private hospitals slightly behind in terms of percentage penetration (taking last place in three areas of five: “Single EPR shared by all departments”, “PACS usage” and “Exchange of clinical care information with external providers”).

**Figure 44: Italian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

There appears to be a certain scale effect in Italian hospitals in relation to eHealth endowments, however it is not as clearly pronounced as in other European countries. For example, hospitals with fewer than 101 beds have worse results in all five areas considered, however at the larger end of the spectrum hospitals over 750 beds only lead in two of five categories (“Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”), as do hospitals with between 251 and 750 beds (“Broadband > 50Mbps” and “Single EPR shared by all departments”).

#### 4. Composite indicators

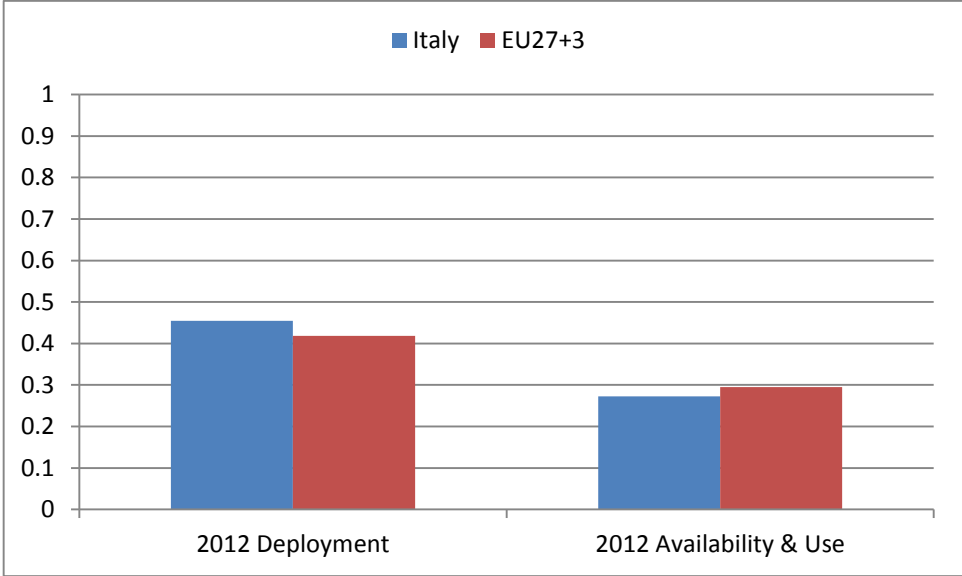
The following section reports the results for Italy on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4

categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Italy’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Italy’s eHealth Deployment indicator is based on data from 189 hospitals, while the Availability and Use indicator was built from the information provided by 182 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

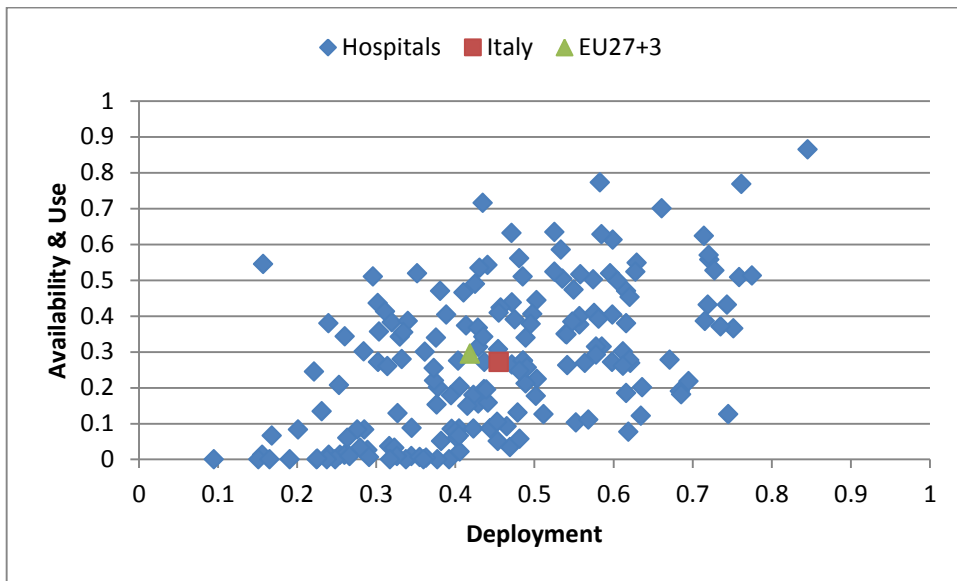
**Figure 4: Italy eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 84 hospitals) for Italy was 0.38, while the 2012 value was 0.45, which shows an increase of 7% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Italy and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a positive relationship among Italian hospitals between level of deployment and of availability and use. Nevertheless, there are also hospitals with low levels of deployment and relatively high levels of use and vice versa.

**Figure 5: Italy's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Latvia**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>49</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>50</sup>.

This document reports the results of this project for **Latvia**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Latvia are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

138 hospitals were identified in Latvia. Within this rough universe 95 (69%) completed the screener part of the questionnaire and 32 qualified as acute care hospitals. The proportion of very large hospitals among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (4% vs. 12%) and there were more hospitals of public ownership (88% vs. 64%). Out of the Latvian universe, 19 acute hospitals (59%) completed the survey.

**Table 49: Latvian sample breakdown by size of acute care hospitals**

Latvia	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>32</b>	8 25%	10 31%	8 25%	1 3%	5 16%
<b>2012</b>	<b>19</b>	5 26%	9 47%	3 16%	1 5%	1 5%
<b>2010</b>	<b>3</b>	-	2 67%	1 33%	-	-

<sup>49</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>50</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 50: Latvian sample breakdown by ownership type**

Latvia	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>32</b>	23 72%	3 9%	-	6 19%
<b>2012</b>	<b>19</b>	16 84%	1 5%	-	2 11%
<b>2010</b>	<b>3</b>	3 100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Latvian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has increased considerably, with a lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

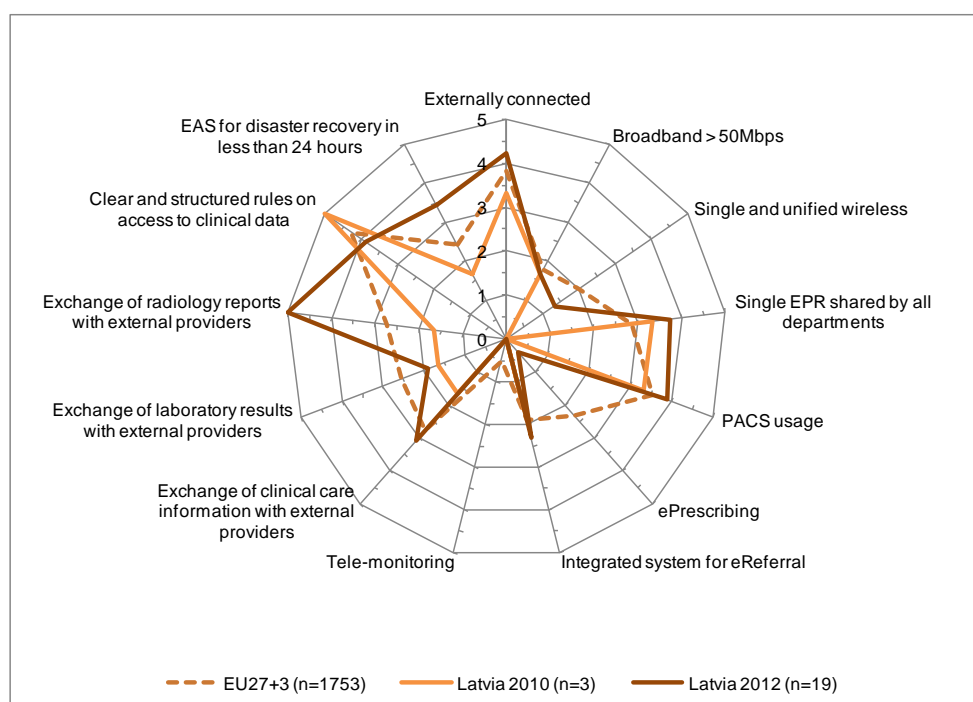
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 45: Latvian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 51 – eHealth indicators Latvia**

eHealth indicators - Latvia	Valid N	% hospitals	2012 difference Latvia vs.EU27+3	Latvia evolution, 2012 vs. 2010 <sup>51</sup>
<b>Infrastructure</b>				
Externally connected	19	84%	8%	18%
Broadband > 50Mbps	18	33%	-2%	0%
Single and unified wireless	19	26%	-14%	26%
Single EPR shared by all departments	16	75%	18%	8%
<b>Applications</b>				
PACS usage	18	78%	7%	11%
ePrescribing	13	8%	-39%	8%
Integrated system for eReferral	13	46%	8%	13%
Tele-monitoring	14	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	13	62%	6%	28%
Exchange of laboratory results with external providers	13	38%	-13%	5%
Exchange of radiology reports with external providers	14	100%	45%	67%
<b>Security</b>				
Clear and structured rules on access to clinical data	18	78%	-8%	-22%
EAS for disaster recovery in less than 24 hours	16	69%	21%	35%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>51</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Latvian eHealth profile within EU27+3

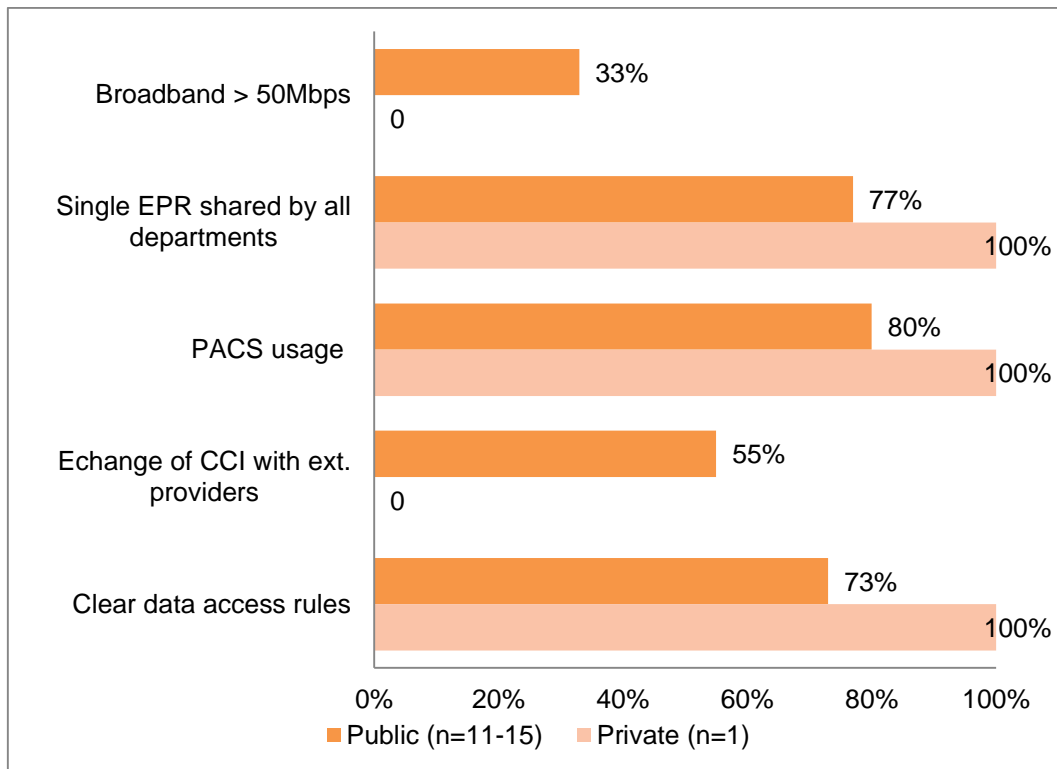
Latvia experienced an uneven development, with results for the indicators “Exchange of radiology reports with external providers” and “EAS for disaster recovery in less than 24 hours” been higher than the EU27+3 mean by 45% and 21% respectively, while “ePrescribing” was 29% below the European average.

### Changes in the Latvian eHealth profile

Latvia has made progress in its development of eHealth in acute hospitals. “Exchange of radiology reports with external providers” and “EAS for disaster recovery in less than 24 hours” accounted for the largest areas of growth at 67% and 35% respectively. Of the 13 areas examined, only one experienced negative growth and two recorded no variation in relation to the 2010 results. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

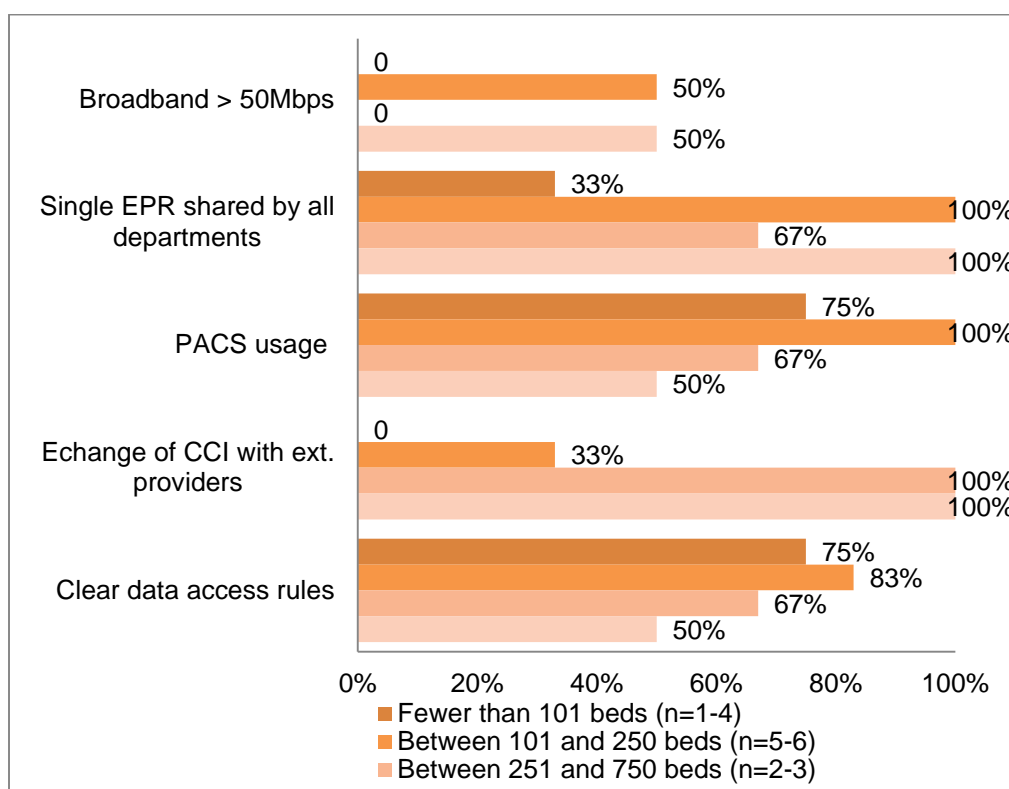
**Figure 46: Latvian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

As the category of Private not for profit returned no values for Latvia and there was only one hospital in the Private category, it is not possible to analyse indicators results by hospital's ownership.

**Figure 47: Latvian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In Latvia, acute hospitals of between 101 and 250 beds in size appear to have the highest penetration of eHealth capabilities, with four of five categories being led (or jointly led) by this segment. In two of these areas (“Single EPR shared by all departments” and “PACS usage”) hospitals with between 101 and 250 beds posted 100% values. Similarly, the largest hospitals with more than 750 beds also recorded full implementation in two areas (“Single EPR shared by all departments” and “Exchange of clinical care information with external providers”), but large hospitals have underperformed elsewhere, often by a wide margin. Nevertheless, these results should be taken with caution given the low number of hospitals in each category.

#### 4. Composite indicators

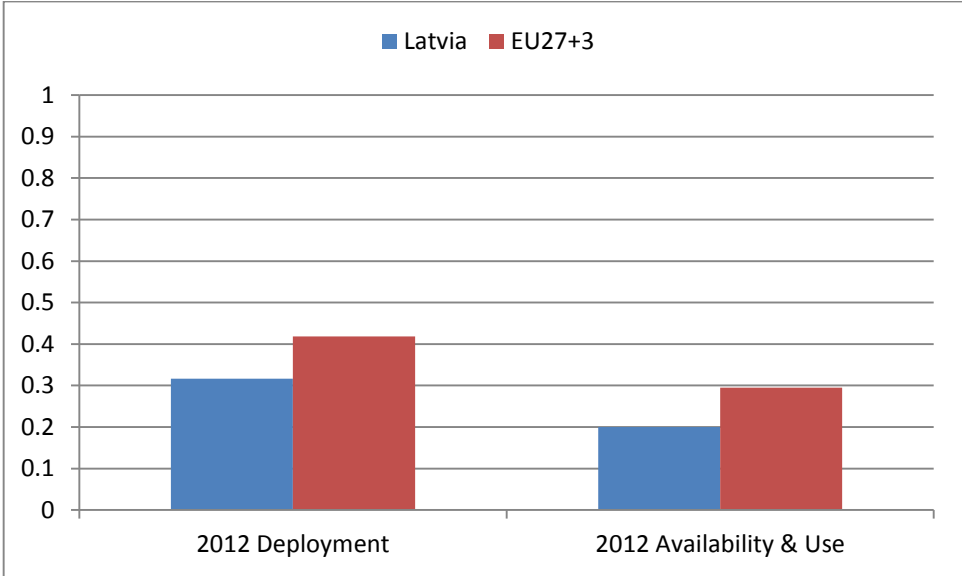
The following section reports the results for Latvia on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator.

Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Latvia’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Latvia's eHealth Deployment indicator is based on data from 9 hospitals, while the Availability and Use indicator was built from the information provided by 15 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

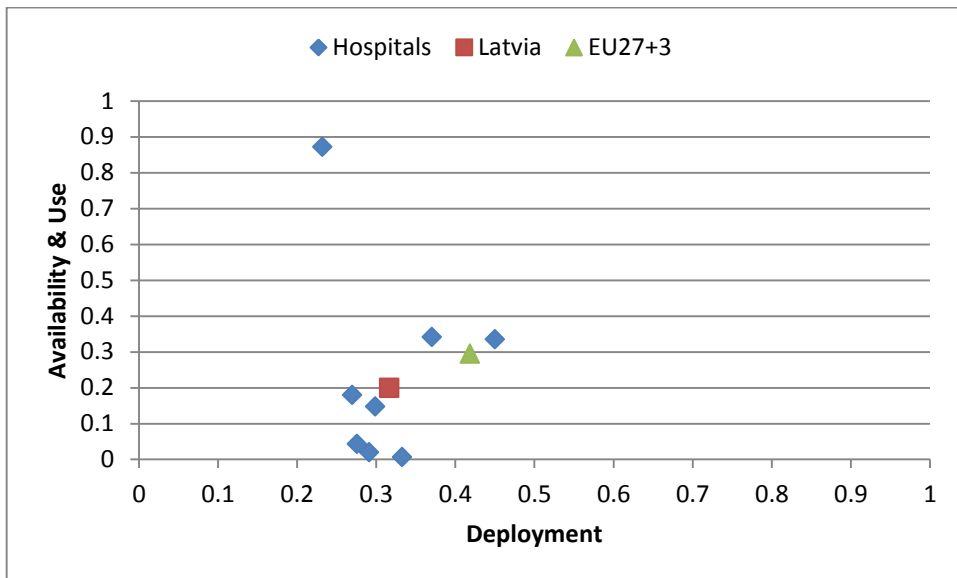
**Figure 4: Latvia eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 2 hospitals) for Latvia was 0.22, while the 2012 value was 0.32, which shows an increase of 10% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Latvia and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that only 1 hospital was above EU27+3 average for both composite indicators and another hospital had a high score in the use indicator despite its low score in the deployment indicator..

**Figure 5: Latvia's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Lithuania**



## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>52</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>53</sup>.

This document reports the results of this project for **Lithuania**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Lithuania are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

219 hospitals were identified in Lithuania. Within this rough universe 119 (54%) completed the screener part of the questionnaire and 63 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (30% vs. 21%) and there were more hospitals of public ownership (98% vs. 64%). Out of the Lithuanian universe, 32 acute hospitals (51%) completed the survey.

**Table 52: Lithuanian sample breakdown by size of acute care hospitals**

Lithuania	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>63</b>	18	17	11	10	7
		29%	27%	17%	16%	11%
<b>2012</b>	<b>32</b>	10	12	5	5	-
		31%	38%	16%	16%	-
<b>2010</b>	<b>10</b>	-	3	4	3	-
		-	30%	40%	30%	-

<sup>52</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>53</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 53: Lithuanian sample breakdown by ownership type**

Lithuania	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	63	57 90%	1 2%	-	5 8%
2012	32	32 100%	-	-	-
2010	10	10 100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Lithuanian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has tripled, with a lower proportion of very large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

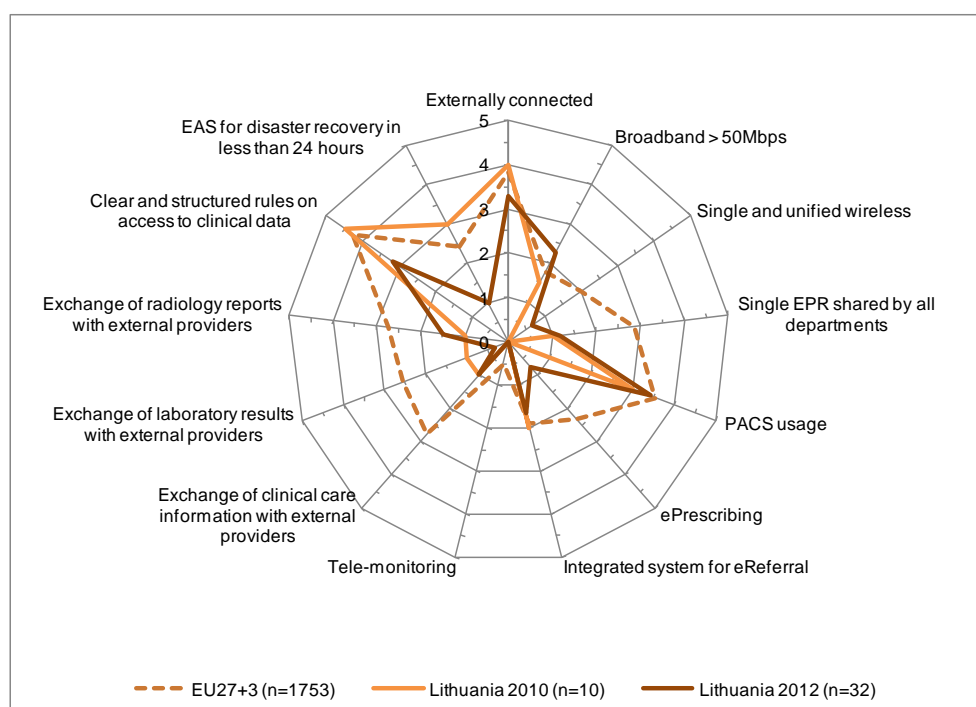
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 48: Lithuanian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 54 – eHealth indicators Lithuania**

eHealth indicators - Lithuania	Valid N	% hospitals	2012 difference Lithuania vs.EU27+3	Lithuania evolution, 2012 vs. 2010 <sup>54</sup>
<b>Infrastructure</b>				
Externally connected	32	66%	-11%	-14%
Broadband > 50Mbps	31	45%	10%	15%
Single and unified wireless	32	13%	-28%	13%
Single EPR shared by all departments	30	23%	-34%	3%
<b>Applications</b>				
PACS usage	32	69%	-2%	9%
ePrescribing	27	15%	-32%	15%
Integrated system for eReferral	27	33%	-4%	-7%
Tele-monitoring	23	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	30	20%	-35%	0%
Exchange of laboratory results with external providers	30	7%	-45%	-13%
Exchange of radiology reports with external providers	30	30%	-25%	10%
<b>Security</b>				
Clear and structured rules on access to clinical data	30	63%	-22%	-27%
EAS for disaster recovery in less than 24 hours	31	19%	-29%	-41%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>54</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Lithuanian eHealth profile within EU27+3

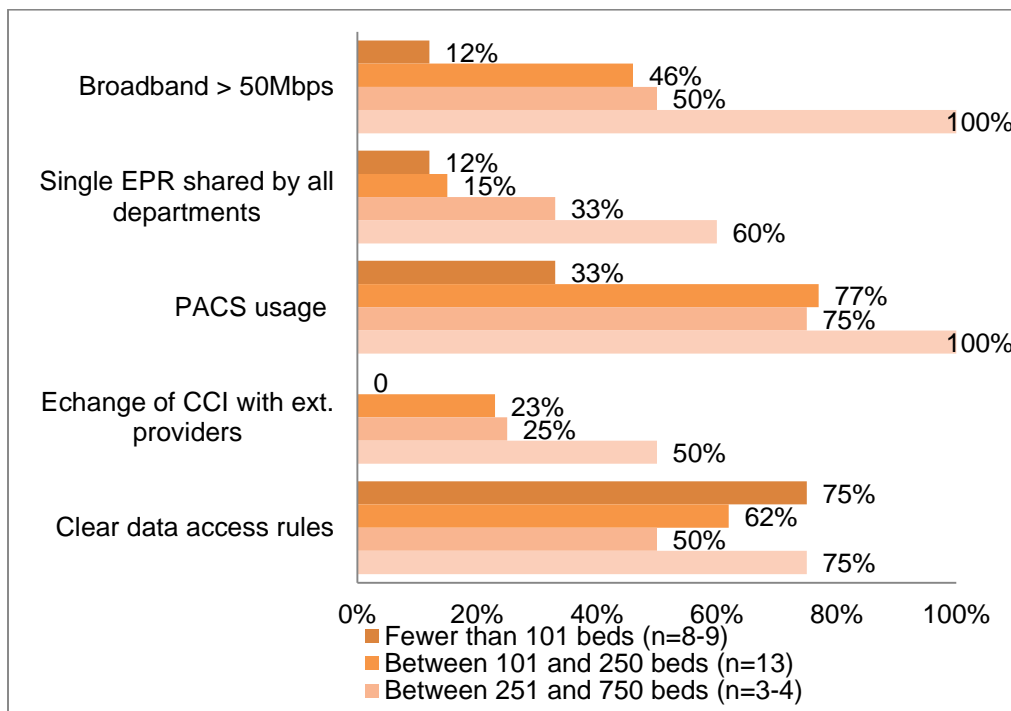
Lithuania is behind the European average in terms of eHealth, with lower values than the EU27+3 average in 12 of the 13 examined categories.. The two areas with the biggest differences were “Exchange of clinical care information with external providers” and “Exchange of laboratory results with external providers”, with -35% and -45% respectively.

Changes in the Lithuanian eHealth profile

Lithuania has seen a marginal decrease in its overall eHealth profile since 2010. The main contractions were observed in “Clear and structured rules on access to clinical data” and “EAS for disaster recovery in less than 24 hours”, which dropped by 27% and 41% respectively. In all other areas, the decline amounted to less than 15%, with some areas (“Tele-monitoring” and “Exchange of clinical care information with external providers”) recording no variation over the two-year period. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size of the hospitals (No comparison by ownership type can be carried out for Lithuania since only public hospitals returned data for the survey).

**Figure 2: Lithuanian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Lithuanian hospitals with more than 750 beds score better than all other segments in all categories under review.. By contrast, acute hospitals with fewer than 101 beds have the lowest scores in three of the five categories.

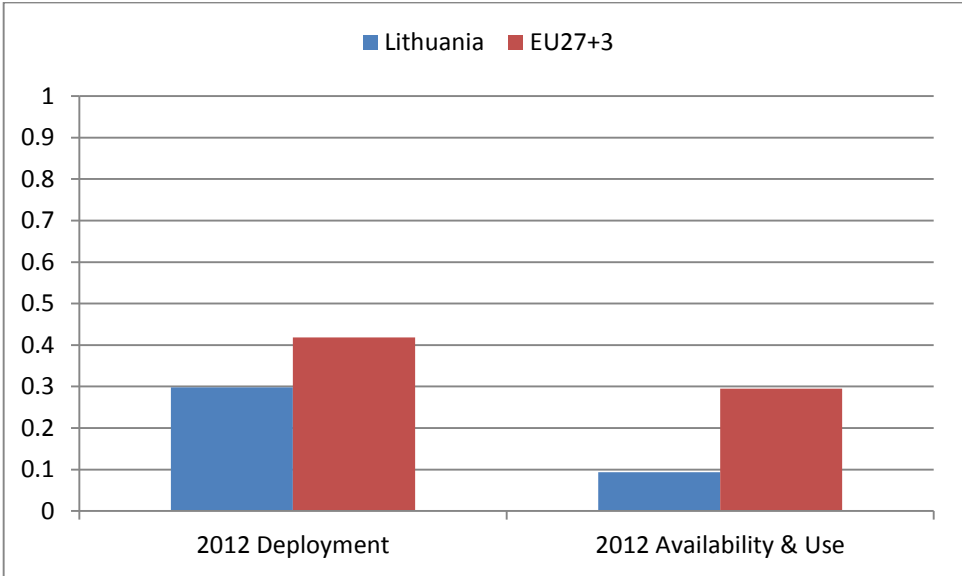
### 4. Composite indicators

The following section reports the results for Lithuania on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Lithuania's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Lithuania's eHealth Deployment indicator is based on data from 30 hospitals, while the Availability and Use indicator was built from the information provided by 32 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

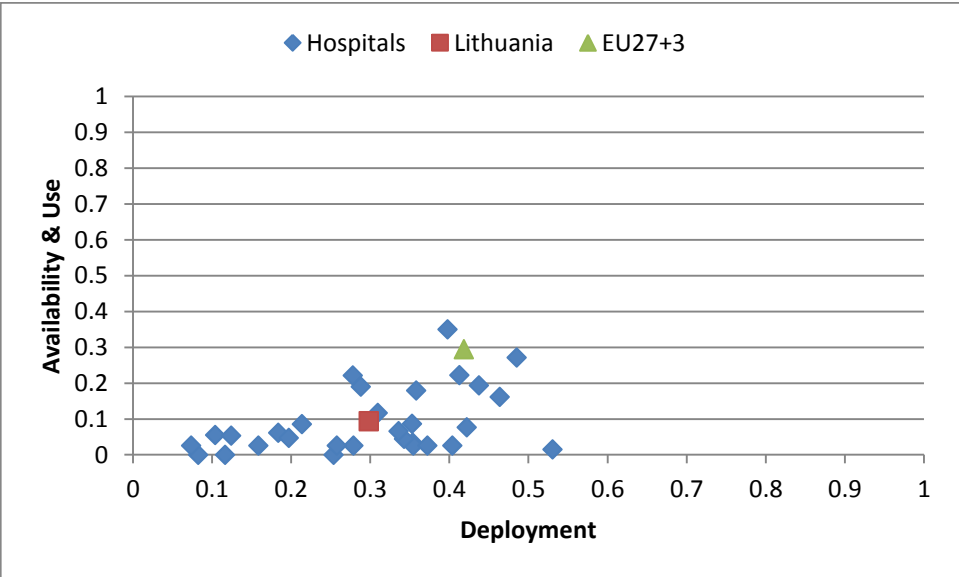
**Figure 3: Lithuania eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 10 hospitals) for Lithuania was 0.23, while the 2012 value was 0.30, which shows an increase of 7% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Lithuania and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a large group of hospitals with almost no Effective use at various levels of deployment. No hospital was above EU27+3 average for both composite indicators.

**Figure 4: Lithuania's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Luxembourg**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>55</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>56</sup>.

This document reports the results of this project for **Luxembourg**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Luxembourg are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

7 hospitals were identified in Luxembourg. Within this rough universe 7 (100%) completed the screener part of the questionnaire and all of them qualified as acute care hospitals. The proportion of hospitals with between 250-750 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (71% vs. 36%). Out of the Luxembourgish universe, 3 acute hospitals (43%) completed the survey.

**Table 55: Luxembourgish sample breakdown by size of acute care hospitals**

Luxembourg	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	7	2	-	5	-	-
		29%	-	71%	-	-
<b>2012</b>	3	-	-	3	-	-
		-	-	100%	-	-
<b>2010</b>	3	1	-	2	-	-
		33%	-	67%	-	-

<sup>55</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>56</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"



**Table 56: Luxembourgish sample breakdown by ownership type**

Luxembourg	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	7	4 57%	-	3 43%	-
2012	3	1 33%	-	2 67%	-
2010	3	2 67%	1 33%	-	-

Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has remained the same, with a lower proportion of public hospitals than in 2010 and with no small hospitals.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

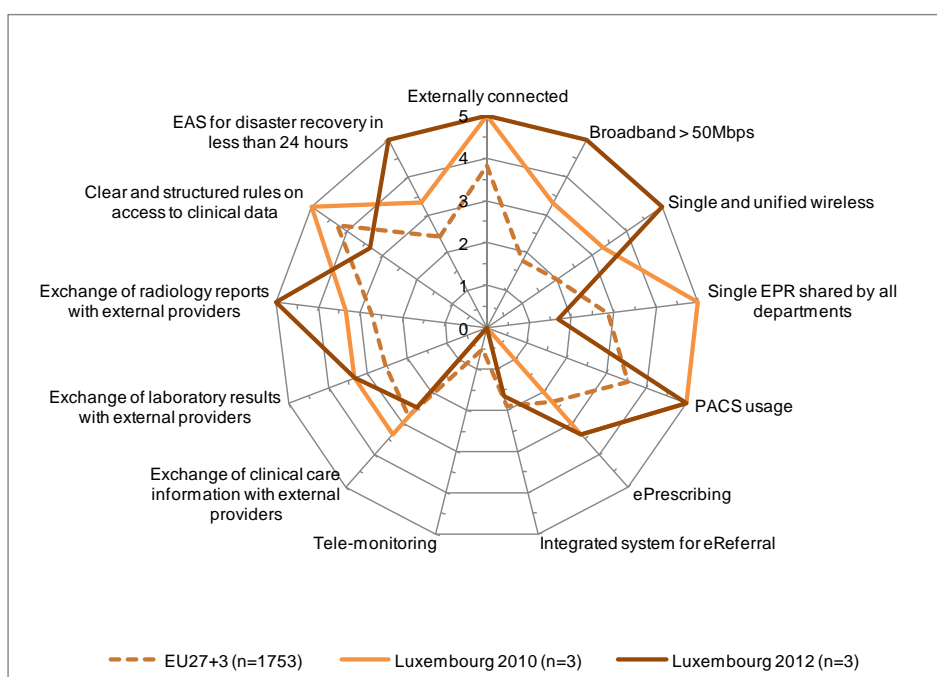
Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

**Figure 49: Luxembourgish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 57 – eHealth indicators Luxembourg**

eHealth indicators - Luxembourg	Valid N	% hospitals	2012 difference Luxembourg vs.EU27+3	Luxembourg evolution, 2012 vs. 2010 <sup>57</sup>
<b>Infrastructure</b>				
Externally connected	3	100%	24%	0%
Broadband > 50Mbps	3	100%	64%	33%
Single and unified wireless	3	100%	60%	33%
Single EPR shared by all departments	3	33%	-24%	-67%
<b>Applications</b>				
PACS usage	3	100%	29%	0%
ePrescribing	3	67%	20%	0%
Integrated system for eReferral	3	33%	-4%	33%
Tele-monitoring	3	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	2	50%	-5%	-17%
Exchange of laboratory results with external providers	3	67%	15%	0%
Exchange of radiology reports with external providers	3	100%	45%	33%
<b>Security</b>				
Clear and structured rules on access to clinical data	3	67%	-19%	-33%
EAS for disaster recovery in less than 24 hours	3	100%	52%	33%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>57</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Luxembourgish eHealth profile within EU27+3

Luxembourg has an excellent eHealth profile compared to the European average. Values for “Broadband > 50Mbps” and “Single and unified wireless” were particularly strong, with significant leads over the EU27+3 average.

### Changes in the Luxembourgish eHealth profile

Luxembourg’s overall eHealth profile has not changed considerably since 2010. “Single EPR shared by all departments” accounted for the most dramatic change, with a drop of 67% in relation to the 2010 position, while “Broadband >50Mbps”, “Single and unified wireless”, “Integrated system for eReferral”, “Exchange of radiology reports with external providers” and “EAS for disaster recovery in less than 24 hours” all posted gains of 33%. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Low number of hospitals included in the sample prevents from analyzing differences in the results by hospital characteristics as size and ownership.

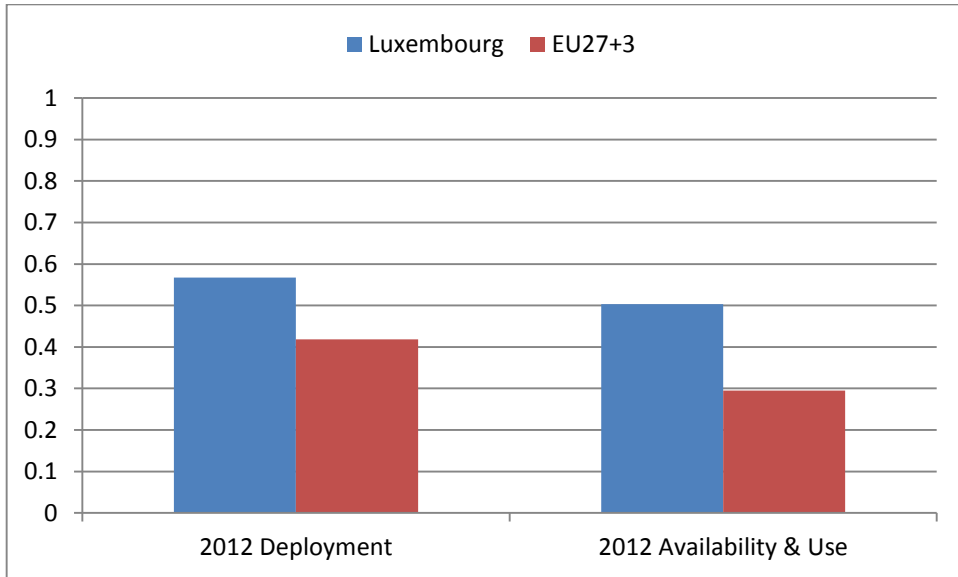
## **4. Composite indicators**

The following section reports the results for Luxembourg on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals’ units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Luxembourg’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Luxembourg’s eHealth Deployment indicator is based on data from 3 hospitals, while the Availability and Use indicator was built from the information provided by 3 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

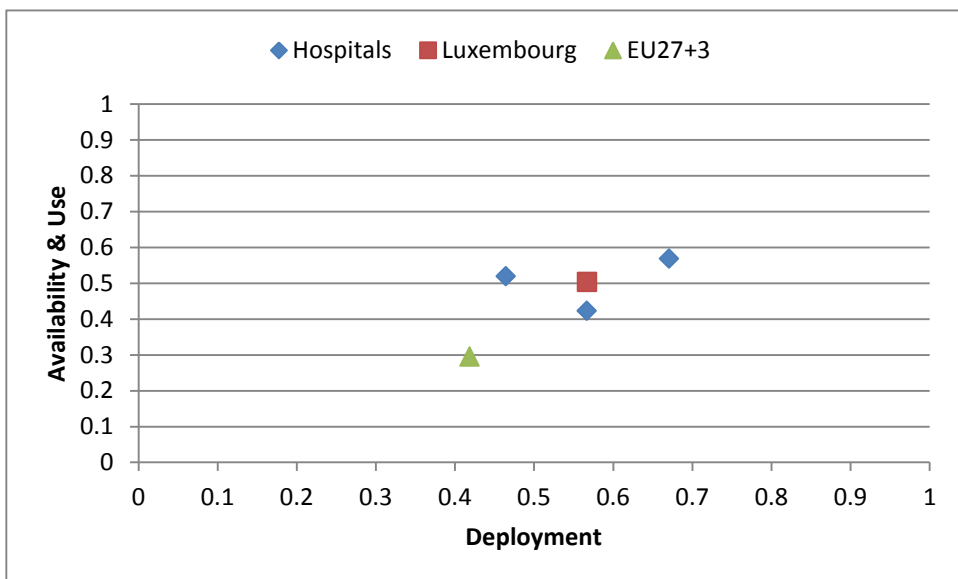
**Figure 2: Luxembourg eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 3 hospitals) for Luxembourg was 0.45, while the 2012 value was 0.57, which shows an increase of 12% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Luxembourg and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that all hospitals (3) were above EU27+3 average for both composite indicators.

**Figure 3: Luxembourg's hospitals values of eHealth Composite Indicators**



# European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)

## **Country Report Malta**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>58</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>59</sup>.

This document reports the results of this project for **Malta**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Malta are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

10 hospitals were identified in Malta. Within this rough universe 8 (80%) completed the screener part of the questionnaire and 3 qualified as acute care hospitals. Out of the Maltese universe, 2 acute hospitals (67%) completed the survey.

**Table 58: Maltese sample breakdown by size of acute care hospitals**

Malta	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>3</b>	1	1	-	1	-
		33%	33%	-	33%	-
<b>2012</b>	<b>2</b>	-	1	-	1	-
		-	50%	-	50%	-
<b>2010</b>	<b>3</b>	2	-	-	1	-
		67%	-	-	33%	-

<sup>58</sup> This criteria was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>59</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 59: Maltese sample breakdown by ownership type**

Malta	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	3	2	1	-	-
		67%	33%	-	-
2012	2	2	-	-	-
		100%	-	-	-
2010	3	2	1	-	-
		67%	33%	-	-

Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has decreased.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

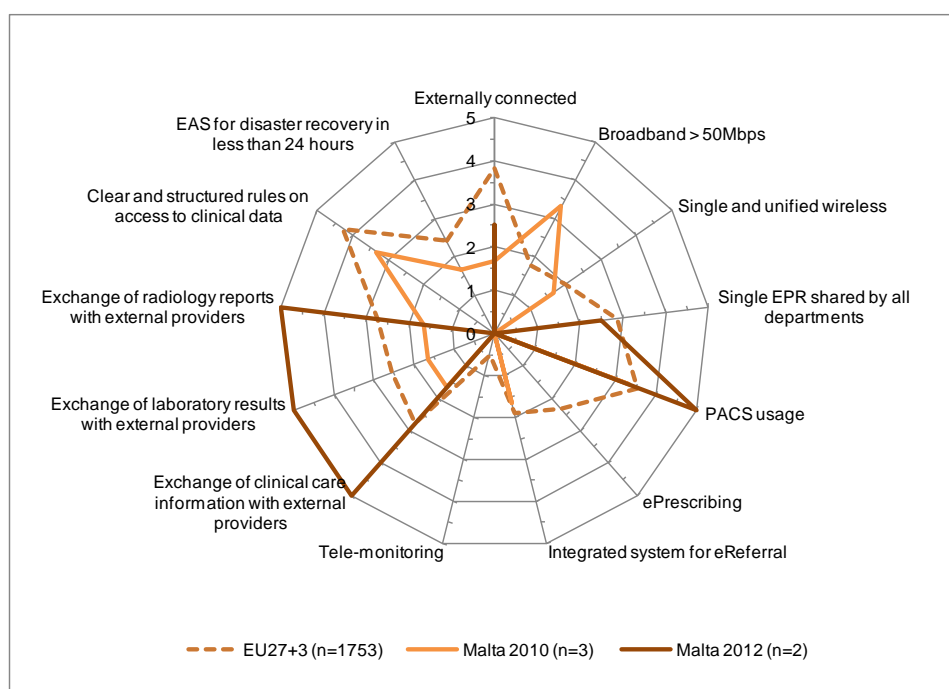
Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

**Figure 50: Maltese acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 60 – eHealth indicators Malta**

eHealth indicators - Malta	Valid N	% hospitals	2012 difference Malta vs.EU27+3	Malta evolution, 2012 vs. 2010 <sup>60</sup>
<b>Infrastructure</b>				
Externally connected	2	50%	-26%	17%
Broadband > 50Mbps	1	0%	-36%	-67%
Single and unified wireless	2	0%	-40%	-33%
Single EPR shared by all departments	2	50%	-7%	50%
<b>Applications</b>				
PACS usage	2	100%	29%	33%
ePrescribing	2	0%	-47%	0%
Integrated system for eReferral	2	0%	-38%	-33%
Tele-monitoring	2	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	1	100%	45%	67%
Exchange of laboratory results with external providers	1	100%	49%	67%
Exchange of radiology reports with external providers	2	100%	45%	67%
<b>Security</b>				
Clear and structured rules on access to clinical data	na	na	na	na
EAS for disaster recovery in less than 24 hours	na	na	na	na

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>60</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.



### Position of the Maltese eHealth profile within EU27+3

Malta trails the European average in eHealth, with significant discrepancies in four of the 13 areas examined. However, the low number of hospitals (2) included in the Maltese sample requires that these results should be taken with caution.

### Changes in the Maltese eHealth profile

Since 2010, Malta has made progress on its eHealth profile. “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers” are the areas where the increase has been bigger. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years and the sample sizes are very small.

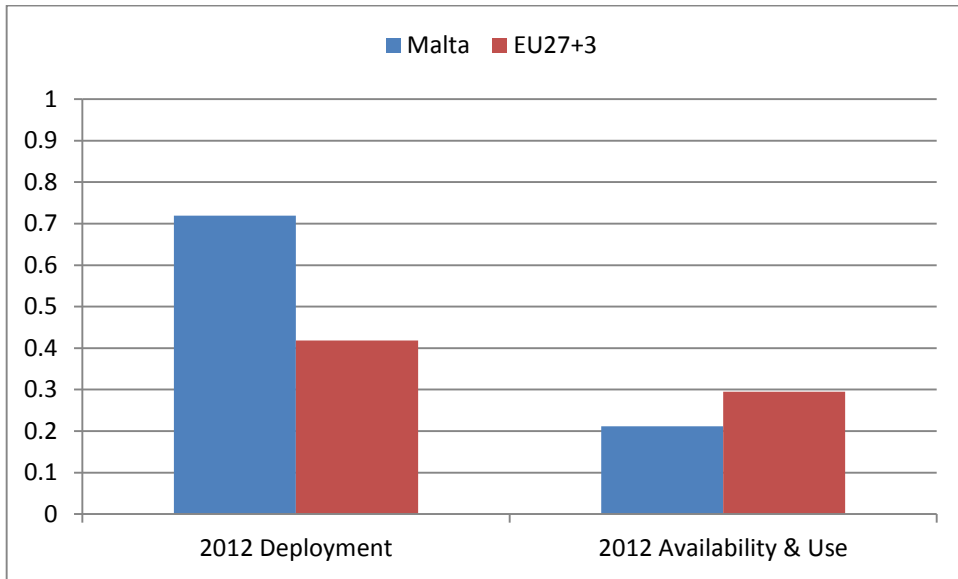
## **4. Composite indicators**

The following section reports the results for Malta on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Malta's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Malta's eHealth Deployment indicator is based on data from only 1 hospital, as the Availability and Use indicator. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

**Figure 4: Malta eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 3 hospitals) for Malta was 0.31, while the 2012 value was 0.72, which shows an increase of 41% over the two year period. As mentioned before, 2012 result is based on data form only one hospital. Therefore, the finding on increase of deployment should be taken with caution. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

# European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)

## **Country Report The Netherlands**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>61</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>62</sup>.

This document reports the results of this project for **the Netherlands**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for the Netherlands are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

606 hospitals were identified in the Netherlands. Within this rough universe 381 (63%) completed the screener part of the questionnaire and 114 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (9% vs. 21%) and there were more hospitals of public ownership (89% vs. 64%). Out of the Dutch universe, 26 acute hospitals (23%) completed the survey.

**Table 61: Dutch sample breakdown by size of acute care hospitals**

Netherlands	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>114</b>	7	10	48	15	34
		6%	9%	42%	13%	30%
<b>2012</b>	<b>26</b>	5	3	14	3	1
		19%	12%	54%	12%	4%
<b>2010</b>	<b>29</b>	-	3	19	4	3
		-	10%	66%	14%	10%

<sup>61</sup> This criteria was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>62</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 62: Dutch sample breakdown by ownership type**

Netherlands	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>114</b>	85 75%	4 4%	6 5%	19 17%
<b>2012</b>	<b>26</b>	20 77%	1 4%	5 19%	- -
<b>2010</b>	<b>29</b>	27 93%	1 3%	- -	1 3%

The final sample of hospitals included in the survey has a similar structure to the one of the Dutch universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has decreased, with a lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

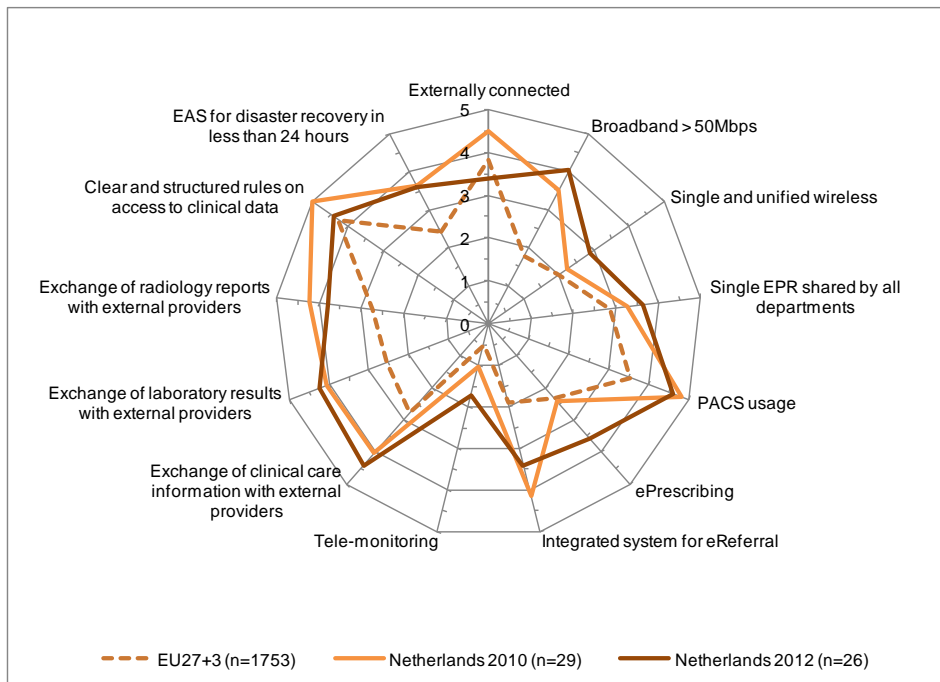
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 51: Dutch acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 63 – eHealth indicators The Netherlands**

eHealth indicators - the Netherlands	Valid N	% hospitals	2012 difference the Netherlands vs.EU27+3	the Netherlands evolution, 2012 vs. 2010 <sup>63</sup>
<b>Infrastructure</b>				
Externally connected	25	68%	-8%	-22%
Broadband > 50Mbps	26	81%	45%	10%
Single and unified wireless	26	58%	18%	13%
Single EPR shared by all departments	26	73%	16%	8%
<b>Applications</b>				
PACS usage	26	92%	21%	-4%
ePrescribing	25	72%	25%	24%
Integrated system for eReferral	25	68%	30%	-15%
Tele-monitoring	26	35%	3%	68%
<b>Integration</b>				
Exchange of clinical care information with external providers	26	88%	33%	8%
Exchange of laboratory results with external providers	26	85%	33%	3%
Exchange of radiology reports with external providers	25	76%	21%	-9%
<b>Security</b>				
Clear and structured rules on access to clinical data	26	88%	3%	-12%
EAS for disaster recovery in less than 24 hours	25	72%	21%	8%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>63</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Dutch eHealth profile within EU27+3

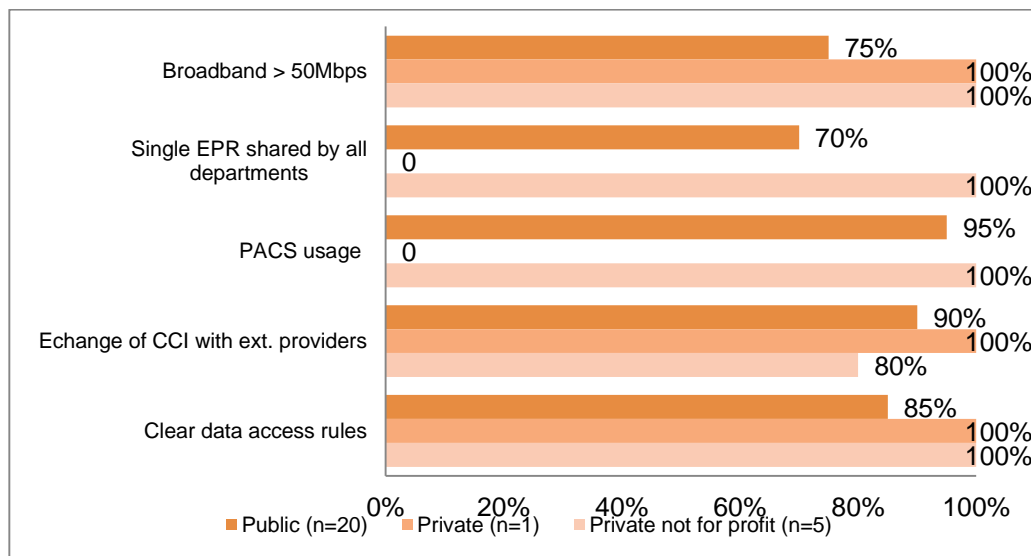
The Netherlands scores better than the European average eHealth profile by a wide margin, with “Broadband > 50Mbps” 45% in excess of the European average. This good performance is distributed evenly across all sectors, with only one indicator of the 13 under review scoring below the EU27+3 average (“Externally connected” at -8%)..

### Changes in the Dutch eHealth profile

The Dutch eHealth profile has not changed significantly between 2010 and 2012. The single largest gain was realised in the area of “Tele-monitoring”, which increased by 68% over the period. By contrast, “Externally connected”, “PACS usage”, “Integrated system for eReferral”, “Exchange of radiology reports with external providers” and “Clear and structured rules on access to clinical data” all posted negative growth; however, with the exception of “Externally connected” these reductions did not exceed 15%. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

**Figure 52: Dutch acute hospitals eHealth profile by ownership**

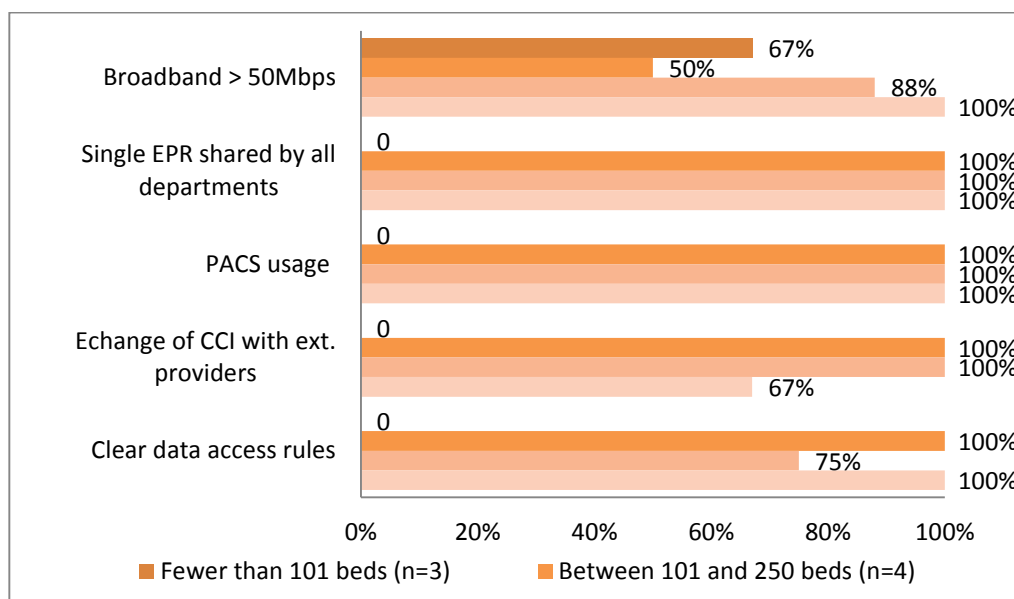


*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

When considering capabilities based on the ownership type of the hospital in question, in the Netherlands we can observe that both Private and Private not for profit hospitals lead in all five categories: “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”. Public hospitals, by contrast, lag behind in all these categories, being the gap larger for the indicator “Single EPR shared by all departments”.

Areas as “Broadband > 50Mbps”, “Exchange of clinical care information with external providers” and “PACS usage”) show important differences. between Public and Private hospitals. Looking across ownership types, Private hospitals appear to be generally better endowed with respect to eHealth facilities, with the exception of “Broadband > 50Mbps”, where Private hospitals lag behind Public hospitals

**Figure 53: Dutch acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In terms of hospital size, eHealth performance in the Netherlands remains evenly distributed, with very high penetration rates being posted across most segments for “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”. However, in most categories, no data was returned for hospitals with fewer than 101 beds.

#### 4. Composite indicators

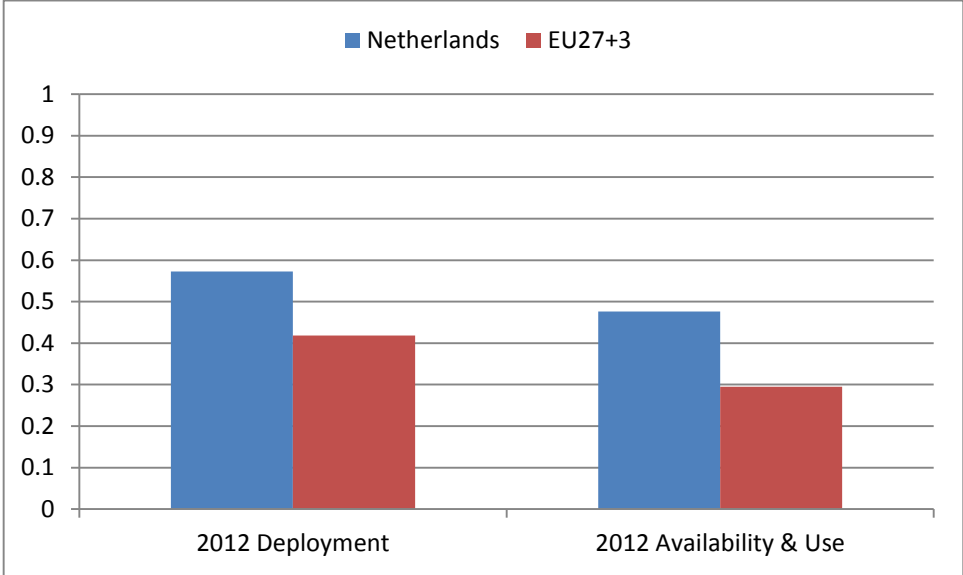
The following section reports the results for the Netherlands on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals’ units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.



The following graph displays the average values of these indicators in the Netherlands's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. The Netherlands's eHealth Deployment indicator is based on data from 25 hospitals, while the Availability and Use indicator was built from the information provided by 20 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

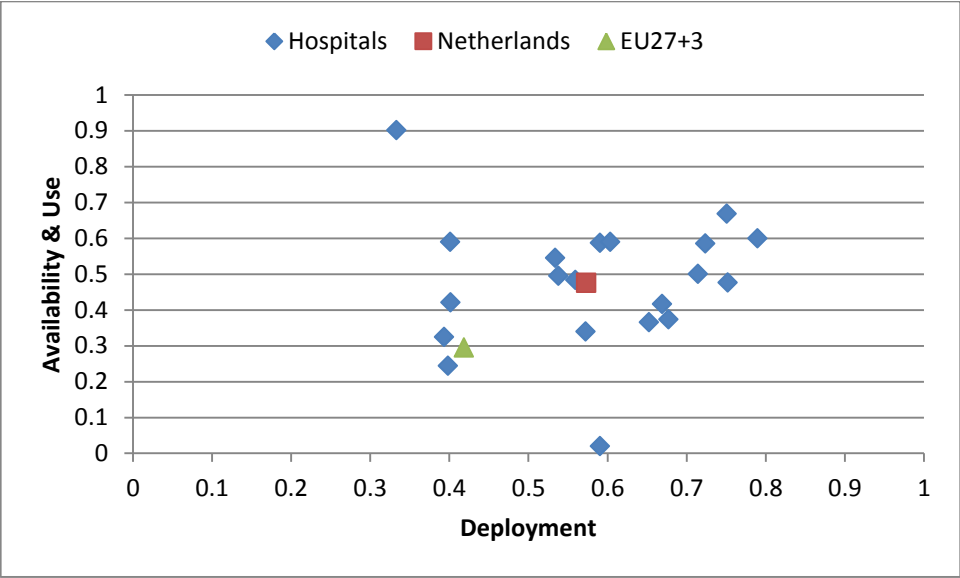
**Figure 4: the Netherlands eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 23 hospitals) for the Netherlands was 0.60, while the 2012 value was 0.57, which shows a negative growth of 3% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for the Netherlands and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is large variability between hospitals in their level of effective use, even at similar levels of deployment. Only 1 hospital was below EU27+3 average for both composite indicators.

**Figure 5: the Netherlands's hospitals values of eHealth Composite Indicators**



# European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)

## **Country Report Norway**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>64</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>65</sup>.

This document reports the results of this project for **Norway**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Norway are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

100 hospitals were identified in Norway. Within this rough universe 75 (75%) completed the screener part of the questionnaire and 28 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (48% vs. 21%) and there were more hospitals of public ownership (81% vs. 64%). Out of the Norwegian universe, 6 acute hospitals (21%) completed the survey.

**Table 64: Norwegian sample breakdown by size of acute care hospitals**

Norway	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>28</b>	12 43%	6 21%	4 14%	3 11%	3 11%
<b>2012</b>	<b>6</b>	2 33%	2 33%	1 17%	1 17%	- -
<b>2010</b>	<b>7</b>	1 14%	2 29%	3 43%	1 14%	- -

<sup>64</sup> This criteria was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>65</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 65: Norwegian sample breakdown by ownership type**

Norway	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>28</b>	21 75%	4 14%	1 4%	2 7%
<b>2012</b>	<b>6</b>	3 50%	3 50%	-	-
<b>2010</b>	<b>7</b>	6 86%	-	1 14%	-

The final sample of hospitals included in the survey has a similar structure to the one of the Norwegian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has reduced, with a lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

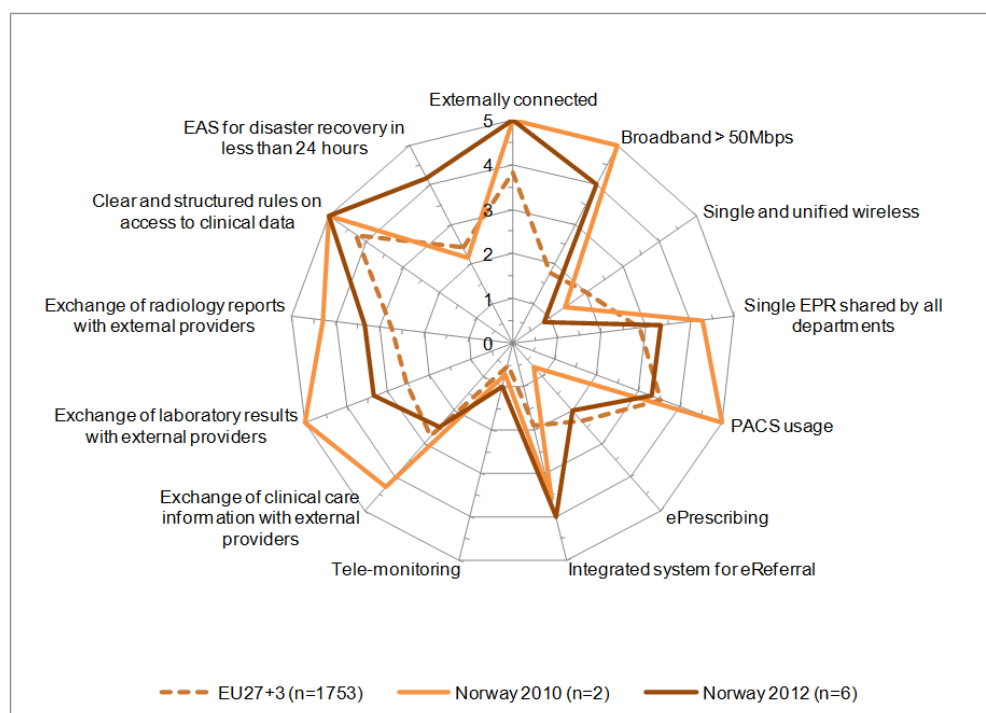
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 54: Norwegian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 66 – eHealth indicators Norway**

eHealth indicators - Norway	Valid N	% hospitals	2012 difference Norway vs.EU27+3	Norway evolution, 2012 vs. 2010 <sup>66</sup>
<b>Infrastructure</b>				
Externally connected	6	100%	24%	0%
Broadband > 50Mbps	5	80%	44%	-20%
Single and unified wireless	6	17%	-23%	-12%
Single EPR shared by all departments	6	67%	10%	-19%
<b>Applications</b>				
PACS usage	6	67%	-4%	-33%
ePrescribing	5	40%	-7%	26%
Integrated system for eReferral	5	80%	42%	9%
Tele-monitoring	5	20%	10%	6%
<b>Integration</b>				
Exchange of clinical care information with external providers	6	50%	-5%	-36%
Exchange of laboratory results with external providers	6	67%	15%	-33%
Exchange of radiology reports with external providers	6	67%	12%	-19%
<b>Security</b>				
Clear and structured rules on access to clinical data	6	100%	15%	0%
EAS for disaster recovery in less than 24 hours	6	83%	35%	40%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>66</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Norwegian eHealth profile within EU27+3

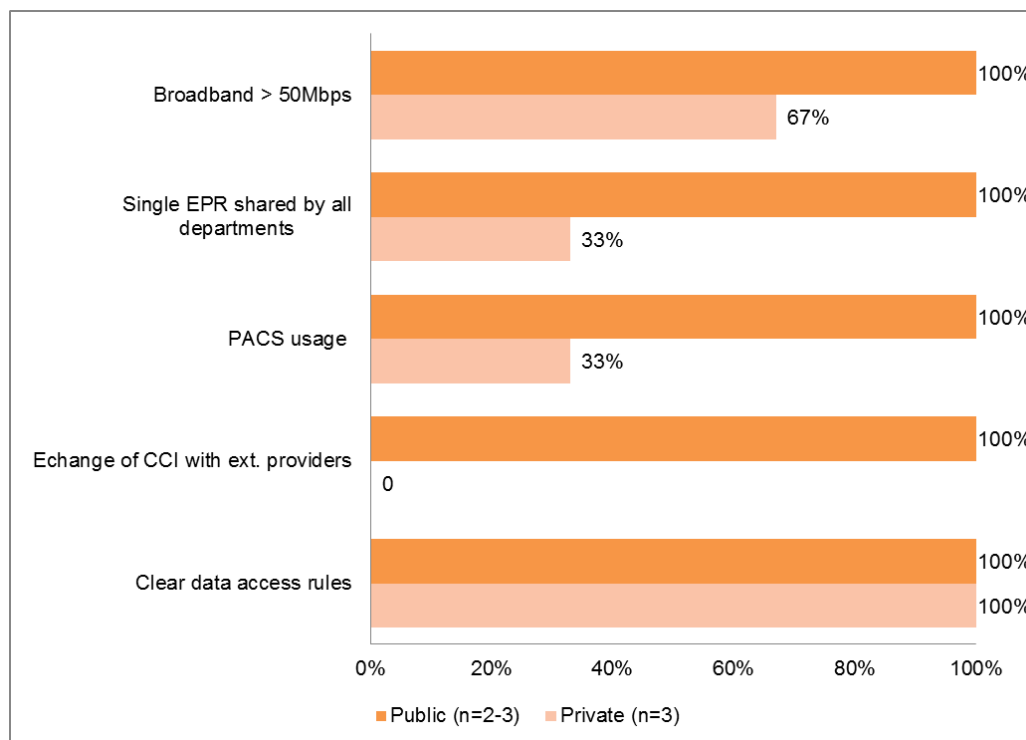
Norway noticeably scores better than the average EU27+3 in in the areas of “Broadband > 50Mbps” and “Integrated system for eReferral”. The country is slightly behind in terms of “Single and unified wireless”, “PACS usage”, “ePrescribing” and “Exchange of clinical care information with external providers”.

Changes in the Norwegian eHealth profile

Norway’s eHealth profile has declined in relation to 2010, with nine of 13 areas posting zero growth or negative growth in 2012. This reduction was fairly evenly distributed, with the largest decreases registered in “PACS usage”, “Exchange of clinical care information with external providers” and “Exchange of laboratory results with external providers”. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

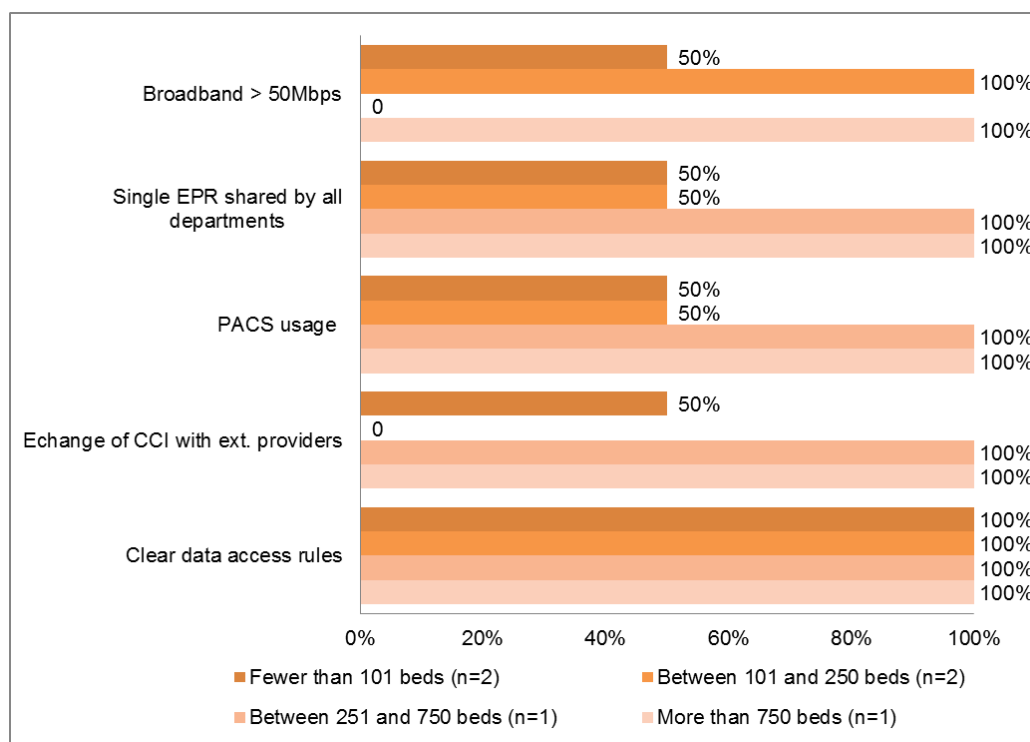
**Figure 55: Norwegian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Although Private not for profit hospitals did not return any results for Norway, a clear comparison can still be made between Public and Private hospitals in terms of eHealth capabilities. Public hospitals in Norway recorded full implementation in all five areas under scrutiny and outperformed Private hospitals by a wide margin in the areas of “Broadband > 50Mbps”, “Single EPR shared by all departments” and “PACS usage”.

**Figure 56: Norwegian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

The largest hospitals in Norway by scale (Between 251 and 750 beds and More than 750 beds) appear to enjoy a distinct advantage over the smaller categories of acute hospitals. Larger hospitals led in five of five examined areas, and in four categories enjoyed a 50 percentage point lead over their smaller counterparts. These categories were “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage” and “Exchange of clinical care information with external providers”.

#### 4. Composite indicators

The following section reports the results for Norway on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

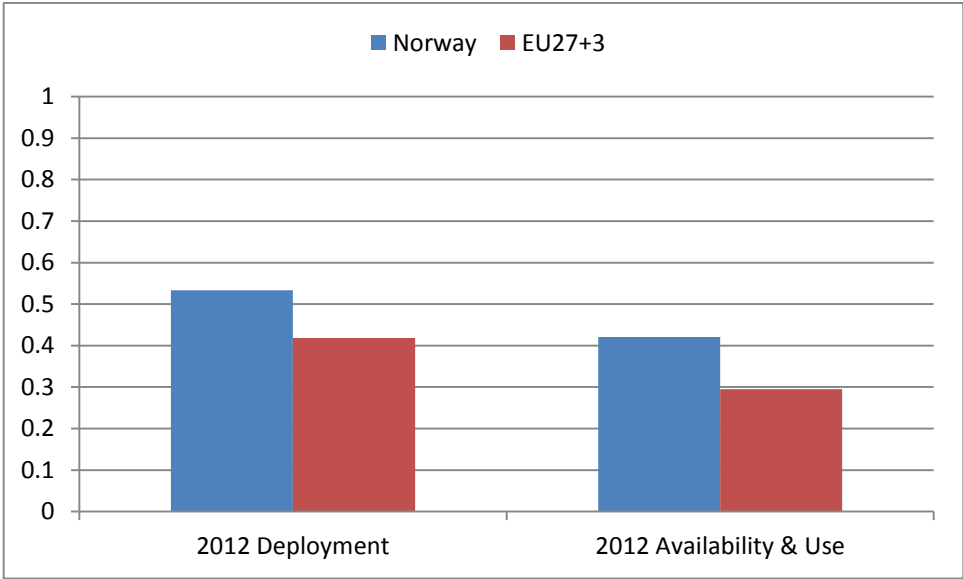
The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information



Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Norway’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Norway’s eHealth Deployment indicator is based on data from 4 hospitals, while the Availability and Use indicator was built from the information provided by 5 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

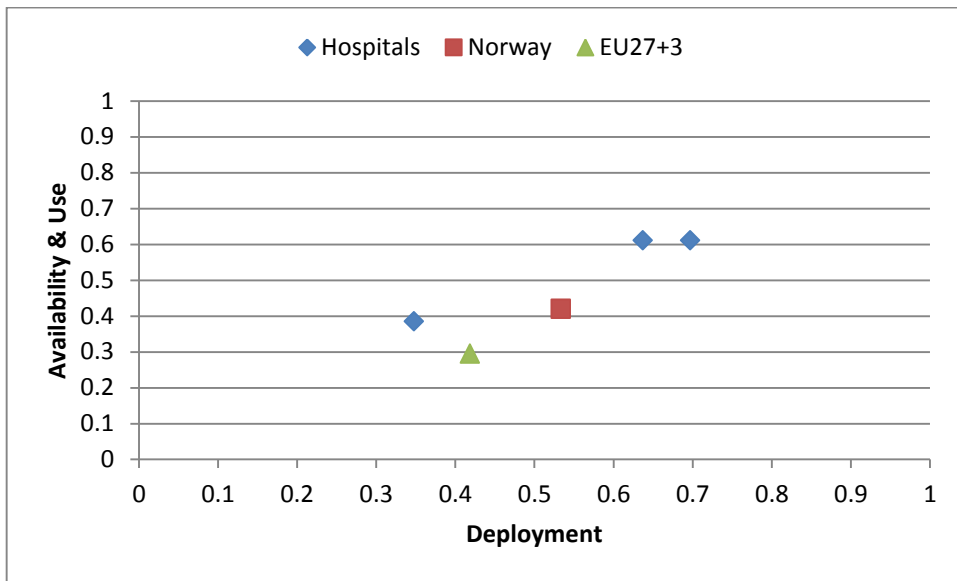
**Figure 4: Norway eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 7 hospitals) for Norway was 0.64, while the 2012 value was 0.53, which shows a negative growth of 11% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators (only 3 ), it is possible to map these individual values on a graph and compare them with the average value for Norway and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a significant difference in the score of the indicators between one hospital and the other 2 with completed data.

**Figure 5: Norway's hospitals values of eHealth Composite Indicators**



# European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)

## **Country Report Poland**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>67</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>68</sup>.

This document reports the results of this project for **Poland**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Poland are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

2411 hospitals were identified in Poland. Within this rough universe 1110 (46%) completed the screener part of the questionnaire and 459 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was lower compared to the universe of acute Hospitals at EU27+3 level (16% vs. 21%) and there were more hospitals of public ownership (81% vs. 64%). Out of the Polish universe, 149 acute hospitals (32%) completed the survey.

**Table 67: Polish sample breakdown by size of acute care hospitals**

Poland	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>459</b>	67	157	180	26	29
		15%	34%	39%	6%	6%
<b>2012</b>	<b>149</b>	18	65	54	9	3
		12%	44%	36%	6%	2%
<b>2010</b>	<b>99</b>	21	34	36	3	5
		21%	34%	36%	3%	5%

<sup>67</sup> This criteria was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>68</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 68: Polish sample breakdown by ownership type**

Poland	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>459</b>	349 76%	69 15%	13 3%	28 6%
<b>2012</b>	<b>149</b>	118 79%	22 15%	7 5%	2 1%
<b>2010</b>	<b>99</b>	85 86%	12 12%	-	2 2%

The final sample of hospitals included in the survey has a similar structure to the one of the Polish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has increased a 50%, with a lower proportion of very small hospitals (less than 100 beds) than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

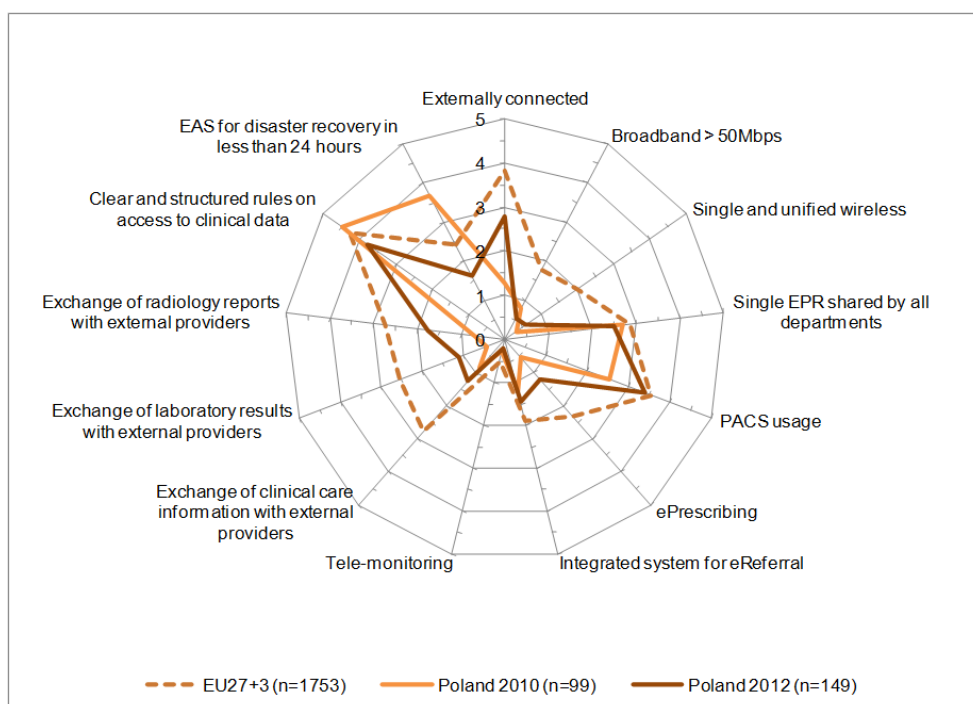
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 57: Polish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 69 – eHealth indicators Poland**

eHealth indicators - Poland	Valid N	% hospitals	2012 difference Poland vs.EU27+3	Poland evolution, 2012 vs. 2010 <sup>69</sup>
<b>Infrastructure</b>				
Externally connected	149	56%	-21%	30%
Broadband > 50Mbps	146	11%	-25%	-5%
Single and unified wireless	147	12%	-28%	6%
Single EPR shared by all departments	144	50%	-7%	-4%
<b>Applications</b>				
PACS usage	148	68%	-3%	18%
ePrescribing	106	25%	-22%	13%
Integrated system for eReferral	106	29%	-9%	5%
Tele-monitoring	117	4%	-6%	-1%
<b>Integration</b>				
Exchange of clinical care information with external providers	142	25%	-30%	8%
Exchange of laboratory results with external providers	146	23%	-29%	14%
Exchange of radiology reports with external providers	145	35%	-20%	21%
<b>Security</b>				
Clear and structured rules on access to clinical data	146	76%	-9%	-14%
EAS for disaster recovery in less than 24 hours	142	32%	-16%	-41%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>69</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Polish eHealth profile within EU27+3

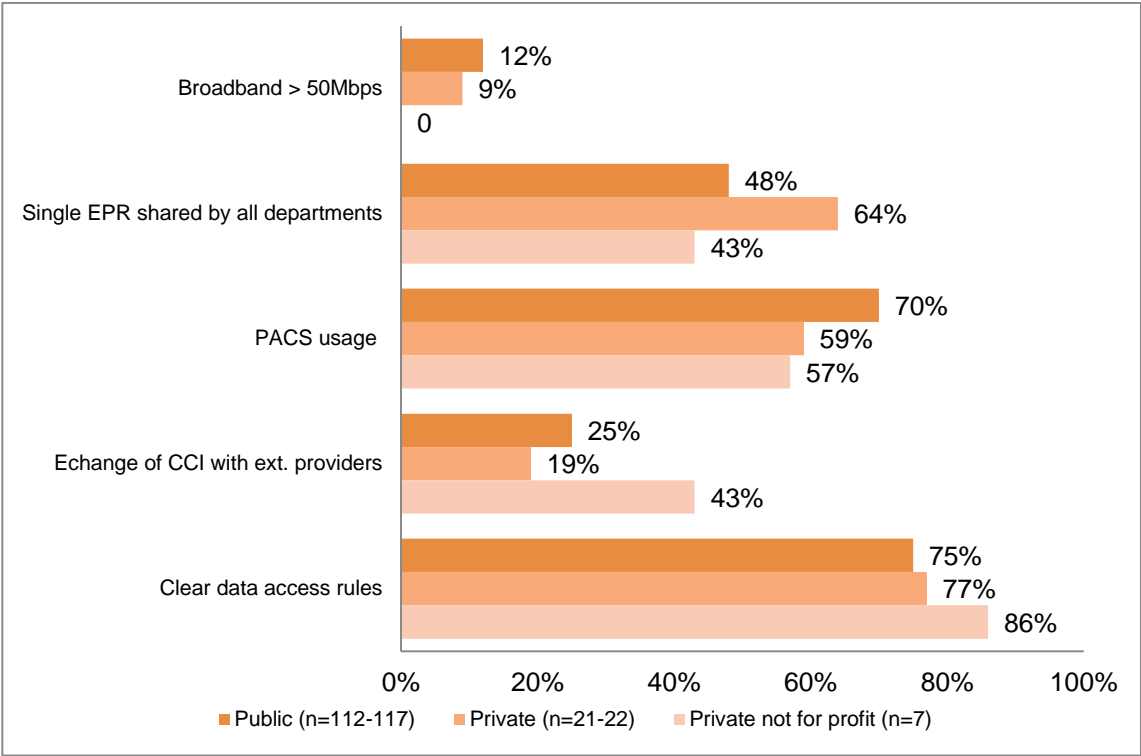
Poland is universally behind the European average in eHealth, with all areas under review behind the corresponding average value. The country’s lag was evenly distributed across all 13 sectors and the difference did not exceed 30% in all sectors.

Changes in the Polish eHealth profile

Despite falling far behind the European average, Poland’s eHealth profile has improved somewhat. However, the changes have been broadly spread out across the 13 areas, with the two largest movers (“Externally connected” and “EAS for disaster recovery in less than 24 hours”) posting a 30% and a -41% difference since then. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

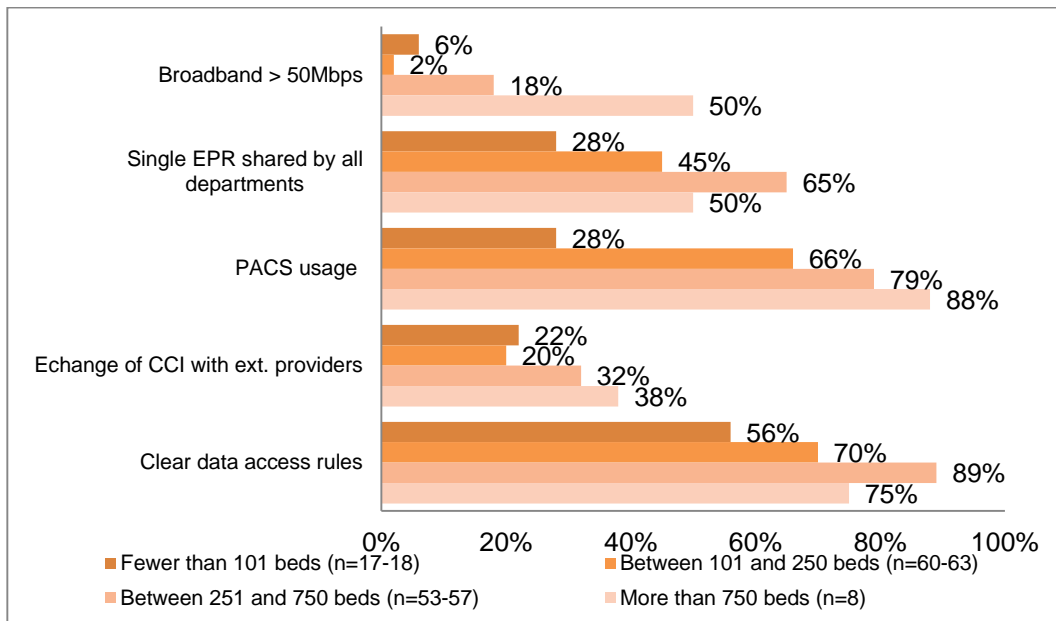
**Figure 58: Polish acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

There are no clear discrepancies in terms of eHealth capabilities in Polish acute hospitals when ownership characteristics are taken into account. Private not for profit acute hospitals score highly in two specific areas (“Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”), but either scored worse or did not return values for the other areas under review. Public hospitals, by contrast, led in only two areas (“PACS usage” and “Broadband > 50Mbps”), although this advantage was only marginal.

**Figure 59: Polish acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

The scale of Polish acute hospitals does appear to be a significant factor in the development of eHealth capabilities, both in terms of leadership and extent of leadership. In all five categories examined, hospitals with between 251 and 750 beds and with more than 750 beds outperformed hospitals of lesser scale. In addition, this advantage was often significant, as can be seen in “Broadband > 50Mbps”, “Single EPR shared by all departments” and “PACS usage”.

#### 4. Composite indicators

The following section reports the results for Poland on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

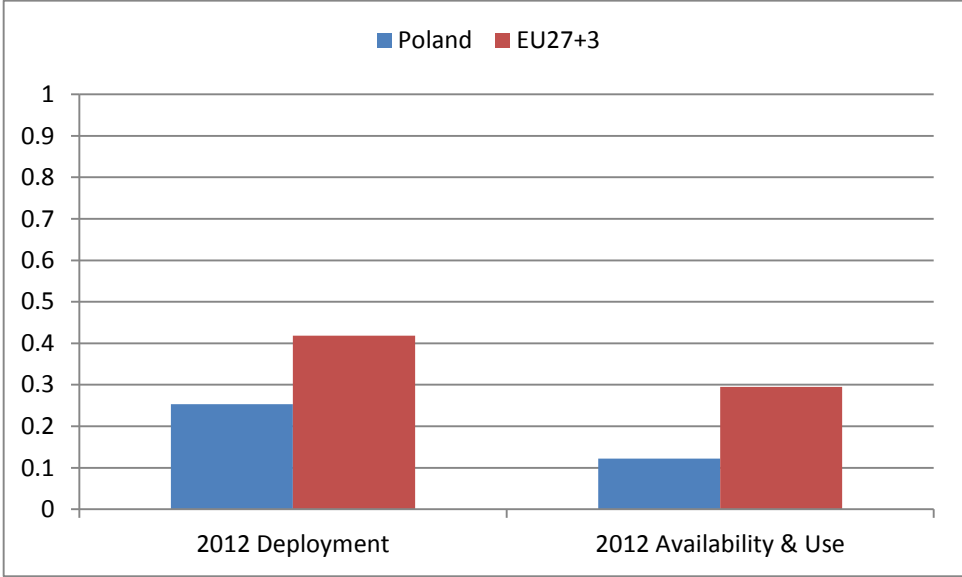
The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which



all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Poland's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Poland's eHealth Deployment indicator is based on data from 129 hospitals, while the Availability and Use indicator was built from the information provided by 146 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

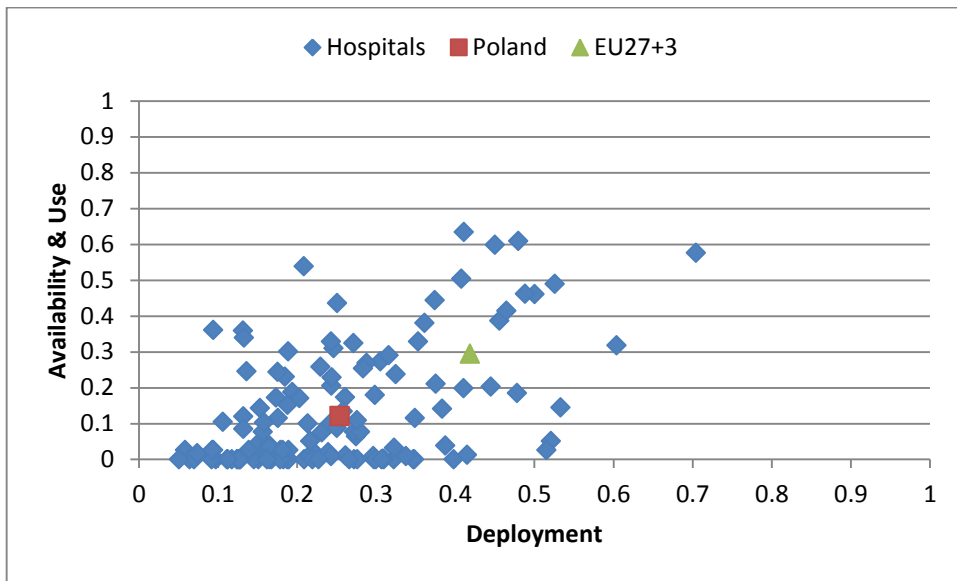
**Figure 4: Poland eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 98 hospitals) for Poland was 0.23, while the 2012 value was 0.25, which shows an increase of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Poland and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a large group of hospitals with almost no Effective use at various levels of deployment. Only 9 hospitals were above EU27+3 average for both composite indicators.

**Figure 5: Poland's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Portugal**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>70</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>71</sup>.

This document reports the results of this project for **Portugal**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Portugal are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

589 hospitals were identified in Portugal. Within this rough universe 224 (38%) completed the screener part of the questionnaire and 73 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (45% vs. 21%) and there were less hospitals of public ownership (55% vs. 64%). Out of the Portuguese universe, 41 acute hospitals (56%) completed the survey.

**Table 70: Portuguese sample breakdown by size of acute care hospitals**

Portugal	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>73</b>	21 29%	16 22%	7 10%	3 4%	26 36%
<b>2012</b>	<b>41</b>	13 32%	11 27%	6 15%	3 7%	8 20%
<b>2010</b>	<b>20</b>	7 35%	5 25%	7 35%	1 5%	- -

<sup>70</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>71</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556\*

**Table 71: Portuguese sample breakdown by ownership type**

Portugal	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>73</b>	34 47%	20 27%	8 11%	11 15%
<b>2012</b>	<b>41</b>	24 59%	13 32%	4 10%	- -
<b>2010</b>	<b>20</b>	13 65%	2 10%	5 25%	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Portuguese universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has doubled, with similar characteristics than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

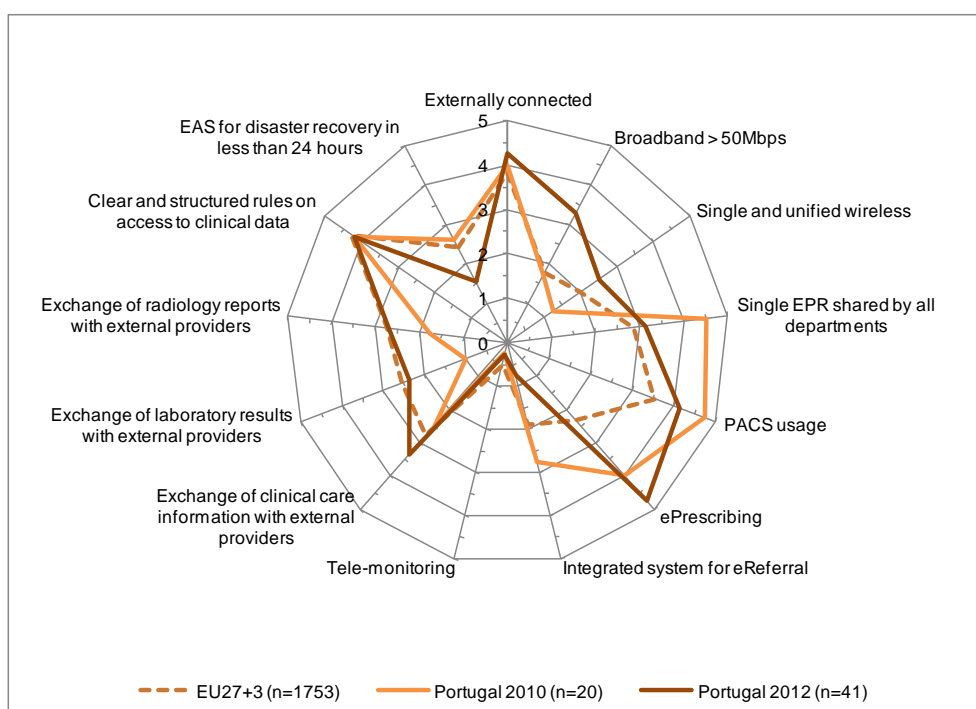
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 60: Portuguese acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 72 – eHealth indicators Portugal**

eHealth indicators - Portugal	Valid N	% hospitals	2012 difference Portugal vs.EU27+3	Portugal evolution, 2012 vs. 2010 <sup>72</sup>
<b>Infrastructure</b>				
Externally connected	40	85%	9%	5%
Broadband > 50Mbps	38	66%	30%	31%
Single and unified wireless	40	50%	10%	25%
Single EPR shared by all departments	40	63%	6%	-28%
<b>Applications</b>				
PACS usage	41	83%	12%	-12%
ePrescribing	40	95%	48%	15%
Integrated system for eReferral	40	15%	-23%	-40%
Tele-monitoring	37	5%	-5%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	39	67%	11%	17%
Exchange of laboratory results with external providers	40	48%	-4%	28%
Exchange of radiology reports with external providers	39	54%	-1%	19%
<b>Security</b>				
Clear and structured rules on access to clinical data	38	84%	-1%	0%
EAS for disaster recovery in less than 24 hours	39	31%	-17%	-22%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>72</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the Portuguese eHealth profile within EU27+3

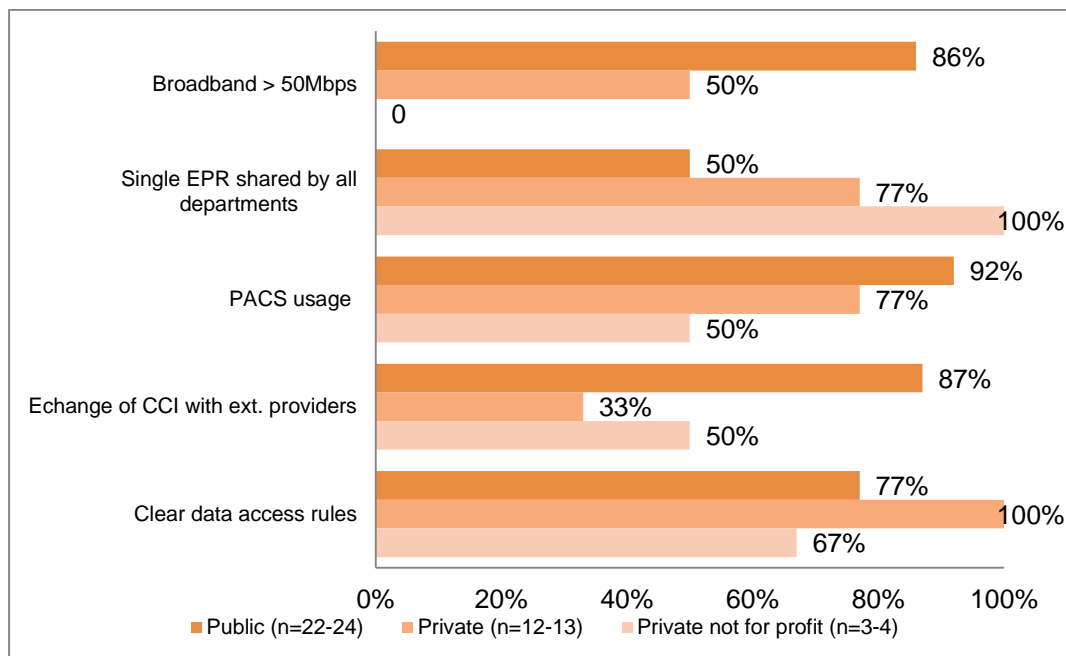
Portugal is close to the European average in its eHealth profile. However, the gains over and above the European average are not evenly distributed, with “ePrescribing” alone standing 48% above the EU27+3 average. Similarly, “Broadband > 50Mbps” was 30% above the average, with most other areas varying by less than 15%.

Changes in the Portuguese eHealth profile

The greatest gains since 2010 have been achieved in “Broadband > 50Mbps”, “Exchange of laboratory results with external providers” and “Single and unified wireless” which delivered 31%, 28% and 25% growth respectively. However, “Single EPR shared by all departments” and “Integrated system for eReferral” posted negative growth, at -28% and -40% respectively. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

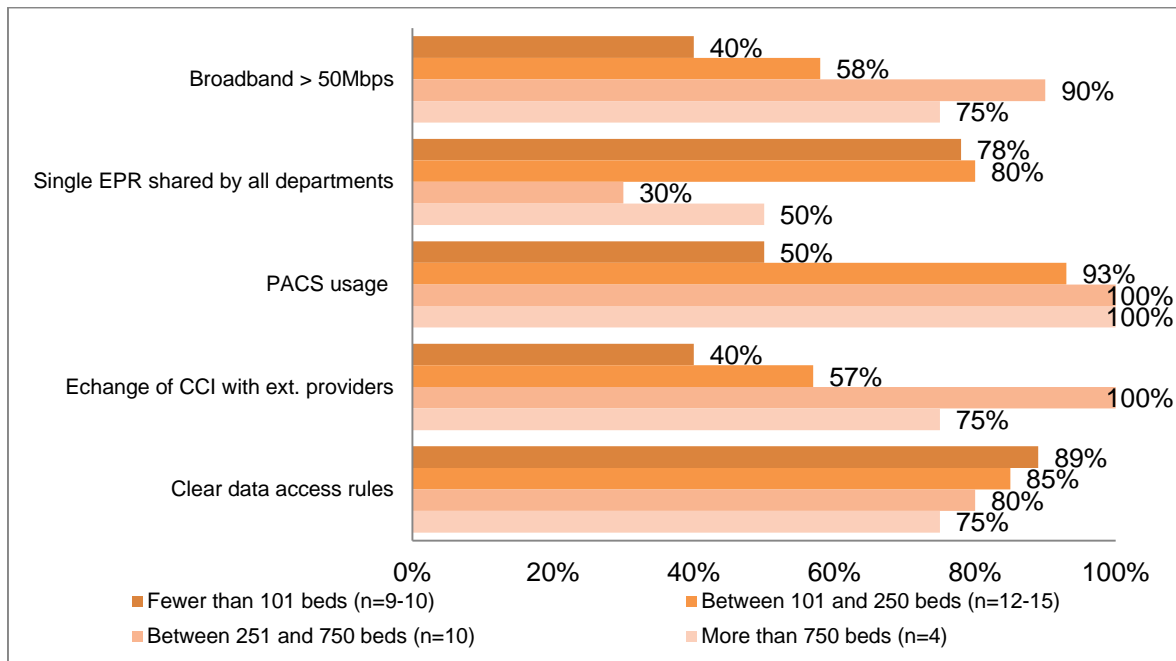
**Figure 61: Portuguese acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Public acute hospitals in Portugal appear to be the best endowed in terms of eHealth capabilities, with Public hospitals leading by a wide margin in three areas: “Broadband > 50Mbps”, “PACS usage” and “Exchange of clinical care information with external providers”. However, Private not for profit acute hospitals led notably in “Single EPR shared by all departments”, while Private hospitals led in “Clear and structured rules on access to clinical data”.

**Figure 62: Portuguese acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

The distribution of eHealth capabilities appears to be relatively even in terms of hospital size. Although the largest hospital segments (Between 251 and 750 beds, as well as More than 750 beds) have leadership positions in “Broadband > 50Mbps”, “PACS usage” and “Exchange of clinical care information with external providers”, smaller hospitals lead in “Clear and structured rules on access to clinical data” as well as “Single EPR shared by all departments”. Significantly, the smallest segment (Fewer than 101 beds) underperformed in three of the five categories by a wide margin.

#### 4. Composite indicators

The following section reports the results for Portugal on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

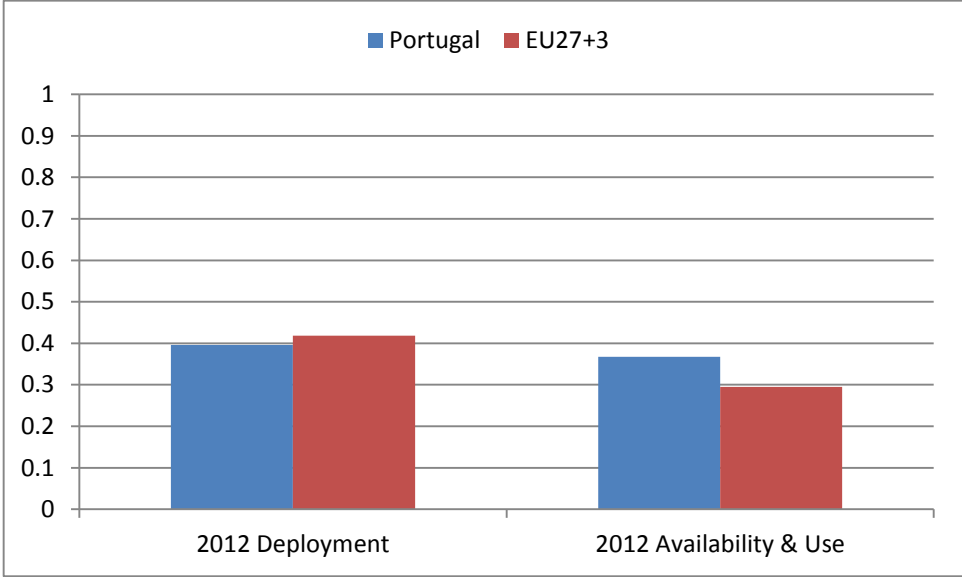
The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which



all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Portugal's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Portugal's eHealth Deployment indicator is based on data from 39 hospitals, while the Availability and Use indicator was built from the information provided by 34 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

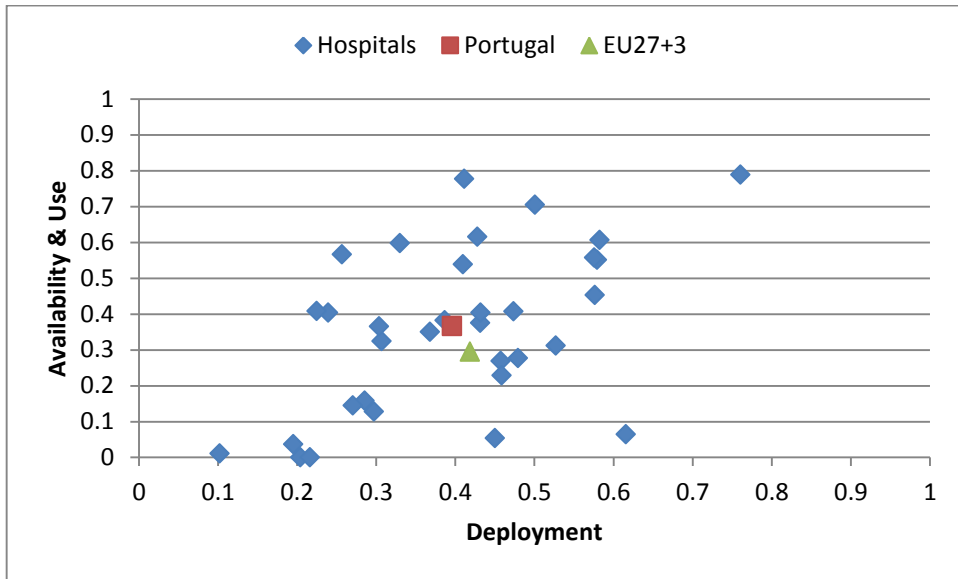
**Figure 4: Portugal eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 11 hospitals) for Portugal was 0.44, while the 2012 value was 0.40, which shows a negative growth of 4% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Portugal and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is large variability between Portuguese hospitals and that it seems that there is a clear relationship between levels of deployment and levels of use.

**Figure 5: Portugal's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Romania**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>73</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>74</sup>.

This document reports the results of this project for **Romania**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Romania are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

1042 hospitals were identified in Romania. Within this rough universe 612 (59%) completed the screener part of the questionnaire and 166 qualified as acute care hospitals. There were more hospitals of public ownership (96% vs. 64%) compared to the universe of acute Hospitals at EU27+3 level. Out of the Romanian universe, 85 acute hospitals (51%) completed the survey.

**Table 73: Romanian sample breakdown by size of acute care hospitals**

Romania	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>166</b>	31	53	49	29	4
		19%	32%	30%	17%	2%
<b>2012</b>	<b>85</b>	15	27	28	15	-
		18%	32%	33%	18%	-
<b>2010</b>	<b>38</b>	8	13	10	6	1
		21%	34%	26%	16%	3%

<sup>73</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>74</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 74: Romanian sample breakdown by ownership type**

Romania	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	166	157	7	-	2
		95%	4%	-	1%
2012	85	82	3	-	-
		96%	4%	-	-
2010	38	37	-	-	1
		97%	-	-	3%

The final sample of hospitals included in the survey has a similar structure to the one of the Romanian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has more than doubled, with similar hospital's characteristics than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

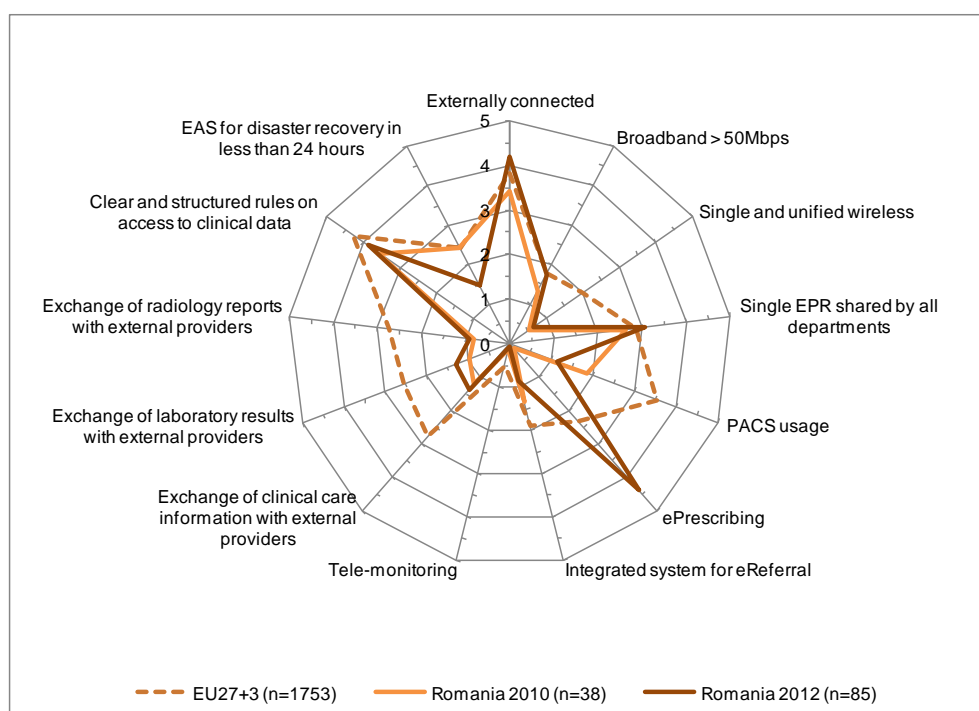
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 63: Romanian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 75 – eHealth indicators Romania**

eHealth indicators - Romania	Valid N	% hospitals	2012 difference Romania vs.EU27+3	Romania evolution, 2012 vs. 2010 <sup>75</sup>
<b>Infrastructure</b>				
Externally connected	85	84%	7%	15%
Broadband > 50Mbps	74	35%	0%	9%
Single and unified wireless	85	13%	-27%	2%
Single EPR shared by all departments	82	61%	4%	8%
<b>Applications</b>				
PACS usage	83	23%	-48%	-14%
ePrescribing	81	88%	41%	85%
Integrated system for eReferral	81	17%	-20%	-10%
Tele-monitoring	64	2%	-9%	-1%
<b>Integration</b>				
Exchange of clinical care information with external providers	83	28%	-28%	3%
Exchange of laboratory results with external providers	82	26%	-26%	6%
Exchange of radiology reports with external providers	82	18%	-37%	2%
<b>Security</b>				
Clear and structured rules on access to clinical data	80	78%	-8%	6%
EAS for disaster recovery in less than 24 hours	81	30%	-19%	-19%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>75</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Romanian eHealth profile within EU27+3

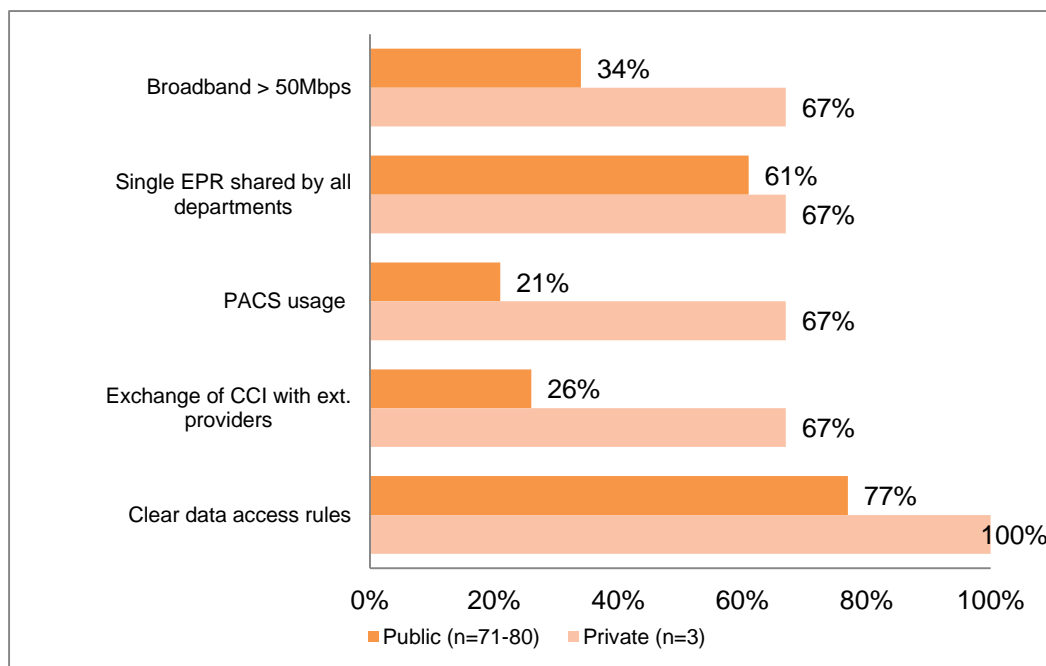
Romania scores worse than the average EU27+3 in eHealth. Five areas in particular are responsible for the majority of this lag: “Single and unified wireless”, “PACS usage”, “Exchange of clinical care information with external providers”, “Exchange of laboratory results with external providers” and “Exchange of radiology reports with external providers”. However, the country performs well in “ePrescribing”.

### Changes in the Romanian eHealth profile

Despite its poor profile by contrast to the European average, Romania’s eHealth profile is improving. However, this growth has been uneven. The largest growth was recorded in the area of “ePrescribing” while all other areas have registered less significant changes, both positive and negative. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

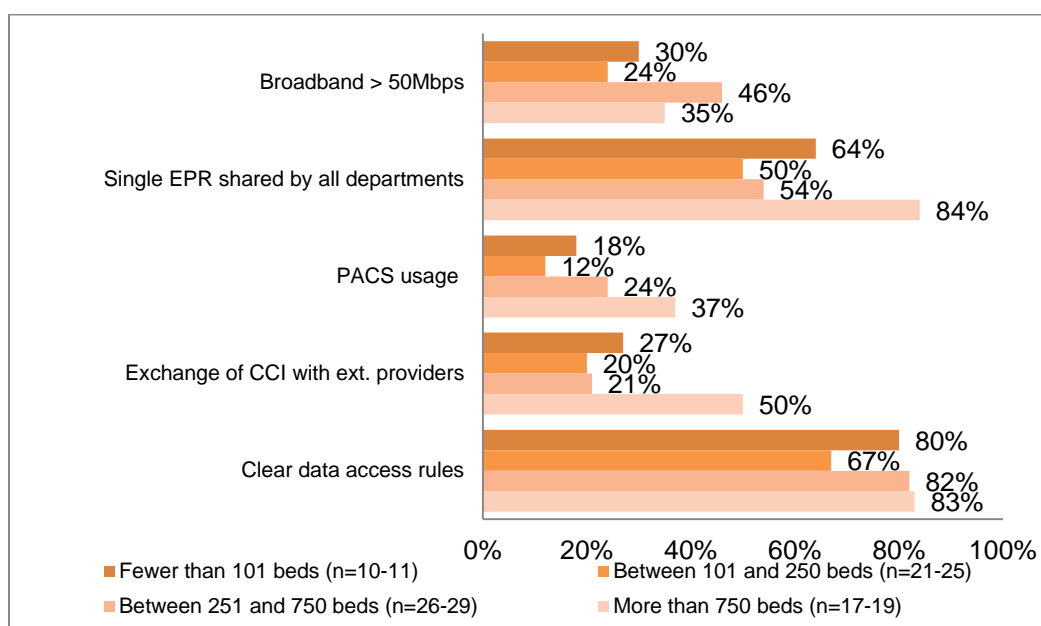
**Figure 64: Romanian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

When looking at the ownership type of Romanian acute hospitals, we can see the private acute hospital sector is far better performing in the areas of “Broadband > 50Mbps”, “Single EPR shared by all departments”, “PACS usage”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”. However, only 3 hospitals were of private ownership.

**Figure 65: Romanian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

In terms of hospital size, the very largest segment (More than 750 beds) registered much better performance than the smaller hospitals, with leading values in four of the five categories under review. Unusually, however, the worst performing category is not the smallest segment (Fewer than 101 beds) but the next largest segment of Between 101 and 250 beds.

#### 4. Composite indicators

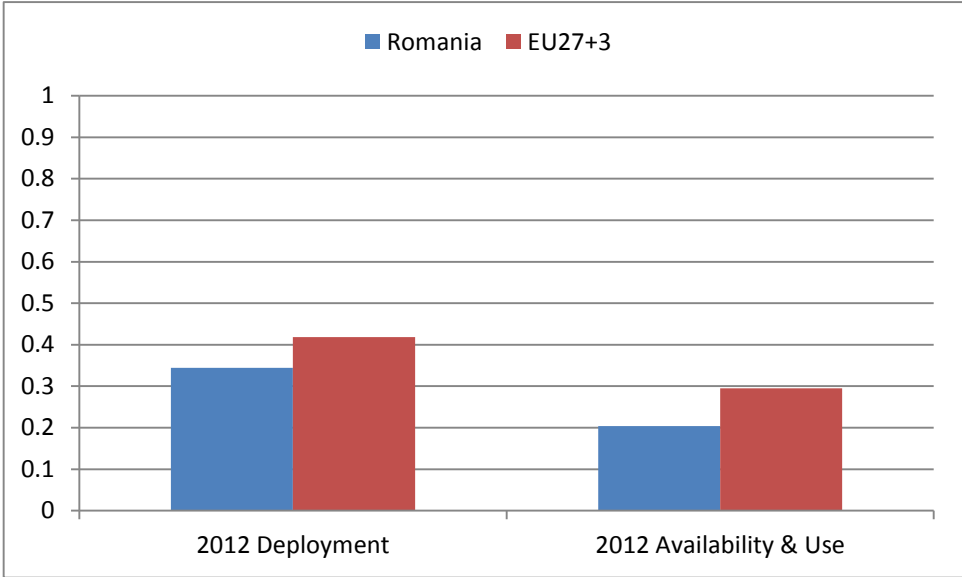
The following section reports the results for Romania on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.



The following graph displays the average values of these indicators in Romania’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Romania’s eHealth Deployment indicator is based on data from 82 hospitals, while the Availability and Use indicator was built from the information provided by 78 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

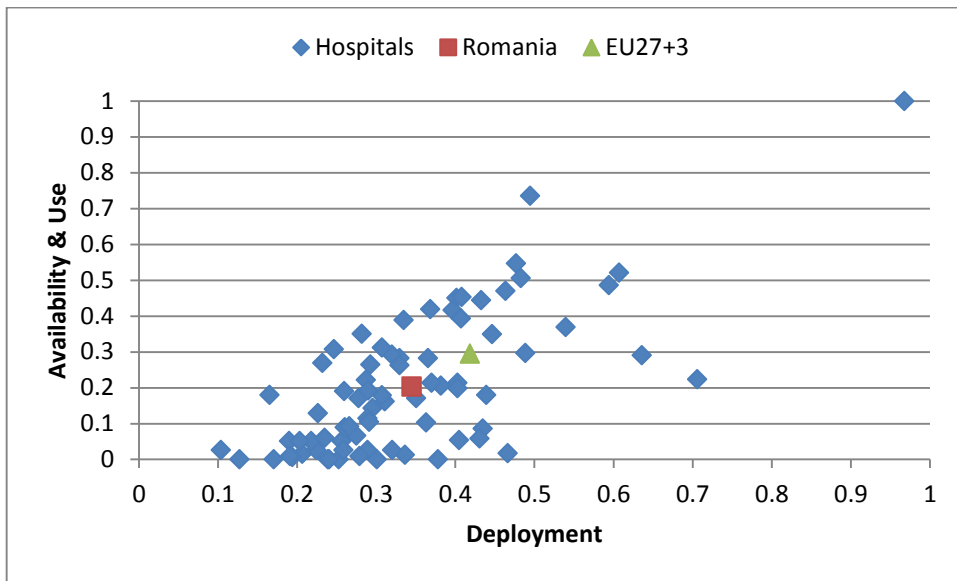
**Figure 4: Romania eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 11 hospitals) for Romania was 0.27, while the 2012 value was 0.34, which shows an increase of 7% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Romania and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a large group of hospitals with almost no Effective use at various levels of deployment. It also shows that almost 15% of the hospitals were above EU27+3 average for both composite indicators while 65% of them were below average for both indicators.

**Figure 5: Romania's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Slovakia**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>76</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>77</sup>.

This document reports the results of this project for **Slovakia**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Slovakia are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

391 hospitals were identified in Slovakia. Within this rough universe 187 (48%) completed the screener part of the questionnaire and 72 qualified as acute care hospitals. The size and type of ownership of these hospitals were similar than those of the universe of acute Hospitals at EU27+3 level. Out of the Slovakian universe, 33 acute hospitals (46%) completed the survey.

**Table 76: Slovakian sample breakdown by size of acute care hospitals**

Slovakia	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>72</b>	11	19	30	5	7
		15%	26%	42%	7%	10%
<b>2012</b>	<b>33</b>	6	10	14	3	-
		18%	30%	42%	9%	-
<b>2010</b>	<b>12</b>	4	4	1	2	1
		33%	33%	8%	17%	8%

<sup>76</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>77</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 77: Slovakian sample breakdown by ownership type**

Slovakia	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>72</b>	43 60%	14 19%	9 13%	6 8%
<b>2012</b>	<b>33</b>	22 67%	8 24%	3 9%	- -
<b>2010</b>	<b>12</b>	3 25%	2 17%	6 50%	1 8%

The final sample of hospitals included in the survey has a similar structure to the one of the Slovakian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost tripled, with a higher proportion of public and big (more than 250 beds) hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

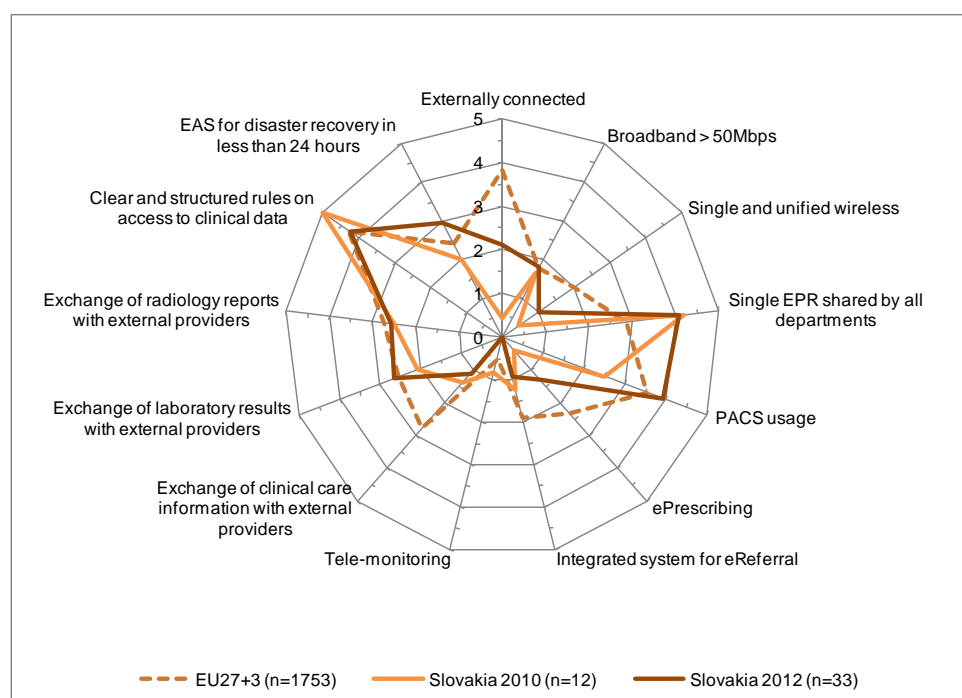
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 66: Slovakian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 78 – eHealth indicators Slovakia**

eHealth indicators - Slovakia	Valid N	% hospitals	2012 difference Slovakia vs.EU27+3	Slovakia evolution, 2012 vs. 2010 <sup>78</sup>
<b>Infrastructure</b>				
Externally connected	33	42%	-34%	33%
Broadband > 50Mbps	33	36%	0%	1%
Single and unified wireless	30	20%	-5%	3%
Single EPR shared by all departments	33	82%	6%	0%
<b>Applications</b>				
PACS usage	33	79%	2%	7%
ePrescribing	27	26%	-5%	4%
Integrated system for eReferral	27	19%	-5%	-2%
Tele-monitoring	33	0%	-3%	-4%
<b>Integration</b>				
Exchange of clinical care information with external providers	32	22%	-8%	-1%
Exchange of laboratory results with external providers	32	53%	0%	3%
Exchange of radiology reports with external providers	33	52%	-1%	0%
<b>Security</b>				
Clear and structured rules on access to clinical data	33	85%	0%	-4%
EAS for disaster recovery in less than 24 hours	32	59%	3%	5%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>78</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Slovakian eHealth profile within EU27+3

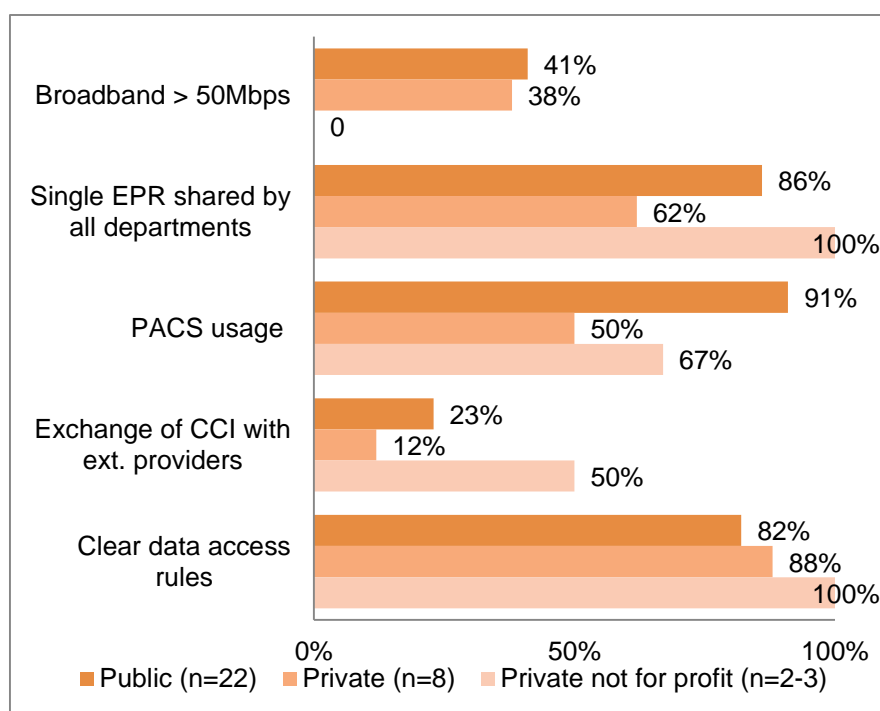
Slovakia trails behind the European average in eHealth. Four specific areas account for most of this lag: “Externally connected”, “Single and unified wireless”, “ePrescribing” and “Exchange of clinical care information with external providers”. However, Slovakia is not universally behind the European average in all areas, with five of the 13 areas very close to or exceeding the European average.

### Changes in the Slovakian eHealth profile

Although it is still behind the European average, Slovakia has improved on its 2010 eHealth profile. The major areas of increase were “Externally connected” and “PACS usage”, which had gains of 133% and 7% respectively. “EAS for disaster recovery in less than 24 hours” also improved. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

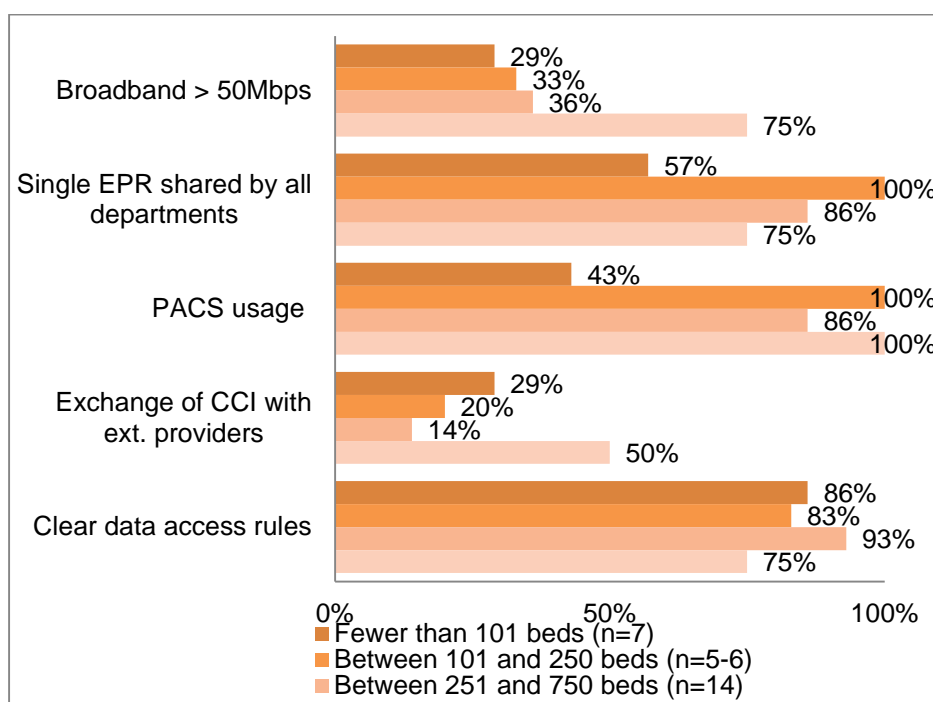
**Figure 67: Slovakian acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Type of ownership does not appear to affect eHealth capabilities in any definite way in Slovakia, with both Private not for profit and Public hospitals leading in various different areas. While Private hospitals score better than public ones in four of five areas, the disparity in performance levels in three of these areas is not very high.

**Figure 68: Slovakian acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Scale does not appear to be a definite factor either in deciding the eHealth development of acute hospitals in Slovakia. While the largest hospitals have a clear advantage in two areas, “Broadband > 50Mbps” and “Exchange of clinical care information with external providers”, acute hospitals in the segment of Between 101 and 250 beds perform at 100% levels in two areas; “Single EPR shared by all departments” and “PACS usage”. Hospitals of all sizes perform well in the final category, “Clear and structured rules on access to clinical data”, and in this area, the maximum variation between results is not very high between the lowest and highest performers. By contrast, greater disparity in performance can be seen in “Broadband > 50Mbps”, “PACS usage” and “Exchange of clinical care information with external providers”.

#### 4. Composite indicators

The following section reports the results for Slovakia on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

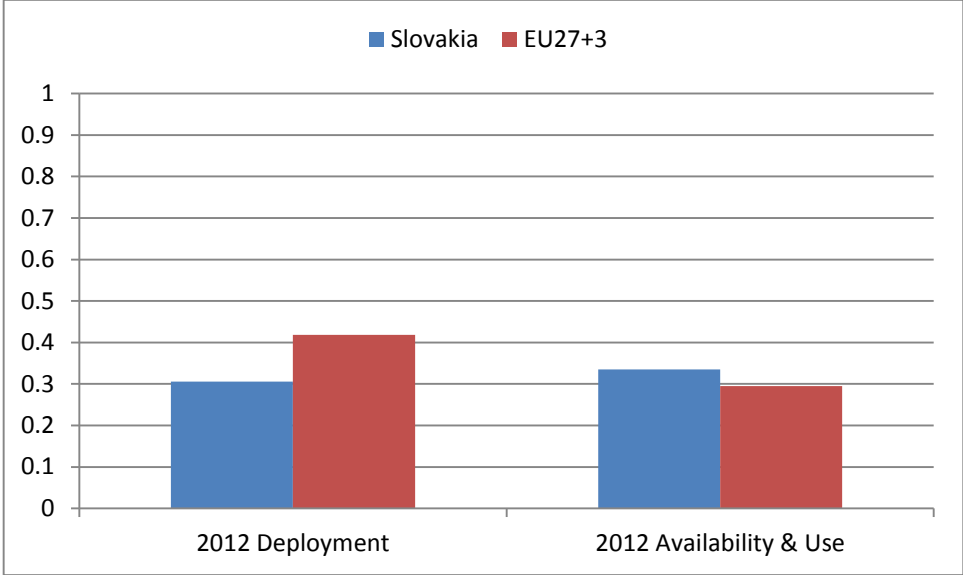
The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the



level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Slovakia’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Slovakia's eHealth Deployment indicator is based on data from 33 hospitals, while the Availability and Use indicator was built from the information provided by 32 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

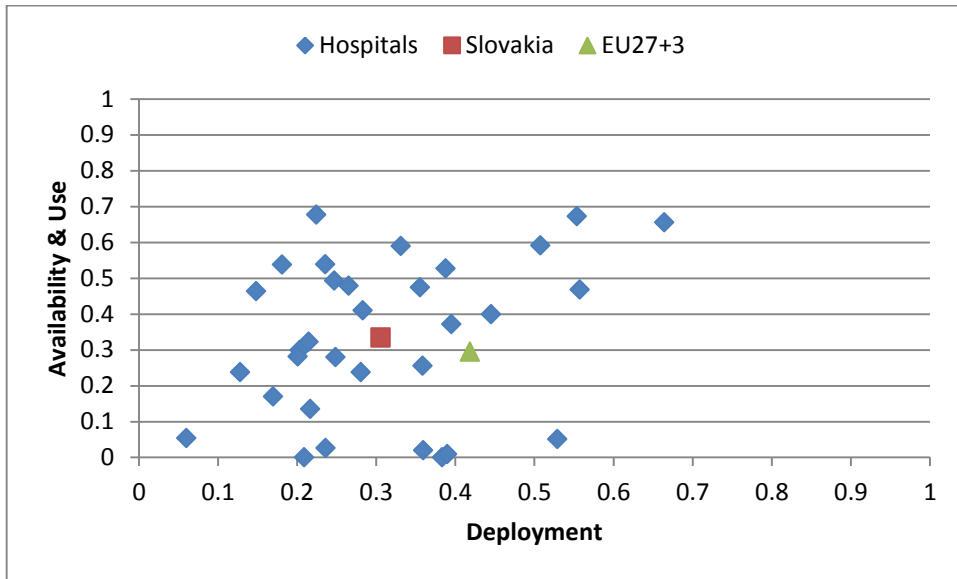
**Figure 4: Slovakia eHealth Composite Indicators**



For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 9 hospitals) for Slovakia was 0.22, while the 2012 value was 0.31, which shows an increase of 9% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Slovakia and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a group of 7 hospitals with almost no Effective use at various levels of deployment. 5 hospitals were above EU27+3 average for both composite indicators.

**Figure 5: Slovakia's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Slovenia**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>79</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>80</sup>.

This document reports the results of this project for **Slovenia**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Slovenia are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

186 hospitals were identified in Slovenia. Within this rough universe 104 (56%) completed the screener part of the questionnaire and 14 qualified as acute care hospitals. The proportion of hospitals of public ownership among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (92% vs. 64%). Out of the Slovenian universe, 6 acute hospitals (53%) completed the survey.

**Table 79: Slovenian sample breakdown by size of acute care hospitals**

Slovenia	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>14</b>	2 14%	5 36%	2 14%	3 21%	2 14%
<b>2012</b>	<b>6</b>	-	3 50%	2 33%	1 17%	-
<b>2010</b>	<b>3</b>	1 33%	1 33%	1 33%	-	-

<sup>79</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>80</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 80: Slovenian sample breakdown by ownership type**

Slovenia	N=	Public	Private	Private not for profit	Don't know/ No answer
Census	14	12	1	-	1
		86%	7%	-	7%
2012	6	6	-	-	-
		100%	-	-	-
2010	3	3	-	-	-
		100%	-	-	-

The final sample of hospitals included in the survey has a similar structure to the one of the Slovenian universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has doubled, with a lower proportion of very large hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

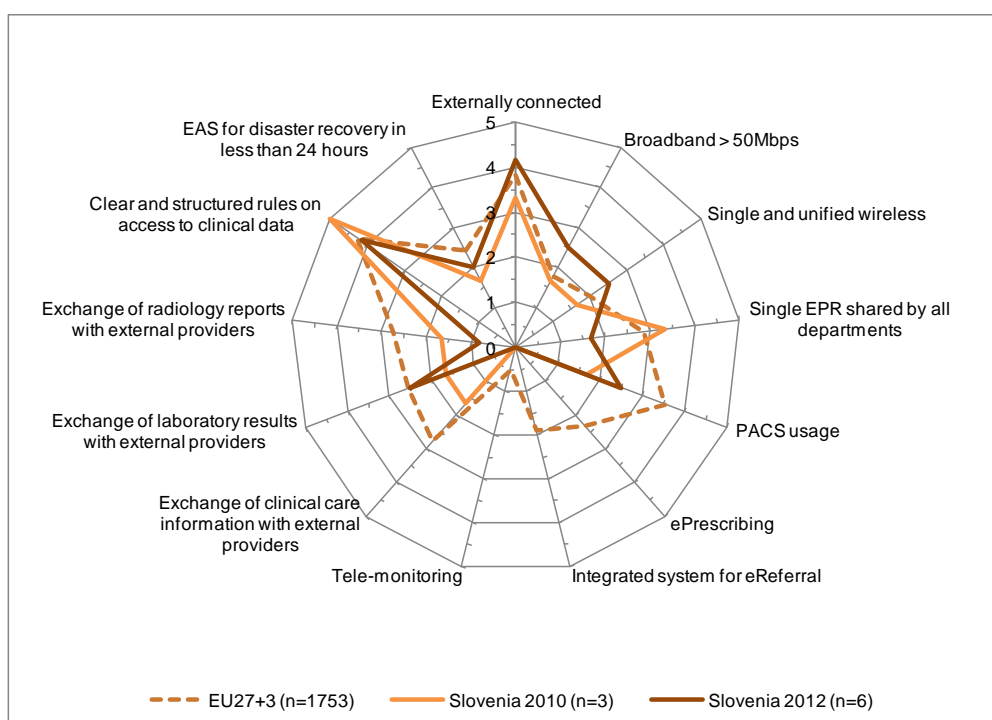
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 69: Slovenian acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 81 – eHealth indicators Slovenia**

eHealth indicators - Slovenia	Valid N	% hospitals	2012 difference Slovenia vs.EU27+3	Slovenia evolution, 2012 vs. 2010 <sup>81</sup>
<b>Infrastructure</b>				
Externally connected	6	83%	7%	17%
Broadband > 50Mbps	6	50%	14%	17%
Single and unified wireless	6	50%	10%	17%
Single EPR shared by all departments	6	33%	-24%	-33%
<b>Applications</b>				
PACS usage	6	50%	-21%	17%
ePrescribing	5	0%	-47%	0%
Integrated system for eReferral	5	0%	-38%	0%
Tele-monitoring	6	0%	-10%	0%
<b>Integration</b>				
Exchange of clinical care information with external providers	5	0%	-55%	-33%
Exchange of laboratory results with external providers	6	50%	-1%	17%
Exchange of radiology reports with external providers	6	17%	-38%	-17%
<b>Security</b>				
Clear and structured rules on access to clinical data	62	92%	7%	-1%
EAS for disaster recovery in less than 24 hours	60	45%	-3%	-19%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>81</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Slovenian eHealth profile within EU27+3

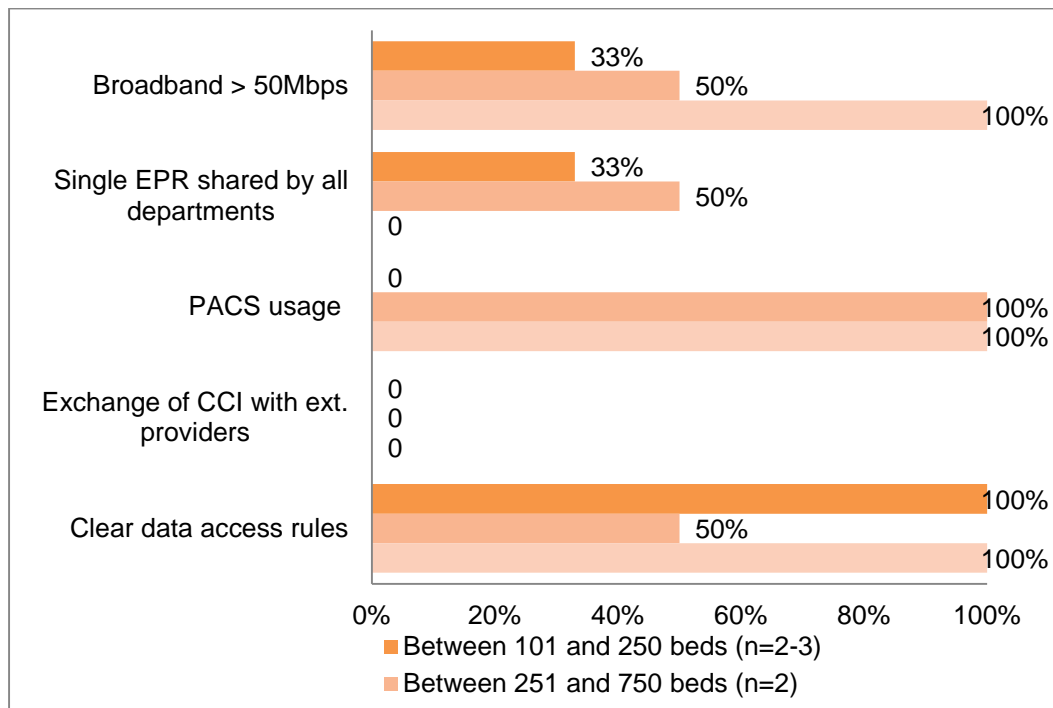
Slovenia scores worse than the average EU27+3 in in many areas; with the biggest disparities evident in “ePrescribing”, “Integrated system for eReferral”, “Exchange of clinical care information with external providers” and “Exchange of radiology reports with external providers”.

### Changes in the Slovenian eHealth profile

Slovenia’s eHealth profile has changed marginally since 2010. Six areas have improved slightly, while four areas have dropped in value, being “Single EPR shared by all departments” and “Exchange of clinical care information with external providers” the categories where the decrease in scores is higher. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals. However, as only public hospitals recorded values in relation to ownership type, no contrast is possible between other ownership types in Slovenia.

**Figure 2: Slovenian acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

In relation to the size of hospitals , the low number of hospitals pertaining to each size category do not allow us to extract clear conclusions.

## **4. Composite indicators**

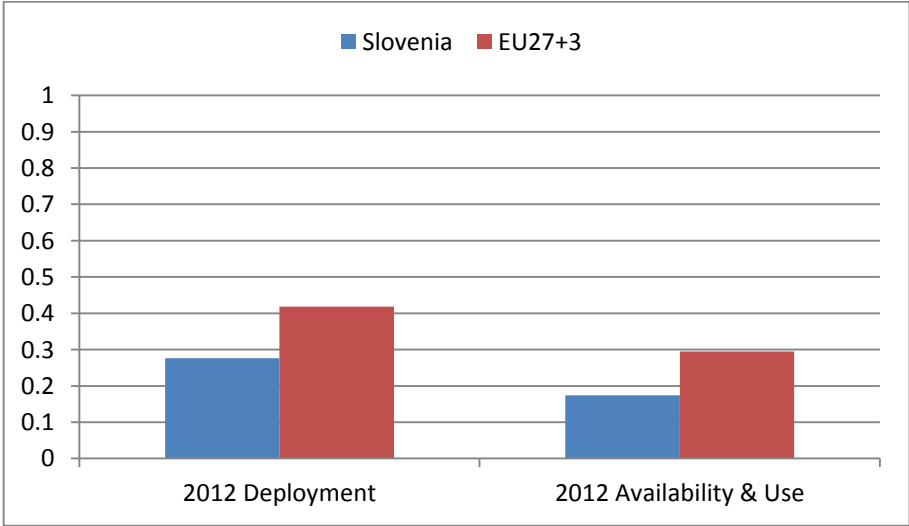
The following section reports the results for Slovenia on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e.to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level

of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Slovenia's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Slovenia's eHealth Deployment indicator is based on data from 6 hospitals, while the Availability and Use indicator was built from the information provided as well by 6 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

**Figure 3: Slovenia eHealth Composite Indicators**



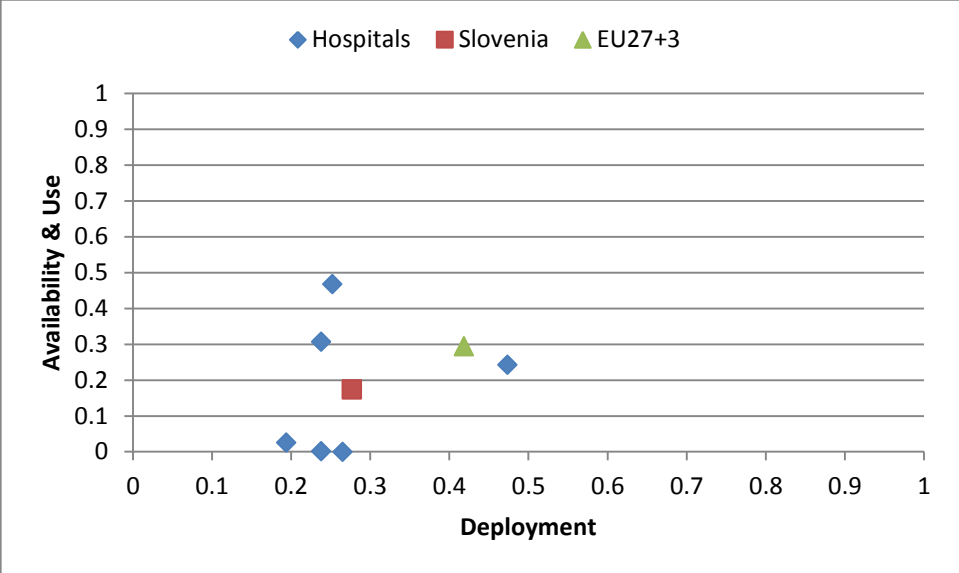
For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 3 hospitals) for Slovenia was 0.18, while the 2012 value was 0.28, which shows an increase of 10% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Slovenia and with the average value of



the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there are 3 hospitals (50% of the sample) with almost no Effective use, the three of them with similar levels of deployment. No hospital was above EU27+3 average for both composite indicators.

**Figure 4: Slovenia's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Spain**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>82</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>83</sup>.

This document reports the results of this project for **Spain**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Spain are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

1311 hospitals were identified in Spain. Within this rough universe 845 (64%) completed the screener part of the questionnaire and 478 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (35% vs. 21%) and there were less hospitals of public ownership (52% vs. 64%). Out of the Spanish universe, 124 acute hospitals (26%) completed the survey.

**Table 82: Spanish sample breakdown by size of acute care hospitals**

Spain	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>478</b>	121	127	70	32	128
		25%	27%	15%	7%	27%
<b>2012</b>	<b>124</b>	30	36	19	6	33
		24%	29%	15%	5%	27%
<b>2010</b>	<b>90</b>	19	27	26	16	2
		21%	30%	29%	18%	2%

<sup>82</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>83</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 83: Spanish sample breakdown by ownership type**

Spain	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>478</b>	225 47%	157 33%	50 10%	46 10%
<b>2012</b>	<b>124</b>	67 54%	44 35%	13 10%	- -
<b>2010</b>	<b>90</b>	62 69%	16 18%	11 12%	1 1%

The final sample of hospitals included in the survey has a similar structure to the one of the Spanish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has increased almost a 50%, with a lower proportion of public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

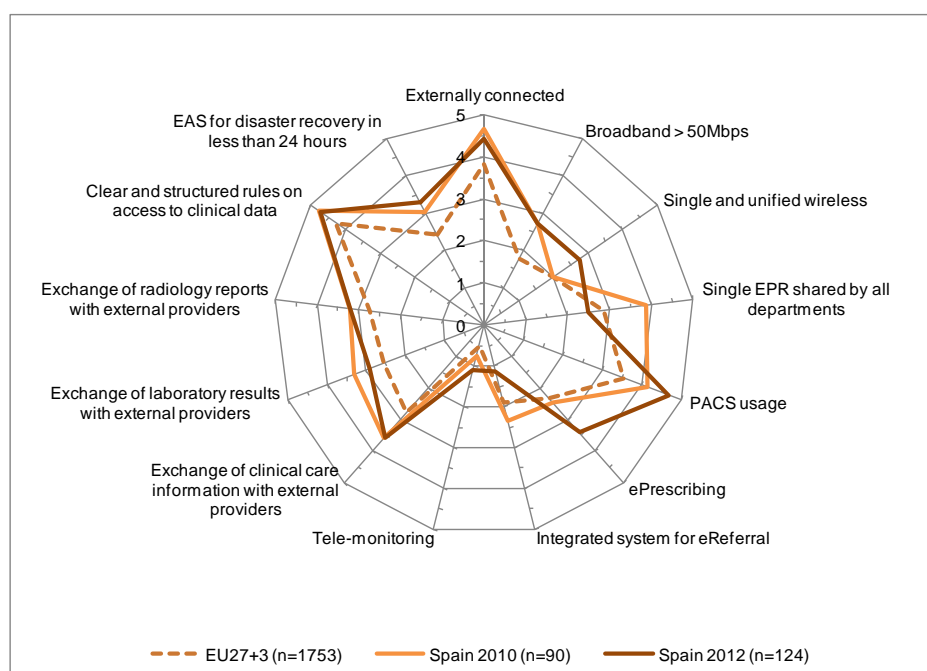
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 70: Spanish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 84: eHealth indicators Spain**

eHealth indicators - Spain	Valid N	% hospitals	2012 difference Spain vs.EU27+3	Spain evolution, 2012 vs. 2010 <sup>84</sup>
<b>Infrastructure</b>				
Externally connected	123	89%	12%	-5%
Broadband > 50Mbps	118	54%	19%	0%
Single and unified wireless	122	55%	15%	15%
Single EPR shared by all departments	121	50%	-7%	-28%
<b>Applications</b>				
PACS usage	123	93%	23%	10%
ePrescribing	122	68%	21%	19%
Integrated system for eReferral	122	23%	-15%	-24%
Tele-monitoring	123	22%	12%	7%
<b>Integration</b>				
Exchange of clinical care information with external providers	118	71%	16%	-1%
Exchange of laboratory results with external providers	117	58%	7%	-8%
Exchange of radiology reports with external providers	121	64%	9%	0%
<b>Security</b>				
Clear and structured rules on access to clinical data	123	94%	9%	-1%
EAS for disaster recovery in less than 24 hours	122	66%	17%	5%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>84</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Spanish eHealth profile within EU27+3

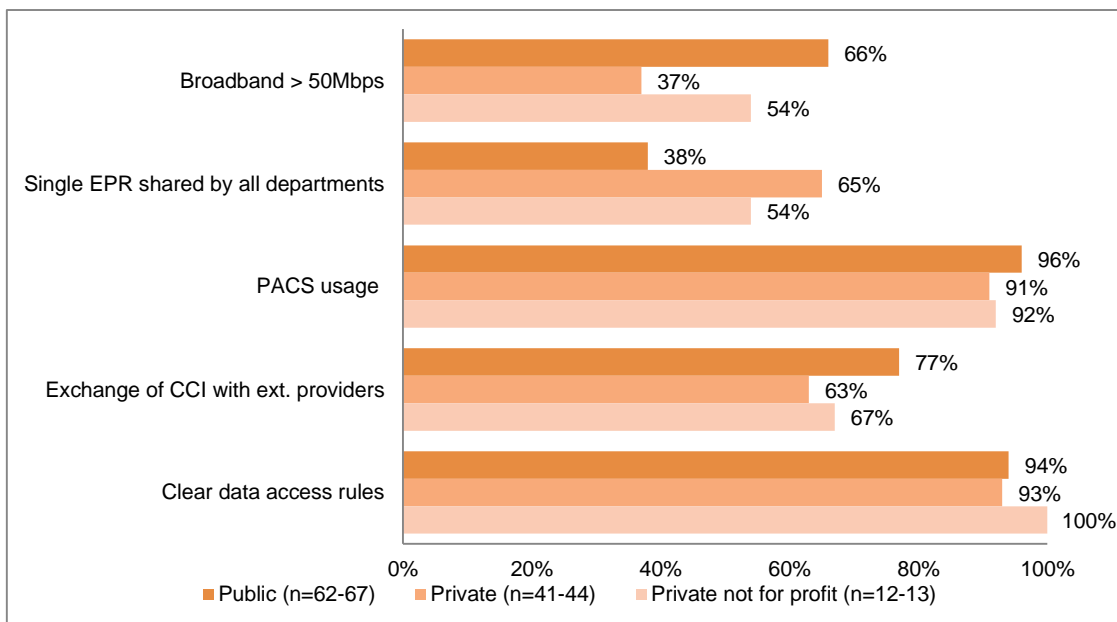
Spain is comfortably ahead of the European average in eHealth. For example, “PACS usage” and “ePrescribing” recorded scores of 20% or more above the European average (“PACS usage” is 23% above and “ePrescribing” is 21% above)

### Changes in the Spanish eHealth profile

Despite being ahead of the EU average, Spain’s eHealth profile has contracted slightly since 2010. Seven areas registered declines from the 2010 values , the highest being “Single EPR shared by all departments” and “Integrated system for eReferral” at -27% and -24%.. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

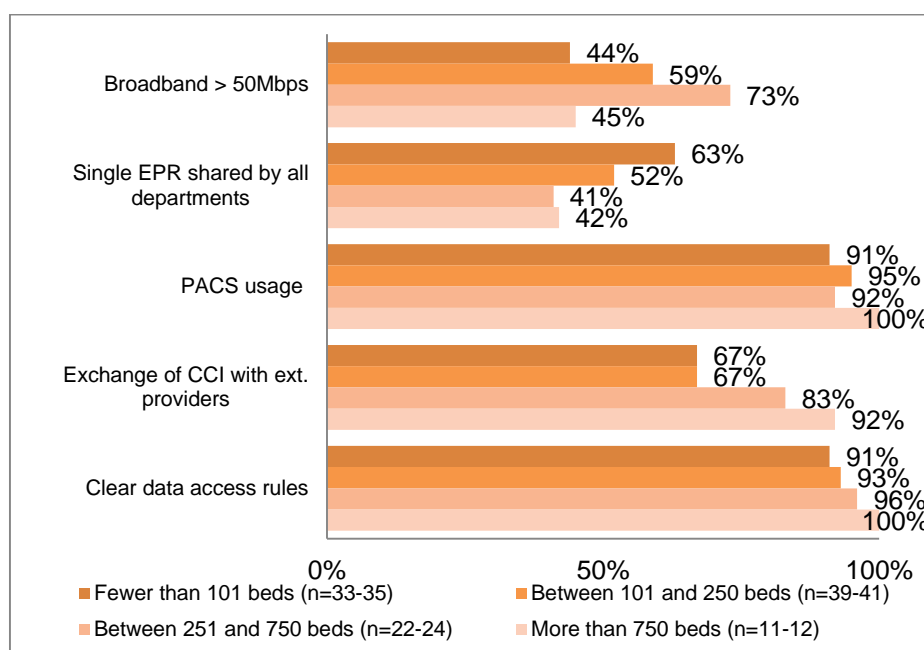
**Figure 71: Spanish acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Type of ownership does not appear to influence the development of eHealth capabilities across Spanish acute hospitals. For example, in “PACS usage” and “Clear and structured rules on access to clinical data” values are quite closely grouped, with a maximum variation of 7% between the lowest and highest performer. More variation can be seen in “Broadband > 50Mbps”, “Single EPR shared by all departments” and “Exchange of clinical care information with external providers”, and in these categories the lead position is twice held by Public hospitals, and once by Private hospitals

**Figure 72: Spanish acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Scale appears to be slightly influential in Spanish acute hospitals, but not universally so. A certain advantage appears to be conferred upon larger hospital segments in three categories, “Exchange of clinical care information with external providers”, “Clear and structured rules on access to clinical data” and “PACS usage”, with acute hospitals of More than 750 beds leading in these areas. However, this segment performs much less well in “Broadband > 50Mbps” and “Single EPR shared by all departments”, where performance is reversed and where significant gaps were noted between the highest and lowest performers.

#### 4. Composite indicators

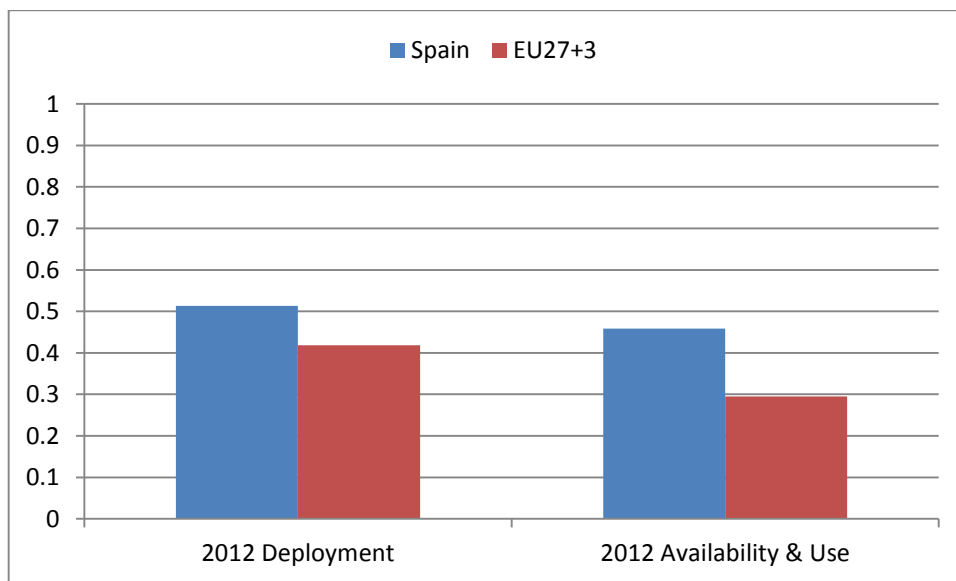
The following section reports the results for Spain on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the

Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Spain's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Spain's eHealth Deployment indicator is based on data from 119 hospitals, while the Availability and Use indicator was built from the information provided by 112 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

**Figure 4: Spain eHealth Composite Indicators**

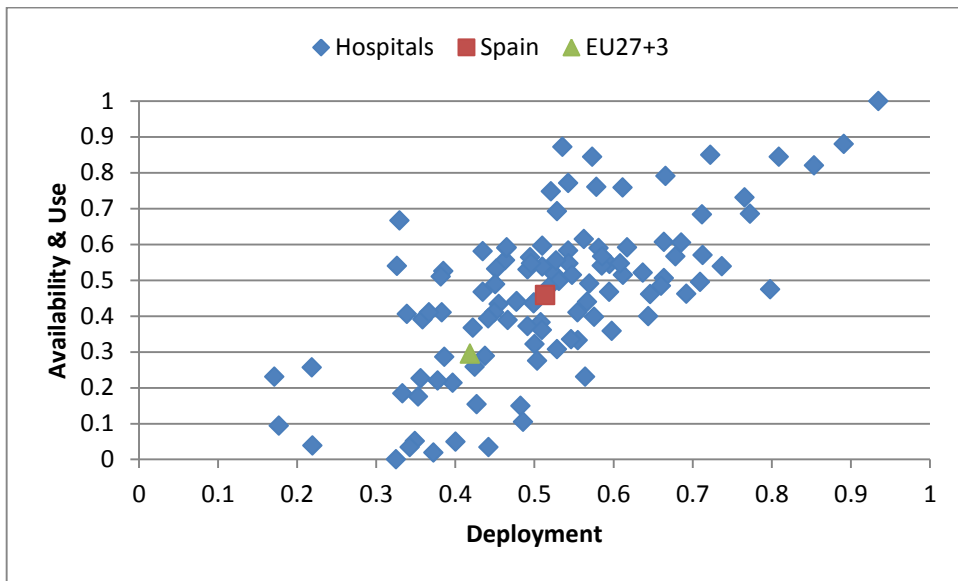


For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 87 hospitals) for Spain was 0.53, while the 2012 value was 0.51, which shows a decrease of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Spain and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is a large group of hospitals (72%) were above EU27+3 average for both composite indicators. Nevertheless, there is as well a group of 10 hospitals with almost no Effective use at various levels of deployment.



**Figure 5: Spain's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report Sweden**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>85</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>86</sup>.

This document reports the results of this project for **Sweden**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for Sweden are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

246 hospitals were identified in Sweden. Within this rough universe 131 (53%) completed the screener part of the questionnaire and 78 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (32% vs. 21%) and there were more hospitals of public ownership (92% vs. 64%). Out of the Swedish universe, 26 acute hospitals (33%) completed the survey.

**Table 85: Swedish sample breakdown by size of acute care hospitals**

Sweden	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>78</b>	18 23%	13 17%	17 22%	9 12%	21 27%
<b>2012</b>	<b>26</b>	6 23%	5 19%	9 35%	3 12%	3 12%
<b>2010</b>	<b>8</b>	1 12%	1 12%	3 38%	2 25%	1 12%

<sup>85</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>86</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 86: Swedish sample breakdown by ownership type**

Sweden	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>78</b>	59 76%	2 3%	3 4%	14 18%
<b>2012</b>	<b>26</b>	20 77%	- -	2 8%	4 15%
<b>2010</b>	<b>8</b>	8 100%	- -	- -	- -

The final sample of hospitals included in the survey has a similar structure to the one of the Swedish universe of acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has more than tripled, with a lower proportion of very large and public hospitals than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

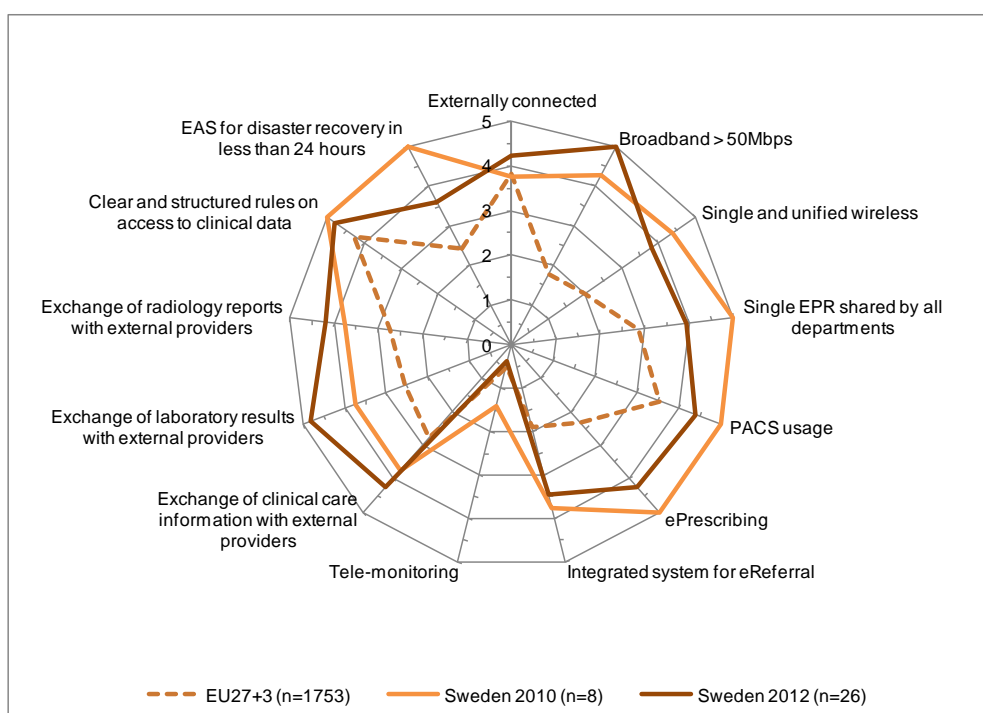
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 73: Swedish acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 87 – eHealth indicators Sweden**

eHealth indicators - Sweden	Valid N	% hospitals	2012 difference Sweden vs.EU27+3	Sweden evolution, 2012 vs. 2010 <sup>87</sup>
<b>Infrastructure</b>				
Externally connected	26	85%	8%	10%
Broadband > 50Mbps	22	100%	64%	14%
Single and unified wireless	25	76%	36%	-12%
Single EPR shared by all departments	24	79%	22%	-21%
<b>Applications</b>				
PACS usage	25	88%	17%	-12%
ePrescribing	26	85%	38%	-15%
Integrated system for eReferral	26	69%	31%	-6%
Tele-monitoring	26	8%	-3%	-21%
<b>Integration</b>				
Exchange of clinical care information with external providers	26	85%	29%	10%
Exchange of laboratory results with external providers	25	96%	45%	21%
Exchange of radiology reports with external providers	25	84%	29%	9%
<b>Security</b>				
Clear and structured rules on access to clinical data	26	96%	11%	-4%
EAS for disaster recovery in less than 24 hours	25	72%	24%	-28%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>87</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

### Position of the Swedish eHealth profile within EU27+3

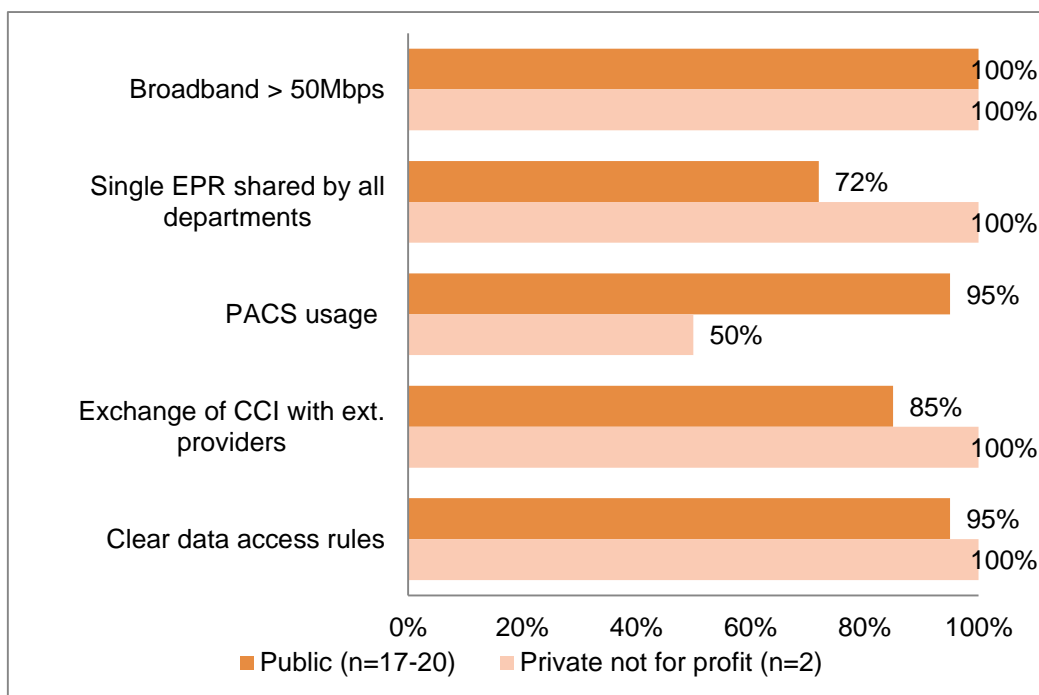
Sweden is one of the strongest eHealth performers in the sample. In fact, in all 13 indicators examined, Sweden scored worse than the EU27+3 average in only one area (“Tele-monitoring”) and in this area is only marginally behind (-3% points). The areas within which Sweden is the most evolved by contrast to other countries within this study are “Broadband > 50Mbps” (64% ahead) and “Exchange of laboratory results with external providers” (64% ahead).

### Changes in the Swedish eHealth profile

Despite Sweden’s strong position in eHealth, there has been some contraction of eHealth capabilities when contrasted with 2010 values. The most notable decrease was recorded for in “EAS for disaster recovery in less than 24 hours”. In the 13 areas under review, five indicators posted modest growth, being “Exchange of laboratory results with external providers” the area where the growth was bigger. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

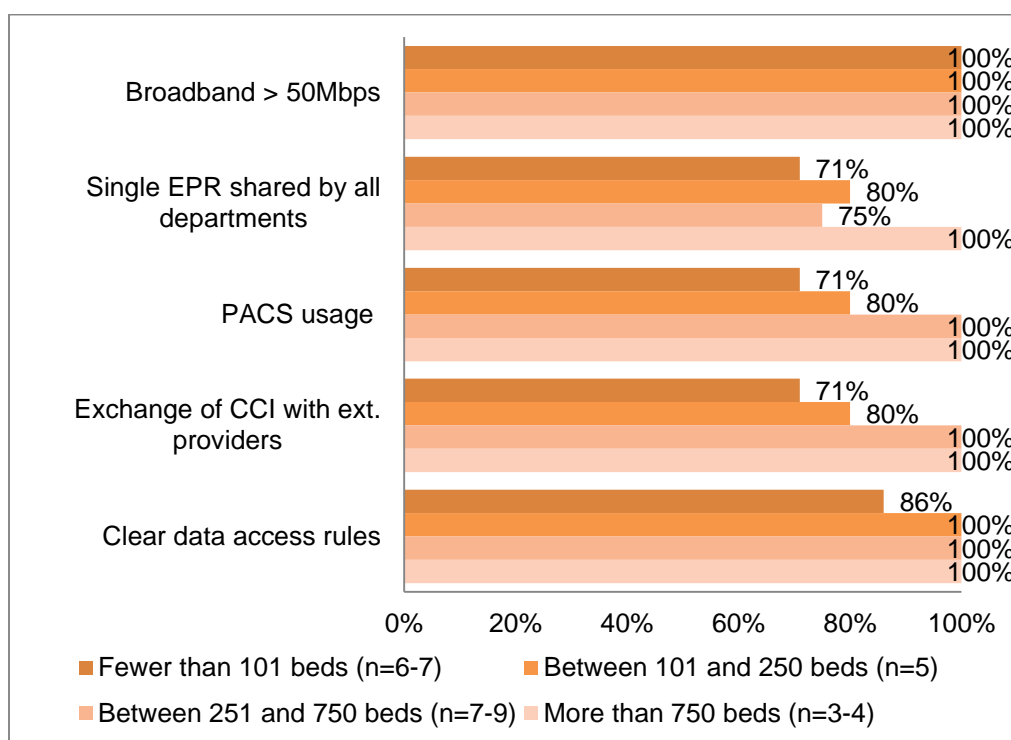
**Figure 74: Swedish acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Only data for Public and Private not for profit hospitals were returned by our survey, and within this data we see that the latter segment of the market appears to have slightly better scores. Nevertheless, the sample size of this category, just 2 hospitals, is too small to extract definitive conclusions

**Figure 75: Swedish acute hospitals eHealth profile by size**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

Scale does appear to affect the eHealth capabilities of Swedish acute hospitals, with the very largest hospital segment (More than 750 beds) scoring 100% in all five indicator areas. The lowest performing hospitals, by contrast, are the two smallest segments, being Fewer than 101 beds and Between 101 and 250 beds..

#### 4. Composite indicators

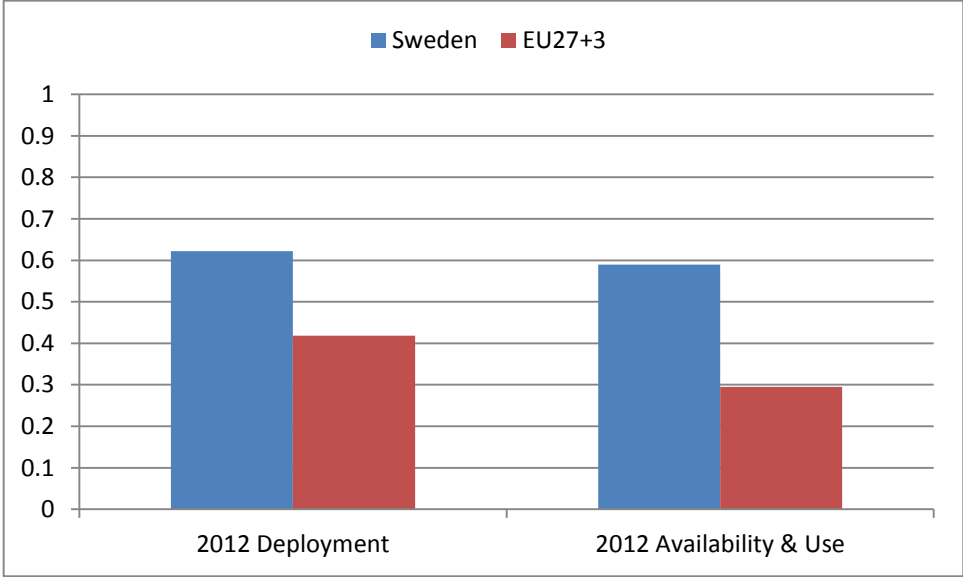
The following section reports the results for Sweden on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals' units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which

all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in Sweden's hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. Sweden's eHealth Deployment indicator is based on data from 25 hospitals, while the Availability and Use indicator was built from the information provided by 24 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

**Figure 4: Sweden eHealth Composite Indicators**

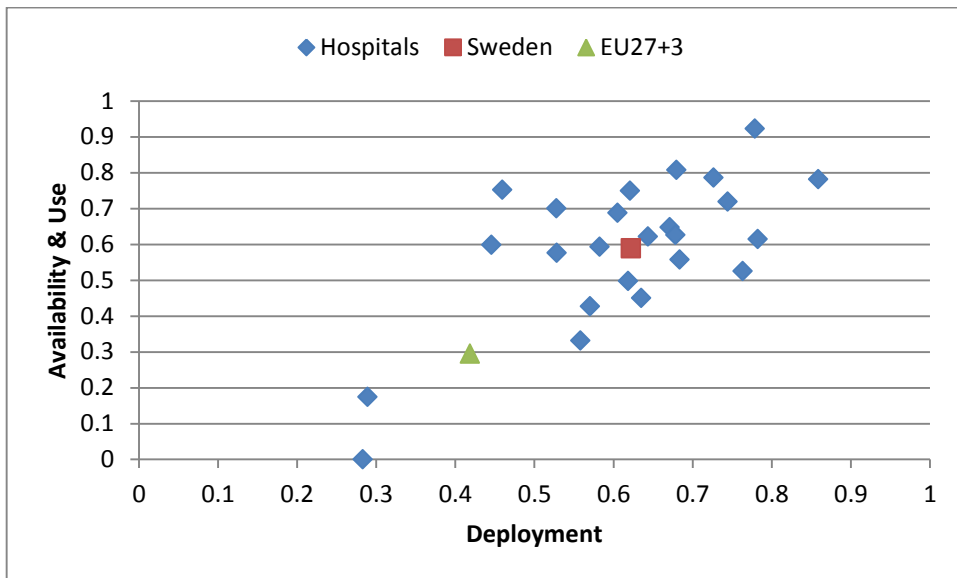


For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 7 hospitals) for Sweden was 0.64, while the 2012 value was 0.62, which shows a decrease of 2% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for Sweden and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that all Swedish hospitals but 2 were above EU27+3 average for both composite indicators. However, these two hospitals have scores lower than the European average in both indicators.



**Figure 5: Sweden's hospitals values of eHealth Composite Indicators**



European Hospital Survey:  
Benchmarking Deployment of e-Health Services  
(2012–2013)

**Country Report United Kingdom**

## 1. Background

With the aim to benchmark the level of eHealth use in acute hospitals in all 27 EU Member States and Croatia, Iceland and Norway (EU27+3), a survey was launched to: (i) gather and analyse data on deployment, that is comparable to a 2010 similar survey; (ii) compute a composite index and use it to monitor evolution of adoption over time; and (iii) develop a new index that will monitor availability and use of eHealth.

In total 26,551 healthcare establishments in EU27+3, were contacted and screened to help define an as much homogeneous group of hospitals as possible. In total, 5424 qualified as acute care hospitals<sup>88</sup>, and of those 1717 completed the interview, 49 questions with an average duration of 43 minutes, over the period October 2012 -January 2013. The survey targeted Chief Information Officers (CIOs) and it was carried out via Computer-Aided Telephone Interviewing (CATI). The novelty of this survey is that it includes a number of questions that enable the comparison of availability and use of eHealth specific functionality; this set of questions is compatible with OECD early guidelines, as well as with the equivalent part of a similar survey among Europeans General Practitioners<sup>89</sup>.

This document reports the results of this project for **United Kingdom**. It starts with a brief description of the characteristics of the sample and presents a comparison with the 2010 sample. It then provides descriptive statistics and indicators. Finally, the results of the composite indicators for United Kingdom are displayed. When possible, these results are compared with the European level results, and the evolution over the period 2010-2012 is analyzed.

## 2. Sample analysis

889 hospitals and National Health Service (NHS) trusts were identified in United Kingdom. Within this rough universe 510 (57%) completed the screener part of the questionnaire and 102 qualified as acute care hospitals. The proportion of hospitals with less than 100 beds among these hospitals was higher compared to the universe of acute Hospitals at EU27+3 level (34% vs. 21%) and there were more hospitals of public ownership (74% vs. 64%). Out of the United Kingdom universe, 33 acute hospitals and NHS trusts (32%) completed the survey. In order to guarantee the representativeness of the healthcare system in the United Kingdom, the 2012 results of the acute hospitals within NHS trusts have been duplicated based on the number of hospitals represented by the trust. After this duplication process, the United Kingdom counts 69 hospitals in its sample.

**Table 88: United Kingdom sample breakdown by size of acute care hospitals**

United Kingdom	N=	Fewer than 101 beds	Between 101 and 250 beds	Between 251 and 750 beds	More than 750 beds	Don't know/ No answer
<b>Census</b>	<b>102</b>	59	9	15	4	15
		58%	9%	15%	4%	15%
<b>2012</b>	<b>69</b>	36	7	16	5	5
		64%	9%	9%	3%	15%
<b>2010</b>	<b>38</b>	9	4	18	7	-
		24%	11%	47%	18%	-

<sup>88</sup> This criterion was based on whether respondents considered that the hospital was an acute or general hospital and in case they did not, whether they reported that the hospital had an emergency department, and at least one of the following: a) routine and/or life-saving surgery operating room; and/or b) an intensive care unit.

<sup>89</sup> Benchmarking Deployment of eHealth among General Practitioners (2013). ISBN 978-92-79-31130-7 DOI: 10.2759/24556"

**Table 2: United Kingdom breakdown by ownership type**

United Kingdom	N=	Public	Private	Private not for profit	Don't know/ No answer
<b>Census</b>	<b>102</b>	55 54%	43 42%	2 2%	2 2%
<b>2012</b>	<b>69</b>	55 80%	13 19%	1 1%	- -
<b>2010</b>	<b>38</b>	28 74%	5 13%	5 13%	- -

The final sample of hospitals included in the survey has a bigger proportion of public hospitals than the universe of United Kingdom acute hospitals. Comparing this 2012 final sample with the one of the 2010 survey, the number of hospitals has almost doubled, with a higher proportion of small hospitals (less than 100 beds) than in 2010.

### 3. Descriptive statistics and indicators

Using 13 eHealth indicators derived from the specific answers to the questionnaire, an eHealth profile has been constructed for each country and is represented through a spider diagram. These diagrams have scores ranging from 0 to 5, which respectively correspond to a 0% to 100% implementation rate. The 13 indicators cover the following 4 thematic areas:

Infrastructure: Externally connected, Broadband > 50Mbps and Single and unified wireless:

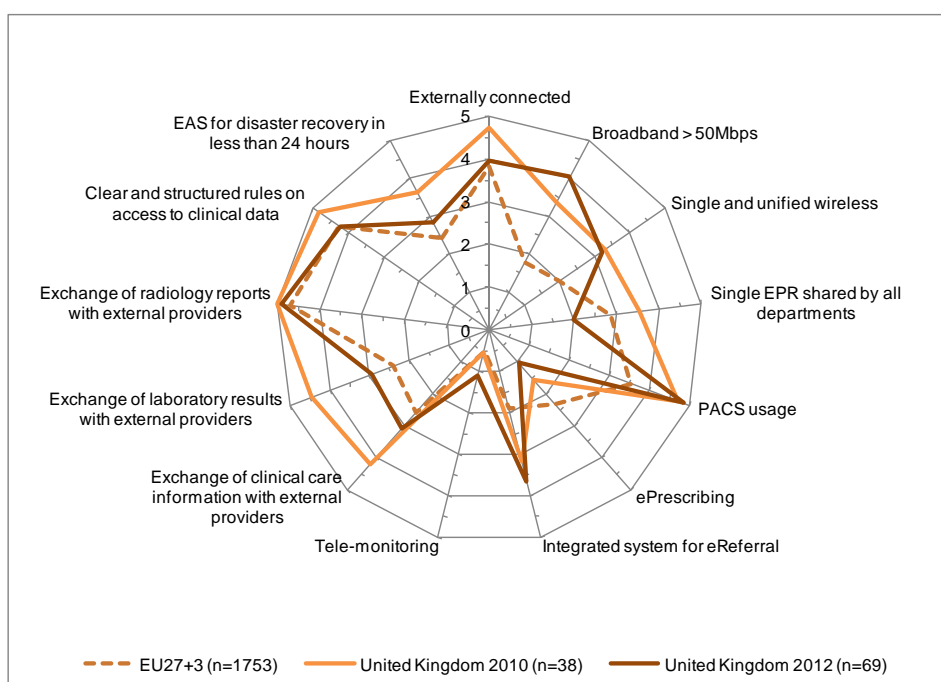
Applications: Single Electronic Patient Records (EPR) shared by all departments, Picture Archiving and Communication System (PACS) usage, ePrescribing, Integrated system for eReferral and Tele-monitoring

Integration: Exchange of clinical care information (CCI) with external providers; Exchange of laboratory results with external providers; and Exchange of radiology reports with external providers.

Security: Clear and structured rules on access to clinical data and Enterprise Archive Strategy (EAS) for disaster recovery in less than 24 hours:

The results for some of these indicators are also reported by groups of hospitals according to the ownership and size of the hospitals that completed the survey.

**Figure 76: United Kingdom acute hospital eHealth profile**



Note: The scoring scale from 0 to 5 points corresponds to an implementation rate from 0% to 100%.

**Table 89 – eHealth indicators United Kingdom**

eHealth indicators - United Kingdom	Valid N	% hospitals	2012 difference United Kingdom vs.EU27+3	United Kingdom evolution, 2012 vs. 2010 <sup>90</sup>
<b>Infrastructure</b>				
Externally connected	68	79%	3%	-15%
Broadband > 50Mbps	37	81%	46%	13%
Single and unified wireless	67	64%	24%	-2%
Single EPR shared by all departments	68	40%	-17%	-31%
<b>Applications</b>				
PACS usage	69	97%	26%	2%
ePrescribing	67	21%	-26%	-11%
Integrated system for eReferral	67	73%	35%	10%
Tele-monitoring	68	22%	12%	11%
<b>Integration</b>				
Exchange of clinical care information with external providers	67	76%	10%	-23%
Exchange of laboratory results with external providers	67	73%	11%	-30%
Exchange of radiology reports with external providers	68	65%	4%	-2%
<b>Security</b>				
Clear and structured rules on access to clinical data	66	85%	0%	-13%
EAS for disaster recovery in less than 24 hours	58	57%	9%	-16%

Note: Results are based on valid answers only - bases (n) may differ from the ones reported here

<sup>90</sup> These results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Position of the United Kingdom eHealth profile within EU27+3

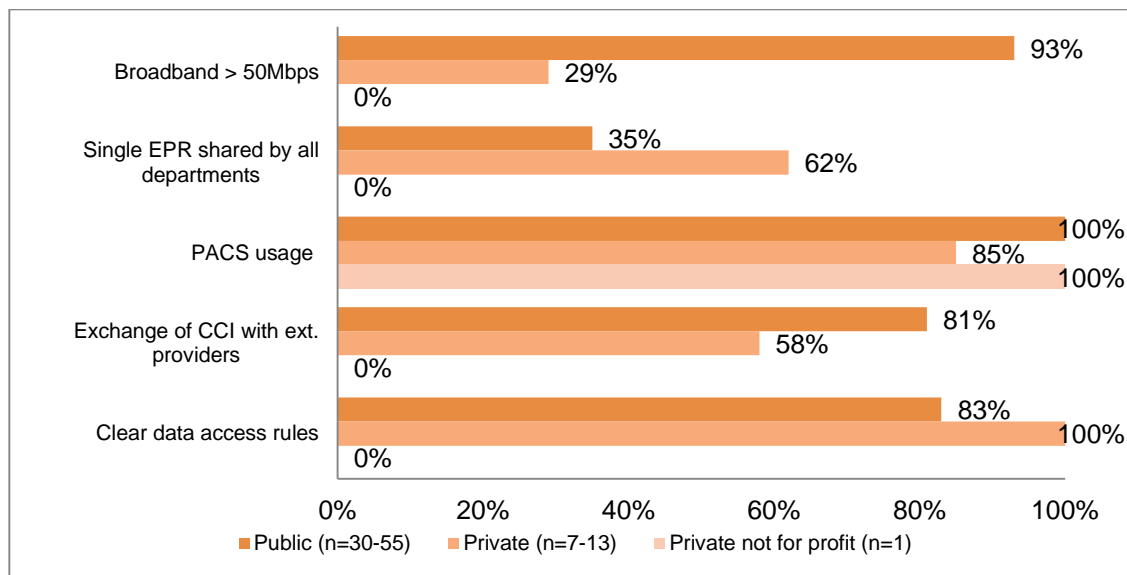
The United Kingdom is above the average in terms of the adoption of eHealth capabilities. The United Kingdom’s largest scores above the average value come from “Broadband > 50Mbps”, “Single and unified wireless”, “PACS usage” and “Integrated system for eReferral”. Only the “Single EPR shared by all departments”, “ePrescribing” and “Clear and structured rules on access to clinical data” indicators scored below average.

Changes in the United Kingdom eHealth profile

Despite the United Kingdom’s healthy position in relation to the average EU27+3 results, the country’s performance has dropped in several areas, with only four areas where the 2012 results are higher than the 2010 ones.. All other nine indicators registered negative growth, with “Single EPR shared by all departments”, “Exchange of clinical care information with external providers” and “Exchange of laboratory results with external providers” being the areas where this decrease has been more significant. Nevertheless, these results should be taken with caution. Although samples are representative of the universe in each survey, they might not be fully comparable between the two years.

Out of the 13 indicators included and analysed in the eHealth profile, 5 were selected to explore variability in the results according to size and ownership of the hospitals.

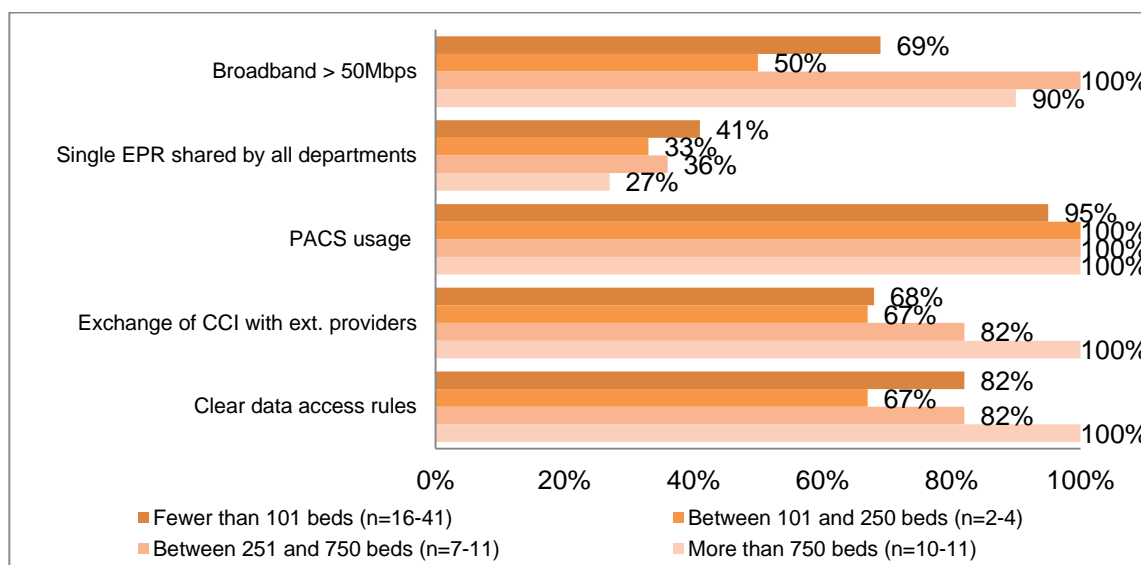
**Figure 77: United Kingdom acute hospitals eHealth profile by ownership**



*Note: Results are based on valid answers only - category bases may vary from the total reported here.*

No definite trends can be observed based on ownership type among United Kingdom hospitals. Public hospitals appear to perform better, scoring highest or joint highest in three of five categories (“Broadband > 50Mbps”, “PACS usage” and “Exchange of clinical care information with external providers”) and Private hospitals perform better in “Clear and structured rules on access to clinical data” and “Single EPR shared by all departments”. Private not for profit acute hospitals only returned data for one of five categories under investigation

**Figure 78: United Kingdom acute hospitals eHealth profile by size**



Note: Results are based on valid answers only - category bases may vary from the total reported here.

Scale appears to be more influential in the development of eHealth capabilities across UK hospitals, with the largest hospitals (Between 251 and 750 beds and More than 750 beds) outperforming other segments in four of five indicator areas. In addition, for three of these indicators, “Broadband > 50Mbps”, “Exchange of clinical care information with external providers” and “Clear and structured rules on access to clinical data”, the margin between the highest and lowest performers is considerable.

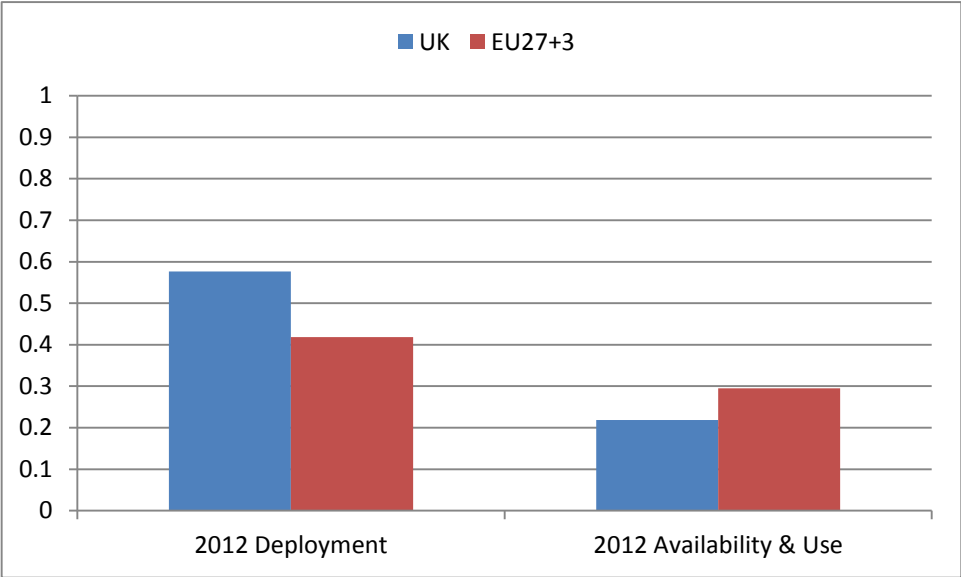
#### 4. Composite indicators

The following section reports the results for United Kingdom on the composite indicators for eHealth Deployment and eHealth Availability and Use. Deployment, in this context, is understood as the existence of infrastructure (i.e. broadband connection), applications (i.e. a computerised system for eprescribing), systems (i.e. to exchange clinical information with other care providers electronically) and regulations (i.e. on security and privacy of medical data). Availability is understood as the level of implementation of eHealth functionalities across hospitals’ units while use is understood as the extent to which health professionals use the eHealth functionalities that have been implemented. The composite indicators are calculated at Hospital level before obtaining average country values. These indicators have been developed by IPTS through multivariate statistical analysis and they make it possible to benchmark between countries and compare 2012 results for eHealth deployment with those from a similar survey carried out in 2010.

The indicator for eHealth Deployment was based on 45 variables from the survey that provided information on characteristics related to the deployment of eHealth in each hospital. These variables were grouped in 4 dimensions (Infrastructure, Applications, Health Information Exchange, and Security and Privacy) and each dimension was given the same weight in the final indicator. Further, the eHealth Availability and Use indicator was based on information from the survey on the level of availability and use in each hospital of 39 different eHealth functionalities pertaining to 4 categories (View/Input Information on EHR; Clinical Decision Support on EHR; Health Information Exchange; and Telehealth). For both indicators, the range of possible values is 0-1. This implies that, for instance, a hospital with positive answers in all 45 variables which were the basis for the Deployment indicator would score a value of 1 in this indicator. Correspondingly, a hospital in which all 39 of the eHealth functionalities were unavailable (or available but not being used) would obtain a score of zero in the Availability and Use indicator.

The following graph displays the average values of these indicators in United Kingdom’s hospitals, comparing them with the average values obtained for the whole sample of EU27+3 hospitals. United Kingdom's eHealth Deployment indicator is based on data from 67 hospitals, while the Availability and Use indicator was built from the information provided by 51 hospitals. The values for the EU27+3 indicators are obtained from samples of 1,643 hospitals (Deployment) and 1,533 hospitals (Use and Availability). These differences are the consequence of different numbers of missing values in each of the survey blocks.

**Figure 4: United Kingdom eHealth Composite Indicators**



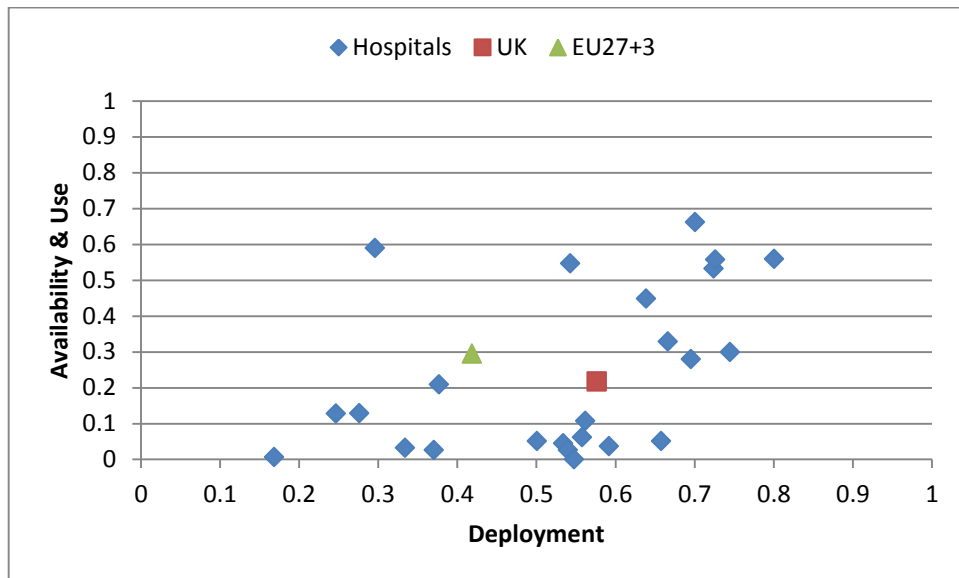
For the eHealth Deployment indicator, it is also possible to analyse the evolution over the period 2010-2012. In 2010, this indicator (based on data from 37 hospitals) for United Kingdom was 0.62, while the 2012 value was 0.58, which shows a negative growth of 4% over the two year period. In comparison, the average increase in eHealth Deployment for the EU27+3 hospitals (2010 results based on data from 844 hospitals) was 3%.

Finally, for hospitals with valid data for both indicators, it is possible to map these individual values on a graph and compare them with the average value for United Kingdom and with the average value of the EU27+3 hospitals in order to show the variability of the hospitals' results. This exercise is displayed in the following graph. It shows that there is significant variability among UK hospitals and NHS trusts<sup>91</sup>. While 9 hospitals (36% of the sample) were above EU27+3 average for both composite indicators, there were as well 6 hospitals (25%) with results below EU27+3 average for both composite indicators.

<sup>91</sup> In this graph, results for NHS trusts have been not duplicated based on the number of hospitals represented by the trust.



**Figure 5: United Kingdom's hospitals values of eHealth Composite Indicators**





European Commission

EUR 26357 – Joint Research Centre – Institute for Prospective Technological Studies

Title: European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013) – Country Reports

Author: Ramon Sabes-Figuera

Luxembourg: Publications Office of the European Union

2013 – 239 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-34778-8 (pdf)

I

doi:10.2791/55973

#### Abstract

A widespread uptake of eHealth technologies is likely to benefit European Healthcare systems both in terms of quality of care and financial sustainability and European society at large. This is why eHealth has been on the European Commission policy agenda for more than a decade. The objectives of the latest eHealth action plan developed in 2012 are in line with those of the Europe 2020 Strategy and the Digital Agenda for Europe.

This report, based on the analysis of the data from the "European Hospital Survey: Benchmarking deployment of e-Health services (2012–2013)" project, presents policy relevant results and findings for each of the 28 EU Member States as well as Iceland and Norway.

The results highlighted here are based on the analysis of the survey descriptive results as well as two composite indicators on eHealth deployment and eHealth availability and use that were developed based on the survey's data

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.



ISBN 978-92-79-34778-8

