



# **The ASSEHS WHITE PAPER on** **Deployment of Stratification Methods**

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## White Paper Executive Summary

Chronic diseases and frailty are two hallmarks of ageing that must be considered when trying to improve health for older adults. Chronic diseases are highly heterogeneous, cluster into multi-morbidities and are intertwined with ageing. Frailty is not a disease, but a condition on a continuum that may be reversible often medically interlinked with the development and aggravation of some chronic diseases. Multimorbid and/or frail patients consume up to 50 times more health care resources than non-chronic patients. This is partly due to the reactive and fragmented way in which care is nowadays delivered. It also relates to the particular needs of people with two or more conditions who may find themselves seeking advice from different specialists while also having a continuing relationship with a primary health care team.

European health systems were created to deal with acute health problems. A paradigm shift is needed to accommodate the changing demands for healthcare in our societies. These changes require an encompassing and holistic view, involving all actors and stakeholders in a common framework, creating synergies between providers and avoiding goal conflicts.

To face the challenge of active and healthy ageing (AHA), European Health Systems and services should move towards proactive, anticipatory and integrated care. Health care systems thus need to personalize services, put patients in the centre of care and provide services using the adequate resources. Population health risk management is emphasized through the use of tools to stratify people with chronic diseases according to their risk and offering support commensurate with this risk. Effective screening of frailty is key in optimizing care for frail population at risk.

Risk Stratification (RS) tools can (i) help to identify complex frail and high-risk patients and maintain these patients on the radar of the Health Services (ii) to ensure appropriate coverage of health risk prevention interventions. Systematic screening of groups of people in risk of suffering a disease constitutes a part of a broader area-level strategy on public health.

Activation of Stratification Strategies and Results of the interventions on frail patients of Healthcare Services (ASSEHS) EU project (N° 2013 12 04)<sup>i</sup> is an international effort to bring together stratification related professionals from Health Services, Academia and Research in the EU to (i) study current existing health RS strategies and tools (ii) spread their use and the application on frail elderly patients, (iii) minimize deterioration of conditions and/or (iv) prevent emergency or hospital admissions. ASSEHS is in line with Area 4 of the B3 Action Plan of the EIP on AHA.

The ASSEHS consortium lead by KRONIKGUNE is enriched by the presence of stakeholders and regions in which the health system is organized in different ways, i.e. general practitioners as public salaried employees, general practitioners cooperatives or health care models based on private care suppliers and with public and private hospitals providing secondary care. This gave to the project a strong focus on the European reality and with heterogeneity of input, which is beneficial for the design of patient RS tools that ought to be exportable to different regions and diverse health care models. The analysis of RS in different Health Systems generated conclusions and RS solutions transferable to a variety of regions.

A White Paper on Deployment of Stratification Methods has been produced at the end of the ASSEHS project and the present paper represents the executive summary of the White Paper.

### Risk stratification tools

Risk stratification tools are predictive models applied to predict future events at clinical and administrative levels in the healthcare domain. They are also used to stratify a population according to a selected metric, such as the likelihood of a future outcome, patient complexity, concurrent or future health care expenditure, etc. In general, predictive models are algorithms (e.g. statistical models, machine learning algorithms, etc.) which provide information about the relationship between a set of parameters, such as age, gender, clinical information, diagnosis, living conditions, district of residence, and the predicted outcome (e.g. readmission to hospital, death, healthcare expenditure, length of stay in hospital, etc.).

In order to facilitate critical and comprehensive comparisons among different RS models, the ASSEHS Appraisal Standard (AS) has been designed. This tool can help policy makers and health care managers for a broader integration of RS tools in European health care systems. A scoping review<sup>i</sup> collected the knowledge and identified the source of information used to design the AS<sup>ii</sup>. The web-based AS dashboard allows the user to retrieve the data collected during the scoping review. The dashboard has been designed using shinydashboard package within RStudio (RStudio, Inc. 2014).

Risk stratification models were compared in four EU regions (Basque country, Catalonia, Lombardia and Puglia).

## Risk Stratification planning and deployment

In order to identify key RS feasibility elements, a scoping review was performed with a focus on barriers and facilitators at the macro, meso and micro levels of the care systems. The relevant elements were organized in a framework proposal which included dimensions and sub dimensions applicable to the feasibility of RS. Further refinement then took place based on the information regarding implementation experience. The scoping review<sup>iii</sup> was carried out following five stages (1): (i) Identifying the research question (ii) Identifying relevant studies, (iii) Study selection, (iv) Charting the data, (v) Collating, summarizing, and reporting the results. Following Arksey et al.<sup>iv</sup>, a “Consultation” was carried out to refine the framework draft.

Planning, deployment and change management is composed of six sub-dimensions.

- The aim of the communication explaining the purpose and outcomes of RS.
- Training and mutual learning which is about the professional becoming competent in the use of RS.
- Multidisciplinarity of the team leading RS deployment involving health professionals, managers, ICT professionals, epidemiologists and others.
- Professionals’ accountability, commitment and involvement and the ways to ensure that they are linked to the engagement of clinicians.
- The operational plan focusing on definition of action, quality and implementation.
- ICT-Information display and functionalities including the devices and applications used in RS, its support and visualization.

Care intervention has three sub-dimensions.

- Case finding is the selection, identification and enrolment of target population.
- The pathway definition and implementation includes the intervention with patients and the follow up that should be done.
- Quality assessment and improvement process is related to the monitoring and assessment measures to be applied in the implementation process.

During the implementation process, gaps can be identified and improvements put in place. These changes can affect the functionalities of RS. Understanding how RS is implemented in real practice can help to close the gap between knowledge and practice<sup>v</sup>. Implementation research analyses the adoption of clinical research findings using routine clinical practice in a

systematic, widespread, sustainable and continued wayvi. ASSEHS has developed a framework to analyse RS feasibility to be implemented in health services.

A high-quality operational plan establishing the agenda and the strategic goals and objectives for the years to come is needed. Having trained people qualified in RS is necessaryvii. The clinicians' commitment is a sine qua non requirement. Since the clinical group consists of different profiles, a multidisciplinary team should lead the RS deploymentviii. Besides, appropriate ICT is also crucial.

The main uses of RS include the identification of patients, workload distribution, planning and resource allocation. Despite RS functionalities, there are some limitations related to data availability and database lack of dynamism. Understanding barriers and facilitators is crucial for the implementation of improvements. The proposed framework is useful to analyse feasibility and identify improvement areas. For a successful implementation leadership, internal communication and commitment on behalf of the clinicians are relevant. At the same time, ICTs should enable clinicians to manage their own lists of stratified and target patients. Cost-effectiveness of the implementation process needs to be further measured.

## **Risk Stratification Tools impact**

ASSEHS goals were focussed on three levels of impact: (i) healthcare structures (risk-adjusted resource allocation), (ii) health information systems and health professionals), (iii) processes (stratification of healthcare professionals, efficiency and resource utilisation and quality of care and health outcomes) and results. An analytical framework (the performance management framework) was developed. The analysis of impact was rather qualitative than quantitative. A set of qualitative methods was designed to assess the degree of impact on each domain and subdomain identified in the ASSEHS framework. Interventions use RS but its logic goes beyond predicting adverse events or identifying patients at risk that requires collaborative and proactive care. In a nutshell, RS may be a necessary condition but it is not sufficient to cause by itself an impact on healthcare systems. Therefore, we designed a Performance Management Framework combining four different analytical frameworks: Donabedian's quality of care assessmentix, RE-AIM evaluation frameworkx, the Triple Aim from the Institute of Healthcare Improvementxi and Michael E. Porter's Outcome Measures Hierarchyxii.

## **Assessment for Regional Interventions using risk stratification**

In order to generate the lessons learnt and identify improvement areas from ongoing Regional programmes using RS, the ASSEHS project has set up an Intervention Assessment Framework. This is expected to assess all the different domains involved in RS: (i) the selection or development of a RS tool, (ii) the implementation plan for a RS tool, and (iii) the impact of the deployment of a RS tool.

The Intervention Assessment Framework (IAF) generated in the ASSEHS project is a heterogeneous set of tools, which can be used to assess Regional interventions based on RS tools. Each tool was targeting different profiles, from RS tool developers, to programme managers, to clinicians, to commissioners, to key informants, etc.

Over 80 indicators were defined and that the final list of tools (each of which might span through multiple domains) resulted in:

- 2 surveys (one on the selection/development of RS tools and one on the satisfaction of clinicians)
- 3 interviews (one on the selection/development of RS tools, one on implementation, and one on funding).
- 1 focus group (on barriers and facilitators for the implementation and deployment of RS tools)
- A data collection methodology from Regional Databases

These tools were applied in the four ASSEHS pilot Regions (Basque Country, Catalonia, Lombardia and Puglia). The most important discoveries on the best practices and lessons learnt are reported.

## **Lessons learned from the ASSEHS project**

- Up-front 'buy or build' decision to be made when deploying RS: Building a proprietary solution in-house also requires maintaining and updating it, whenever needed. Buying comes down to license a commercial solution. However, one can learn from deploying a licensed model in a first exploratory phase before making a well-informed transition to an in-house solution, later on. Evidently, this requires substantial professional and monetary resources.

- Lackluster performance of available RS solutions on the market: Existing solutions are comparable in performance; there is no overall winner. Localization of methods is required for better performance. However, required performance can vary dependent on the need at hand: low false positive rate is acceptable in case of expensive interventions that are beneficial to a restricted sub-cohort of individuals.
- It is key to bring disparate data sources together for deploying RS to all stakeholders: inpatient, outpatient, pharmacy, GP, claims and other sources.
- Identification of the need and scope of RS. Case finding, risk adjustment or resource planning are different needs that are likely best served with different solutions. In addition, it is essential to properly choose the predictive model according to the objective of the clinical program. The success of a clinical program does not rely only on the performance of the risk model, instead it is based on a combination of the model's accuracy and the appropriateness and cost-effectiveness of the interventions. Identification of complex patients using a double process based on risk score and clinical assessment, as both are complementary and mutually supportive.
- Internal and external validation of RS solutions are crucial to create confidence in performance and generalizability across populations and settings. Communication and training are key elements in the implementation of RS solutions.
- Use of performance metrics allows benchmarking of RS solutions, though standardization on metrics is needed. Quality improvements and efficiency gains are difficult to demonstrate due to the multifactorial nature of healthcare interventions.
- Periodical update of a RS solution is required by monitoring estimated and actual outcomes in the population, demographical trends, prevailing public health issues or healthcare system changes. Monitoring comes down to a regular assessment on population changes (e.g. new people in the region not yet classified, people moving from a stratum to another, etc.). Updating comes down to re-calibrating parameters of the underlying RS model or re-generating a new model.

## **Ethical issues**

Ethical issues may arise when deploying RS including (i) personalised medicine providing an equal access to care, (ii) the benefits and dangers of patient stratification and (iii) ethical

considerations of personalized medicine in old age adults. Diverse solutions will be required to protect individual and societal interests but a balance could be reached through well deliberated healthcare policies. Wilson and Jungner<sup>xiii</sup> principles and criteria for disease screening may also apply for population RS. As an example, is there a recognized need for stratification, or is there beneficial intervention after stratification<sup>xiv</sup>?

## Conclusions

- The goal of this White Paper is to spread knowledge about the use of RS tools at policy making, healthcare management and clinical practice levels. The White Paper described in detail which are the main barriers which can be encountered when planning and deploying RS tools in a Regional intervention, as well as the facilitators that will help to overcome those barriers, and concrete examples of implementations from four pilot Regions, participating to the ASSEHS project.
- The best practices and lessons learnt from those pilots are supposed to serve as examples for the development of programs for managing multi-morbidity among complex frail older citizens, and to help policy makers and stakeholder to design, plan, deploy and validate RS in other Regions.
- The goal is that this White Paper will support other Regions and healthcare systems in the transformation toward new models of provisioning of proactive and targeted interventions according the patients' needs.
- The key general benefits of using stratification methods can be summarized as:
- A mean to provide levels of care that are tailored to an entire population and individual patients, with the proposition to deliver better care to EU citizens with better outcomes and lower costs;
- A mean to maximize population/patient benefit at a given level of resources;
- A mean to cope with versatility in care delivery by addressing patients across all acuity levels (health risks), accounting for prevalence and progression of different long-term medical conditions and accounting for regional differences in patient case-mix;
- A mean to inform policy makers, healthcare commissioners and medical specialists on expected outcome and expected (direct) costs on healthcare resource utilization for various intervention programs for an entire population or an individual patient.
- This White Paper aimed at the following outcomes:

- Increased predictability and reliability of the stratification tools in terms of population selection;
- Better selection of population groups thanks to fine-tuned stratification tools;
- Prevention / delay onset of physical frailty thanks to customized/integrated interventions for each group of patients according to their specific needs;
- Improved outcomes of the interventions in order to reduce “avoidable emergency admissions” and readmissions and costs;
- Raised public and professional awareness on the use of stratification methods to address the management of multi-morbidity among elderly people;
- Increased capability of detecting physical frailty in older adults in any setting of the health system (community, primary care, hospital, long-term care or social facilities);
- Indicators of frailty that can be exported to other European Health Services.

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