

GOOD PRACTICE BRIEF

POPULATION STRATIFICATION: A fundamental instrument used for population health management in Spain

José Cerezo Cerezo¹ Carmen Arias López²

Motivation and summary

Changing health services from a disease-centred to a patient-centred approach was one of objectives of the Spanish Strategy for Approaching Chronicity in the National Health System (2012). A strategic priority for facilitating this transformation was considered to be identification of the health needs of every patient, so that interventions could be tailored. In the framework of the project “Stratification of the population of the National Health System”, a locally developed and tested “population grouper”, Adjusted Morbidity Groups (AMG), was used in the majority of the Spanish regions to stratify patients’ risks according to morbidity and complexity (Ministry of Health, Social Services and Equality, 2018). Risk stratification is widely used in population health management, health service planning and clinical management.

Stratification of the health risks of people with chronic diseases has been adopted in many European countries to strengthen population health management and provide better-tailored services. Some countries have purchased or adapted existing software, and others, like Spain, have developed novel, country-specific population tools for grouping and health risk assessment (Dueñas-Espín et al., 2016; Nalin et al., 2016). These practices are aligned with the European framework for action on integrated health services delivery as one of the key strategies for moving towards people-centred health services (WHO Regional Office for Europe, 2016).

Adjusted morbidity groups

Process

AMG were set up in the Catalan Health Service by the Catalan Health Institute and the TicSalut Foundation as part of the Catalan Prevention and Chronic Care Programme. Later, the Spanish Ministry of Health, Social Services and Equality promoted two consecutive collaboration agreements with the TicSalut Foundation (Catalan Health Service), which enabled the extension of the AMG from Catalonia to the vast majority of the Spanish regions. By 2015, 38 million people had been grouped (Monterde et al., 2016; Ministry of Health, Social Services and Equality, 2018).

Key Messages

- Risk stratification tools such as the Adjusted Morbidity groups (AMG) can assist health systems in progressing from disease-centred to patient-centred care.
- The AMG can be used to estimate current and future risks for mortality, morbidity and various indicators of health service utilization, enhancing health care management.
- The AMG are particularly relevant for addressing patients with chronic comorbid conditions from both a system-wide and a clinical approach and allow benchmarking at various levels.
- The AMG have proved to be flexible and transferable among regions.
- To develop and put into practice a tool of this nature, reliable, up-to-date, systematized, homogeneous, computerized primary health care records are indispensable.

¹ Consultant, WHO Barcelona Office for Health Systems Strengthening, Division of Health Systems and Public Health.

² Technical officer of the Strategy for Addressing Chronicity in the National Health System, Subdivision of Quality and Innovation, Ministry of Health, Social Services and Equality.

Nature of AMG

AMG is a tool for population grouping and risk stratification that takes into account two factors: multimorbidity and complexity. The process requires the codified diagnostic codes of users' morbidity, the date of diagnosis and, as the principal source of information, data collected in electronic primary health care records. Acute diagnoses are taken into consideration only if they were made during the study period (usually one year), while chronic diagnoses are considered regardless of the date.

Grouping by morbidity: Individuals are classified into one of seven morbidity groups by their assigned international diagnostic codes, as follows: healthy population, pregnancy and/or labour, acute disease, chronic disease in one system, chronic disease in two or three systems, chronic disease in four or more systems and cancer.

Grouping by complexity: Each morbidity group (except the healthy population) is divided into five subgroups of complexity, the level of which is determined by analysis of a set of resource use variables, such as primary care visits, pharmaceutical prescriptions, mortality and risk for hospital admission. The complexity calculation was based on information on the population of Catalonia in 2011 (7.5 million). Combining morbidity and complexity resulted in 31 AMG.

Individual clinical labels and complexity index: The AMG includes two additional kinds of information on each patient. First, an individual clinical label for the most relevant and/or prevalent disease is selected from a list of 80 agreed, prioritized health problems. Secondly, a numerical complexity index is calculated that allows pyramidal risk stratification, in which each patient is allocated to a risk level or stratum (Fig. 1).

Fig. 1. Stratification pyramid based on complexity index



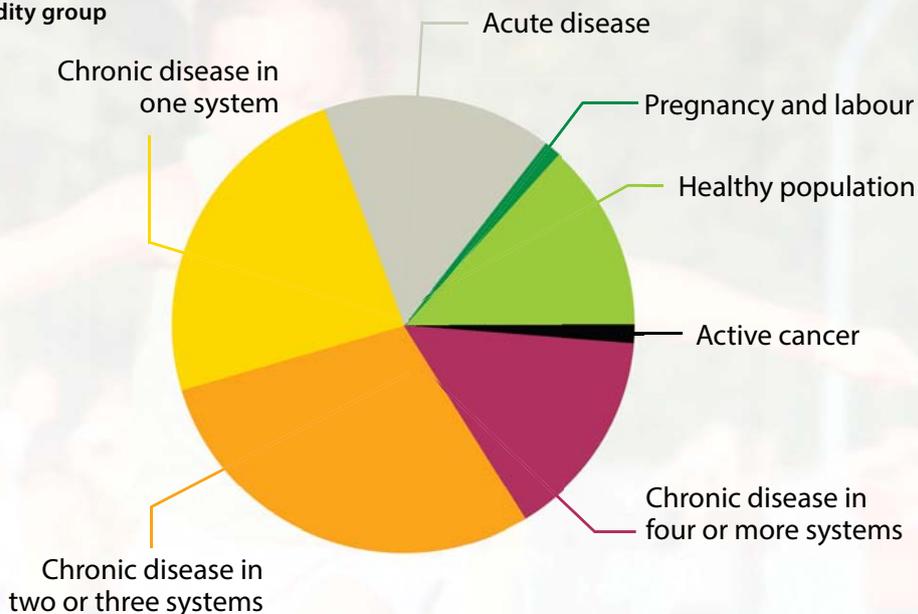
Towards population health management

The AMG is helpful for better understanding the distribution of health risks in the population. The Spanish health system is coordinated nationally but is decentralized to the 17 Spanish regions, many of which have used the AMG for different analytical purposes. Some examples are given below.

Temporal and geographical distribution of morbidity: Fig. 2 shows the proportions of the population in the seven morbidity groups in one region: 68% had at least one chronic disease and 44% experienced multimorbidity. About 15% of the patients with multimorbidity had chronic diseases that affected four or more organ systems. Such simple figures can be used for analysis over time and by geographical area for better planning decisions, for example.

Fig. 2. Population distribution by morbidity group

Morbidity groups	%
Healthy population	13.4
Pregnancy and labour	1.1
Acute disease	16.1
Chronic disease in one system	24
Chronic disease in two or three systems	29.2
Chronic disease in four or more systems	14.9
Active cancer	1.3



Source: Ministerio de Sanidad, Servicios Sociales e Igualdad, 2018

Resource needs by health risk. Fig. 3 shows the results in another region, where pyramidal risk stratification was used to calculate the values for a set of variables of resource use and cost analysis for every risk stratum. The highest risk stratum, which includes only 5% of the population, consumed the highest share of health resources, with a clear gradient across the risk spectrum. Changes over time and by geographical area can be useful for ensuring that resource allocation patterns meet needs.

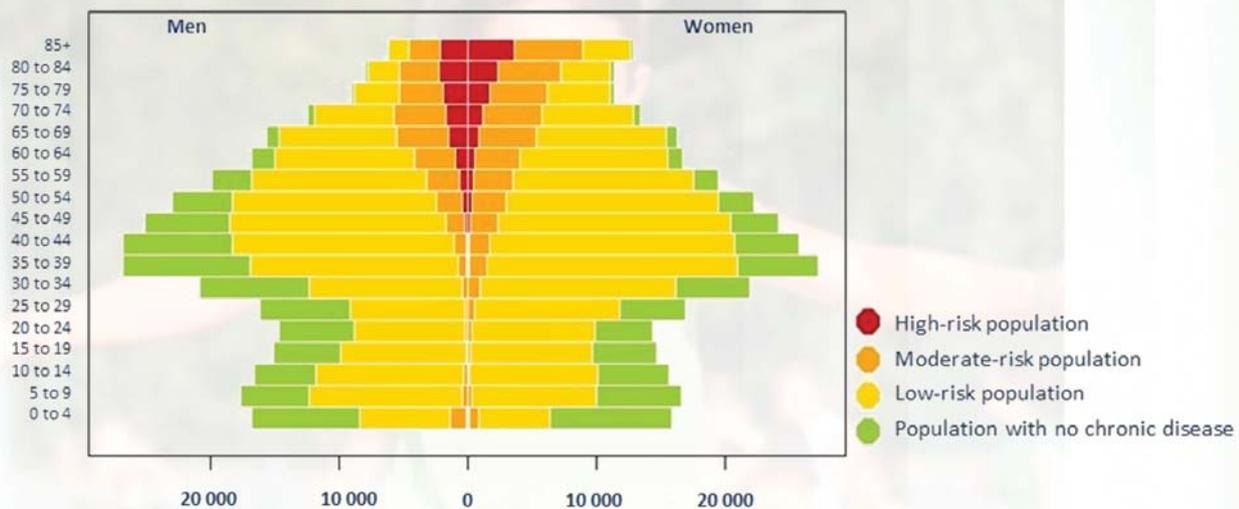
Fig. 3. Mortality and resource use by risk stratum

	Population (%)	Mortality rate (x 100)	Visits to primary care (mean)	Emergency admission rate (x 100)	Emergency visit rate (x 100)	Dispensed drugs (mean)	Health care expenditure (mean)
High-risk population	5	16.6	22.2	58.1	160.8	13.4	7067€
Moderate-risk population	15	1.1	12.4	7.5	72.5	8.0	2121€
Low-risk population	30	0.2	7.0	2.9	51.9	3.6	779€
Baseline-risk population	50	0.1	2.0	0.6	17.3	1.0	164€

Source: Ministerio de Sanidad, Servicios Sociales e Igualdad, 2018

Life-course and gender distribution of health risk. In a third region, patients stratified according to their complexity index were distributed on the population pyramid as depicted in Fig. 4. This revealed the numbers of high-risk individuals by sex and age group. As observed in this example, the higher the age group, the more patients are in the high-risk stratum. This becomes especially relevant for those over 65 years, who are most likely to have multimorbidity. High-risk patients are also seen in the age group 50-60 years, with a direct impact on the labour and economic sectors. This information can be particularly helpful for designing interventions.

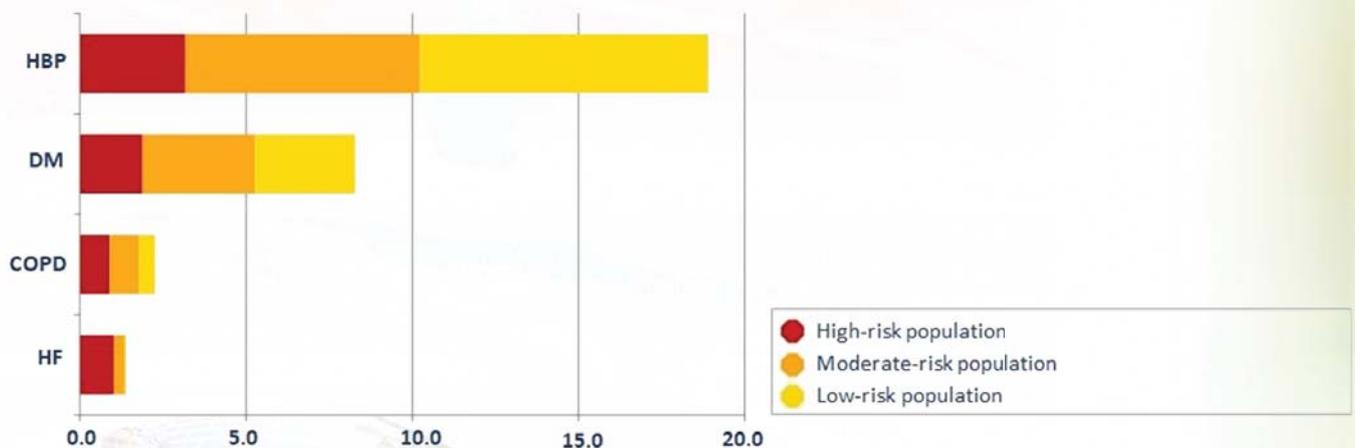
Fig. 4. Population distribution by age, sex and risk stratum



Source: Ministerio de Sanidad, Servicios Sociales e Igualdad, 2018

Chronic conditions and health risk: The proportion of high-risk patients in each of the most relevant noncommunicable diseases can be also determined by the AMG. Fig. 5 shows the results for a fourth region of Spain, with the proportions of the population at high risk shown in red. The proportion of patients in the highest complexity category depends on the disease. Whereas the vast majority of people with high blood pressure were in the moderate or low risk strata, a high proportion of patients with heart failure were classified as high-risk patients. This information is valuable for forecasting use of health resources according to the noncommunicable disease profile of the population.

Fig. 5. Frequency (%) of the main chronic diseases by risk stratum



Source: Ministerio de Sanidad, Servicios Sociales e Igualdad, 2018

Impact and uses of the AMG

In a survey carried out in 2017 by the Ministry of Health, Social Services, and Equality, Spanish regions reported a wide range of applications for the AMG for better health management and resource planning.

Population health management and case finding: The most widespread use is in finding cases in primary and secondary health care in order to include them in the regional programmes for complex or advanced chronic patients. For example, in Madrid, the risk calculated in the AMG is used, with other variables and with a clinician's validation, to refer patients to such programmes. The strength of the concordance between the AMG risk levels (high, medium, low) and the intervention levels assigned by physicians (high, medium, low) was assessed as moderate to good (González González et al., 2017).

Proactive case management of high-risk patients in primary care: The AMG are also used as routine health indicators in individual primary health care records for proactive clinical decision-making. In some regions, such as Catalonia, the AMG risk score is listed in the patient's electronic health records and is thus accessible to health care professionals (physicians, family nurses, case managers etc.). They can then draw up a list of their most complex patients by combining the information provided by the stratification tool with other clinical variables and therefore compare a patient with the rest of their assigned population.

Resource planning: In other regions, the AMG are used in macro-management to estimate current or future health care costs and resource utilization in order to allocate health resources accordingly. For example, in the Balearic Islands, the AMG are used to calculate the annual pharmaceutical budget of primary health care family physicians. The pharmaceutical expenditure and the complexity indexes of the patients assigned to the family practitioner in the previous year are used to estimate the next year's budget, and the estimates are adjusted by the practitioner's actual pharmaceutical expenditure to determine the final annual budget.

Strategic purchasing: The AMG are used in Catalonia with other variables to adjust the annual per capita payment to primary health care teams. In the Madrid region, the AMG are used to calculate the capitative prescription budget of primary health care centres.

Health workforce planning: The AMG can contribute to optimizing health workforce planning and allocation. In Catalonia, the Nursing Council has proposed a new model for establishing the minimum number of nurses required on primary health care teams to ensure the quality of health care. In this model, morbidity measured by the AMG was part of the allocation formula.

Research and decision-making in public health: Research uses may include identification of vulnerable groups, analysis of population morbidity or selection of controls for epidemiological studies. One region used the AMG complexity index to prioritize individuals for eligibility for influenza vaccination and for alerting them by SMS.

Performance assessment: The AMG are also used to adjust many indicators of efficiency and quality in primary and emergency health care.

Lessons learned

- The information provided by risk stratification tools such as the AMG can assist health systems in progressing from disease-centred to patient-centred care. Through better patient health profiling, health services can respond more accurately and comprehensively to the actual health needs of both groups and individuals.
- The AMG can be used to estimate current and future risks for mortality, morbidity and various indicators of health service utilization, enhancing health care management by the introduction of transparent, evidence-based criteria in decision-making about health programmes, policies and resource allocation.
- The AMG are particularly relevant for addressing patients with chronic comorbid conditions from both a system-wide and a clinical approach. Such patients are readily identified through the AMG and can be included in case management programmes for patients with complex chronic disease (with physician validation). In addition, inclusion in the AMG of information from electronic health records allows health professionals (physicians, nurses) to forecast a patient's prognosis and tailor clinical interventions accordingly.
- The AMG allow benchmarking at various levels. Health managers can identify and compare areas with larger health demands and resource consumption with better-performing areas. In addition, physicians and nurses can compare patients according to their complexity index and with average rates in their health area.
- The AMG have proved to be flexible and transferable among regions, as shown by their use in 13 of the 17 Spanish autonomous health systems.
- In order to develop and put into practice a tool of this nature, reliable, up-to-date, systematized, homogeneous, computerized primary health care records are indispensable.
- In decentralized health systems such as that in Spain, successful regional initiatives can be identified and scaled up if there are adequate mechanisms for selecting good practices and effective collaboration agreements.

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