



Deliverable 6.4

Intermediate report on dissemination activities

Big Data for Medical Analytics

Project Coordinator	Supriyo Chatterjea, Philips Electronics Nederland B.V.		
Start date Project	January 1 st 2018	Duration	38 months
Version	1.0		
Status	Final		
Date of issue	11/10/2019		
Dissemination level	Public		



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495. The content of this document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information.



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Management Summary

This document describes the Intermediate report on dissemination activities in order to evaluate the communication and dissemination activities within the BigMedilytics project which corresponds to the second deliverable of the Work Package 6: Dissemination, Communication & Standardisation, led by INCLIVA.

The document is structured in seven sections: introduction; communication and dissemination objectives; monitoring methods; communication and dissemination tools and actions; media coverage; achievements, and challenge:

- The introduction explains the purpose of the document and the background and justification of communication and dissemination actions in European Union funded projects.
- The second section explains the communication and dissemination objectives set by the project, the targets and the progress expected.
- The third section presents the different monitoring methods used by the project in order to gather the information needed and assess the progress.
- The fourth section describes the communication and dissemination tools and actions carried out by the project during the first 18 months.
- The fifth section refers to the media coverage of the different news generated by the project.
- The sixth section presents the objectives achieved according to the progress expected.
- Finally, the document describes the challenges and it includes some recommendations in order to improve the communication and dissemination strategy.

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1. Introduction

1.1. Purpose of the document

The purpose of this document is to describe the communication and dissemination actions and procedures of the BigMedilytics project during the first 18 months. This deliverable has been developed by INCLIVA as lead beneficiary of the Work package 6: Dissemination, Communication & Standardisation.

1.2. Background and justification

In August 2018, the communication and dissemination plans (Deliverable 6.2. Communication plan and tools and Deliverable 6.3. Dissemination procedures) for the BigMedilytics project were delivered.

Communication is a contractual obligation for Horizon 2020 funded projects. Beneficiaries agree to “promote the action and its results, by providing targeted information to multiple audiences (including the media and the public), in a strategic and effective manner and possibly engaging in a two-way exchange” (Article 38 of the Model Grant Agreement).

Communication activities to promote the project and its results will improve visibility, support and reputation that will lead to more chances of success. A successful implementation of communication plans, along with dissemination and exploitation plan, will help to drive competitiveness and growth in Europe and address societal challenges.

Dissemination refers to “the public disclosure of results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium”. Regarding results, they are defined as “any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected, which are generated in the action as well as any attached rights, including intellectual property rights”.

The dissemination of results contributes to the progress of science and it is in line with the EU Research and Innovation policy goals: open innovation, open science, open to the world. The conversion of knowledge into innovation will shape a better European future. This is why promoting and investing in innovative ideas with rapid scale-up potential is one of the key actions to maximise the impact of EU research and innovation programmes.

In this case, the transfer of knowledge and the dissemination of results are essential to improve healthcare, and making these results openly available will enable their sharing in order to generate further researches, novel solutions or tackle other challenges. This is even more important in the framework of a project that has received funding from the European Commission through European tax payers. In this sense, the public investments done will be justified by the innovations achieved.

It should be mentioned that communication and dissemination actions can sometimes overlap.

1.3. Related documents

- D6.1. Website Portal
- D6.2. Communication plan
- D6.3. Dissemination procedures

2. Communication and dissemination objectives

2.1. Communication objectives and targets

A communication plan was developed in order to publicize the project results, shared among the partners and published publicly on the project's website. For the communication plan we will refer to the [deliverable 6.2 "Communication plan and tools"](#).

In the dissemination plan we identified 4 objectives:

1. To create awareness
2. To involve external partners
3. To maximize the impact of the project results
4. To create effective communication among project partners

Eight target groups and subgroups have been identified:

- Industry
 - EU HealthTech industry
 - EU ICT big data industry
 - Health insurance industry
 - Pharmaceutical industry
 - Healthcare providers (end users)
- Researchers / scientists
 - Clinical scientists and professionals
 - Researchers
- Policy makers
 - Healthcare authorities
 - European Commission
- Standards development organizations
 - International Consortium for Health Outcomes Measurement (ICHOM)
- Patient organisations
 - Patient organisations in the fields covered by the project
- General public
 - Students form all levels and general public
- Media
 - Specialized media
 - Generalist media at regional and national level
- Project consortium
 - 35 partners that make up the consortium

2.2. Dissemination objectives and targets

The objective of the dissemination is to transfer knowledge and results in order to enable others to use and take up results, thus maximising the impact of BigMedilytics.

Four target groups were identified: Industry (EU HealthTech industry, EU ICT big data industry, Health insurance industry, Healthcare providers) researchers / clinical scientists, policy makers, patient organisations, and more than 100 organisations representing key players in the EU Healthcare sector: care providers, insurances, medical device and diagnosis companies, pharmaceutical companies, and healthcare IT.

2.3. Progress expected

An initial list of indicators was elaborated to measure the progress of the communication and dissemination:

TARGET	INDICATOR	PROGRESS		
		Y1	Y2	Y3
EU HealthTech Industry	BigMedilotics workshop for External Exploitation Partners		/1	/1
EU ICT big data Industry	BigMedilotics symposium	/1	/1	/1
Health Insurance Industry	Demonstrations in selected meetings/conferences		/1	/1
EU HealthTech industry	Demonstrations at major Medical tradeshow		/2	/2
End users	Tutorials/presentations/demos to selected hospitals		/6	/6
Healthcare authorities/Policy makers	Workshops with local/regional/national authorities	/1	/2	/4
Patient organisations	Meetings with representatives of selected organisations	/1	/1	/1
Reserachers/scientists	Journal papers/conferences papers/posters	/6	/8	/8
European Commission	Presenting results via EC networking mechanisms	/2	/2	/2
Liaison within programme	Meetings with projects from ICT14-18 via BDVe-CSA [16]	/2	/2	/2
Standards	Participation in standarization events	/2	/3	/4
All above + general public	White papers		/1	/1
All above + general public	Newsletter	/2	/2	/2
All above + general public	Number of blog posts	/4	/4	/4

3. Monitoring methods

3.1. Reporting template

A reporting template was distributed among the communication contacts. Reminders are sent regularly. The main purpose of the reporting template is to know the different activities attended or organised by the partners to communicate the project.



The screenshot shows the 'BIG Medilotics Reporting of dissemination activities' form. It features a header with the logo and title. Below is a table with 14 columns: Partner, Indicator (with a dropdown arrow), Name of the event, Website of the event, Dates of the event, Country of the event, Target, Is the partner an organizer of the event?, Kind of material used by the partner, Goal, Link to the material, Number of people reached, Photos attached (yes / no), and Comments.

Figure 1. Screenshot of the reporting template

The reporting aims to find out if the indicators set in the Grant Agreement have been reached. For this reason, it includes the following information to fill out:

- Partner
- Indicator
 - o BigMedilytics symposium
 - o Demonstrations in selected meetings/conferences
 - o Demonstrations at major Medical tradeshows
 - o Tutorials/presentations/demos to selected hospitals
 - o Workshops with local/regional/national authorities
 - o Meetings with representatives of selected organisations
 - o Industrial journal papers/conferences papers/posters
 - o Presenting results via EC networking mechanisms
 - o Meetings with projects from ICT14-18 via BDVe-CSA [16]
 - o Participation in standardization events
 - o Other (Indicate below)
- Name of the event
- Website of the event
- Dates of the event
- Country of the event
- Target
- Is the partner an organizer of the event?
- Kind of material used by the partner
- Goal
 - o Awareness
 - o Communicate best practices
 - o Demonstration
 - o Influencing standards
 - o Support
 - o Partnership
 - o Present results
 - o Knowledge transfer
 - o Transfer of results
 - o Other (indicate below)
- Link to the material
- Number of people reached
- Photos attached (yes / no)
- Comments

3.2. Reporting info for dissemination

A template for dissemination was also distributed among the consortium in order to inform about their publications.

Publication info	
<div> <div>+</div> <div>1. DOI (optional, but it will save you a lot of work if you have it)</div> <div> If possible, please provide a DOI (digital object identifier): <input type="text"/> </div> </div>	
<div> <div>2. Is this publication available in Open-Access, or will it be made available? (mandatory)</div> <div> Choose: <input type="checkbox"/> Yes, available in Green Open Access <input type="checkbox"/> Yes, available in Gold Open Access <input type="checkbox"/> No (in H2020 (see article 29.2 of the grant agreement) beneficiaries must ensure Open Access to all peer-reviewed scientific publications relating to the results of the project. Check more information in this link to the Participant Portal) </div> </div>	
<div> <div>3. Open access Embargo/Charges (mandatory)</div> <div> In case of Green Open Access: <input type="checkbox"/> Length of the Embargo, if any: XX months In case of Gold Open Access: <input type="checkbox"/> Processing charges for Gold Open Access, charged by the publisher </div> </div>	
<div> <div>4. Is this a peer-reviewed publication? (mandatory)</div> <div> <input type="text"/> Yes/No </div> </div>	
<div> <div>5. Is this a joint public/private publication? (mandatory)</div> <div> <input type="text"/> Yes/No </div> </div>	
<div> <div>Only needed if no DOI was provided in step (1)</div> <div> <div> <div>Only needed if no DOI was provided in step (1)</div> <div> <div>Type of Publication (mandatory)</div> <div> Choose: <input type="checkbox"/> Article in Journal <input type="checkbox"/> Publication in Conference proceedings/Workshop <input type="checkbox"/> Book/Monograph <input type="checkbox"/> Chapter in a book <input type="checkbox"/> Thesis/Dissertation <input type="checkbox"/> Other </div> </div> </div> </div> </div>	
<div> <div>Title (mandatory)</div> <div> <input type="text"/> </div> </div>	
<div> <div>Authors (mandatory)</div> <div> <input type="text"/> </div> </div>	

Publisher (mandatory)	<input type="text"/>
Place of Publication (mandatory)	<input type="text"/>
Year of Publication (mandatory)	<input type="text"/>
Repository link	<input type="text"/>
Link to the publication	<input type="text"/>
Title of the Journal/Proceedings/Books series/Book (for book chapters)	<input type="text"/>
Number, date or frequency of the Journal/Proceedings/Book	<input type="text"/>
Relevant Pages	<input type="text"/>
ISSN/EAN/ISBN	<input type="text"/>

Figure 2: Publication info template

3.3. Survey

In June 2019, a survey was launched to the Consortium in order to find out some relevant information about how partners are communicating the project.

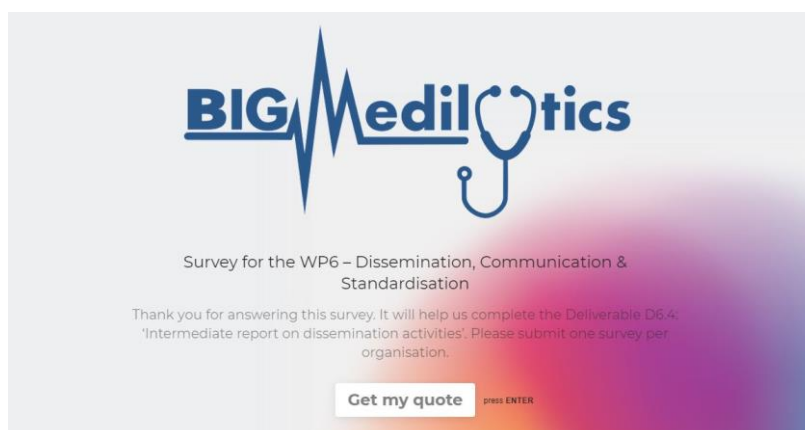


Figure 3: Screenshot of the heading of the survey

The survey contains the following questionnaire:

ORGANISATION

1. WEBSITE

1.1. Does your organisation website include a section regarding the BigMedilytics project?

Yes

No

Please include link

1.2. Does your organisation website have a link to www.bigmedilytics.eu on...

the homepage?

a section (such as "projects", "research", "innovation", etc.)?

other?

Not included

2. NEWSLETTER

2.1. Are you subscribed to the newsletter?

Yes

No

2.2. Have you forwarded the newsletter to other people interested?

Yes

No

3. SOCIAL NETWORKS

3.1. Which BigMedilytic's social network are you (or your organisation) following?

Twitter

Facebook

LinkedIn

YouTube

None

3.2. Do you (or your organisation) like, retweet or comment the posts of BigMedilytics on social media?

Yes

No

3.3. Do you (or your organisation) post about BigMedilytics?

Yes

No

3.4. Do you send contents to the science communicator to share on the BigMedilytics accounts?

Yes

No

4. PROJECT TOOLS AND IMAGE

4.1. Did you deliver the project's brochures?

Yes

No

How many of them approximately?

--

4.2. Do you use the BigMedilytic's video on your presentations?

Yes

No

4.3. Do you use the ppt templates in your presentations / conferences, etc.?

Yes

No

Results of the survey

16 organisations answered the survey. The results are the following:

- 9 organisations include a section regarding the BigMedilytics project on their websites
 - 2 of them on the homepage and 8 in other sections.
- 12 organisations are subscribed to the newsletter and 8 have forwarded it.
- 8 organisations follow the project on Twitter, 8 on LinkedIn, and 4 on YouTube.
- 9 organisations like, retweet or comment the posts of BigMedilytics on social media
- 9 organisations post about BigMedilytics
- 4 organisations send contents to the science communicator to share on the BigMedilytics social networks.
- 11 organisations have delivered the project's brochures. Around 550 were delivered in total.
- 6 organisations use the project's video on their presentations
- 8 organisations use the templates in their presentations / conferences

4. Communication and dissemination tools and actions

4.1. Objective 1: to create awareness

In order to reach the first objective (To create awareness) some communication tools have been developed and used and some actions were carried out:

4.1.1. Creation of a project corporate identity

A **logotype** was created at the start of the project, as well as a **project image** was defined (a Corporate Identity Manual was created and can be found in Appendix B.1. in the Deliverable 6.2) in different tools and platforms, like the website, social networks, templates and posters. A set of templates was also designed following the visual identity defined for the project.

All these elements help the large consortium to create coherence and unit.

4.1.2. Creation of a website

A website (<https://www.bigmedilotics.eu>) for the project was developed and launched on June 2018. It is the main communication channel of the project. It presents the most relevant information of the project in an appealing and understandable way: objectives, expected impact and purpose of the twelve pilots that make up the project. Further information about the creation of the website and its sections can be found in the [deliverable 6.1. "Website Project"](#).

A total of 6,796 users visited the website from June 2018 to August 2019. During this time, the website has received a total of 9,654 visits. In the following image we can find the main figures of the BigMedilotics website during the mentioned period of time:

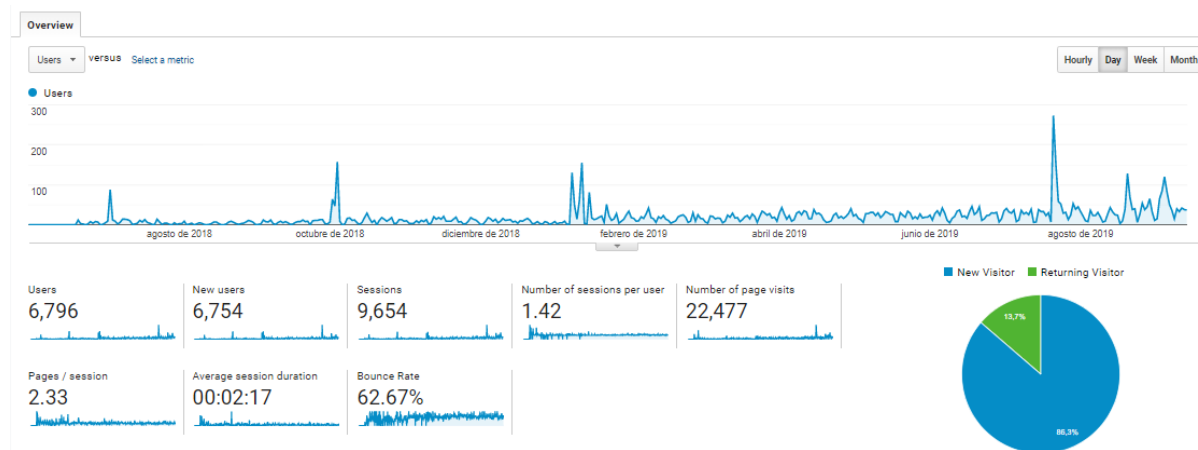


Figure 4. Users on the website. Source: Google Analytics

The homepage is the most visited content, followed by the project general information and the pilots' descriptions. It should be highlighted the average time spent to learn about the project on the [project's page](#) (2,15 minutes) –whose content is presented in an appealing way– which shows the interest generated by the project.



Figure 5. Project's page

The most relevant contents in terms of visits can be found in the image below.











Page ?		Number of page visits ?	Number of unique page views ?	Average time on the page ?
		22,477 % of the total: 100.00% (22,477)	17,604 % of the total: 100.00% (17,604)	00:01:43 Average view: 00:01:43 (0.00%)
one. /		6,920 (30.79%)	5,403 (30.69%)	00:01:51
two. /big-data-project/		3,994 (17.77%)	2,721 (15.46%)	00:02:15
3. /pilots/		1,035 (4.60%)	660 (3.75%)	00:00:56
Four. /news-events/		978 (4.35%)	735 (4.18%)	00:01:01
5. /contact/		574 (2.55%)	472 (2.68%)	00:01:04
6. /deliverables/		518 (2.30%)	459 (2.61%)	00:02:12
7. /publications/		512 (2.28%)	450 (2.56%)	00:00:29
8. /related-projects/		473 (2.10%)	397 (2.26%)	00:01:43
9. /big-data-fueling-the-transformation-of-europes-healthcare-secto r/		468 (2.08%)	314 (1.78%)	00:00:54
10. /big-data-fueling-the-transformation-of-europes-healthcare-secto r-last-seats-available/		381 (1.70%)	307 (1.74%)	00:03:41

Figure 6. Visits to pages on the website. Source: Google Analytics

According to the geographical information, users are located mainly in Spain, France, United States, Germany and Netherlands:

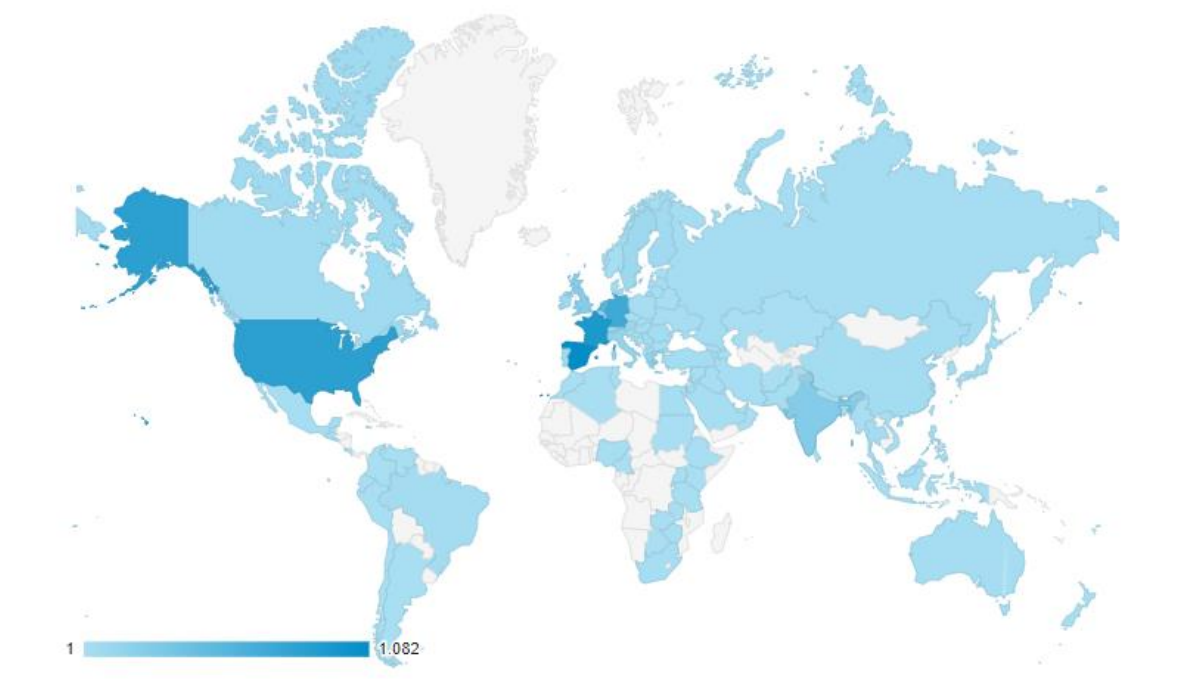


Figure 7. Visits to pages on the website per country. Source: Google Analytics

4.1.3. Design of a brochure

A brochure was also designed in order to communicate the main objectives and aspects of the project. The printed version and de files were delivered to the 35 partners of the consortium. A [digital version is publicly available on the project's website](#).



Figure 8. Printed brochure (cover and inside)

4.1.4. Update of the news & events sections on the website

The website has been updates with posts, press releases, relevant events, videos and photos (using a Flickr gallery).

A total of 18 posts and 6 events have been published. The posts of the first year of the project were published following the calendar in the communication plan (Deliverable 6.2) that covered the different work packages of the project.

Some partners have contributed to feed the blog with contents about their progress, work and activities carried out.

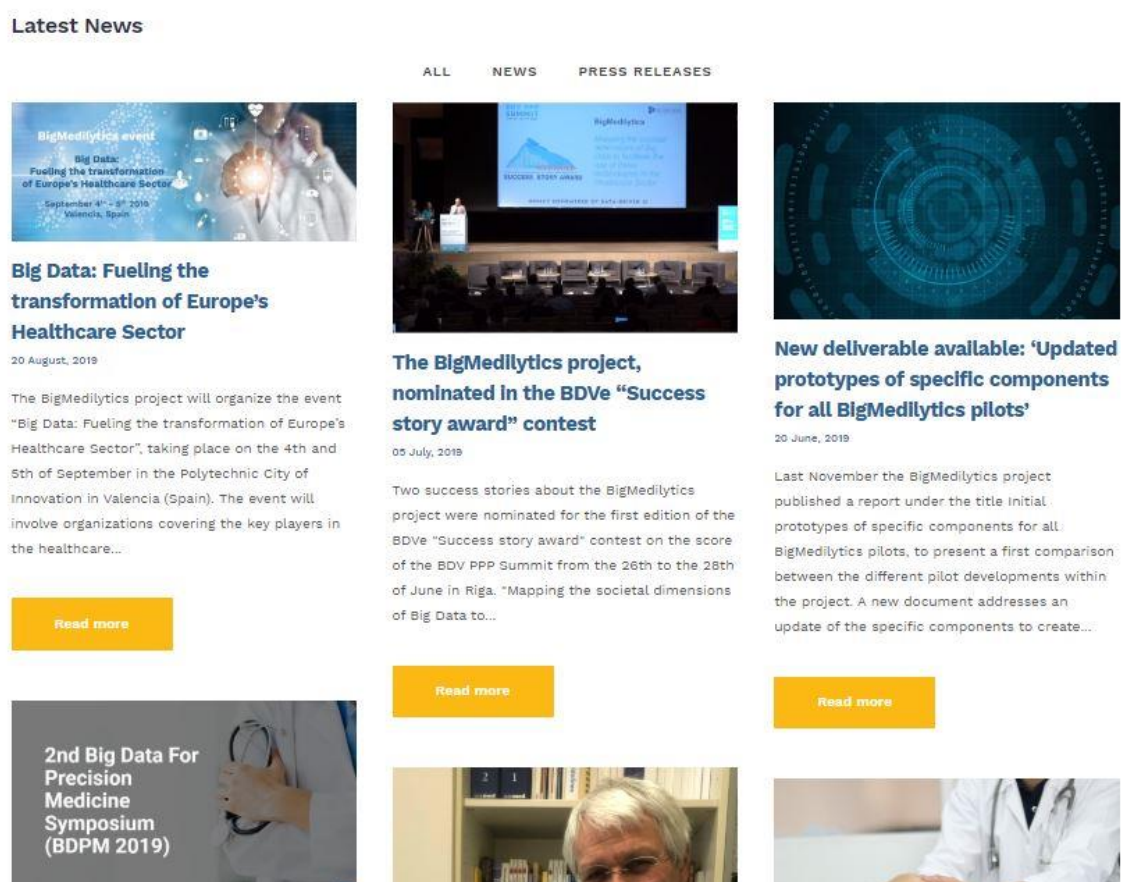


Figure 9. Screenshot of the last news published on the website

The project also used other relevant websites to communicate its objectives and updates like the BDVA website and its newsletter which reaches to more than 1,000 people. News about the project were included in three BDVA newsletters (December 2018, June 2019 and September 2019):

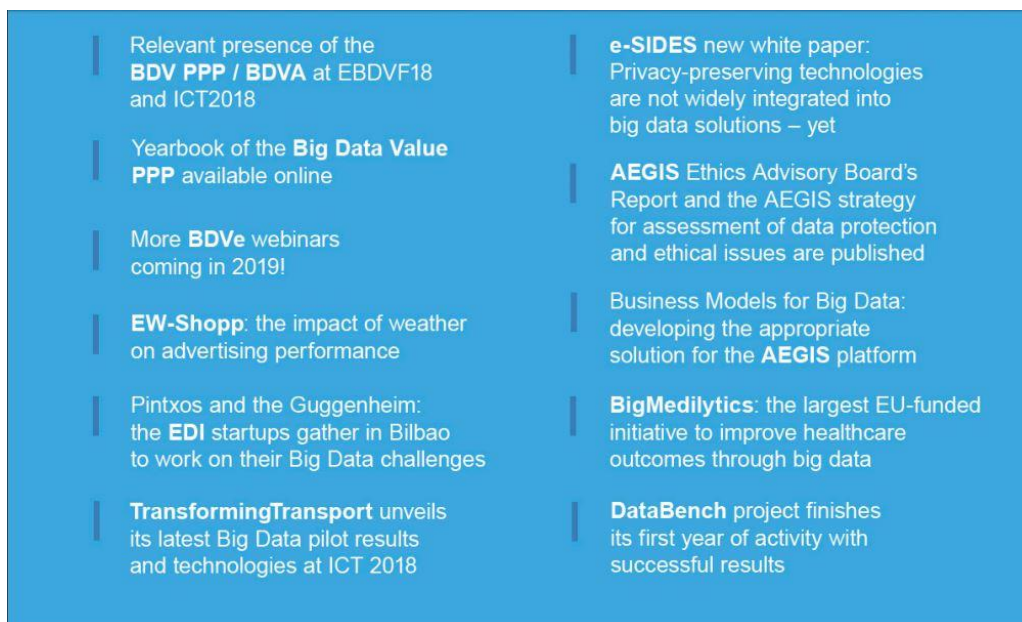


Figure 10. Screenshot of the BDVA newsletter of December 2018



Figure 11. Screenshot of the BDVA newsletter of June 2019



Figure 12. Screenshot of the BDVA newsletter of September 2019

The partners have also published contents of the project on their websites / channels:

Partner	URL
Demokritos	https://www.aok.de/pk/nordost/inhalt/mitarbeit-an-ki-strategie-der-bundesregierung/
Demokritos	https://www.iit.demokritos.gr/projects/bigmedilotics/
Contextflow	http://contextflow.com/big-medilotics-contextflow/
DFKI	https://www.dfki.de/en/web/research/projects-and-publications/projects/project/bigmedilotics/
Erasmus Universiteit Rotterdam	https://www.eur.nl/en/eshpm/research/bigmedilotics
Erasmus Universiteit Rotterdam	https://www.eur.nl/eshpm/nieuws/radiointerview-over-bigmedilotics-bij-new-business-radio
Erasmus Universiteit Rotterdam	https://youtu.be/DfCBwc6KglA
Gottfried Wilhelm Leibniz Universitaet Hannover	https://www.uni-hannover.de/en/forschung/forschungsfoerderung/europaeische-foerderung/bewilligte-eu-projekte/projekte/
Medizinische Universitaet Wien	https://www.meduniwien.ac.at/web/forschung/forschungsprojekte/eu-projekte/
INCLIVA	https://www.incliva.es/actualidad/noticias/incliva-participa-en-un-proyecto-europeo-de-big-data-para-mejorar-la-asistencia-sanitaria
INCLIVA	https://www.incliva.es/actualidad/noticias/expertos-europeos-en-salud-y-big-data-abordan-en-valencia-los-principales-retos-del-sector-sanitario
Institut Curie	https://techtransfer.institut-curie.org/news/partnership/institut-curie-unique-french-clinical-center-massive-philips-research-led-big-data
ITI	https://www.iti.es/proyectosidi/bigmedilotics/
ITI	https://www.iti.es/noticias/bigmedilotics-estuvo-presente-en-las-actividades-programadas-por-la-bdv-ppp-en-el-marco-del-ict-2018/
ITI	https://www.iti.es/noticias/bienvenidos-a-la-era-de-la-salud-digital/
ITI	https://www.iti.es/noticias/expertos-europeos-en-salud-y-big-data-abordan-en-valencia-los-principales-retos-del-sector-sanitario/
Optimedis	https://optimedis.de/eu-forschungsprojekte
Optimedis	https://optimedis.de/aktuelles/916-optimedium-juli-2018?start=9

PHILIPS	https://www.philips.com/a-w/about/news/archive/standard/news/press/2018/20180329-philips-research-led-big-data-consortium-receives-eu-funding-to-improve-healthcare-outcomes.html
PHILIPS	https://www.philips.com/a-w/about/news/archive/blogs/innovation-matters/20190913-how-prostate-cancer-care-can-be-personalized-every-step-of-the-way.html
PHILIPS	https://www.philips.com/content/corporate/en_AA/about/news/archive/future-health-index/articles/20181219-making-the-eus-health-systems-fit-for-the-21st-century.html/
TNO	https://www.tno.nl/en/tno-insights/articles/what-impact-will-technology-have-on-the-future-of-healthcare/
UPM	http://www.upm.es/biotech/proyectos
VTT	https://www.vtt.fi/Impulssi/Pages/Teko%C3%A4ly%C3%A4-opetetaan-tunnistamaan,-kuka-hy%C3%B6tvy-kemoterapiasta.aspx

4.1.5. Social networks

The project has presence in 4 social networks: **Facebook**, addressed to the general public; **Twitter**, addressed to a broader audience including general public; **LinkedIn**, focused on the scientific and industrial communities; and **YouTube**, in order to have a larger exposure of the project. Moreover, a profile in Flickr was opened in order to publish photos of relevant events in which the project had presence or organized by the consortium.

Social networks are updated regularly with contents from the consortium or from the website, as well as research and news related to the objectives of the project.

A. TWITTER

Twitter is the most used social network to communicate the progress of the project. The account was opened in August 2018 after the publication of the communication plan and the launch of the project's website.



Figure 13. Screenshot of the Twitter account.

In the images below we can find the impressions got during the last year and top tweets in terms of impressions.

1. Period from September – November 2018

Your Tweets earned **34.6K impressions** over this **91 day** period

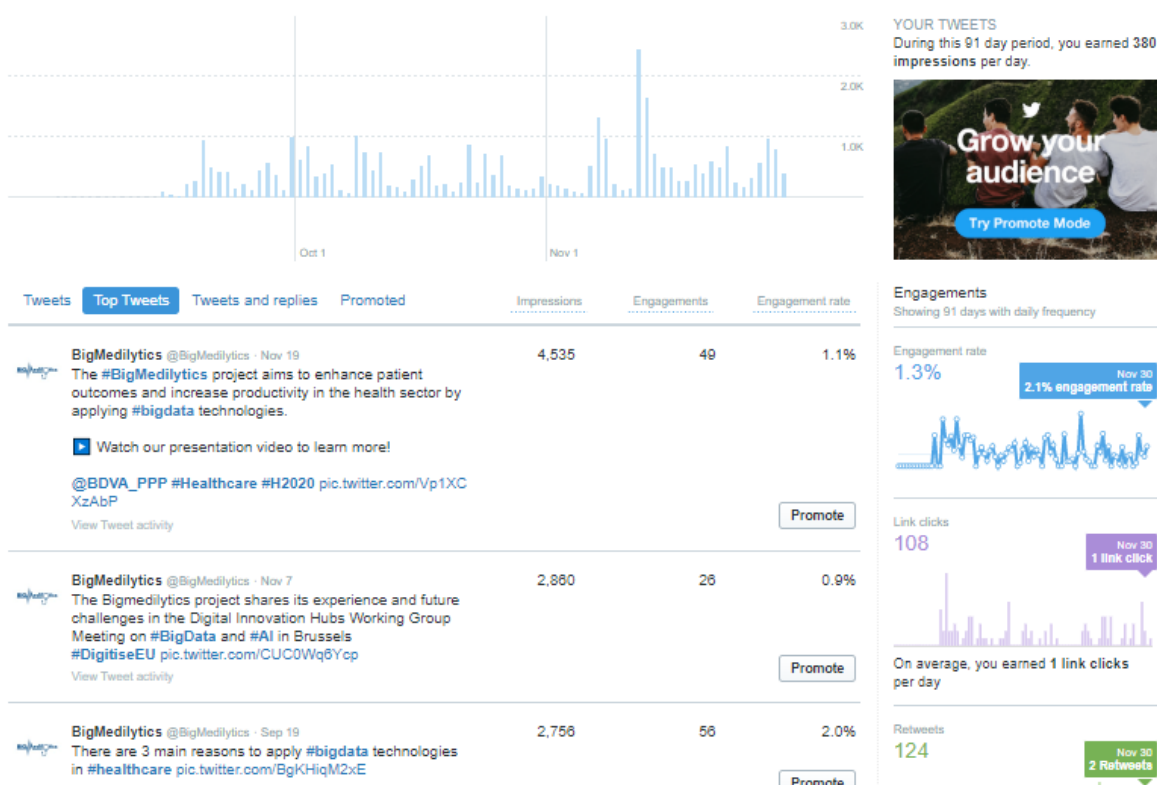


Figure 14. Period from September – November 2018. Source: Twitter



Figure 15. Top tweet in terms of impressions

2. Period from December 2018 – February 2019

Your Tweets earned **36.8K impressions** over this **90 day** period

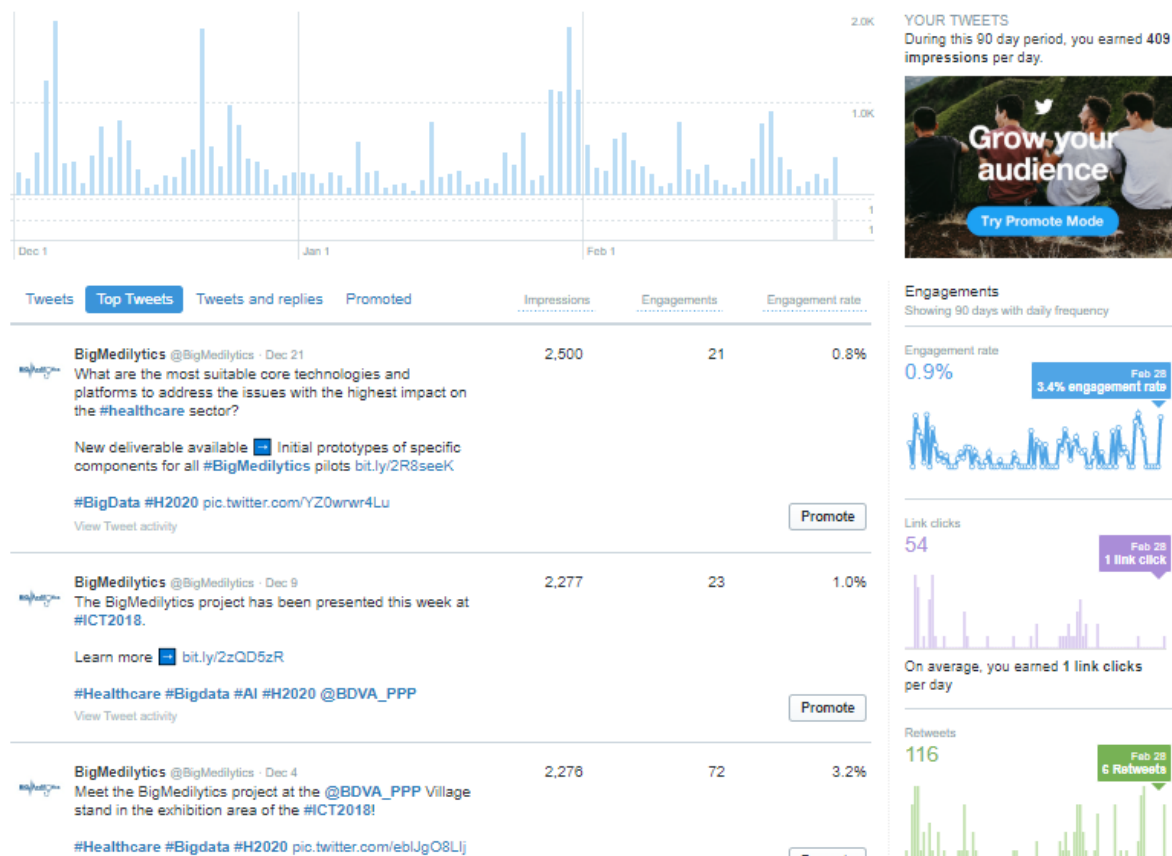


Figure 16. Period from December – February 2019. Source: Twitter



Figure 17. Top tweet in terms of impressions

3. Period from March– May 2019

Your Tweets earned **27.0K impressions** over this **91 day** period

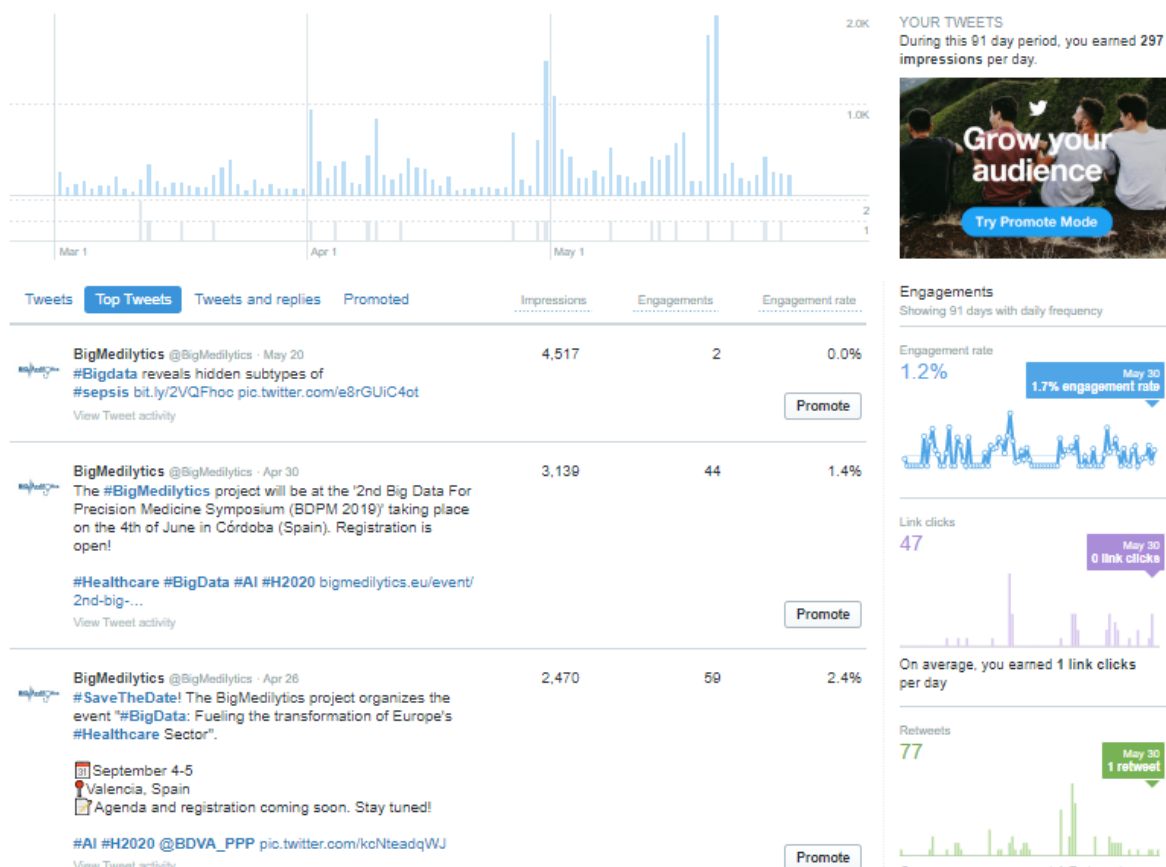


Figure 18. Period from March – May 2019. Source: Twitter

During this period, the tweet with more impressions was a research related to the project's area.

4. Period from June – August 2019.

Your Tweets earned **36.6K impressions** over this **91 day** period

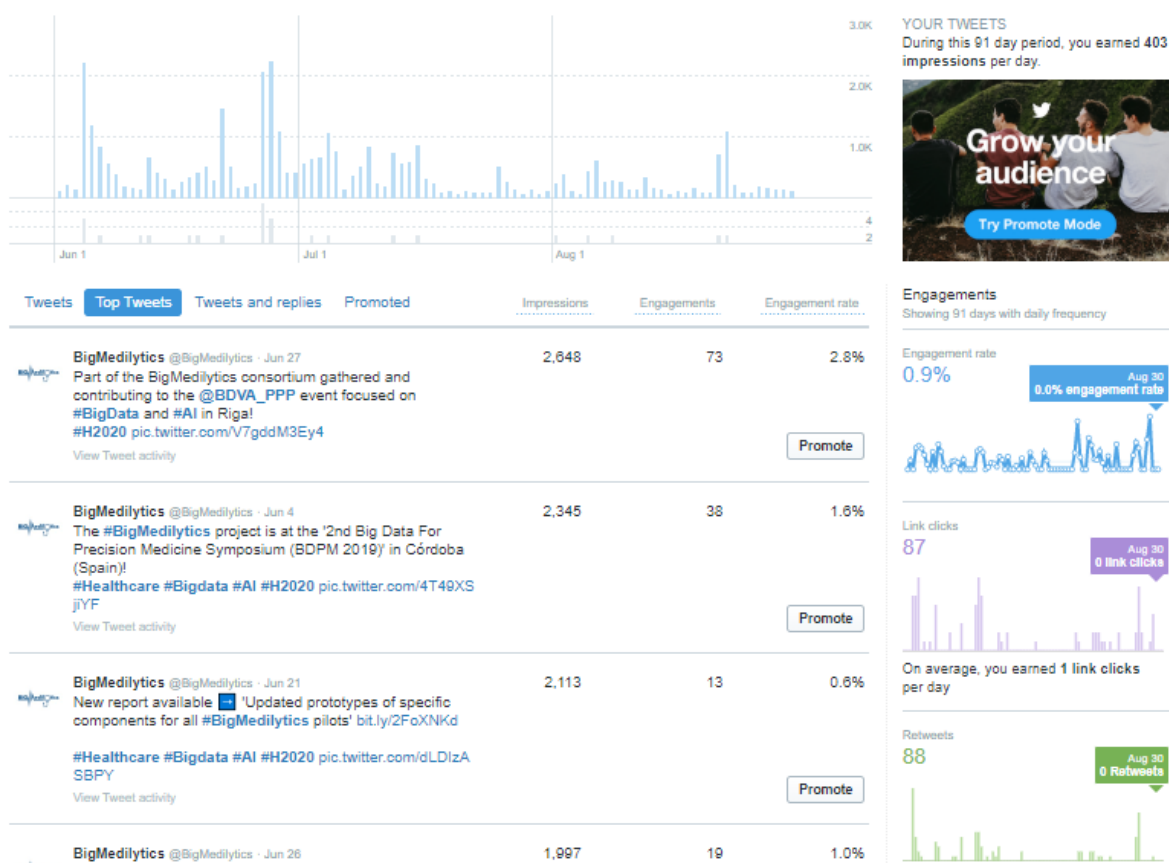


Figure 19. Period from June – August 2019. Source: Twitter



Figure 20. Top tweet in terms of impressions

































B. Facebook

The Facebook account of the project was opened in August 2018 after the publication of the communication plan and the launch of the project's website.

































Figure 21. Facebook account































The posts generated from September 2018 to August 2019 can be found below:

Reach: Organic/Paid Post clicks Reactions, comments 8						
Published	Post	Type	Targeting	Reach	Engagement	
27/08/2019 18:27	 We recently launched the August newsletter! You can read it here 			8	2	2
21/08/2019 13:32	 Just two weeks for the BigMedilotics event "#BigData: Fueling the			11	0	5
09/08/2019 18:34	 The BigMedilotics project was nominated for the first edition of the			9	0	3
05/08/2019 19:02	 How can #bigdata solutions be developed and used in a responsible			10	0	2
11/07/2019 20:26	 Welcome to the era of digital health			11	0	2
07/07/2019 21:06	 The High-Level Expert Group on #AI has recently launched the document			13	2	2
26/06/2019 22:01	 What an intense day in the BDV PPP Summit in Riga (Latvia)! Two			16	2	3
21/06/2019 14:45	 New report available  'Updated prototypes of specific components for			12	0	3
17/06/2019 17:12	 What are the benefits of #bigdata in #healthcare? www.bigmedilotics.eu			8	0	1
12/06/2019 18:46	 "How Healthcare is Revolutionising in the Digital Age". Interesting			8	0	0































■ Reach: Organic/Paid ■ Post clicks ■ Reactions, comments 8































Published	Post	Type	Targeting	Reach	Engagement
06/06/2019 18:02	 "The #BigMedilytics project will impact on the European #healthcare			9 	2 1
02/06/2019 14:43	 The BigMedilytics' recommendations to work with #bigdata technologies in			7 	2 0
27/05/2019 14:24	 Artificial Intelligence and Big Data applied to the health sector, the			7 	1 0
26/05/2019 11:44	 #AI is revolutionizing #healthcare. A few examples 📖			7 	0 0
19/05/2019 18:22	 #ArtificialIntelligence could select #heart failure patients for expensive			9 	2 1
08/05/2019 16:58	 How can #BigData technologies help to reduce morbidity and mortality in			7 	0 0
30/04/2019 10:42	 Don't miss out the interesting contribution from Professor Ricard			7 	2 0
26/04/2019 15:54	 #SaveTheDate! The BigMedilytics project organizes the event			7 	0 0
09/04/2019 10:18	 #ArtificialIntelligence can benefit a wide range of sectors, such as			7 	0 0
08/04/2019 17:57	 Yesterday was #WorldHealthDay. The #BigMedilytics project aims to			6 	0 0








































■ Reach: Organic/Paid ■ Post clicks ■ Reactions, comments 8

Published	Post	Type	Targeting	Reach	Engagement
02/04/2019 17:44	 The BigMedilotics project is showcased this week at the			7 	0 0
27/03/2019 18:10	 The BDV PPP will meet at Riga to discuss around the "Impact			6 	0 0
24/03/2019 18:29	 Artificial Intelligence has the potential to revolutionize #healthcare leading			8 	2 1
12/03/2019 13:47	 The BDVA newsletter of February has been launched, and the			7 	1 0
11/03/2019 18:41	 #BigData and #AI can collaborate for improved decision-making in			7 	2 0
28/02/2019 14:53	 Did you know that #chronicdiseases result in the loss of 3.4 million			996 	107 64
21/02/2019 11:05	 #ArtificialIntelligence for #cardiology can help make the process of			8 	0 1
19/02/2019 18:22	 "Technology needs to normalise as part of #healthcare delivery". #AI			5 	1 0
11/02/2019 11:50	 Don't miss out our partners' messages on the occasion of the			9 	1 1
04/02/2019 17:57	 One of the research streams within BigMedilotics is dedicated to			7 	0 0

Reach: Organic/Paid
Post clicks
Reactions, comments 8

Published	Post	Type	Targeting	Reach	Engagement
29/01/2019 17:21	 What are the relevant European and national regulations for the collection,			7	1 0
28/01/2019 20:28	 Ricard Martínez: "The digital transformation, and especially the			6	0 0
25/01/2019 10:22	 The expected increase of healthcare expenditure results in the need to			7	0 0
23/01/2019 17:27	 Our partner Universidad Politécnica de Madrid (Oficial) coorganizes the			7	0 0
15/01/2019 10:04	 We have launched our second newsletter! bit.ly/2FvAYoQ Would			6	1 0
24/12/2018 12:23	 We wish you happy holidays and all the best for 2019!			9	0 0
21/12/2018 13:33	 What are the most suitable core technologies and platforms to			10	1 0
17/12/2018 18:08	 The BigMedilytics project aims to enhance patient outcomes and			7	0 0
11/12/2018 18:11	 One of the areas of research within the BigMedilytics project aims to			8	0 0
07/12/2018 18:53	 The helpfulness of artificial intelligence to help doctors was			8	0 0

<div> Reach: Organic/Paid Post clicks Reactions, comments 8 </div>						
Published	Post	Type	Targeting	Reach	Engagement	
28/11/2018 12:55	 The BigMedilytics project will be present at ICT 2018: 'Imagine Digital			9	<div></div>	<div>10</div>
27/11/2018 19:55	 In our case, BigMedilytics will enhance patients' outcomes and			7	<div></div>	<div>00</div>
23/11/2018 13:14	 The BigMedilytics project was exposed during the Digital Innovation			8	<div></div>	<div>00</div>
21/11/2018 16:49	 Today is #WorldCOPDDay. One of the pilots within the BigMedilytics			7	<div></div>	<div>00</div>
19/11/2018 13:47	 The BigMedilytics project aims to enhance patient outcomes and			7	<div></div>	<div>20</div>
16/11/2018 13:16	 The BigMedilytics project was presented at the European Big Data			116	<div></div>	<div>71</div>
14/11/2018 17:07	 Today is #WorldDiabetesDay. One of the pilots within the BigMedilytics			6	<div></div>	<div>00</div>
13/11/2018 11:38	 Great first day at the European Big Data Value Forum in Vienna during			8	<div></div>	<div>20</div>
06/11/2018 17:57	 Tomorrow the BigMedilytics project will be participating in the Digital			4	<div></div>	<div>00</div>
02/11/2018 18:48	 #Bigdata can help to solve problems in a wide spectrum of chronic			4	<div></div>	<div>00</div>

<div> Reach: Organic/Paid Post clicks Reactions, comments 8 </div>									
Published	Post	Type	Targeting	Reach			Engagement		
24/10/2018 15:53	 The BigMedilytics project will lead a parallel session on healthcare on			6	<div></div>		1 0	<div></div>	
19/10/2018 16:37	 One of the research streams within the BigMedilytics project is			5	<div></div>		0 0	<div></div>	
17/10/2018 13:40	 We have launched our first newsletter! http://bit.ly/2CmJPm			5	<div></div>		1 0	<div></div>	
11/10/2018 11:41	 What is our aspiration? Find out more at http://bit.ly/2EcXlvj			4	<div></div>		1 0	<div></div>	
10/10/2018 13:19	 BigMedilytics implements twelve pilot experiences that cover three			4	<div></div>		0 0	<div></div>	
08/10/2018 15:07	 What are our main objectives? Find out more at			3	<div></div>		1 0	<div></div>	
05/10/2018 18:19	 Would you like to receive our newsletter? Visit			3	<div></div>		1 0	<div></div>	
02/10/2018 10:24	 The city of Rotterdam hosted the second meeting of #BigMedilytics			3	<div></div>		2 0	<div></div>	
30/09/2018 11:00	 One of the areas of research in BigMedilytics is devoted to exploring			3	<div></div>		0 0	<div></div>	
27/09/2018 14:01	 What is the impact of big data technologies on transforming			3	<div></div>		0 0	<div></div>	
26/09/2018 18:02	 Second #BigMedilytics consortium meeting in Rotterdam, hosted by			3	<div></div>		0 1	<div></div>	
19/09/2018 13:22	 Did you know that BigMedilytics is the largest EU-funded initiative to			3	<div></div>		0 0	<div></div>	
17/09/2018 11:26	 The BigMedilytics project is now on Facebook! Check out our website to			2	<div></div>		0 0	<div></div>	

C. LinkedIn

The LinkedIn account of the project was opened in August 2018 after the publication of the communication plan and the launch of the project's website.



Figure 22. LinkedIn account

The posts generated from September 2018 to August 2019 can be found below:

Update Title	Created	Impressions	Video views	Clicks	Clickthrough Rate	Reactions	Comments	Times shared
We have launched our third newsletter! http://bit.ly/2ZmoG8y Would you like to... All followers	8/22/2019	248	-	16	6.45%	6	0	0
Big Data: Fueling the transformation of Europe's Healthcare Sector. Last seats... All followers	8/21/2019	248	-	25	10.08%	8	2	0
The BigMedilotics project, nominated in the BDVe "Success story award" contest All followers	8/12/2019	65	-	4	6.15%	one	0	0
Welcome to the era of digital health All followers	7/11/2019	98	-	2	2.04%	2	0	one
New report available: 'Updated prototypes of specific components for all... All followers	6/21/2019	84	-	0	0%	0	0	0
"The #BigMedilotics project will impact on the European #healthcare system through... All followers	6/6/2019	288	-	twenty-one	7.29%	6	0	0
The BigMedilotics' recommendations to work with big data technologies in... All followers	5/30/2019	66	-	0	0%	one	0	0
Artificial Intelligence and Big Data applied to the health sector, protagonist of the 5t... All followers	5/28/2019	66	-	4	6.06%	one	0	0
Paco Valverde from ITI, explaining at #ticsaludvic the use of Big Data... All followers	5/26/2019	84	-	4	4.76%	one	0	0

Update Title	Created	Impressions	Video views	Clicks	Clickthrough Rate	Reactions	Comments	Times shared
Big Data technologies to reduce morbidity and mortality in Chronic Diseases and... All followers	5/8/2019	57	-	2	3.51%	0	0	0
#SaveTheDate! The BigMedilytics project organizes the event "#BigData: Fueling th... All followers	4/26/2019	164	-	4	2.44%	5	0	0
Artificial intelligence All followers	4/9/2019	74	-	3	4.05%	3	0	0
The BigMedilytics project is showcased this week in Tib Hannover's booth at the... All followers	1/4/2019	73	-	0	0%	one	0	0
The BDV PPP will meet at Riga to discuss around the "Impact empowered by Data-... All followers	3/27/2019	66	-	0	0%	0	0	0
The BDVA - Big Data Value Association newsletter of February has been launched... All followers	3/12/2019	136	-	6	4.41%	2	0	0
International Day of Women and Girls in Science 2019 All followers	2/2/2019	118	-	3	2.54%	3	0	0
One of the research streams within the BigMedilytics project is dedicated to... All followers	2/2/2019	74	-	2	2.7%	one	0	0
Infographics on regulations for big data technologies in the healthcare sector in... All followers	1/29/2019	72	-	2	2.78%	0	0	0
The expected increase of healthcare expenditure results in the need to improv... All followers	1/25/2019	71	-	one	1.41%	one	0	0

Update Title	Created	Impressions	Video views	Clicks	Clickthrough Rate	Reactions	Comments	Times shared
We have launched our second newsletter! http://bit.ly/2FvAYoQ Would you like to... All followers	1/15/2019	76	-	8	10.53%	one	0	0
We wish you happy holidays and all the best for 2019! All followers	12/24/2018	95	-	4	4.21%	one	0	0
New deliverable available: 'Initial prototypes of specific components for all... All followers	12/21/2018	46	-	one	2.17%	0	0	0
Using big data technologies to optimize workflows in hospitals All followers	12/11/2018	53	-	3	5.66%	one	0	0
BigMedilotics at ICT 2018: 'Imagine Digital - Connect Europe' All followers	12/9/2018	46	-	3	6.52%	0	0	0
ICT 2018: 'Imagine Digital - Connect Europe' All followers	11/28/2018	42	-	0	0%	0	0	0
BigMedilotics at the meeting on Digital Innovation Hubs on Big Data and AI All followers	11/23/2018	49	-	one	2.04%	0	0	0
The BigMedilotics project aims to enhance patient outcomes and increase productivit... All followers	11/19/2018	278	-	9	3.24%	3	0	one
Outstanding presence of BigMedilotics at the European Big Data Value Forum All followers	11/16/2018	49	-	5	10.2%	0	0	0
Great first day at the European Big Data Value Forum in Vienna during which we le... All followers	11/13/2018	127	-	96	75.59%	one	0	one
European Big Data Value Forum 2018 All followers	10/24/2018	62	-	one	1.61%	0	0	0
Big data analytics to improve patient care in Oncology All followers	10/22/2018	41	-	0	0%	0	0	0
We have launched our first newsletter! http://bit.ly/2CmJPm Would you like to... All followers	10/17/2018	41	-	0	0%	0	0	0
Second BigMedilotics consortium meeting in Rotterdam All followers	10/2/2018	44	-	3	6.82%	one	0	0
How can big data help to improve chronic disease management? All followers	10/1/2018	3.4	-	0	0%	0	0	0
New deliverable available: T0 base line measurement of the KPIs Todos los seguidores	27/9/2018	26	-	0	0%	0		
What is the impact of big data technologies on transforming healthcare? New... Todos los seguidores	27/9/2018	16	-	0	0%	0		
BigMedilotics consortium receives EU funding to improve healthcare outcomes Todos los seguidores	17/9/2018	35	-	4	11.43%	0		

Social media activity by the Consortium until August 2019:

Partner	Twitter link	Facebook link	LinkedIn link
Contextflow	https://twitter.com/contextflow_rad/status/1094975642423177216		
Contextflow	https://twitter.com/contextflow_rad/status/1092377462074425345		
Contextflow	https://twitter.com/contextflow_rad/status/1080418647309467648		
Contextflow	https://twitter.com/contextflow_rad/status/1077881942517911552		
Contextflow	https://twitter.com/contextflow_rad/status/1075375457930002432		
Contextflow	https://twitter.com/contextflow_rad/status/1150781847644856320		
Contextflow	https://twitter.com/contextflow_rad/status/1143525548712439808		https://www.linkedin.com/posts/contextflow_big-data-ai-artificialintelligence-activity-6549291248463724544-mFVD
Contextflow	https://twitter.com/contextflow_rad/status/1161938110252535808		https://www.linkedin.com/posts/contextflow_big-data-fueling-the-transformation-of-europe-activity-6572052458124660737-8gdG
Erasmus Universitair Medisch Centrum Rotterdam	https://twitter.com/ESHMP_EUR/status/1090167081021177856		
Erasmus Universitair Medisch Centrum Rotterdam	https://twitter.com/ESHMP_EUR/status/1097803434735161344		
Erasmus Universitair Medisch Centrum Rotterdam	https://twitter.com/ESHMP_EUR/status/1097808993962074113		
Erasmus Universitair Medisch Centrum Rotterdam	https://twitter.com/ESHMP_EUR/status/1098951223934443520		https://www.linkedin.com/posts/erasmus-school-of-health-policy-%26-management_nbr-update-gemist-luister-het-hier-terug-activity-6503909521482620928-zkPu
Erasmus Universitair Medisch	https://twitter.com/ESHMP_EUR/status/1123490919427260416		

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Partner	Twitter link	Facebook link	LinkedIn link
IT Innovation Center	0983936 https://twitter.com/IT_Innov/status/944267390195519488		
ITI	https://twitter.com/ITI_TIC/status/981926971989995520		https://www.linkedin.com/posts/iti-instituto-tecnologico-de-informatica-bienvenidos-a-la-era-de-la-salud-digital-activity-6564792281302355968-DZGf
ITI	https://twitter.com/ITI_TIC/status/1072419497800318977		https://www.linkedin.com/posts/iti-instituto-tecnologico-de-informatica-el-proyecto-europeo-bigmedilytics-en-el-que-activity-6478184269314351104-ulaD
ITI	https://twitter.com/ITI_TIC/status/1131488886658600960		
ITI	https://twitter.com/ITI_TIC/status/1149340145197506560		
ITI	https://twitter.com/ITI_TIC/status/1164447334157230080		
NCSR Demokritos	https://twitter.com/iit_demokritos/status/972967076590772227		
NCSR Demokritos	https://twitter.com/iit_demokritos/status/974667355442860035		
OptiMedis	https://twitter.com/OptiMedis/status/979290429123448832		

4.1.6. Video

A first video to present the projected was created in coincidence with the European Big Data Value Forum in Vienna last November 2018. The video was also uploaded on [YouTube](#), included on the project's website and distributed among the consortium.

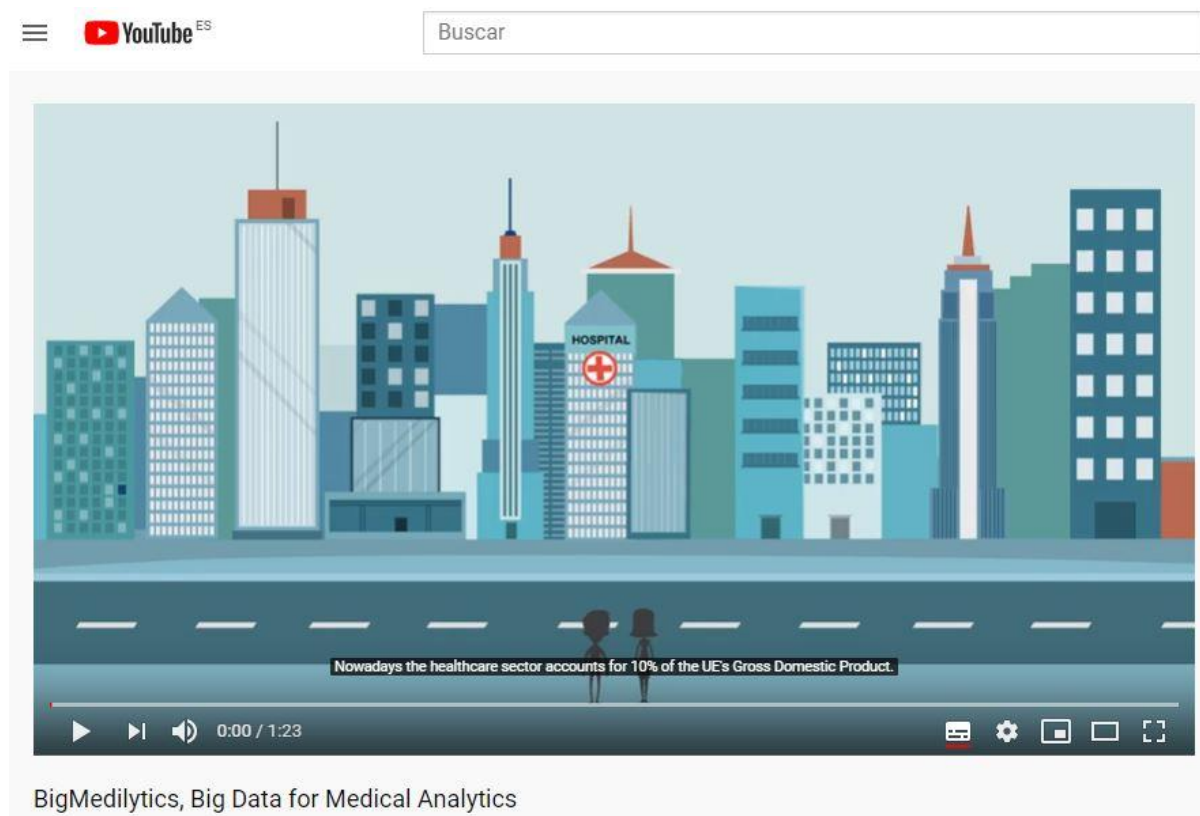


Figure 23. Screenshot of the video on YouTube

The consortium was encouraged to show the video when they attend events to communicate the project.

4.1.7. Release of newsletters

The most relevant contents published on the website are sent out via a public newsletter which has a total of 84 subscribers.

Three newsletters have been launched during the first 18 months of the project.

- [Newsletter No. 1 – October 2018](#)
- [Newsletter No. 2 – January 2019](#)
- [Newsletter No. 3 – August 2019](#)

As an example, below we can find an image of the Newsletter No. 3 sent in August 2019.

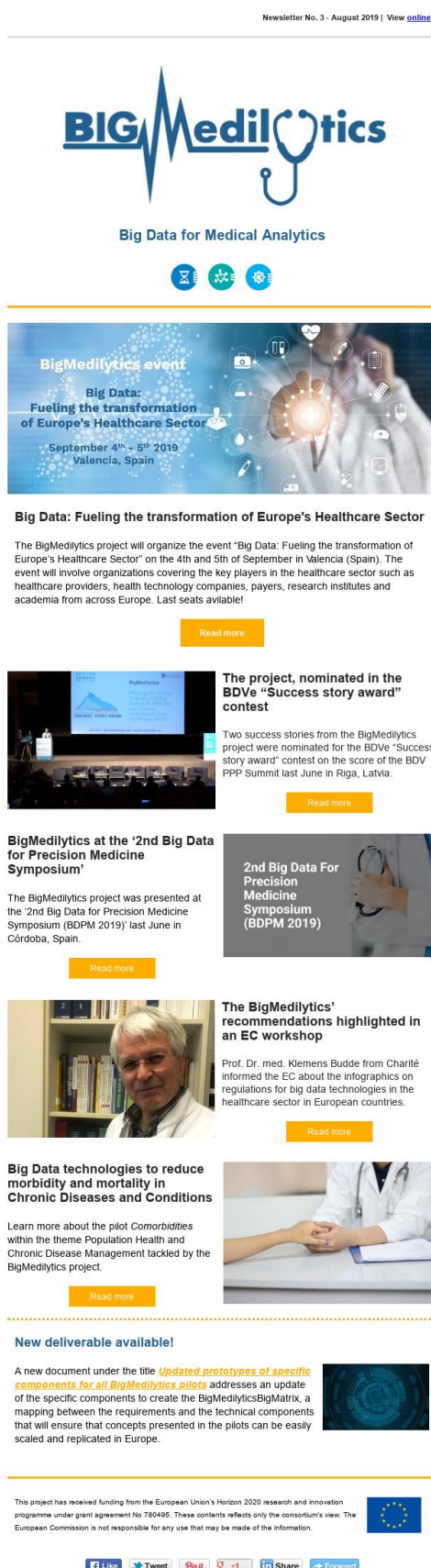


Figure 24. Newsletter No. 3

4.1.8. Creation of press releases

A first press release announcing the start of the project was created on March 2018. The different partners of the consortium launched the press release from their organisations.

March 29, 2018

Philips Research-led big data consortium receives EU funding to improve healthcare outcomes

- *Application of Artificial Intelligence technologies in healthcare aims to achieve better patient outcomes at lower cost*
- *Program to cover all major disease groups, accounting for over three quarters of Europe's disease burden [1]*

Amsterdam, the Netherlands – Royal Philips (NYSE: PHG, AEX: PHIA), a global leader in health technology, together with its consortium partners, today announced that it has received funding from the EU's Horizon 2020 program to pilot big data solutions to achieve better patient outcomes in healthcare at a lower cost. The three-year program is the largest EU-funded initiative to transform the region's healthcare sector through the use of big data. The 'BigMedilytics' [2] program aims to improve patient outcomes and increase productivity in the health sector by applying Artificial Intelligence (AI) technologies to complex datasets across the data value chain. This includes data from patients, healthcare providers, health insurers and medical technology providers.

"From patients capturing their own health data with wearable devices to ubiquitous monitoring across the hospital from the emergency room to the general ward, a huge amount of information about people's health is being created," said Henk van Houten, Chief Technology Officer and Head of Research at Philips. "By applying AI to that data and combining that with clinical knowledge we are able to develop meaningful insights and workflow improvements that can improve patient care whilst reducing the burden of cost to health systems."

Figure 25. Fragment of the press release sent by Philips and published on its website

4.1.9. Spread knowledge in major events

IoT Week. 4 – 7 June, 2018, Bilbao, Spain.

The BigMedilytics project was addressed during a session "Creating Value by AI and Big Data: Industrial Applications, Challenges and Outlooks" at the 8th edition of IoT Week in Bilbao, Spain.

<https://iotweek.org/wp-content/uploads/2018/09/20180918-IoT-Week-2018-long-Report-revised.pdf>

European Big Data Value Forum. 12-14 November 2018, Vienna, Austria.

The BigMedilytics project was presented at **the European Big Data Value Forum (EBDVF)**, a key European event to discuss the challenges and opportunities of the European data economy and data-driven innovation that took place from 12th to 14th of November 2018 in Vienna.

In this event, the project led a **parallel session on Healthcare** in which attendees had the chance to know the objectives of the project and the way in which some of the pilots are being implemented.



Figure 26. Dr. med. univ. Wiebke Düttmann-Rehnolt – Charité during the session

The project was also exhibited in the BDV PPP booth during the **EBDVF**. For this occasion a roller up was created and leaflets were distributed. The video about the project was also showed during the event.

More information: <https://www.bigmedilytics.eu/bigmedilytics-project-presented-in-the-european-big-data-value-forum-in-vienna/>

ICT 2018: 'Imagine Digital – Connect Europe'. 4 – 6 December 2018, Vienna, Austria.

The BigMedilytics project was presented during the session 'Impact of the Data-driven AI in business sectors' within the framework of the event ICT 2018: 'Imagine Digital – Connect Europe' that took place in Vienna from the 4th to the 6th of December.

More information: <https://www.bigmedilytics.eu/bigmedilytics-at-ict-2018-imagine-digital-connect-europe/>

BDV PPP Summit. 26 June 2019, Riga, Latvia.

Two success stories about the BigMedilytics project were presented during the BDV PPP Summit in Riga. The project submitted two success stories for the first edition of the BDVe "Success story award" in which it resulted finalist.

More information: <https://www.bigmedilytics.eu/the-bigmedilytics-project-nominated-in-the-bdve-success-story-award-contest/>



Figure 27. The BigMedilytics project in the BDV PPP Village.

The different partners have also made big efforts in order to communicate the project in different events during the first half of the project. A list of the most important events and activities is provided in the Appendix A.1.

4.1.10. Publications

The project has generated seven publications during the first 18 months:

Title	Abstract	Authors	Publisher
Data Science in healthcare: benefits, challenges and opportunities	The advent of digital medical data has brought an exponential increase in information available for each patient, allowing for novel knowledge generation methods to emerge. Tapping into this data brings clinical research and clinical practice closer together, as data generated in ordinary clinical practice can be used towards rapid-learning healthcare systems, continuously improving and personalizing healthcare. In this context, the recent use of Data Science technologies for healthcare is providing mutual benefits to both patients and medical professionals, improving	Ziawasch Abedjan, Nozha Boujemaa, Stuart Campbell, Patricia Casla, Supriyo Chatterjea, Sergio Consoli, Cristobal Costa-Soria, Paul Czech, Marija Despenic, Chiara Garattini, Dirk Hamelinck, Adrienne Heinrich, Wessel Kraaij, Jacek Kustra, Aizea Lojo, Marga Martin Sanchez, Miguel A. Mayer, Matteo Melideo, Ernestina Menasalvas, Frank Moller Aarestrup, Elvira Narro Artigot, Milan Petkovic, Diego Reforgiato Recupero, Alejandro Rodriguez Gonzalez, Gisele Roesems Kerremans, Roland Roller,	Springer, Cham https://link.springer.com/chapter/10.1007%2F978-3-030-05249-2_1

Title	Abstract	Authors	Publisher
	<p>prevention and treatment for several kinds of diseases. However, the adoption and usage of Data Science solutions for healthcare still require social capacity, knowledge and higher acceptance. The goal of this chapter is to provide an overview of needs, opportunities, recommendations and challenges of using (Big) Data Science technologies in the healthcare sector. This contribution is based on a recent whitepaper (http://www.bdva.eu/sites/default/files/Big%20Data%20Technologies%20in%20Healthcare.pdf) provided by the Big Data Value Association (BDVA) (http://www.bdva.eu/), the private counterpart to the EC to implement the BDV PPP (Big Data Value PPP) programme, which focuses on the challenges and impact that (Big) Data Science may have on the entire healthcare chain.</p>	<p>Mario Romao, Stefan Ruping, Felix Sasaki, Wouter Spek, Nenad Stojanovic, Jack Thoms, Andrejs Vasiljevs, Wilfried Verachtert, Roel Wuyts</p>	
Exploring Diachronic Changes of Biomedical Knowledge using Distributed Concept Representations	<p>In research best practices can change over time as new discoveries are made and novel methods are implemented. Scientific publications reporting about the latest facts and current state-of-the-art can be possibly outdated after some years or even proved to be false. A publication usually sheds light only on the knowledge of the period it has been published. Thus, the aspect of time can play an essential role in the reliability of the presented information. In Natural Language Processing many methods focus on information extraction from text, such as detecting entities and their relationship to each other. Those methods mostly focus on the facts presented in the text itself and not on the aspects of knowledge which changes over time. This work instead examines the evolution in biomedical knowledge over time using scientific literature in terms of diachronic change. Mainly the usage of temporal and distributional concept representations are explored and evaluated by a proof-of-concept.</p>	<p>Gaurav Vashisth, Jan-Niklas Voigt-Antons, Michael Mikhailov, Roland Roller</p>	<p>https://www.aclweb.org/anthology/W19-5037/</p>

Title	Abstract	Authors	Publisher
ISO standard "Self-contained Information Retention Format (SIRF)" to preserve medical information for the future	<p>This document specifies the Self-contained Information Retention Format (SIRF) Level 1 and its serialization for LTFS, CDMI and OpenStack Swift.</p> <p>This document proposes an approach to digital content preservation that leverages the processes of the archival profession thus helping archivists remain comfortable with the digital domain.</p>	Simona Rabinovici-Cohen, Philip Viana and Sam Fineberg	https://www.iso.org/standard/76648.html
Big Data im Gesundheitswesen – Regulierung und Herausforderungen in acht europäischen Ländern (Big Data in healthcare – regulation and challenges in eight European countries)		Rik Wehrens, Johanna Kostenzer	https://oep.h.at/sites/default/public/files/newletter/OEGPH_Newsletter_Juni2019.pdf
MoRTy: Unsupervised Learning of Task-specialized Word Embeddings by Autoencoding	<p>Word embeddings have undoubtedly revolutionized NLP. However, pretrained embeddings do not always work for a specific task (or set of tasks), particularly in limited resource setups. We introduce a simple yet effective, self-supervised post-processing method that constructs task-specialized word representations by picking from a menu of reconstructing transformations to yield improved end-task performance (MORTY). The method is complementary to recent state-of-the-art approaches to inductive transfer via fine-tuning, and forgoes costly model architectures and annotation. We evaluate MORTY on a broad range of setups, including different word embedding methods, corpus sizes and end-task semantics. Finally, we provide a surprisingly simple recipe to obtain specialized embeddings that better fit end-tasks.</p>	Nils Rethmeier, Barbara Plank	https://www.aclweb.org/anthology/W19-4307/
Enabling Analytics on Sensitive Medical Data with Secure Multi-Party Computation	<p>While there is a clear need to apply data analytics in the healthcare sector, this is often difficult because it requires combining sensitive data from multiple data sources. In this paper, we show how the</p>	Veening M, Chatterjea S, Horváth AZ, Spindler G, Boersma E, van der Spek P, van der Galiën O, Gutteling J5, Kraaij W, Veugen T.	https://www.ncbi.nlm.nih.gov/pubmed/29677926

Title	Abstract	Authors	Publisher
	cryptographic technique of secure multi-party computation can enable such data analytics by performing analytics without the need to share the underlying data. We discuss the issue of compliance to European privacy legislation; report on three pilots bringing these techniques closer to practice; and discuss the main challenges ahead to make fully privacy-preserving data analytics in the medical sector commonplace.		
DEEP LEARNING IN INFORMATION SECURITY	<p>Machine learning has a long tradition of helping to solve complex information security problems that are difficult to solve manually. Machine learning techniques learn models from data representations to solve a task. These data representations are hand-crafted by domain experts. Deep Learning is a sub-field of machine learning, which uses models that are composed of multiple layers. Consequently, representations that are used to solve a task are learned from the data instead of being manually designed. In this survey, we study the use of DL techniques within the domain of information security. We systematically reviewed 77 papers and presented them from a data-centric perspective. This data-centric perspective reflects one of the most crucial advantages of DL techniques – domain independence. If DL-methods succeed to solve problems on a data type in one domain, they most likely will also succeed on similar data from another domain. Other advantages of DL methods are unrivaled scalability and efficiency, both regarding the number of examples that can be analyzed as well as with respect of dimensionality of the input data. DL methods generally are capable of achieving high-performance and generalize well. However, information security is</p>	Stefan Thaler, Vlado Menkovski, Milan Petkovic	https://arxiv.org/pdf/1809.04332.pdf#targetText=Information%20security%20(InfoSec)%20addresses%20the,analysis%20of%20data

Title	Abstract	Authors	Publisher
	a domain with unique requirements and challenges. Based on an analysis of our reviewed papers, we point out shortcomings of DL-methods to those requirements and discuss further research opportunities.		

4.2.Objective 2: to involve external partners

BigMedilytics aims to engage external partners representing all the key players across the healthcare and data value chain that will ensure the uptake of its solutions and concepts across the European Union. The objective is to gather feedback from these partners to refine the pilots. For this reason, a first workshop was organized in Valencia (Spain) addressed to these external partners on the 4th and 5th of September 2019 under the title **“Big Data: Fueling the transformation of Europe’s Healthcare sector”**.

The project had previously gathered the support from 69 External Exploitation Partners (with letters from 54 partners –and two of them representing 15 other EEPs–), however, after initial contacts, only 28 organisations confirmed their interest in taking part as External Exploitation Partners for the project.

In order to involve more relevant EEPs to reach the goals set in the Grant Agreement, the following actions were carried out in 2019:

1. The Consortium was asked to provide more potential EEPs.
2. The partners presented the project to potential interested parties in different events.
3. The event in Valencia was announced in the BDVA newsletter (that reaches more than 1,000 people) and website.
4. A special newsletter from the BigMedilytics project was launched to announce the event, that was also published on the website and social networks.

In total, more than 100 people were contacted during the different stages in order to get involved as EEPs for the project and to participate in the first BigMedilytics workshop in Valencia. Finally, 62 EEPs registered for the event, 56 of which attended representing healthcare providers, health technology companies, payers, research institutes and academia from across Europe. It should be mentioned that in few cases two different departments from the same organisation could attend since they provided with different backgrounds.

The list of the organisations that attended the event can be found below:

ORGANISATION	COUNTRY
Clinical Research Consultants	FR
Andalusian Health Service	ES
EGI Foundation	NL
European Alliance Partners Company AG	SE
everis Spain S.L.U.	ES
Ferrer	ES
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung Ev	DE
Fundación Empresa Universidad Gallega	ES
GMV Soluciones Globales Internet S.A.U.	ES
Know-Center GmbH	AT

ORGANISATION	COUNTRY
Leids Universitair Medisch Centrum	NL
Mondragon Goi Eskola Politeknikoa J.M.A.S. Coop	ES
Oxford Academic Health Science Network	UK
Quibim S.L.	ES
Treelogic SL	ES
Wings ICT solutions	GR
Zorginstituut Nederland	NL
Centro de Investigacion Principe Felipe	ES
BIOIATRIKI S.A., bioMed	GR
Helsinki Biobank	FL
INTERAMERICAN	GR
Catholic University of Milan	IT
Instituto de Biomecánica de Valencia	ES
Madrimsd	ES
Microsoft Ibérica S.R.L.	ES
Fundación Vicomtech	ES
Medical School of Hannover	DE
University of Novi Sad, Institute for Cardiovascular Diseases of Vojvodina	SE
Barcelona Supercomputing Center	ES
Stichting ZorgTTP	NL
University Medical Center Mainz	DE
St Antonius Ziekenhuis	NL
Assuta	IL
Foundation 29	ES
CRG	ES
Instituto de Salud 'Carlos III'	ES
Hospital Clinic. Universitat Barcelona	ES
Hospital Universitario y Politecnico LA FE	ES
Servicio Murciano de Salud	ES
Bellvitge University Hospital and Research Institute (IDIBELL)	ES
Hospital Universitario de Tarragona Joan XXIII	ES
TU/Eindhoven	NL
University of Groningen/Academic Medical Centre	NL
OLVG	NL
IRCCS Istituto Auxologico Italiano - Milano	IT
Competence Center Machine Learning Rhein/Ruhr ML2R	DE
University Hospital of Tarragona Joan XXIII	ES
Turku University Hospital	FI
Instituto de Salud Carlos III (ISCIII)	ES
CeADAR	IE
MediRisk Organisatie BV	NL
Maasstad Ziekenhui	NL

ORGANISATION	COUNTRY
Visual Limes	ES
Grupo Quirónsalud	ES
IGENOMIX	ES
I2CAT	ES
Hospital Niño Jesús (SERMAS)	ES
P3 Group	DE
Complejo Hospitalario Universitario de Badajoz	ES
Maasstad Ziekenhuis	NL
BDVA	ES
GEN inCode	ES
Instituto de Investigación Sanitaria La Fe	ES

The whole event involved around 100 organisations covering the key players in the healthcare sector consisted of EEPs, the Consortium and organisations that participated in different sessions.



Figure 28. Attendees on the 4th of September

The event offered a complete overview of the three different themes in the project and the 12 pilots. It was structured to gather the valuable feedback to ensure the BigMedilytics project transfers solutions that are useful and relevant to Europe's healthcare sector at large. For this reason, parallel breakout sessions were organised in order to let the EEPs to interact with the themes and pilot leaders.

In addition, relevant discussion topics were addressed by experts such as Dr. Ceri Thomson, Deputy head of the eHealth Unit in DG CNECT within the European Commission, Prof. Dr. med. Stefan Blankenburg from UKE (University Medical Center Hamburg-Eppendorf) and Prof. Dr. Josep Redón from INCLIVA. Opinions on business models and healthcare policy were also discussed to better understand the challenges that need to be overcome to roll out the concepts across Europe.

Also, on the second day, the EU-funded projects in the fields of healthcare and big data BigO Project, BodyPass, CloudButton, CrowdHEALTH, IASIS, and Track and Know were invited to share their progress and results in a specific session.

The agenda can be found below:

Big Data: Fueling the transformation of Europe's Healthcare Sector

September 4th - 5th 2019

“Ciudad Politécnica de la Innovación (CPI)”

Valencia (Spain)

AGENDA

Wednesday, 4th September

08:30	Registration
09:00	Opening and introduction
09:20	Address by Dr Ceri Thompson , Deputy head of the eHealth Unit in DG CONNECT, European Commission
09:50	'From population-based studies and clinical cohorts to clinical application – data driven approaches in cardiovascular research'. Prof. Dr. med. Stefan Blankenburg , UKE
10:20	Coffee break
10:40	BigMedilytics' journey from prototype to payment
11:20	Theme 1: Population Health
12:20	Theme 2: Oncology
13:05	Lunch + Posters (BigMedilytics Demos + Posters + Other EU projects)
14:15	Theme 3: Industrialization of Healthcare
15:00	Parallel breakouts - Themes 1-3, Technologies for Data Analytics in Healthcare
18:00	Drinks with Poster session/Demos
20:00	Networking dinner

Thursday, 5th September

08:30	Registration		
09:00	Opening and introduction		
09:10	'Facing the challenge of health care burden: role of Big-Data and Artificial Intelligence'. Prof. Dr. Josep Redón, INCLIVA		
	EU projects presentations:		
09:40	BigO Project, BodyPass, CloudButton, CrowdHEALTH, IASIS, Track and Know		
10:55	Coffee break		
11:15	Panel discussion		
12:15	Goodbye / Wrap up		
12:25	Lunch + Posters (BigMedilytics Demos + Posters + Other EU projects)		
13:25	Parallel sessions		
13:25 – 16:30	Security, Privacy & Legal aspects of Healthcare Big Data Analytics. SODA, MyHealthMyData and BigMedilytics projects	13:25 –15:00	AI in Healthcare workshop
		15:00 –17:00	Networking session

During the event demonstrations of the solutions piloted by the project were carried out. The different attendees could know the 12 pilots of the project thanks to the demos and posters showed (all the posters are included in Appendix A.2).

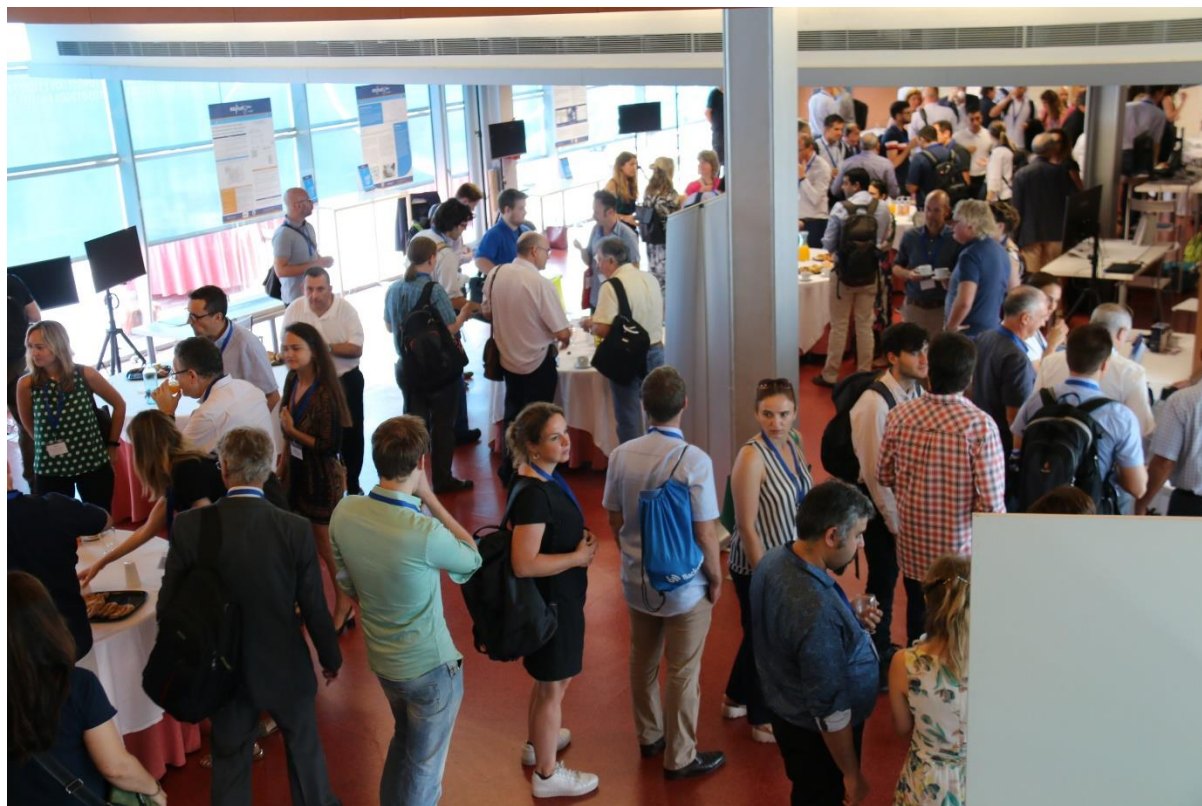
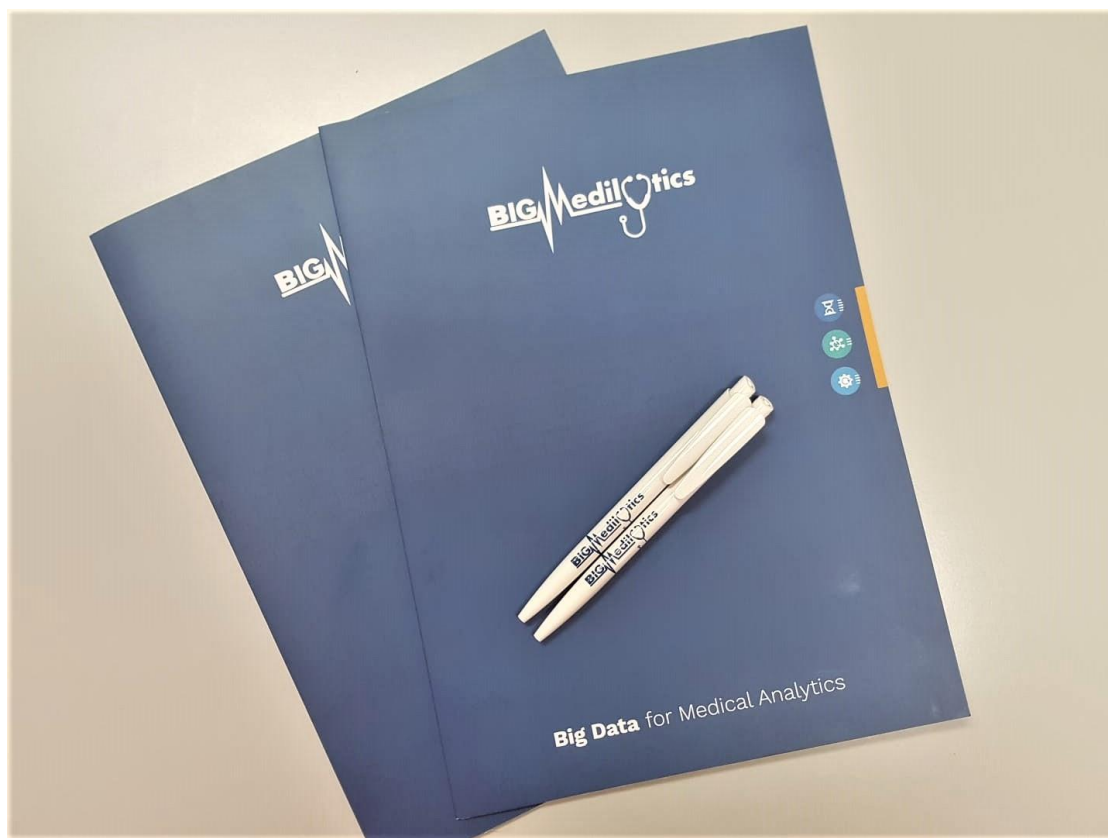


Figure 29. Hall area with demos and posters of the 12 pilots

Several communication materials were produced for the event:

1. Folders and pens



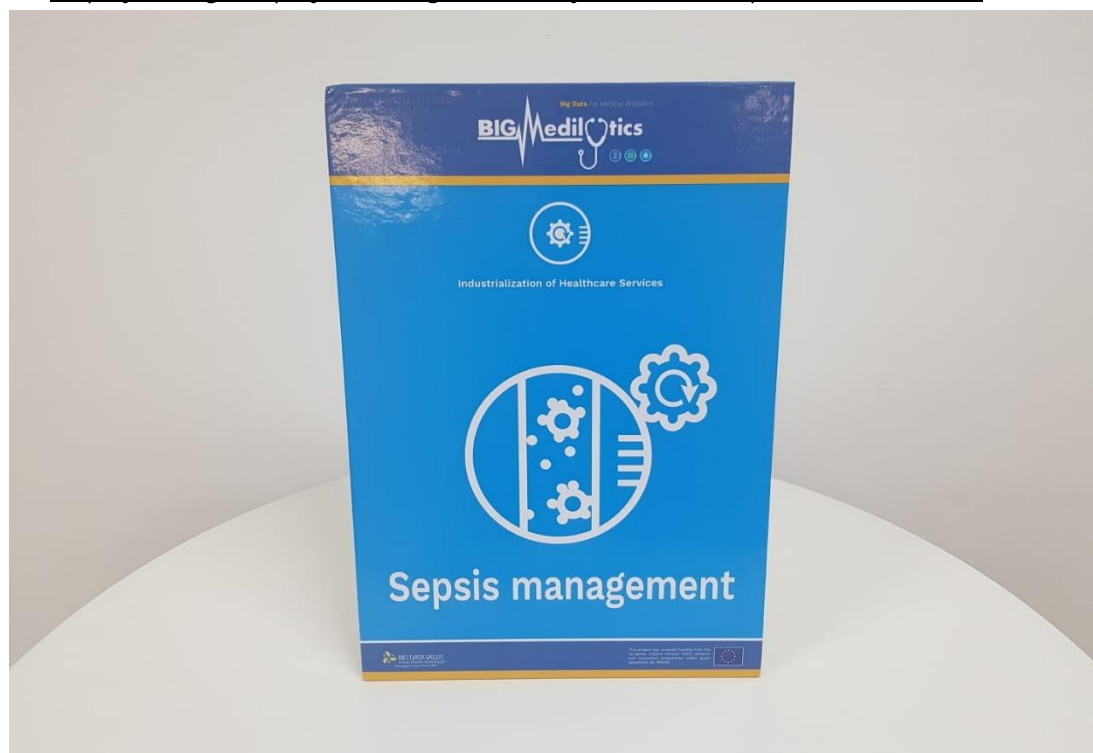
2. Roll up

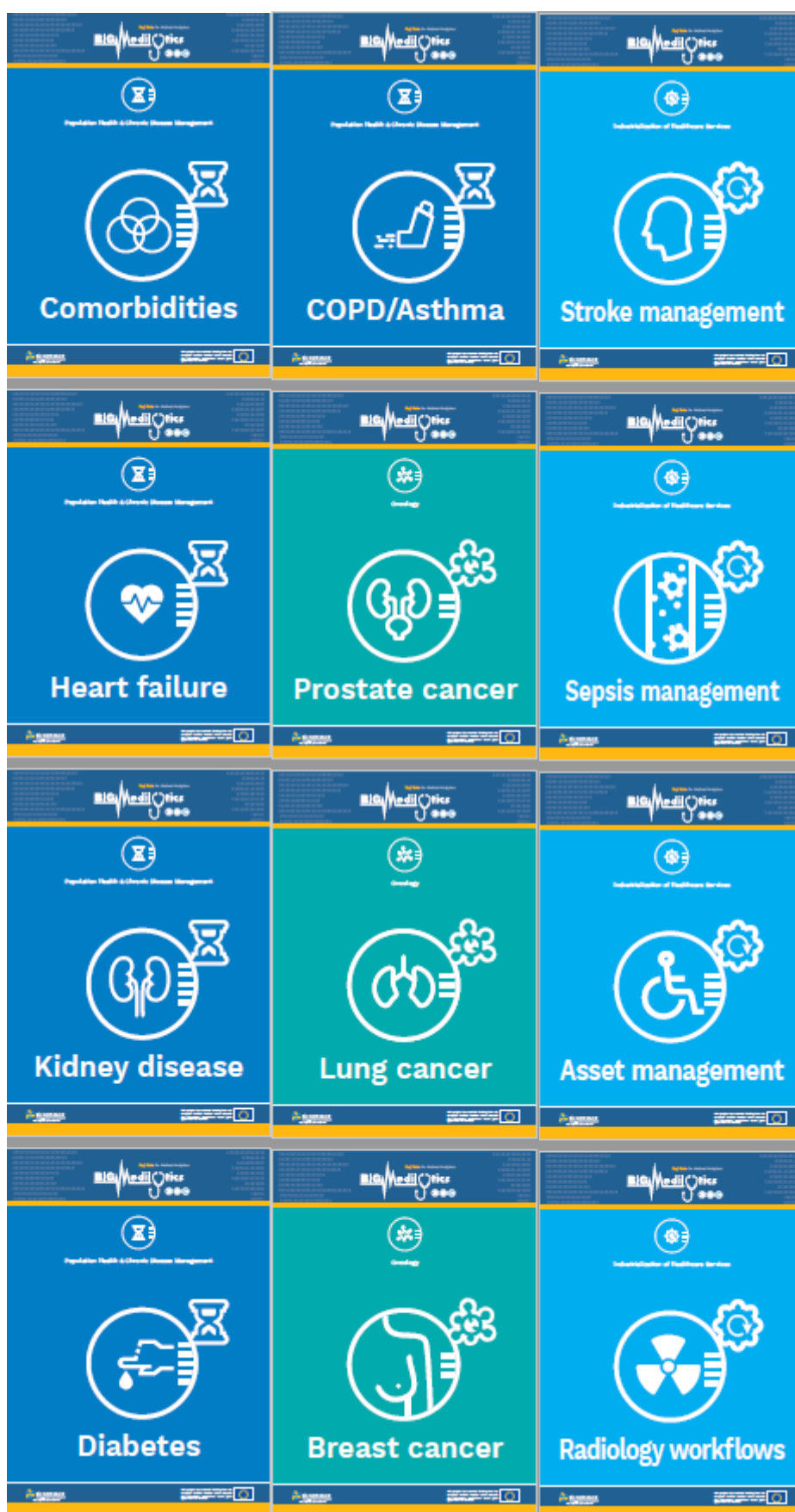


3. Photocall



4. Displays using the project's image to identify the different pilots in the booths





The event was covered in Twitter and attendees could contribute to the conversation by using the hashtag #Bigmediloticsevent2019 in Twitter. The hashtag was used more than 70 times during the days of the event and after the event.

A video summarizing the event was created and uploaded on YouTube. And the posters and presentations were made publicly available on the website. The event was communicated in Valencia.

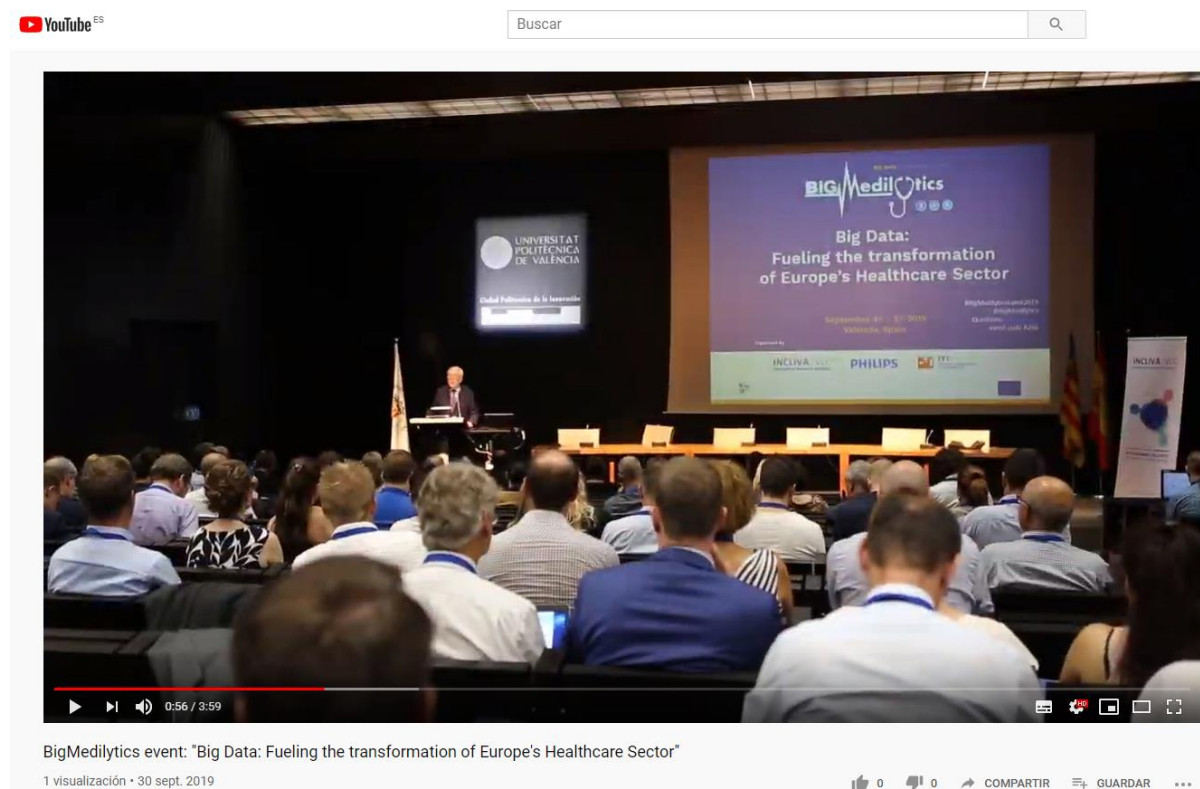


Figure 30: Screenshot of the video on YouTube. URL: <https://www.youtube.com/watch?v=hMzoVbogxZ0>

Websites and local media that covered the event

Date	Headline	Source	URL
06/09/2019	Expertos europeos en salud y big data abordan en Valencia los principales retos del sector sanitario	INCLIVA	https://www.incliva.es/actualidad/noticias/expertos-europeos-en-salud-y-big-data-abordan-en-valencia-los-principales-retos-del-sector-sanitario
06/09/2019	Expertos europeos en salud y big data abordan en Valencia los principales retos del sector sanitario	ITI	https://www.iti.es/noticias/expertos-europeos-en-salud-y-big-data-abordan-en-valencia-los-principales-retos-del-sector-sanitario/
09/09/2019	Expertos europeos en salud y big data abordan en Valencia los principales retos del sector sanitario	EL PERIÒDIC	https://www.elperiodic.com/valencia/expertos-europeos-salud-data-abordan-valencia-principales-retos-sector-sanitario_638256
09/09/2019	Expertos europeos en salud y Big Data abordan en València los principales retos del sector sanitario	RUVID	http://ruvid.org/wordpress/?p=49718

4.3.Objective 3: maximize the impact of the project results

Actions to reach the third objective (maximize the impact) will be carried out in a second stage when the project starts to generate results.

4.4.Objective 4: to create efficient communication among project partners

In order to reach the fourth objective of the communication plan, some actions have been developed such as the creation of policies for external communication, available in the Appendix B.2. of the Deliverable 6.3 (Communication Plan and Tools) and a press release protocol, included in the Appendix B.3. of the Deliverable 6.3.

E-mails about the progress in communication and pending issues are also sent regularly.

A board meeting with the leaders of the different work packages also takes place every two months in order to share and monitor the progress of the work packages and the next steps.

Finally, a survey was launched in order to know how partners are communicating the project. The survey and its results can be found in the section 3.2.

5. Media coverage

During the first half of the project different media have published the press releases or news generated by the project. These media belong to the healthcare and digital fields.

Date	Headline	Source	URL
29/03/2018	EU-geld naar Philips' onderzoek patiëntendata	ED	https://www.ed.nl/philips/eu-geld-naar-philips-onderzoek-patientendata-aa90acfe/
03/04/2018	Eén miljoen voor BIG data project EUR	Dagblad 010	https://dagblad010.nl/algemeen/een-miljoen-voor-big-data-project-eur
04/04/2018	Philips leidt prestigieus Europees big dataproject in de zorg	Zorgvisie	https://www.zorgvisie.nl/philips-dataproject-zorg/
04/04/2018	Philips wil zorgresultaten verbeteren met big data	Skipr	https://www.skipr.nl/actueel/id34146-philips-wil-zorgresultaten-verbeteren-met-big-data.html
04/04/2018	ERASMUS DOET MEE AAN EU BIG DATA-ONDERZOEK ZORGVERBETERING	ICT&health	https://www.icthealth.nl/nieuws/erasmus-doet-mee-aan-eu-big-data-onderzoek-zorgverbetering/
04/04/2018	ESHPM ontvangt miljoen euro subsidie voor Big Data in de zorg	telecompaper	https://www.telecompaper.com/nieuws/eshpm-ontvangt-miljoen-euro-subsidie-voor-big-data-in-de-zorg--1238719
05/04/2018	1 miljoen euro voor onderzoek Big Data in gezondheidszorg	EMERCE	https://www.emerce.nl/nieuws/1-miljoen-euro-onderzoek-big-data-gezondheidszorg
11/04/2018	Hoe big data de zorg optimaliseert	Duurzaam bedrijfsleven.nl	https://www.duurzaambedrijfsleven.nl/ict/28085/hoe-big-data-de-zorg-optimaliseert
12/04/2018	Miljoen voor big data in de zorg	Technisch weekblad	https://www.technischweekblad.nl/nieuws/miljoen-voor-big-data-in-de-zorg
17/04/2018	Big data e Inteligencia Artificial para transformar el sector de la salud con el proyecto BigMedilytics	ESMARTCITY	https://www.esmartcity.es/2018/04/17/big-data-inteligencia-artificial-transformar-sector-salud-proyecto-bigmedilytics
19/04/2018	INCLIVA participa en el proyecto europeo BigMedilytics	Big Data Magazine	http://bigdatamagazine.es/incliva-participa-en-bigmedilytics
23/04/2018	Incliva participa en un proyecto europeo de «big data» para mejorar la asistencia sanitario	EL ECONÓMICO	https://eleconomico.es/salud-sanidad/126560-incliva-participa-en-un-proyecto-europeo-de-big-data-para-mejorar-la-asistencia-sanitario
24/04/2018	BigMedilytics, el proyecto europeo de big data para mejorar la asistencia sanitaria	ConSalud.es	https://www.consalud.es/saludigital/108/bigmedilytics-el-proyecto-europeo-de-big-data-para-mejorar-la-asistencia-sanitaria_49755_102.html
2/05/2018	BigMedilytics: la más grande	DiarioSalud	http://www.diariosalud.do/d

Date	Headline	Source	URL
	iniciativa de la UE para transformar el sector de la salud con big data		o/categoria-clinicas-y-hospitales/18667-bigmedilytics-la-mas-grande-iniciativa-de-la-ue-para-transformar-el-sector-de-la-salud-con-big-data.html
11/06/2018	Digitale Anamnese, Big Data und Exoskelette für die Reha	Ärzte Zeitung online	https://www.aerztezeitung.de/politik_gesellschaft/gesundheitswirtschaft/article/965699/cebit-digitale-anamnese-big-data-exoskelette-reha.html
19/12/2018	Making the EU's health systems fit for the 21st century	POLITICO	https://www.politico.eu/sponsored-content/making-the-eus-health-systems-fit-for-the-21st-century/
29/01/2019	Onderzoekers: angst voor privacy in de zorg te groot	Zorgvisie	https://www.zorgvisie.nl/onderzoekers-angst-voor-privacy-in-de-zorg-te-groot/
03/02/2019	Big data, intelligence artificielle... la prochaine révolution contre le cancer	Doctissimo	http://www.doctissimo.fr/sante/cancer/recherche-contre-le-cancer/big-data-intelligence-artificielle-cancer
19/02/2019	ANGST VOOR PRIVACY BELEMMERT INNOVATIE IN DE ZORG	https://www.newbusinessradio.nl	https://www.newbusinessradio.nl/artikel/1390/angst-voor-privacy-belemmert-innovatie-in-de-zorg?fbclid=IwAR0U4BD9aHTUYFj0aoZAYohebw4YuAgxLpnIGRhZ8F18RGusF5Z-MIT2J-w

6. Achievements

6.1. Objectives achieved

Objective	KPI	Results (first 18 months)
1. To create awareness	Number of unique visits on the website	9,654
	Number of people reached at events	More than 11,000
	Number of brochures distributed	Around 2,750
	Number of media that have published the press releases	At least 18
	Visualization of newsletters	182 times
	Engagement on social media	2-3 on Facebook 1,1% on Twitter 7,11% on LinkedIn (based on the last 33 posts)
	Number of visualizations on YouTube	214 times
2. To involve external partners	Number of external partners attending the workshops	56
	Amount of feedback collected from external partners	56
5. To create efficient communication among project partners	Number of contents sent by partners	At least 19
	Number of follow-up e-mails sent to the partners	17 e-mails to the general list)

The project is on the right track to reach the expected progress in communication and dissemination during the first year, according to the initial indicators included in the Grant Agreement and mentioned below:

- 1 BigMedilytics symposium addressed to EU ICT big data industry
 - Healthcare session during the EBDVF, 12-14 November 2018, Vienna, Austria
- 1 workshop with local/regional/national authorities addressed to healthcare authorities / policy makers
 - Innovationmingel, 18 November 2018, Sweden.
- 6 journal papers/conference papers/posters
 - Poster “Big Data Technologies Applied to Gestational Diabetes”, Carlos Salort Sanchez, Jan Baumbach and Marga Martin Sanchez. 8 - 13 September 2018, Greece.
 - Veeningen M, Chatterjea S, Horváth AZ, Spindler G, Boersma E, van der Spek P, van der Galiën O, Gutteling J5, Kraaij W, Veugen T. Enabling Analytics on Sensitive Medical Data with Secure Multi-Party Computation. Stud Health Technol Inform. 2018;247:76-80. doi:10.3233/978-1-61499-852-5-76
 - Thaler S, Menkovski V, Petkovic M. (2018). Deep Learning in Information Security.
- 2 presenting results via EC networking mechanisms
 - Digital Innovation Hubs on Big Data and AI, 7 November 2018, Brussels.
 - ICT 2018: ‘Imagine Digital – Connect Europe’. 4 – 6 December 2018, Vienna, Austria

- 2 meeting with projects from ICT14-18 via BVDe-CSA
 - EBDVF, 12-14 November 2018, Vienna, Austria
 - Big Data Value Meetup May 2018, Sofia, Bulgaria
- 2 newsletters
 - [Newsletter No. 1 – October 2018](#)
 - [Newsletter No. 2 – January 2019](#)
- 4 blog posts
 - 12 posts during the first year

7. Challenges

7.1. Challenges

Communicating results of the project is critical to maximizing impact. This makes it essential for all consortium partners to actively generate contents for the project's website and also share contents on their own websites and social networks. While there are several partners who are proactive in generating contents, the amount of content generation by a large proportion of the partners needs to be further improved.

Also, the level of engagement on social media could be higher, especially on Facebook where the level of engagement is still low.

Finally, it is important to increase the visibility of the project among interested sectors such as patients' organisations and society in general.

7.2. Recommendations and next steps

Taking into account the progress included in this report, some actions should be implemented in order to follow improve the visibility of the project:

- To distribute contents ready to share among the partners' social networks in order to increase the presence and impact of the project.
- To send follow up e-mails every two weeks and suggest events and activities to the partners.
- To advertise posts on Facebook in order to increase the number of users following the account and thus the visibility of the project.
- To post more frequently about the project to improve the engagement on social media.
- To make short video interviews to the different partners as well as the External Exploitation Partners.
- Use the different tools provided by the European Commission to communicate the project.
- Sponsorships in the different events organized by the BDVA and increase the number of appearances in their communication tools.
- To organise more meetings with patient organisations.
- To participate in more standardisation events.

On the other hand, according to the communication plan, the next actions should be carried out in the second half of the project:

- A final generic video will be created to show the project's results.
- A creation of a group is planned in order to create a forum for sharing relevant information about big data and healthcare.
- Target press releases will be also created addressed to various bodies such as:
 - o Health standards (ICHOM)
 - o Insurance (EURAPCO)
 - o Geospatial (Open Geospatial Consortium)
- Organisation of a second workshop with the EEPs.

- To start to maximize the impact of the project results with the actions included in the communication plan through: scientific publication in open repositories; creation of press releases; publication of the results and scientific publications on BigMedilytics website and share them on LinkedIn; creation of a video showing the project's results and testimonies from the pilots; communication of the results on the European Commission channels and platforms; communication of the impact of big data technologies on healthcare to health authorities; and participation in selected standardizations meetings.

8. Conclusion

The project has reached the expected progress according to the indicators included in the Grant Agreement. Despite being a large consortium, the project has managed to create a homogeneous and consistent image. Issues such as contributions from partners and visibility of the project will be further improved.

Appendix

A.1 List of events

Events that took place until June 2019:

Partner	Indicator	Name of the event	Dates of the activity	Country of the activity	Target	Goal	Number of people reached
INCLIVA		MOSAI: Patient Centered Care	3-/05/2019 - 05/05/2019	AUSTRIA	End users	Awareness	400
INCLIVA		BIG-DATA in Heath	08/05/2019	SPAIN	Pharmacists	Awareness	250
INCLIVA		BIG-DATA IN CARDIOVASCULAR DISEASE	11/04/2019-13/04/2019	ARGENTINA	Physicians, nurses and pharmasists	Awareness	1600
INCLIVA		BIG-DATA IN HYPERTENSION	22/06/2019-26/04/2019	ITALY	Physicians, nurses and pharmasists	Awareness	3500
INCLIVA	Meetings with representatives of selected organisations	XVII Conferencia Española y VII Encuentro Iberoamericano de Biometría - CEB-EIB 2019	19/06/2019 - 21/06/2019	SPAIN	Researchers/scientists	Present results	100
INCLIVA/UV		2nd Big Data for Precision Medicine Symposium (BDPM 2019)	04/06/2019	SPAIN	Researchers	Awareness	40
INCLIVA		DESIREE WORKSHOP	12/07/2019	SPAIN	Physicians	Awareness	70
INCLIVA/UV/ Philips/ Karolinska/ Charité/ DFKI	Meetings with projects from ICT14-18 via BDVe-CSA / BigMedilotics symposium	European Big Data Value Forum 2018. Session on Healthcare	12/11/2018	AUSTRIA	EU HealthTech Industry	Awareness	40
contextflow	Demonstrations at major Medical tradeshows	ECR18	28/2/18 - 04/03/18	Austria	End users	Demonstration	500
contextflow	Tutorials/presentations/demos to selected hospitals	Inselspital Schweiz	24/04/18 - 27/04/18	Switzerland	End users	Demonstration	
contextflow	Demonstrations at major Medical tradeshows	Röko 18	09/05/18 - 12/05/18	Germany	End users	Demonstration	300
contextflow	Demonstrations in selected meetings/conferences	DRG Big Data Meeting	15/05/18 - 16/05/18	Germany	EU ICT big data industry	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	DICOM Meeting	21/06/18 - 23/06/18	Germany	End users	Demonstration	
contextflow	Demonstrations at major Medical tradeshows	RSNA Paris Spotlight	23/09/18 - 24/09/18	France	End users	Demonstration	200
contextflow	Meetings with representatives of selected	Philips Healthworks Accelerator	24/09/18 - 12/12/18	Netherlands	EU HealthTech Industry	Demonstration	

Partner	Indicator	Name of the event	Dates of the activity	Country of the activity	Target	Goal	Number of people reached
organisations							
contextflow	Demonstrations at major Medical tradeshows	ÖRG	04/10/18 - 06/10/18	Austria	End users	Demonstration	100
contextflow	Demonstrations in selected meetings/conferences	EuSoMII	11/03/2018	Netherlands	End users	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	IS3R	10/11/18 - 11/11/18	Netherlands	End users	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	European Big Data Value Forum	12/11/18 - 16/11/18	Austria	Healthcare authorities/Policy makers	Demonstration	
contextflow	Demonstrations at major Medical tradeshows	RSNA	25/11/18 - 29/11/18	USA	End users	Demonstration	1000
contextflow	Meetings with representatives of selected organisations	PHIT	15/12/18	Netherlands	EU HealthTech Industry	Partnership	
contextflow	Demonstrations at major Medical tradeshows	HIMSS	11/2/19 - 15/2/19	USA	Healthcare authorities/Policy makers	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	i2c Networking Days	22/2/19	Austria	Reserachers/scientist s	Demonstration	
contextflow	Demonstrations at major Medical tradeshows	ECR19	27/2/19 - 3/3/19	Austria	EU HealthTech Industry	Demonstration	300
contextflow	Demonstrations in selected meetings/conferences	ESOR Course on AI	5/4/19 - 6/4/19	Spain	End users	Demonstration	100
contextflow	Demonstrations in selected meetings/conferences	IEEE International Symposium on Biomedical Imaging	8/4/19 - 11/4/19	Italy	Reserachers/scientist s	Knowledge transfer	
contextflow	Participation in standarization events	ECIR 2019	14/4/19 - 18/4/19	Germany	End users	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	RSNA Paris Spotlight	3/5/19 - 4/5/19	France	End users	Demonstration	100
contextflow	Demonstrations in selected meetings/conferences	Pioneers Festival	9/5/19 - 10/5/19	Austria	Other (indicate below)	Awareness	1000
contextflow	Demonstrations in selected meetings/conferences	ISMRM19	11/5/19 - 16/5/19	Canada	Researchers/scientist s	Knowledge transfer	
contextflow	Demonstrations in selected meetings/conferences	Darwin's Circle	23/5/19	Austria	EU HealthTech Industry	Knowledge transfer	
contextflow	Demonstrations at major Medical tradeshows	Röko 19	29/5/19 - 1/6/19	Germany	EU HealthTech Industry	Demonstration	
contextflow	Demonstrations in selected meetings/conferences	OHBM 19	9/6/19 - 13/6/19	Italy	Reserachers/scientist s	Knowledge transfer	

Partner	Indicator	Name of the event	Dates of the activity	Country of the activity	Target	Goal	Number of people reached
contextflow	Demonstrations in selected meetings/conferences	BDV PPP Summit	26/6/19 - 28/6/19	Estonia	Reserachers/scientist s	Knowledge transfer	
NCSR Demokritos	Demonstrations in selected meetings/conferences	6th Hellenic Forum: BIG DATA FOR PRECISION MEDICINE SYMPOSIUM	11.7.2018	Athens, Greece	Other		250
UPM	Demonstrations in selected meetings/conferences	CAEPIA 18	23/10/2018-26/10/2018	Spain	Reserachers/scientist s	Awareness	~40
UNIS	Presenting results via EC networking mechanisms	EU Partnering Event on Infectious Diseases	22/05/2018	UK	European Commission	Partnership	~50
UPM	Demonstrations in selected meetings/conferences	CAEPIA 18	23-26/10/2018	Spain	Reserachers/scientist s		~40
DFKI		Panel discussion at XPOMET about "Healthcare for all: The transformative potential of artificial intelligence"	23/03/2018	Germany, Leipzig	Other	Other	100
DFKI		Invited talk "Informationszugriff und Medizindiagnostik in der Nephrologie" at IAG "Verantwortung: Maschinelles Lernen und Künstliche Intelligenz", Berlin-Brandenburgische Akademie der Wissenschaften	08/10/2018	Germany, Berlin	Researchers from different fields	Provide an impulsen talk to motivate further discussion about future medicine and prediction models	30
DFKI		Invited talk "Medical Data Analytics to Support Kideny Disease" at Smart Data Forum	16/10/2018	Germany, Berlin	Delegation from Sweden	Overview about research in context of clinical NLP and clinical decision support	30
DFKI		Invited talk "Early detection of complications in patients after kidney transplant" at Future Medicine	07/11/2018	Germany, Berlin	Research and Industrie, but also general audience	Providing an overview	More than 100
DFKI		DMEA. AI in the Healthcare System – Part 1: Data Knows Better. KI in der Medizin und der Versorgung der Zukunft - Siemens Healthineers	09/04/2019 - 10/04/2019	Germany	mixed, many people from medical field, as DMEA is a medical fair		70
DFKI		Heidelberger Kongress des Fachverbandes Sucht e.V. Künstliche Intelligenz in der	27/06/2019	Germany	mixed, many people from the field of action		150

Partner	Indicator	Name of the event	Dates of the activity	Country of the activity	Target	Goal	Number of people reached
		Medizin: natürliche Sprachverarbeitung, maschinelles Lernen und die datengetriebene Unterstützung von Patienten					
Charité & DFKI		Invited talk "Optimizing the care of kidney transplant patients using Big Data" at EBDVF	12/11/2018	Vienna, Austria		Presenting our work within Kidney Pilot	
KAR	Workshops with local/regional/national authorities	Innovationmingel	18/11/2018	Sweden	Healthcare authorities/Policy makers	Awareness	450
HUA	Demonstrations in selected meetings/conferences	ECCB (Poster)	08/09-13/09/2018	Greece	Reserachers/scientists	Awareness	500
CHARITÉ	Workshops with local/regional/national authorities	Machine Learning Nephrology	18/07/2018	Germany	EU ICT big data industry	Support, knowledge transfer	10
Charité	Demonstrations in selected meetings/conferences	Smart Data Forum-Qatar Roadshow 2018	11/11/2018	Katar	EU HealthTech Industry	Awareness	
Charité	Meetings with representatives of selected organisations	Platform of learning systems	08/01/2019	Germany	Reserachers/scientists	Awareness, demonstration	27
Charité	Meetings with representatives of selected organisations	Max Rubner Award	15/01/2019	Germany	Healthcare authorities/Policy makers	Awareness, demonstration	More than 100
Charité	Demonstrations in selected meetings/conferences	Healthcare Executives from Netherlands	17/01/2019	Germany	Health insurance industry, end users, healthcare authorities/policy makers	Awareness	40
Charité	BigMedilotics symposium	MSD-Gesundheitspreis	March 2019	Germany	Reserachers/scientists	Awareness, demonstration	More than 100
Charité	Meetings with representatives of selected organisations	Canadian-German Chamber	25/03/2019	Germany	EU ICT big data industry, Health insurance industru, Healthcare authorities/policy makers, patient organisations	Awareness, communicate best practicces and demonstration	20
Charité	Demonstrations in selected meetings/conferences	Minisymposiumm "AI in Radiology"	06/06/2019		Healthcare authorities/Policy makers		25
Charité/BMG	Demonstrations in selected meetings/conferences	BDV PPP Summit	26/06/2019	Latvia	Liaison within programme	Communicate best practices,	100


780495 - BigMedilotics

D6.4 - Intermediate report on dissemination activities

Partner	Indicator	Name of the event	Dates of the activity	Country of the activity	Target	Goal	Number of people reached
present results							
IBM/CURIE/VT T		OTAI2019 Workshop. Poster “BigMedilotics – Breast Cancer Pilot”, Kari Antila, Harri Polonen, Simona Rabinovici-Cohen, Oliver Hijano-Cubelos and Juha Pajula	25/03/2019	Finland			
IBM		Presentation “Big Data and AI”, Michal Rosen-Zvi, Tel-Aviv University					
IBM		Presentation “Learn from Screening Data and Assessing Breast Cancer Risk”, Michal Rosen-Zvi, MIXiii-Biomed 2019					
IBM		Panel “Future Directions of AI: The Industry Perspective”, Michal Rosen-Zvi, Big Data TLV conference					
IBM		Keynote “AI in Healthcare - a new revolution?“, Michal Rosen-Zvi, Bar-Ilan University Data Science Event					
IBM		Presentation “AI for healthcare - a promise for improved diagnosis: breast cancer as a case study”, Yaara Goldschmidt, University of Jyväskylä					
Philips		Digital Innovation Hubs on Big Data and AI	7/11/2018	Brussels	Existing initiatives related to Big Data, Robotics, and AI; the ecosystem of users (SMEs, start-ups and data/AI innovators); and other relevant stakeholders (government, investors)	Awareness	
Philips		Big Data Value Meetup	May 2018,	Sofia, Bulgaria			

A.2 Posters presented in the BigMedilotics event

Pilot 1: Comorbidities



Big Data for Medical Analytics

Population Health and Chronic Disease Management

Comorbidities

Pilot 1: Comorbidities - Main goals and technological development

Main goals

Understand how chronic diseases influence each other and **provide a more accurate mortality and hospitalization risks** for a specific patient. Our main data source are around **4 million EHRs** of the Valencian Region population over a timespan of 5 years. Using this data, we have identified **clusters of diseases**, i.e., patients that share similar diagnosis of relevant chronic diseases and conditions. The impact of the clusters of diseases with additional influential variables in each patient will provide useful information to physicians for intensifying controls and therapies to reduce the impact of chronic diseases.

Pilot overview

1. Retrospective analysis

Big data infrastructure
Design & Deploy a BigData Infrastructure to anonymize, store and process 4 million EHR from the Valencian Region.

Mathematical-Statistical Analysis
Clean, prepare and study EHR data in order to find how patients are grouped by a set of candidate diseases (Comorbidities)

2. App and tools development

We will develop an app to take an informed decision related to cluster of chronic disease


3. Prospective analysis

Pilot deployment
We will involve primary care physicians from a Valencia health department in order to test the app developed

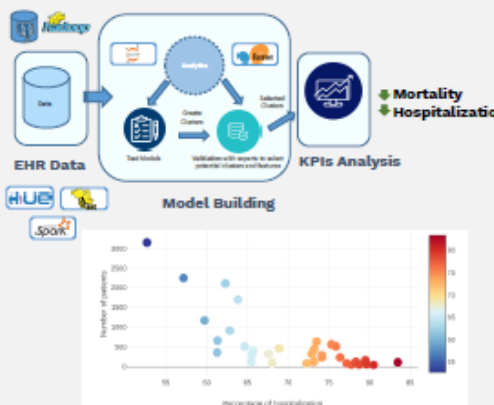
KPI assessment
The pilot partners will assess the evolution of KPI across the pilot

Clustering methodology

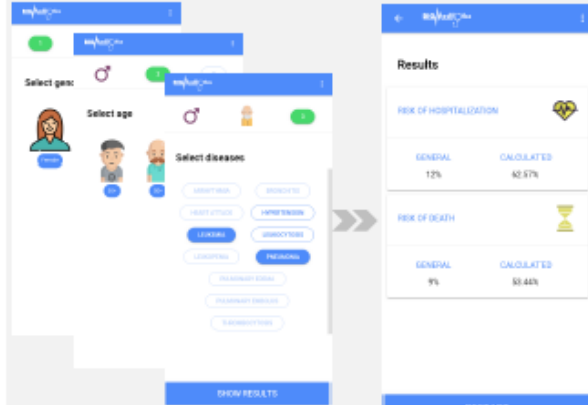
The groups of diseases are obtained by means of a **hierarchical graph** where each node in a level represents a more refined group of comorbidities from the immediately upper node it belongs to. These groups of comorbidities are formed only if there is a statistical difference between the target with the comorbidities group in study and the previous upper and more general group. This groups are formed by using **statistical inference techniques** that help us to discover statistical differences between groups.



Analytics workflow



App development. Visualization



INCLIVA | VLC Biomedical Research Institute

Atos


ITI INSTITUTO TECNOLÓGICO DE INFORMÁTICA

OptiMedis



PHILIPS TU/e Technische Universiteit Eindhoven University of Technology



BIG DATA VALUE
PUBLIC PRIVATE PARTNERSHIP
This project is part of BDV 200

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 2: Kidney disease

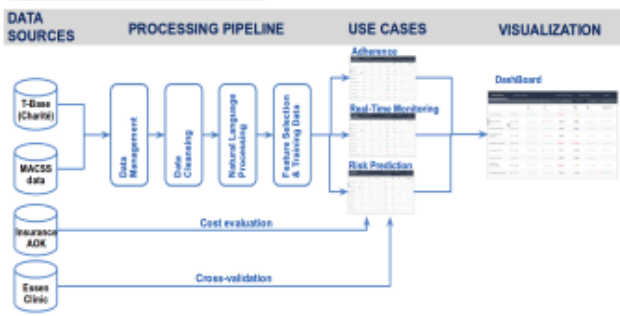

Big Data for Medical Analytics


 Population Health and Chronic Disease Management
Kidney disease 

Introduction:

Malfunction or rejection of transplanted kidneys cause a high financial burden for the German healthcare system. A key reason for transplant rejection is therapeutic non-adherence, other reasons are not fully elucidated yet. Big data analytics and machine learning are technologies with a tremendous potential to reveal (unexpected) patterns and risk factors that are relevant for long-term transplant survival.

System Architecture:



Costs caused by patients after KTx (Charité)

Year	Costs per Year	Number of Cases	Costs per Case per Year
2015	1.913.955€	1.835	1.043,03€
2016	1.863.104€	1.822	1.022,56€
2017	3.447.812€	1.766	1.952,33€

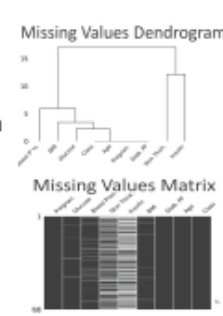
Cleansing:

purify

Python library to ease data wrangling, cleansing, and EDA

Support for handling missing values:

- Listwise deletion;
- Mean/ median/ mode imputation
- Linear regression




Goals: Reduction of re-hospitalizations as well as reduction of graft loss for kidney transplant patients

Adherence:

- The degree to which a patient correctly follows therapies and medical advices
- Non-adherence is one of the main reasons for unwanted re-hospitalizations and loss of kidney function

→ Monitoring adherence has a high impact for the treatment of patients in terms of outcomes and thus cost reductions



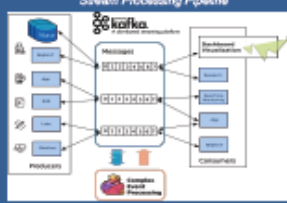
Dashboard:

- Visualization of patients according to adherence
- Data: Real-time APP data, TBase
- Method: Rule-based adherence ranking based on data from MACSS platform

Real-Time Monitoring:

Data Source:

- Producer/consumer software design
- Updates of data can trigger generation of messages (events) in real time
- All important events are available in the moment when needed



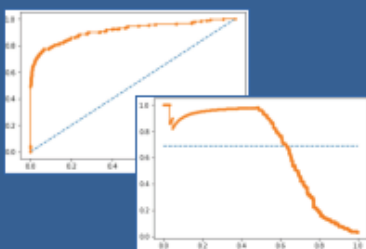
Complex Event Processing:

- Real-time stream processing for detection of sequence of events
- Matching of patterns, generated by experts
- Irrelevant data is discarded, allowing the process potentially infinite data streams



Risk Prediction:




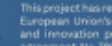
- Task: Predicting the probability that an endpoint occurs in near future
- Targets: Re-hospitalization, mortality, infections, graft loss, ...
- Data (retrospective): 15 years, 8k patients
- Features: ~300 (demographic, vital, lab,...)
- Method: Gradient Boosted Regression Trees
- Train/Dev/Test: 80/10/10, 20-fold x-val
- Preliminary Results (mortality):

ROC: 91.10 (stdev: 2.57)
Prec/Rec F1: 86.72, 56.06, 68.10




AUC-ROC and Precision/Recall Curve for predicting mortality

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 3: Diabetes



This pilot aims to develop a complete monitoring system, including a mobile app (connected with glucometers to ease data collection, and presenting analytics results to the patients), and a web portal to present the data to the medical team.

Gestational Diabetes

Gestational diabetes (GDM) is a condition of glucose intolerance with first recognition or diagnosis in pregnancy. Prevalence of GDM has seen a dramatic increase in recent years due to internationally applied changes in diagnostic criteria along with the global obesity epidemic, more sedentary lifestyles and advancing maternal age. Due to inconsistencies in screening and diagnosis as well as sociodemographic variability, the prevalence of GDM ranges from 1.7% - 20% across studies. Self-monitoring of blood glucose levels is the cornerstone of management of GDM. The association between GDM, poor glycaemic control and adverse perinatal outcomes has been established for many years.

Neonates born to diabetic mothers have a higher incidence of macrosomia, increased operative delivery rates, increased rates of birth complications and higher admission rates to neonatal ICU to correct metabolic imbalances. The rising prevalence of GDM also represents a major public health concern as affected mothers are at increased risk of Type two diabetes later in life.

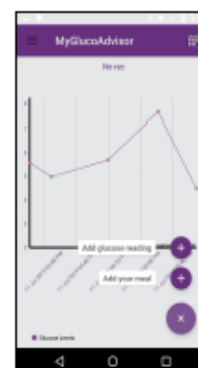
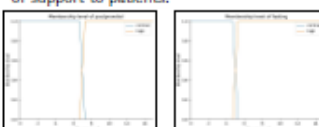
Rising healthcare costs associated with the increased prevalence of GDM necessitates the introduction of innovative strategies for monitoring and management of the condition. To this end we propose the introduction of an app-assisted remote monitoring program for women with GDM to reduce the burden of ever-increasing demand on the health care service and to foster patient-oriented care with the self-monitoring of their condition.

Infrastructure and APP



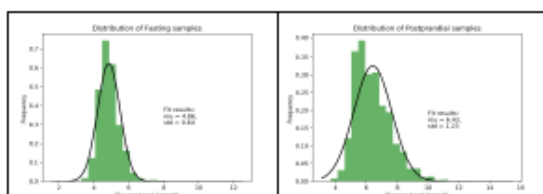
The system belongs to a new generation of Remote Patient Monitoring applications which are based on modern edge computing architecture for collecting health data from wearable devices, processing the data in real time on smartphones and alarming the patient and the doctor in the case of any out of range readings. Additionally, patient data is sent, through secure channels, to the hospital server, where medical staff can analyze the data in short term (e.g. some daily trends) and issue corresponding notifications. Simultaneously, the data is processed using data analytical methods for detecting trends in patient behavior. The system is also capable of predicting potential out of range trends and alerting both doctor and patient.

The application itself collects not only glucose readings, but is capable of collecting dietary data to provide context for those readings. It displays this information to patients in a clear and concise format, including weekly summaries, as well as educational information in the form of notifications. The app is capable of setting reminders to measure glucose levels, and it also provides motivational pop-ups as a form of support to patients.



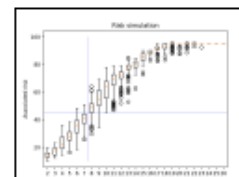
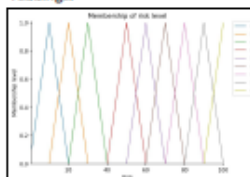
Data

The data used for validating the model was collected from a pre pilot study in the Rotunda Hospital, Dublin. GDM patients are diagnosed approximately in the 28th week of pregnancy. Participating patients were asked to collect four daily glucose level measurements until delivery, one in the morning (fasting) and the remaining three readings taken one hour after the three main daily meals (postprandial). For this analysis, fully anonymized data from 50 patients was used, with different levels of adherence to the schedule of measurements, ranging from one every week (i.e. around 10 measurements in the whole period), to several daily measurements (i.e. 700 measurements).



Analytics

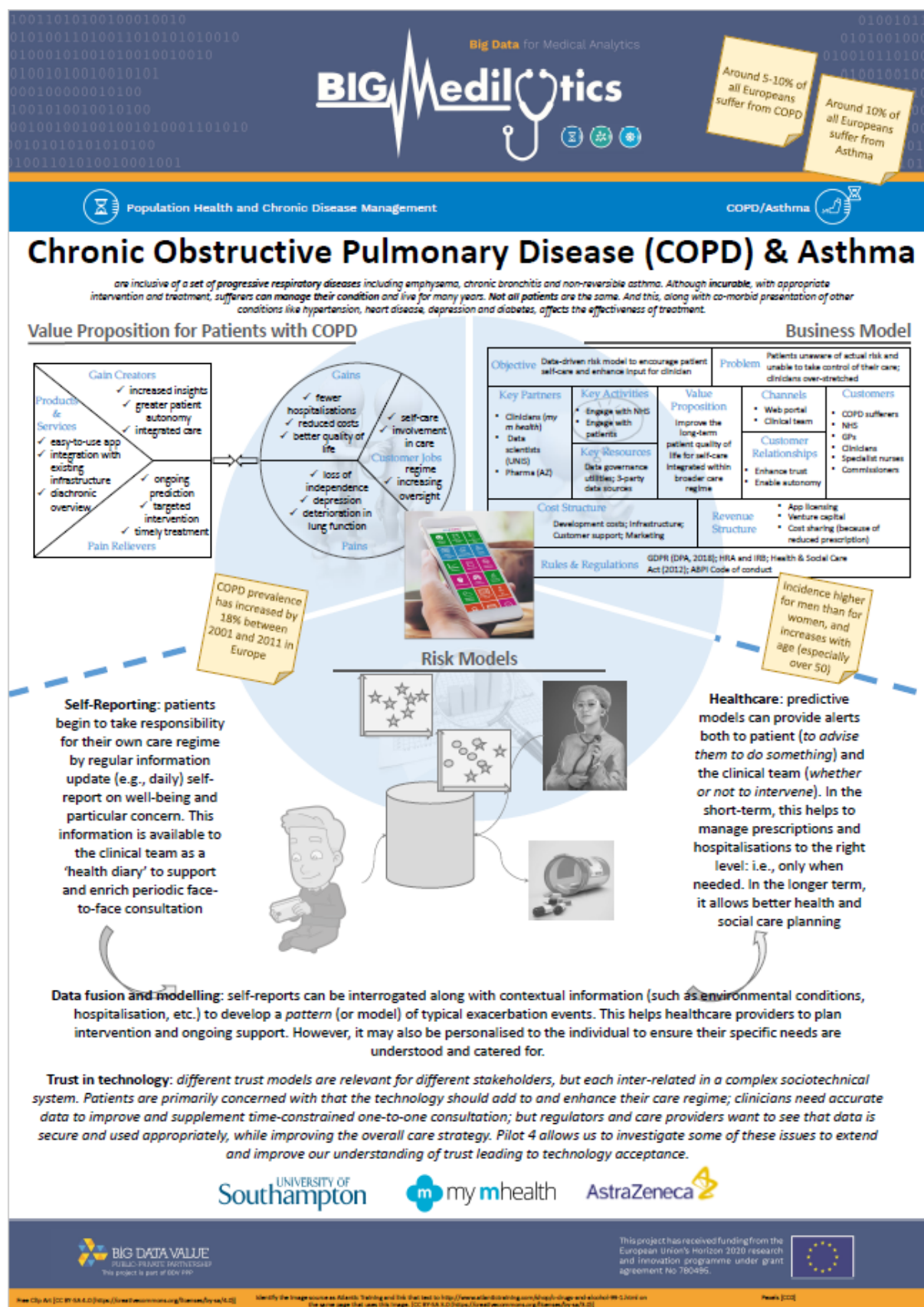
We used a fuzzy inference system for defining a risk value, due to its explainability and interpretability. The input values are the glucose measurements. We derived the thresholds from protocols collected from the ranges used in hospitals in Ireland. The output value is the risk associated to a patient, generated by expert knowledge. The rules are human-readable sentences used as an input for the model. We had a dimension problem (the model needed 2²⁸ rules) that was solved by not using the time component of the rules from the previous week. The results show that most of the values lay on the lower left and upper right quadrants, representing that both criteria agree, and all the measurements with low or high risk are reflected in the risk score. The border cases assign a higher risk score with patients with higher average glucose readings.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 4: COPD & Asthma



Pilot 5: Heart failure



Introduction

Heart failure is a severe chronic disease with a great health care burden. Frequent (re-)hospitalizations and a high mortality remain an important issue. Optimal medical therapy (OMT) and lifestyle changes such as increased physical activity (PA) are the cornerstones of treatment. Based on the European Society for Cardiology (ESC) guidelines, regular aerobic exercise is recommended for all Heart Failure patients with reduced Ejection Fraction (HFrEF) patients. Several studies have shown that PA is just as effective as medical therapy and can lower hospital admissions and decrease mortality. However, physical activity in this group of patients is challenging. This pilot has three tracks to improve physical activity for this group of patients: (1) intervention study to demonstrate the benefits of motivational feedback on relevant outcomes, (2) identifying high risk patients with Big Data techniques to select patients for the intervention in the future and (3) developing a secure multi party computation (MPC) technique to improve the patient selection models with privacy sensitive data of different parties (see other poster).

Track 1 Erasmus MC: Demonstrate that monitoring physical activity in combination with motivational feedback benefits the level of participation in centre-based CR and, hence, the outcomes for these HF patients

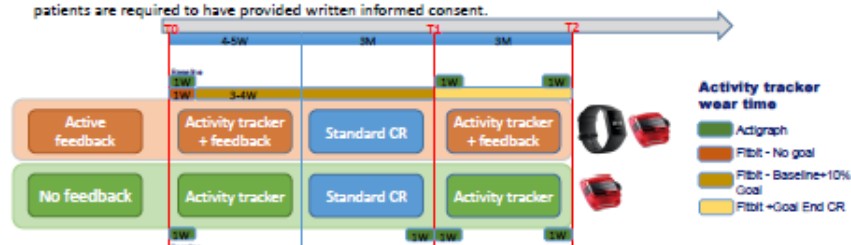
1a. The Rotterdam study

The Rotterdam study is a prospective population based cohort study among adults and elderly in Rotterdam, the Netherlands, originating from 1989. The baseline measurements for the first cohort where completed between 1990 and 1993. The study was extended with two cohorts, in 2000-2001 and 2006-2008. The main objectives of the Rotterdam Study are to investigate the risk factors of cardiovascular, neurological, ophthalmological and endocrine diseases in the elderly. The examinations consists of home interview and visits to the research center. Every 3-4 years examinations will be repeated in potentially changing characteristics. Participants were followed for the most common diseases in the elderly. (Ikram et al, European Journal of Epidemiology 9, 807-850, 1997)

1b. Physical activity promotion trial

Study design: The proposed study is a randomized controlled trial with a follow-up of at least 6 months. A total of 180 patients will be randomized to 2 arms in a 2:1 fashion: (1) Physical activity monitoring device with feedback and motivation; (2) Physical activity monitoring device without feedback and motivation. Both arms will have standard of care (SoC), including standard cardiac rehabilitation (specific for HF) according to the Dutch guidelines along with OMT as prescribed by the treating physician. Additional measurements will take place at 3 time points: at baseline (within 6 weeks after inclusion), at the end of CR (16-20 weeks after inclusion) and at the end of follow-up (3 months after CR or at least 6 months after inclusion).

Study population: Patients aged 18-85 years with chronic HFrEF (NYHA class II and III) who have a clinically stable condition, an indication for physical exercise and CR, will be eligible to participate in this study. All included patients are required to have provided written informed consent.



Track 2 Achmea: Identifying patients with high risk on (re-) hospitalizations and/or high mortality using Big data techniques with more than >5,000 input variables based on insurance claim data




Track 3 TNO: Combining data from both tracks using MPC (see other poster)

Results: Classification of high risk patients with a neural network and random forest performs significantly better than the baseline. Random forest has the best performance (misclassification 1/3 of baseline). Different architectures of neural networks will be estimated to improve the model performance.



Pilot 5: Multi-Party Computation (MPC) against heart failure




Big Data for Medical Analytics

Population Health and Chronic Disease Management

Heart failure

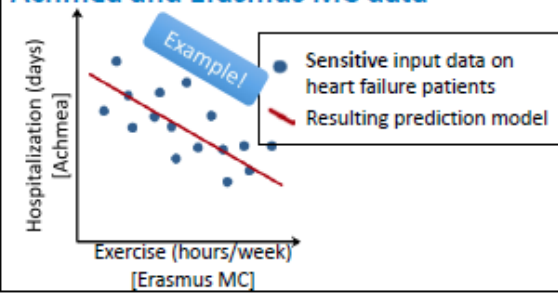
Multi-Party Computation (MPC) against heart failure

How to develop better treatment plans for heart failure patients, based on data of both an insurance company **and** a hospital?




MPC is a toolbox of cryptographic techniques that allows several different parties to jointly compute on data, just as if they have a shared database.


Goal: Finding relations between Achmea and Erasmus MC data



Traditional solution




MPC solution – privacy by design




Advantages of the MPC solution


- ✓ Nobody learns anything from someone else's data (except for the result)
- ✓ Inclusion of ZorgTTP greatly improves computational efficiency

Pilot partners




External Exploitation Partner








This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 6: Prostate cancer




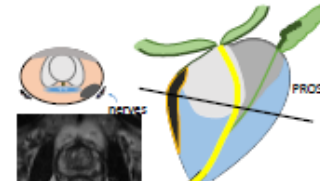
Big Data for Medical Analytics

 Oncology
Prostate cancer 

ISPM Prostate

A Clinical Decision Support System for Prostate Cancer Treatment

Clinical Problem

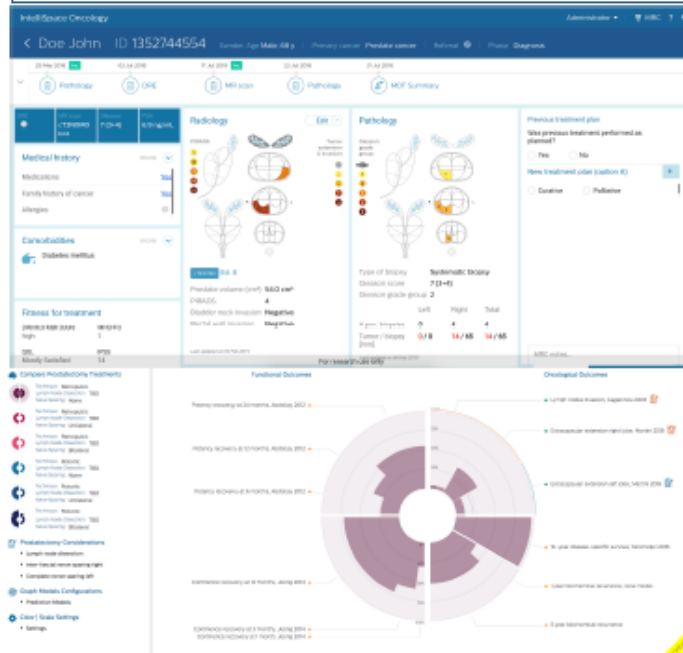



- The quality of care is multi-metric and comprises a trade-off between complete removal of the tumor and the loss of functions relying on tissue close to the prostate
- Tumor location is difficult to visualize
- Prostate cancer care is multi-modal – urology, radiology, pathology, oncology, etc.
- Data are poorly structured with very little system integration
- Feedback to the care flow is limited
- The use of patient-reported data is underdeveloped

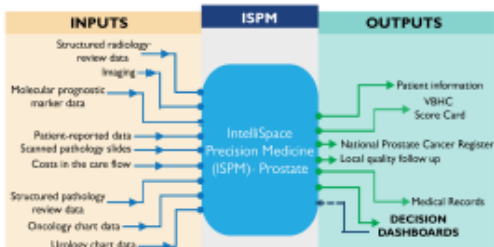
Major objective

Enable personalized treatment to improve the quality of care and increase productivity by:

- integrated visualization of multiparametric data, and
- Big Data-driven predictive modelling



Data flow automated by ISPM



Possible improvements using ISPM

Patient outcomes

- Better oncological outcome – resection margins
- Better functional outcome – urine continence and sexual function
- Patient satisfaction

Efficiency

- Register data once, use often – system integration

Patient safety


- Reduce loss of information in the care flow


Quality reporting/Value-based health care (VBHC)


- Real time quality data, including patient-reported data
- Stratification by risk group – co-morbidity, family history, prognosis, etc.
- Real time, individual feedback to clinical staff
- Improved staff satisfaction


Prediction modelling

- Include known models in the software
- Develop new models (800+ patients expected by end of 2019)
- Visualize prediction models in intuitive ways










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Pilot 7: Lung cancer

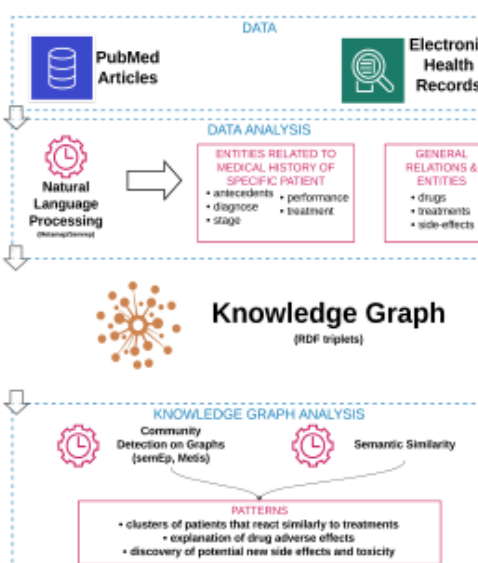

Big Data for Medical Analytics

 Oncology
Lung cancer 

Lung Cancer Pilot:

aims to exploit knowledge from Big data to improve the healthcare continuum of lung cancer patients at all the stages, i.e., prevention, diagnostics, treatment, follow-up, including the last period of life. The pilot also aims at strengthening the sustainability of healthcare systems by reducing costs while improving quality and access to care in lung cancer.

The Lung Cancer Pilot



The flowchart illustrates the process of the Lung Cancer Pilot. It starts with 'DATA' from 'PubMed Articles' and 'Electronic Health Records'. This data undergoes 'DATA ANALYSIS' using 'Natural Language Processing (decomposition)'. The analysis identifies 'ENTITIES RELATED TO MEDICAL HISTORY OF SPECIFIC PATIENT' (antecedents, performance, diagnosis, treatment, stage) and 'GENERAL RELATIONS & ENTITIES' (drugs, treatments, side-effects). These are integrated into a 'Knowledge Graph (RDF triplets)'. The graph is then analyzed using 'KNOWLEDGE GRAPH ANALYSIS' (Community Detection on Graphs (semEg, MeSH) and Semantic Similarity) to identify 'PATTERNS' such as clusters of patients reacting similarly to treatments, explanation of drug adverse effects, and discovery of potential new side effects and toxicity.

Mechanics:

The pilot starts with medical data from the Electronic Health Records and Scientific Literature, performs pattern extraction and ends up in a **knowledge graph (KG)** that captures essential correlations in Lung Cancer treatment. The knowledge graph integrates the extracted knowledge and represents background knowledge for predicting treatment effectiveness, toxicity, and survival time.

Big Data Methods in Lung Cancer:

Machine learning (ML) to extract information from:

- Unstructured & structured data sources
- Open data sources (e.g. PubMed) & Electronic Health Records
- Integrate extracted knowledge into a KG
- ML on top of the KG uncovers patterns that explain treatment effectiveness and disease progression


Results:

- Identify whether there is **evidence before diagnosis** that may lead physicians to **clinical suspicion of lung cancer**
- **Reduce** the number of **visits** to the **Emergency Room** by early detection or treatment of possible symptoms or secondary effects
- **Reduce** the **toxicities** associated to patients with comorbidities in order to adapt the treatments to be applied
















This project is part of BDA-495

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 8: Breast cancer



Big Data for Medical Analytics


Oncology
Breast cancer


Radiomics for Breast Cancer


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¹IBM Research – Haifa, ²Institute Curie, ³VTT Technical Research Centre

1. Pilot Overview

Goals: Improve treatment response for breast cancer by using AI to analyze mammograms, US, and MRI images along with structured clinical data. Reduce costs by tailoring treatment for the individual patient.


 Project lead
Image analytics
Clinical analytics
Deep learning


 Patient images and clinical data
Clinical knowledge
Data hosting


 Image analysis
Interpretable features

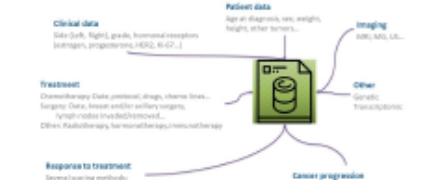
2. Radiomics for NACT Prediction

- Neoadjuvant Chemotherapy Treatment (NACT) option
- Decision today is made based on clinical variables only
- Less than half of treated patients achieve pathological complete response with no evidence of residual disease
- Failed treatment worsens the patient prognosis
- Failed treatment increases the cost

Radiomics can improve NACT response prediction

- Extract large amount of features from multi modal medical images
- Apply deep learning and computer vision algorithms for precision medicine

3. Heterogeneous Data Collection



4. Curation and Anonymization

Clinical Data

- A cohort of ~1700 patients
- Women with breast cancer who received NACT between 2012 - 2018
- Use NLP algorithms to extract data from various reports
- Anonymize PHI as age and dates

Imaging Data

- Multi-modal imaging
 - Mammograms
 - Magnetic Resonance Images (MRIs)
 - Ultrasound (US) images
- Images are very valuable and include intrinsic information, but only ~400 patients have imaging
- All the images are anonymized

5. Data Statistics


Important Clinical Features

- Age at diagnosis
- BMI
- KI67 percent
- HER2 positive
- Progestosterone status
- EE grade


MRI Imaging Types	
Type of Scan	Patient Number
T1 (pre contrast)	335
T2 (pre contrast)	335
Diffusion weighted	335
T1 with Gadolinium	40
Any contrast agent	354
T2 with Dixon method	154
Subtraction	306

Total number of MRI scans: 12174
 Total number of MRI subtraction scans: 1055
 Total number of MG scans: 2836
 Total number of US scans: 1086

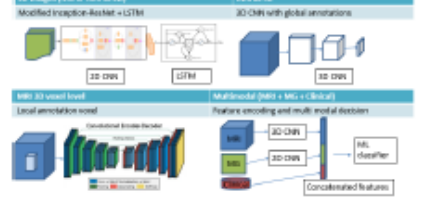
6. Pilot Architecture




7. VTT Image Analysis Pipeline



8. IBM Algorithmic Building Blocks






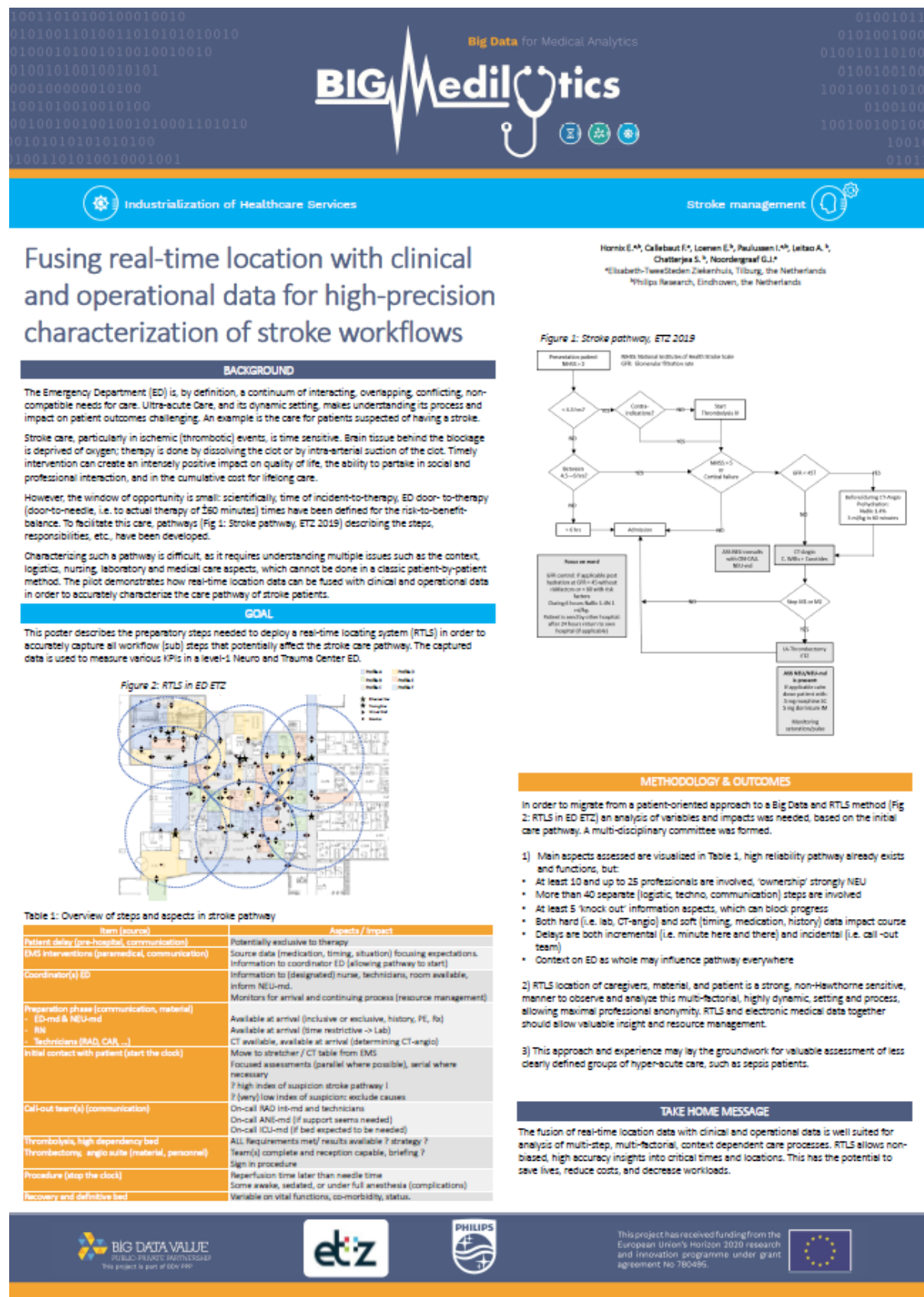
Public-Private Partnership
This project is part of BDP PPP

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.




Pilot 9: Stroke management



Pilot 10: Sepsis management




Big Data for Medical Analytics



Industrialization of Healthcare Services

Sepsis management

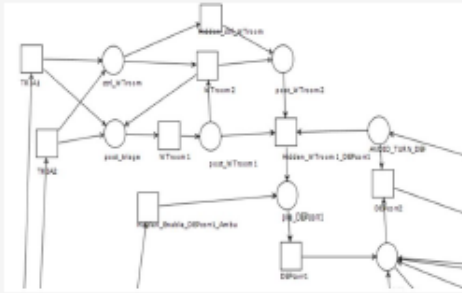


Sepsis Management

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¹Philips Research, Eindhoven, the Netherlands
²Health Research Institute INCLIVA, Valencia, Spain

Sepsis is a life-threatening syndrome characterized by physiologic and pathologic abnormalities induced by infection which may lead to organ damage, organ failure and death. Early identification and appropriate management in the initial hours after the event is associated with lower morbidity and mortality as well as a reduction in health care costs. The currently implemented data management systems are not capable of systematically identifying unnecessary time delays, bottlenecks and other weaknesses in the workflow.



Petri Net illustrating the paths a Sepsis patient can take at the Emergency Department at Hospital Clínico Universitario in Valencia

Case study

Philips and Incliva have come together to improve outcomes and reduce overall costs associated with Sepsis Care at the Emergency Department (ED) of the "Hospital Clínico Universitario" (HCU) in Valencia.

This Pilot monitors the current practices for Sepsis Care at the Emergency Department (ED) of the "Hospital Clínico Universitario" (HCU) in Valencia. After the assessment phase of the pilot we will implement resulting measures in order to fulfil the International Scientific Guidelines, which have established strict time periods for the recognition and initial management.


Assessment Phase
 In this phase of the pilot the main goal is to identify possible time delays, bottlenecks and deviations of the expected paths used at HCU and defined by the Sepsis International Guidelines. This assessment makes use of 2 distinct sources of data: the Real-Time Locating Systems (RTLS) and the Electronic Medical Record (EMR). As a first step into this pilot Incliva and Philips worked together on defining the expected paths of Sepsis patients. Since RTLS does not use geolocation, it was necessary to define and equip the areas of the ED to be included in the paths. A total of 32 areas were defined to cover the complete ED including triage rooms, waiting areas,

Technology


RTLS and Process Mining


Real-Time Locating Systems (RTLS) are capable of providing accurate location, motion, and other data on equipment, staff and/or patients at update rates typically up to once per 3 seconds. At 4000-5000 mobile medical devices per hospital, tracking equipment alone can already generate up to 3 x 1010 location records per hospital per year. Big data solutions (e.g. running on Spark) will be used to process data streaming in from the hospital to visualize the location and area transitions of patients through the Emergency Department. Complex event processing using data cleaning and process mining algorithm will be performed on the streaming data to fuse location and motion data from the RTLS sensor tags. These algorithms will be used to generate reports regarding the location and movement patterns of Sepsis patients. This will also be used to raise real-time alerts regarding deviations from the expected paths and unexpected behavior regarding the use of the sensors.

Example of RTLS area definition at ED




Patient with RTLS sensor






BIG DATA VALUE
PUBLIC-PRIVATE PARTNERSHIP
This project is part of SDN PPP




PHILIPS




INCLIVA | VLC
Biomedical Research Institute

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 11: Asset management




Big Data for Medical Analytics

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Industrialization of Healthcare Services

Asset management



Asset management through a Real-Time Location System

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Background


Healthcare professionals spend valuable time on searching mobile medical equipment. In addition, these costly assets are used inefficiently. A Real-Time Location System (RTLS) can be deployed for improved asset management.

Aim


To evaluate the effect of introducing an asset management system based on an RTLS on **search time**, and **utilisation** of mobile assets among medical staff at the Mother and Child department at OLVG Hospital, Amsterdam (NL).

Methods


- Infrared-based RTLS** was implemented, covering more than 80 rooms and hallways;
- 200 tags** were placed on 22 different groups of mobile assets;
- Tags actively send their location to the server, frequency varies with recent movement (typical range 3-300s);
- Philips developed software **Track&Trace**, to search for assets and to instantly localise them (including view of assets on floor plan);
- A before-after study is being conducted to evaluate our aims. Baseline data was collected through questionnaires and active recording of search time by the staff using RTLS. The research will be completed at the end of 2020.



Design of RTLS hardware



Tagging of assets




Track&Trace application

Results



- Staff self-reported on average 2 search actions per shift and an average time of 3.42 minutes per search;
- Active recording of search times using RTLS showed a search time of 24.3 minutes per search;
- Staff satisfaction on utilisation of mobile assets was average/low.

Conclusion


RTLS can be successfully implemented in a hospital environment. Using the infrastructure, location of assets was available with room level accuracy in the Track&Trace application. Workable solutions are needed to also tag smaller equipment, for example pulseoximeters or thermometers. Baseline measurements on search time and satisfaction were completed, further research is ongoing to evaluate the effectiveness of Track&Trace.




BIG DATA VALUE
PHILIPS TRIUMPH PARTNERSHIP
This project is part of EDV 440

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.



Pilot 12: Radiology workflows


Big Data for Medical Analytics



 Industrialization of Healthcare Services
Radiology workflows 

Image retrieval for the improvement of the radiology workflow in diagnosing pulmonary pathologies

Objective

Problem: the diagnosis of interstitial pneumonias is complicated and time consuming for radiologists

Goal: increase productivity and diagnostic performance of radiologists when reading computed tomography (CT) scans with possible IPs

Methods

Measuring the increase of productivity and performance:

Radiologists reading 100 chest CTs with IPs or differential diagnoses thereof will be assessed with and without the image retrieval tool based on components from contextflow.

Measured parameters:

- Diagnostic accuracy** – is the most probable diagnosis correct?
- Diagnostic completeness** – are the differential diagnoses correct?
- Diagnostic confidence** – what is the radiologist's subjective confidence of the finalized report?
- Diagnostic time** – time from start until completion of a CT scan

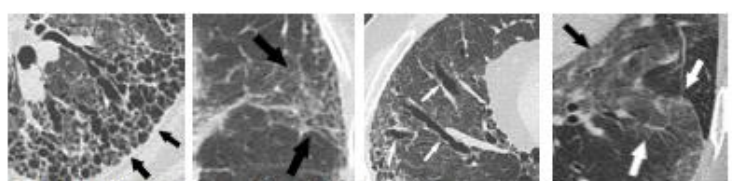


Figure 1: Different CT patterns of interstitial pneumonias

Without image retrieval tool

Specialists
100 CT scans*

→

With image retrieval tool


Specialists
100 CT scans*

Radiologists in training
100 CT scans*

→

Radiologists in training
100 CT scans*

*In total, 100 different CT scans of which every scan will be read four times




Left column: marking of a region of interest (ROI)

Middle column: matching cases, statistics and distribution of a visual pattern

Right column: case relevant information and references

Figure 2: Tool for the provision of contextual imaging and non-imaging data, including similar cases, heatmaps of the distribution of pathological lung alterations and informational sources.



BIG DATA VALUE
Public-Private Partnership
This project is part of H2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780495.

