Integrated care and chronic diseases management
A European Innovation Partnership on Active and Healthy Ageing priority

Result of Literature search
B3 Action Plan On Integrated Care
Action Area 4 On Risk Stratification

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ANNEXES

ANNEX I: LITERATURE SEARCH RESULTS
Introduction
The present document arises as a Deliverable from the work plan of Action Area 4 of the B3 Action Plan on ‘Replicating and tutoring integrated care for chronic diseases, including remote monitoring at regional levels’. B3 Action Plan is a result of the work started with the adoption of the Strategic Implementation Plan (SIP) of the EIP on AHA in November 2011. “Integrated Care” was identified as one of the six specific priority actions of the European Innovation Partnership on Active and Healthy Ageing (EIP-AHA) planned for 2012-15.

Activities were selected for implementation because they were relevant and had potential for impact. B3 Action Group members have reaffirmed their original commitments by agreeing to contribute to the achievement of objectives that are relevant for their region / organisation, in light of the resources and capacities available to them. They also agreed to work collaboratively to implement related deliverables in their own region / organisation and to support others to do so. Activities will be implemented on planned basis from 2012 until 2015 and have been scheduled to impact on the European Integrated Care Agenda.

1. Action Area 4 on Risk Stratification

Action Area 4 is one of the 9 Action Areas of B3 Action Plan and is focused on the study of Risk Stratification Tools in use in Europe (Figure 1).
To do this, the Action Area 4 has developed a Work Plan to generate knowledge in this field.

The Work plan was drafted after the 1st Conference of Partners of the EIP-AHA, which took place in Brussels in November 2012.

The plan has been implemented during the last two years (until October 2014) and has been appropriately modified when required, adjusting tasks and timelines and adding new participants to the Action Area.

One of the outcomes of this Work Plan is this deliverable which contains a database with relevant information about risk stratification in several fields: design and definition of the tool, feasibility of implementation and impact on health services.
2. What are risk stratification tools: definitions and uses

2.1 Definitions of Risk Stratification Tools

“Risk Stratification” is a statistical process used to determine detectable characteristics associated with an increased chance of experiencing unwanted outcomes\(^1\).

By identifying factors leading-to or linked-to an unwanted events before its occurrence, it is possible to develop targeted interventions to mitigate their impact.

- The term ‘Risk Stratification’ is commonly used in insurance-based healthcare systems, not so much in public healthcare systems
- Since the 1980s the concept of ‘Risk Stratification’ has been increasingly used in management of healthcare systems
- Increase in the use was first triggered by the Health Maintenance Organisations (HMO) in USA by ‘cream skimming’ and ‘dumping’ concepts
- 18,838 entries can be found in Pubmed for ‘Risk Stratification’ nowadays, first one dating from 1967
- In 2014, ‘Risk Stratification’ is not yet a Mesh term

Figure 2. Background of Risk Stratification at a glance

2.2 Functionalities of Risk Stratification Tools

Stratification tools have to main functionalities:
- The first one is called case finding and pursue identify complex frail and high risk patients to whom apply an anticipatory care can have a positive impact in order to avoid potential worsening symptoms or hospital
admissions. To keep these patients under the radar of Health Services can help to introduce proactive care.

The second functionality is related to health care resources distribution and capitated payment according population risk. Each allows a fairer distribution of the resources, due to the basis of it is to allocate resources depending on the needs of the population in terms of health status.

2.3 Definition of risk stratification tool
Risk Stratification Tools have 3 main components:

**PREDICTIVE TOOL**: it is defined by the outcomes or events to be predicted and the data sources used for prediction.

**PREDICTIVE MODEL**: mathematical algorithm/s or the ‘inner-workings’ that calculate risk scores for individual patients. They can be built upon Decision trees, Multiple regression models or Neural networks.

**SOFTWARE/PLATFORM**: web portal, a bespoke software package or a database.

![Diagram of Risk Stratification Tools](image)


Figure 3. Components of Risk Stratification Tools

**2. Aims of this deliverable**

- Obtain information on available strategies, models and tools used for risk stratification in health services around us (in Europe or elsewhere
• Collect, categorize and summarize the information obtained to provide a baseline state

3. Purpose of this document

Stratification tools have been identified as a key element in the management of Chronic patients, mainly for two reasons: provide anticipatory care to whom can benefit of it and customize interventions according to the needs of those patients.

Current existing risk stratification strategies and tools have not been widely deployed and their ability to predict adverse events is unknown.

Challenges to spread the use of Risk Stratification Strategies not also include tools’ availability and usability, but also data availability, requirements and accessibility, adaptation to real life services and clinical practice circumstances, clinicians’ acceptance or barriers related to healthcare structures and processes.

Besides, a Health System is an intricate network of health care structures with multiple levels of governance, using extensive screening methods is not easy due to the fact that each particular organization has specific ICT infrastructure, organizational maturity, structures, professional roles and governance schemes. Obtaining different data from a variety of sources for large numbers of patients can be troublesome.

A database of risk stratification information available in Europe and beyond can provide the basis for European Health Systems to introduce risk stratification tools and learn from good practices and lessons learnt from advanced regions in this field. It will help in generating useful conclusions and solutions transferable to a variety of European regions in the future.

4. Methods

This deliverable has been developed by the contribution of Action Area 4 of B3 Action Group on Integrated Care and synergies with ASSEHS project.

This deliverable has been created and developed by using two different approaches:
1. Desktop search methodology
2. Synergies with Assehs project and using scoping review techniques

### 4.1 Desktop search

B3 Desktop Search Spreadsheet was designed by AA4: in accordance with the B3 Combined Work Plan, it is a semi-structured information gathering tool and it is fully based on the Desktop Search Methodology designed for B3 Action Plan. Improvements have been included to it as suggested by Action Plan coordinators. Figure 3. Desktop Search Spreadsheet.

Dissemination of the B3 Desktop Search spreadsheet: was done through Yammer, Google Drive and email to participants. Explanations and support to the participants have been facilitated as to how to fill the spreadsheet, when necessary.

The use of the spreadsheet was extended to all Action Areas of B3: thus proving itself useful for the activities of the Action Plan.
**Definition of a methodology of work for AA4:** for the compilation of documents. Participants of Action Area 4 were divided in teams and team leaders were designated; scanning of mapped European Countries was organized amongst the teams. Responsibilities amongst coordinator, leaders and participants were established. A number of teleconferences were convened for this purpose.
Figure 5. Work Plan for AA4, Map

59 documents from 6 different European Countries have been (up to now) listed and described in the B3 Desktop Search spreadsheet and collected, using the methodology above. When participants have chosen other ways to share documents (for example posting them directly in Yammer) or when Good Practices related to Risk Stratification have been detected, they have also been added to the spreadsheet.

4.2 Synergies with assehs project

ASESEHS project is the acronym of Analysis of the feasibility of introducing stratification tools in healthcare. The project is a result of the call of EC HEALTH AND CONSUMERS, 2nd OBJECTIVE: PROMOTE HEALTH, Promote initiatives to increase healthy life years and promote healthy ageing. Specifically, the Project answers Call 3. Objective 4.2.1.2 Supporting the priorities of the European Innovation Partnership on Active and Healthy Ageing.

ASESEHS project pursues:

- To identify the best in class risk stratification tool transferable to European Countries
• To determine which are the conditions to optimally introduce Risk Stratification tools in a Health System and identify barriers and facilitators, including agents and instruments
• To assess the impact of risk stratification tools in healthcare Systems

The achievement of these objectives will ultimately provide information about the key aspects that define a feasible instruction or implementation of risk stratification in healthcare.

During 2014, ASSEHS project has carried out 3 scoping reviews in order to answer the following questions:

• To detect a relevant number of risk stratification implementation initiatives for frailty
• To understand the feasibility of introducing stratification tools and identify the difficulties of the process.
• To find evidence on the impact of Risk Stratification in Health services- Impact was defined as the effect of the use of risk stratification on budget allocation, funding, information systems, organizational configurations, resource utilization and impactibility models

4.2.1 Scoping review methodology definition

“Scoping studies aim to map the literature on a particular topic or research area and provide an opportunity to identify key concepts; gaps in the research; and types and sources of evidence to inform practice, policymaking, and research” ⁴.

The process followed in the 3 Scoping Reviews is summarized in Figure 6.
4.3. Structure of risk stratification database

The information gathered from Desktop Spreadsheets Search and ASSEHS project was:

- **Dimension**: which categorizes the document in design and definition of the tools (details how the risk stratification tool has been developed, data used and results in terms of validation and accuracy of the tool), feasibility (focuses on barriers and facilitators during the implementation of the risk stratification in a health service) and impact (analyses the impact in terms of outcomes, resources and roles in a Health service)
- **English title**: describes the title of the document in English language
- **Keyword/s**: the keywords of the document are detailed in this item
- **Language**: describes the original language of the document
- **Reference**: details the link or reference of the document
- **Date of publication**: specifies the data of publication of the document
- **Author/s**: details the authors of the document
• **Country**: details the Country of the risk stratification tools is designed or implemented  
Source: explains the source of the document, if it comes from Desktop search or ASSEHS project  
English abstract: includes the abstract of the document

### 4.3.1 Search functions of the database

The database allows to organize and structure the information by:

- **Dimension**
- **Country**
- **Year**

And also, allows searches by author, keywords, journal and title of the document

Examples of organizing and structuring the information:

- Structuring the information by year and dimension:
### 5. Results

The number of documents identified by the two approaches used in this documents has been 148; 59 from Desktop Search methodology and 89 documents from ASSEHS project.

### 5.1 Geographical analysis

89 documents belong to European regions, 49 documents are from other continents and the information is not available for 10 documents.
Graph 1. Geographical distribution of the documents

In terms of leading countries in this field, United Kingdom (46) followed by EEUU (22) and Spain (17) are the ones that concentrate the 57% of the total documents identified in this deliverable.
Moreover, through AA4, documents from France, Italy, Germany, Portugal, Spain and United Kingdom have been identified. And through the ASSEHS project 3 other countries have been identified despite of the number of documents identified in these regions are few.

On the other hand, countries like France, Portugal, have provided information through AA4, however the scoping review have not identified any document in these countries.

**5.2 Analysis per year of publication**

The firsts documents identified were in 1997. Until 2009 the publications related to risk stratification were quite low, only 26% of the total documents identified were developed during this period of time. After 2010 the interest on risk stratification field seems to increase if we take into consideration the number of documents appeared since 2010 (105 documents which represents the 70% of total documents identified)
Graph 3. Distribution of documents per year of publication

EEUU is the country where publications started first. United kingdom started later but the number of documents identified is the largest one. Spain started in 2009, and after this year has generated a relevant number of documents. Germany presents a similar pattern than Spain and documents that have an overall application.
Graph 4. Distribution of documents per year and most relevant countries*.

NOTE: the most relevant countries are considered the ones that have published more than 10 documents.

5.3 Analysis per dimension

54 documents are classified as design and definition of the tool; 58 documents are classified as feasibility of implementation of the risk stratification tool and finally, 36 documents are identified as impact of the risk stratification in health services.
The documents classified as “overall”, which their application is at overall level, they are mainly focus on the design and definition of the risk stratification tools. On the other hand, EEUU and Germany are mainly focus on the feasibility of risk stratification implementation and their impact in the Health services. Spain and United Kingdom covers mainly the design and definition of the tool and feasibility of implementation.
References
