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Strategic Intelligence Monitor on Personal Health Systems Phase 3 (SIMPHS3)

SPARRA (United Kingdom)
Case Study Report

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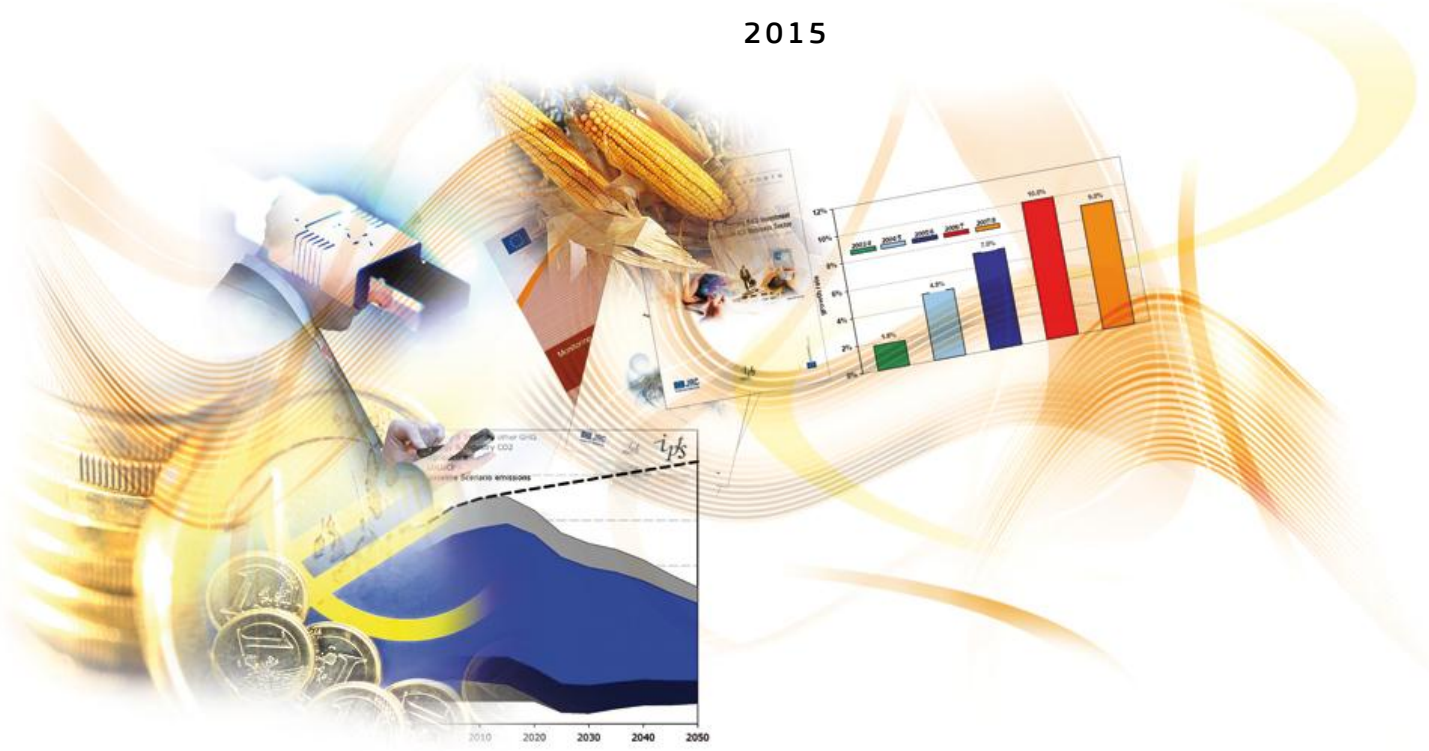

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Abstract
SPARRA/ACP is an integrated care management approach based on two main components: the predictive model "Scottish Patient at Risk of Readmission and Admission" (SPARRA) which aims to measure the risk of hospital admission of a targeted patient and an Anticipatory Care Planning (ACP) approach which designs, implements and monitors the most suitable intervention according to the degree of hospital admission risk of the targeted patient. Together they form the SPARRA/ACP Patient-Centric Integrated Care approach that is being implemented in several communities in Scotland, promoted by the Scottish Government and NHS Scotland as part of its strategy of national health care system renewal.

Preface

The Strategic Intelligence Monitor on Personal Health Systems (SIMPHS) research started in 2009 with the analysis of the market for Remote Patient Monitoring and Treatment (RMT) within Personal Health Systems (PHS). This approach was complemented in a second phase (SIMPHS2) with the analysis of the demand side, focusing on needs, demands and experiences made with PHS by healthcare producing units (e.g. hospitals, primary care centres), healthcare professionals, healthcare authorities and patients amongst others.

Building on the lessons learnt from SIMPHS2 as well as on the European Innovation Partnership on Active and Healthy Ageing initiative, SIMPHS3 aims to explore the factors that lead to successful deployment of integrated care and independent living, and define best operational practices and guidelines for further deployment in Europe. This case study report is one of a series of case studies developed to achieve these objectives.

The outcomes of SIMPHS2 are presented in a series of public reports discussing the role of governance, innovation and impact assessment in enabling integrated care deployment. In addition, through the qualitative analysis of 27 Telehealth, Telecare and Integrated Care projects implemented across 20 regions in eight European countries investigated in SIMPHS2, eight facilitators have been identified, based on Suter's ten key principles for successful health systems integration.

The eight main facilitators identified among these as necessary for successful deployment and adoption of telehealth, telecare and integrated care in European regions are:

- Reorganisation of services
- Patient focus
- Governance mechanisms
- Interoperable information systems
- Policy commitment,
- Engaged professionals
- National investments and funding programmes, and
- Incentives and financing.

These eight facilitators have guided the analysis of the cases studied in SIMPHS3 and a graphical representation with arrows whose length represents the relative importance of each facilitator is presented in each case study.

In addition to the above facilitators analysed in each case report, a specific section is dedicated to the analysis of care integration. It should be noted that the definition of vertical and horizontal integration used in this research is taken from the scientific literature in the field of integrated care[1] and differs from the one mentioned in the European Innovation Partnership on Active and Healthy Ageing Strategic Implementation Plan[2]. We define horizontal integration as the situation where similar organisations/units at the same level join together (e.g. two hospitals) and vertical integration as the combination of different organizations/units at different level (e.g. hospital, primary care and social care).

[1] Kodner, D. (2009). All together now A conceptual Exploration of Integrated Care.

[2] http://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/steering-group/operational_plan.pdf (page 27)

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SPARRA/ACP is an integrated care management approach based on two main components: the predictive model "Scottish Patient at Risk of Readmission and Admission" (SPARRA) which aims to measure the risk of hospital admission of a targeted patient and an Anticipatory Care Planning (ACP) approach which designs, implements and monitors the most suitable intervention according to the degree of hospital admission risk of the targeted patient.

Together they form the SPARRA/ACP Patient-Centric Integrated Care approach that is being implemented in several communities in Scotland. This approach is promoted by the Scottish Government and NHS Scotland as part of its strategy of National health care system renewal.

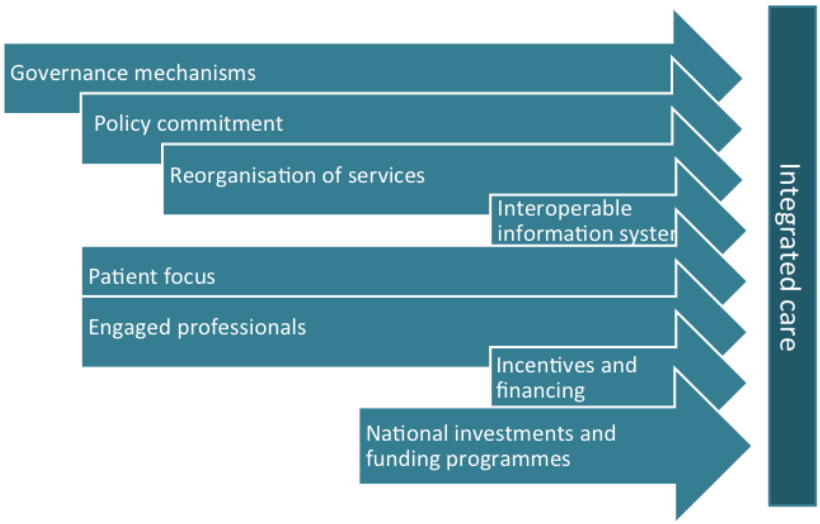
The SPARRA/ACP case started about 8 years ago on the initiative of the Scottish Government. In 2006, the government launched a shift from a healthcare system oriented towards hospital-based treatment to a system founded on preventive, anticipatory approaches to the management of long-term conditions. This case focuses on preventive care management, and in particular, on chronic disease management to avoid the risk of unplanned hospital admission. To achieve its objectives, SPARRA/ACP enables vertical integration within the Communities of Health Partnerships (CHPs), and should lead to full integration in the short to medium-term, given that new legislation will enter into force in 2015, aimed at integrating health and social care units as a consequence of a recent health care spending review.

Key drivers of the SPARRA/ACP case comprise:

- organisational stability with no major structural changes in the NHS for a period of about 10 years or in the local government for almost 17 years, together with political consensus among the parties committed to health and social care issues;
- combined responsibility for planning and delivery of acute, primary and community services within the CHPs;
- a strong performance management culture within the NHS.

Barriers to the diffusion of SPARRA/ACP case, that could also hinder the transferability of the initiative comprise:

- lack of availability of citizens' data for continuous update of predictive modelling;
- slow adoption by citizens; interoperability issues;
- lack of integration amongst funding streams, budgets and accounting systems across organisations/departments/units;
- inconsistency of quality of care for people, and the support provided to carers, particularly for elderly people, across Scotland.


Governance mechanisms
Policy commitment
Reorganisation of services
Interoperable information syster
Patient focus
Engaged professionals
Incentives and financing
National investments and funding programmes
Integrated care

1 Background

1.1 Scottish social and health care services

The health services in Scotland are available to all inhabitants and are financed through general taxation, which means that services are largely free at the point of delivery. The responsibility for health and health-related services lies with the Cabinet Secretary for Health and Wellbeing. The Scottish Parliament, however, plays a huge role in scrutinising the health system via its Minister (Minister for Public Health and Minister for Commonwealth Games and Sport), as well as through a parliamentary Health Committee, Audit Scotland and Health Care Improvement Scotland. The Scottish government is also committed to the outcomes-based approach as set out in 2007 in the National Performance Framework's (NPF) 10 year vision which was reviewed in 2011. As well as the National Health System, there is a private not-for-profit health care sector, which is independent and financed through private contributions.

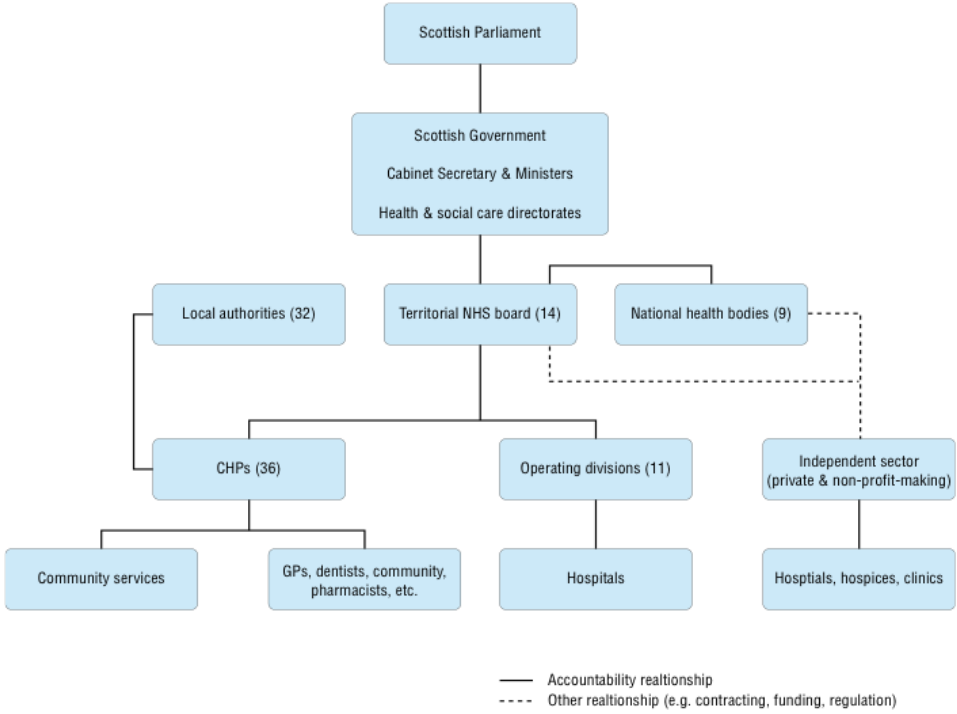
The Scottish Government distributes the budget between the NHS (Director-General Health and Social Care and Chief Executive of NHS Scotland) and other social services, such as education and sport. Once the budget is split, the Cabinet Secretary, advised by the Scottish Government Directorates for Health and Social Care, decides how to allocate the funds to health and social care and monitors their use. The Scottish Government Directorates for Health and Social Care retain responsibility for health and social care policy. They also manage the NHS and monitor social care services as provided by local authorities, and by private and third sectors. These Directorates are led by a Director General who is also Chief Executive of the NHS, and is supported by professional advisers. The role of the Directorates includes the definition of objectives and policies for health protection, setting of targets, providing a statutory and financial framework for the NHS, and intervening in the event of any problems or deficiencies that may arise at local level. Most of the health budget is distributed among 14 geographically-based NHS Boards that are in charge of the planning and delivery of services to meet the healthcare needs of each region's population. The NHS boards retain significant powers over local care provision and the setting of local priorities.

The Boards provide strategic leadership and manage the performance of the entire local NHS system. Responsibility for service delivery, however, is delegated within each Board to operating divisions for acute services and to specific committees (CHPS) for community and primary care services. Through the CHPs, the Boards contract independent professionals in primary care, such as GPs, dentists or community pharmacists, who are reimbursed in accordance with the services provided by them on behalf of the NHS.

In addition, there are nine national bodies in charge of services provided to the entire country, which are in turn supported by the regional Boards. These focus on delivering services best provided by a single entity, e.g. ambulance transport, information, education and training, and quality improvement.

However, there is no purchaser-provider split. Most of the primary care providers function as independent contractors and are reimbursed according to their specific contracts for the services provided. The NHS boards employ the staff working in hospitals and in the community directly on a salary basis.

Figure 1: Scottish National Health System characterisation



Source: Steel & Cylus (2012)

1.2 Scotland (UK)

Scotland is 78,387 km^2 and has a population of 5.2 million inhabitants, with a density of about 67 inhabitants per km^2. It is located in the North of the United Kingdom. Scotland has an annual GDP of more than €166 billion, with an annual per capita GDP of €31,569. The average age of the Scottish population is about 44 years old, and 17% of individuals are over 64. Current projections suggest that the population of Scotland will rise to 5.78 million by 2037, and that the population will age significantly, with the number of people aged 65 and over increasing by 59%, from 0.93 million to 1.47 million. The key characteristics of the health care system in Scotland are summarised in Table 1:

Table 1: Scotland (UK) health care system and demographic characteristics

Geographical coverage, km^2	78,387
Inhabitants per km^2	67
Number of inhabitants	5,254,800
Life expectancy at birth, years	80.09 males – 85.1 females
Regional GDP (2012), billion €	€166 billion
Regional GDP per inhabitant (2012) €/inhabitants	31,590 €
General Practitioners /1.000 inhabitants (2010)	0.79
Specialists /1.000 inhabitants (2010)	1.94
Regional Budget for Health services management (2013), billion €	€10 billion
Health care professionals / 100.000 inhabitants	294
Regional health care budget, € per inhabitants (2013)	€1,903
Hospital beds (2012)	24,800
Hospital beds/1.000 inhabitants (2012)	4.7

1.3 The SPARRA/ACP

Scottish Patients at Risk of Readmission and Admission (SPARRA) and Anticipatory Care Planning (ACP) are the two main components of the Scottish integrated care case study. SPARRA is a predictive model which measures the risk of hospital admission of targeted patients, and ACP is an intervention which aims to design, implement and monitor the most suitable care plan in accordance with the degree of hospital admission risk of the targeted patients, their needs and their family contexts.

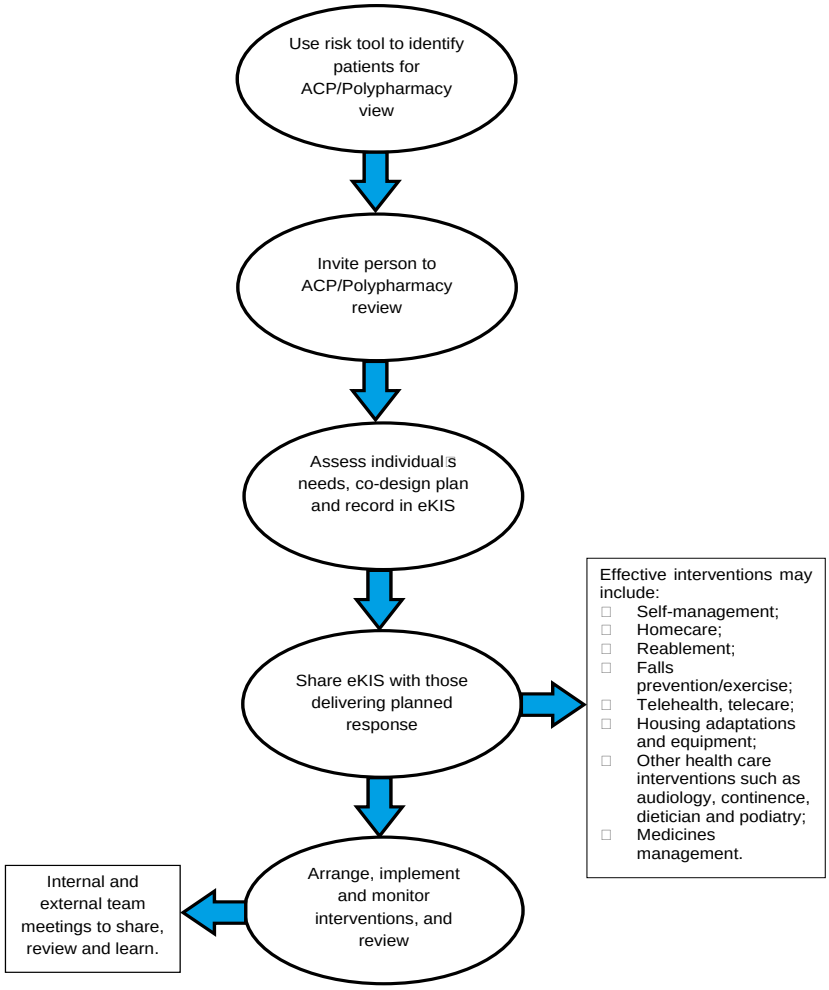
The SPARRA/ACP initiative has been implemented in several Scottish communities, promoted by the Scottish Government and the Scottish NHS. The latter has encouraged the approach as part of its strategy for the national health care system renewal. The objective of the SPARRA/ACP approach is to develop and integrate care services, enabling the shift from a healthcare system based on acute care (hospital-centric), to a system founded on preventive care and an anticipatory approach to the management of long-term and chronic conditions.

The Information Systems Division (ISD) of the NHS National Services Scotland (NHS-NSS) has been developing SPARRA since 2006. The initial model was largely based on the PARR model developed by the Kings Fund and used in England and Wales. In its initial implementation phase, the SPARRA (SPARRA Version 1 – "Classic") was restricted to patients aged 65+. In 2008, the SPARRA algorithm was extended to cover all age groups (SPARRA Version 2 – "All Ages") in order to meet the commitment made by the Scottish Government in the "Better Health, Better Care Act" (Scottish Government, 2007). The initial SPARRA algorithm used national in-patient admission data and calculated risk scores for patients in Scotland who had had an emergency admission in the preceding three years. In 2009, the Scottish Government committed the ISD to expanding the scope of SPARRA (Version 3) to use other data than recent hospital admissions[3].

SPARRA has been essential to the implementation of integrated care experiences, and of the related Anticipatory Care Planning (ACP). Figure 2 describes their logical management processes and shows that SPARRA enables the use of statistical analysis of patient data to supplement clinical judgement It is used as the entry level for the design and implementation of a more personalised ACP, the main objective of which is to avoid unscheduled hospital admissions (NHS Highland, 2011).

[3] I.e. prescribing data is also used. A SPARRA score is calculated for people aged 16+ whether or not they have had a previous Emergency Admission. Then in 2012 SPARRA was developed further with algorithms for 3 adult sub-cohorts (YED, LTC, FE).

Figure 2: Scottish NHS anticipatory care planning and medication pathway



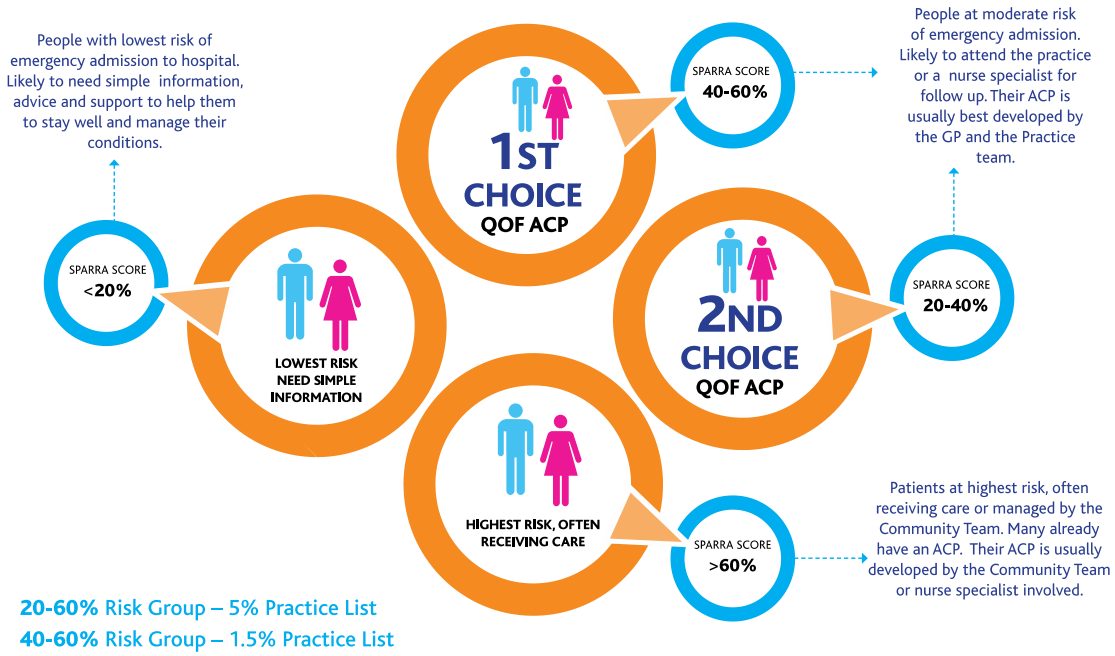
Source: YEHC, 2013

Other elements of the SPARRA/ACP approach comprise:

- Review of the patients' actual therapies and pharmacological treatments.
- Assessment of individuals' healthcare and also social and psychological needs.
- Co-design of personalised care plans that can include new therapies and pharmacological treatments.
- Register of clinical and other relevant information in the Key Information System (KIS), managed by the NHS, which permits the sharing of patient data (provided the patient has given consent) with health care professionals during the implementation of the patients' care plans, based on the ACP.
- Monitor and review the ACP on a regular basis in line with patients' characteristics and the degree of severity of the disease.

However, the SPARRA tool, as anticipated, is not only used for supporting clinical decisions in the definition of a more personalised ACP. In its recent configuration, the tool can also be used to categorise the population more precisely (Figure 3), according to each individual's "risk of hospital admission".

Figure 3: Anticipatory Care Continuum of Risk with SPARRA



Source: NHS, 2014

Following the SPARRA approach depicted in the above figure, the population can be segmented into several categories according to the degree of "hospital admission risk" ("SPARRA SCORE"). The "SPARRA SCORE" allows the division of the population into three categories, with two of them requiring an ACP approach, while the population segment with the lowest "SPARRA SCORE" can be subject to preventive lifestyle advice only. In this way, an individual can have a more personalised preventive lifestyle intervention, and health care professionals are better supported in their decisions about therapies and pharmacological treatment. Scottish health care authorities have used SPARRA as support tool for the following initiatives.

Table 2: Initiatives supported by SPARRA

Area	Initiative
Highland Community	Anticipatory care patient alerts (ACPAs) for all care home residents
East & Midlothian Community	Patients are identified as being suitable for case/care management
Lanarkshire Community	Referral system between social and health care targeting people identified as at high risk
Ayrshire & Arran CHPs	Case management approach to provide health care services.
Moray Community,	Telecare and Telehealth service provisioning for people at risk of readmission
Aberdeenshire CHP,.	Anticipatory Care Plans between primary care and community care
East & Midlothian CHP,	Home care management approach
NHS Fife,	Case management to support older people in their own homes.
NHS Lanarkshire,	Nursing home care management approach.
Inverclyde CHP,	Nursing home care and community care for people under the age of 18
Glasgow City CHP,.	Community based anticipatory care
NHS Lothian	Polypharmacy analysis

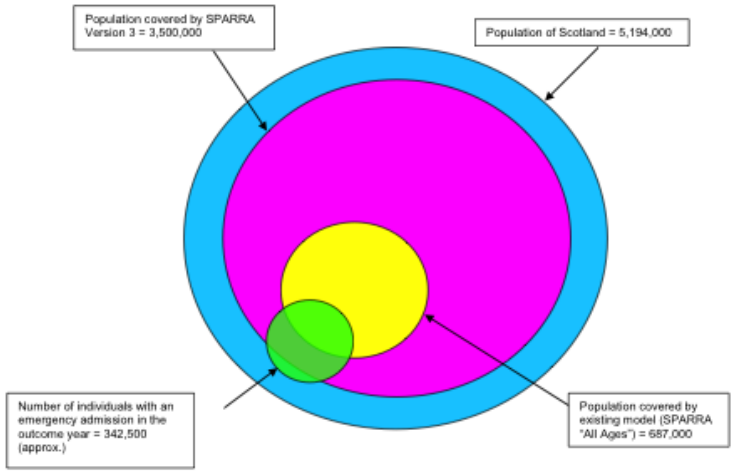
Source: Authors' elaboration

2 Integrated care analysis

2.1 Dimensions of integration

Since January 2012, a new SPARRA tool has been available. This tool allows the identification of patients at risk who have not experienced a recent emergency admission (e.g. 16+ years old). Since August 2013, the risk scores are calculated by the ISD on a monthly basis, and made accessible to NHS Boards, Community Health Partnerships and GP practices. Figure 4 illustrates the population coverage of the most recent version of the SPARRA tool (Version 3). This new version of the SPARRA tool can potentially derive scores for approximately 3.5 million patients, which corresponds to 67% of the population. The diagram (left side of the figure) further illustrates that the expanded cohort includes a much larger proportion of individuals experiencing an emergency hospital admission.

Figure 4: Scottish population covered with SPARRA tool (source: NHS-NSS, 2011)



Number of Patients in each SPARRA Risk Grouping		
	Version 3	All Ages
0-10%	2,668,882	217,221
10-20%	467,897	222,841
20-30%	175,790	104,294
30-40%	89,394	58,471
40-50%	48,852	33,913
50-60%	27,445	21,196
60-70%	15,395	14,345
70-80%	8,575	9,024
80-90%	4,084	5,349
90-100%	482	679
Total	3,506,796	687,332

Source: NHS-NSS, 2011

The SPARRA/ACP approach described in Figure 2 could be applied to the entire population of Scotland in a more personalised way. However, the SPARRA/ACP approach is only applied at the moment to vulnerable subgroups of patients and patients with complex illnesses. In particular, the target pathologies considered are chronic diseases, cognitive impairment, frailty and related comorbidities. Patients with any of these pathologies are likely to have a higher risk of emergency admissions. Preventive care management and chronic disease management interventions in these cases can reduce the number of unplanned hospital admissions.

Looking at the implementation examples of the SPARRA/ACP approach described above, better home care management and chronic care management in primary and community

care settings constitute the main focus. For both home care and chronic care management, the SPARRA/ACP approach foresees strong integration across primary and secondary care, in order to reduce the risk of unplanned hospital admission or re-admission. In most of the cases where the SPARRA/ACP approach has been implemented, a quite advanced level of integration between health and social care within the local Communities of Health Practices (CHPs) was a prerequisite.

The implementation of the SPARRA/ACP approach supports service integration. It enables the organisation of fully personalised care pathways for each individual at risk of emergency admission, from the initial identification of the admission risk to the implementation of the care pathway. To this end, a joint intervention of GP, specialists and nurses is required, to enable them to cooperate in both the design and the implementation of the personalised care pathways. This foresees a high degree of professional integration, and strong coordination between different organisations. This holds true, even though the degree of organisational integration can vary from case to case according to the coordination capability of the local CHPs and the level of commitment of the local authority.

In general terms, organisational integration among the care actors applying the SPARRA/ACP approach has still been only partially achieved. However the new regulation[4] that was planned to come into force in March-April 2015 at the time of writing, should contribute to accelerating the process of integration by merging health and social care organisations in single entities. Despite the fact that the scope of this law targets the reduction of health and social care expenses, it could also prove beneficial for scaling-up fully-integrated care.

The SPARRA/ACP approach has achieved some vertical integration within Communities of Health Practices, regarding health and social care actors involved in the care pathway processes. According to the experts consulted, vertical integration could be further improved in the short to medium term when the new legislation enters into force[5]. The new legislation should facilitate integration between health and social care and the sharing of common objectives and budget.

On the other hand, the degree of horizontal integration supported by the SPARRA/ACP approach implemented in different locations is debatable. The opinions expressed by the experts interviewed reflected disagreement: the people in charge of SPARRA from JIT and ISD agreed that the horizontal integration through the SPARRA/ACP approach was widespread in the current care practices, whereas the experience in Aberdeenshire was reported to have been different.

There is no further evidence of full integration across the health and social care actors, despite the fact that, according to the respondents, it is the ultimate goal of the SPARRA/ACP approach in the long-term perspective.

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[4] i.e. "Joint Working (Scotland) – Act 2014 which "*is seen as a framework to support improvement in the quality and consistency in the delivery of health and social care services in Scotland – to be achieved through formal integration of services for adults….".* In particular the Regulation and Orders section of the Act sets out: "*those functions of a Local Authority that must be delegated in support of the integration of health and social care services. This is set out in pages 28-39 of Set One – including reference to the sections of the various underpinning social work legislation. The services set out in this section relate to people over the age of 18….".*

[5] The Joint Working (Scotland) – Act 2014.

2.2 Impact

In the last 5-8 years, the SPARRA/ACP approach has been widely monitored at both national and local level. The objective was to provide evidence of cost reduction in health care management by reducing unplanned hospital admissions, unnecessary visits and pharmacological treatments. However, as underlined in a report on the status of implementation of the SPARRA/ACP (YECH, 2013), the measured impacts were not based on counterfactual evidence[6] of the benefits achieved. Bearing in mind this limitation, YEHC (2013) measured the following impacts[7] across the whole of Scotland:

- 20% reduction in emergency admissions, with sensitivity analyses using 25% and 15%.
- 10% reduction in length of stay with sensitivity analyses using 5% and 15%.
- £16 million (€21 million)[8] total cost savings in general medicine in terms of the total cost in 2013/2014.
- £90 (€120) saved per persons in polypharmacy reviews.

Lastly, some of the most interesting evidence of the impacts of the implementation of SPARRA/ACP was measured by the local communities:

- **Aberdeenshire CHP.** Since anticipatory care planning was put in place in 2010, Aberdeenshire has reduced secondary care bed utilisation associated with the frail elderly by 10% across the early implementation practices. It has actively shifted the balance of care, and has made it possible to cut the equivalent of 30 beds for acute admissions. This equates to £298 x 30 x 365 (£3.2 million) shifted to community activities.
- **East & Midlothian CHP.** Results of a 2010/11 patient evaluation questionnaire showed that the service was highly valued by patients and significant improvements were made to aspects of self-management. The use of SPARRA data was very useful in flagging patients not otherwise known and in engaging GPs in anticipatory care planning. Further success includes a reduction in the number of bed days per patient from 23 to 7 (according to the service's own informal evaluation).
- **Highland Community**. Outcomes of this approach in 2011 were;

  (1) 29% reduction in emergency and 47% reduction in occupied bed days for patients who had an ACP in place;

  (2) Patients with a SPARRA score of ≥ 50% but no ACP in place showed an increase in both emergency visits (+59%) and occupied bed days (+63%).

  A new evaluation undertaken in 2012 with 1,556 individuals split into two groups, one assisted with ACP (ACP cohort) and a control group, belonging to the top 1% of the population with the highest hospital admission risk has produced the following results:

  (1) Before ACP implementation - emergency admissions and bed days increased by 51% and 49% respectively;

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[6] It is important to notice, as YEHC (2013) said: "*….these examples of potential benefits are only evidence-base available to inform the potential reduction in admission and bed-days following adoption of the ACPs. Quality of the studies is weak, limited by the absence of a matched control".*

[7] YEHC (2013) tried to overcome the lack of counterfactual evidences through a cross-cases analysis of the evidences measured during the SPARRA/APC experiences.

[8] As YEHC (2013) explained this savings are purely hypothetical and are valid only if structural changes in the hospital system are introduced and the beds are removed from the system.

(2) After ACP implementation, emergency admissions and bed days decreased by 38% and 49%; decrease of 52% hospital days for the ACP cohort compared to the non-ACP (before and after the implementation compared to the same timeline with the non-ACP) with a net saving of £190 per patient for the ACP cohort (Baker *et al.*, 2012). However, it has to be noted that emergency admissions in the Highlands increased in the observed period, so the effective re-organisation of the health care service was not fully implemented.

2.3 Barriers and drivers

Drivers for the SPARRA/ACP approach depend on the characteristics of the local context where the service is implemented. However, the experts interviewed agreed that in the local communities where both the local authority and the health care actors are strongly committed, an integrated care initiative is more likely to be successfully implemented. It was also recognised that the most successful cases of SPARRA/ACP implementation were those with well-established CHPs, capable of combining primary and community services with a shared responsibility for planning and delivery personalised care pathways. Ultimately, a strong performance evaluation culture constitutes an important driver for the success of the initiative. This has become evident in all the cases of local implementation of the SPARRA/ACP approach, where the integrated care processes that have been implemented are periodically monitored and revised on the basis of the results achieved.

Barriers to the use of the SPARRA/ACP approach in integrated care services comprise the following:

- Inequalities in terms of leadership between NHS and health care providers (primary and secondary care, social and health care).
- Strong institutional and sector-related responsibilities expressed through vertically and organisationally discrete power structures[9], which are linked to cultural, educational, and professional differences among physicians, nurses and social care workers.
- Lack of integration among funding streams, budgets and accounting systems and among health and social care providers.
- Inconsistency in the quality of care for people, and the support provided to carers, particularly for older people, across the country.

According to the experts consulted, one of the most important barriers is related to the lack of continuous update of patient data, which would allow a more frequent and precise calibration of the SPARRA tool. This is due to a lack of integration of SPARRA with Electronic Health Records (EHR). A way to overcome this barrier is the attempt of the JIT to promote the Key Information System (KIS), which according to the Scottish NHS should support a shared management of electronic health records across different health care actors, and, at the same time, offer the opportunity for the ISD to receive more updated information on patients which can be used to calibrate the SPARRA model.

Another important barrier that potentially hinders the diffusion of the SPARRA/ACP approach is the lack of integration between health and social care. This is evident in several barriers listed above, such as the inequalities in the leadership between different tiers of health and social care, the power structures at different layers of health and social care, which often have divergent managerial and strategic objectives, the lack of integration

[9] It might be overcome by the new regulation fostering the integration of health and social care.

among funding streams, budget and accounting systems across the entire health and social care value chain. Together, they constitute the strongest barriers that would have to be overcome in order to achieve the full potential of the approach. However, most interviewees agreed that the new regulation coming into force in March/April 2015 will help to achieve full integration of health care and social services with a common power structure, shared budget and accounting system.

Lastly, the inequalities of the cost of the service provisioning and the different pricing policies applied by the local communities to patients and their families constitutes another significant barrier, preventing equal access and same quality of service that could be provided with the SPARRA/ACP approach across the country.

2.4 Organisation, health professional and patients

In all the examples analysed, the implementation of the SPARRA/ACP approach involved several types of actors, such as:

- GPs in single surgeries or in associated practices that together with the district and practice Nurses constitute the Community Health Practices (CHP).
- Social Care units that, according to the new legislation, should be better integrated with health care units.
- Community hospitals.
- Private hospitals and rehabilitation clinics.
- Groups of practices, private organisations, NGOs, etc., delivering home care services.
- Non-professional carers, physiotherapists, psychologists etc.

The implementation of the SPARRA/ACP approach requires close collaboration between all health and social care actors. In particular, the GPs are the main gateway to the care planning process and, thanks to the SPARRA tool, they can assess the risk of admission of their patients. In the Lothian Community, for example, the GPs use SPARRA to make an initial screening of COPD patients. They then define personalised care pathways, together with the local hospital unit in charge of COPD patients and the nurses, in accordance with the ACP protocols.

The local implementation of the SPARRA/ACP initiative also requires an integrated approach among health and social care actors in delivering and monitoring the care pathways. This requires that each of these actors follows the care pathway as specified for each patient, and they all provide the required services in an integrated manner. The introduction of a more structured approach supported by the SPARRA tool and the ACP methodology has produced a significant reorganisation of the service provided to chronic patients by local health and social care actors. The new approach has required stronger cooperation between primary care, local hospitals, district or practices nurses, and social care representatives in terms of identification of patients' needs and the design, management and monitoring of care pathways. This approach has then been implemented at local level in the different communities.

For example, in **NHS Lanarkshire**[10] patients' data are downloaded from the SPARRA tool online and stored in the local Management Information system of Lanarkshire CHP (MiLAN) on a monthly basis. The information specialist of CHP sends patient listings to district nurses' organisations. Nurses print the report and go through all records to identify which

[10] SPARRA/ACP started in 2007 and it is still on-going.

patients are known already and which are not. They also identify which patients' risk scores have increased or decreased and they monitor patient records in GPs' administration systems. Based on this, decisions on district nurse or practice nurse visits (depending on familiarity with patient) are made. The extent of health and social care service provision for each patient has to be discussed with social care actors at local planning group meetings. Furthermore, information from medication plans and prescriptions has started to be used to identify patients that may require medication review.

In **Aberdeenshire CHP**[11] data from SPARRA is currently used by almost 80% of GP practices (28 out of 36 GP practices), and it covers 1.8% of the local population aged 65+. From an organisational point of view, the process has four phases:

- *The Preparation Phase* where the practice team (GP/Practice Nurse), supported by the Health and Community Care Team (HCCT) of the CHP, identifies those patients who will benefit most from an Anticipatory Care Plan by reviewing monthly multiple admission data for people aged 65+, combined with local knowledge and data from SPARRA, available monthly from IDS. The range of local options available to support each patient is considered before they are added to the ACP register.
- *Planning and Review Phase* where the HCCT identifies the most appropriate member of the team to act as care manager. The care managers meet with the patient and where possible, their relatives and/or carers, to develop a plan at one of four levels: self-care (focusing on what patients can do for themselves); initiating or increasing community care (social or medical) to supplement informal arrangements; care within a community facility (hospital or care/nursing home); admission to an acute hospital.
- *Implementation Phase* where finalised plans, once agreed with the patients, are faxed or e-mailed to the out-of-hours (OOH) service and added to the Single Shared Assessment tool and the Patients' Notes.
- *Maintenance Phase* where patients' care pathways are monitored and collected data is reviewed by the practice team during the periodic HCCT meetings. Thus, corrective actions can be undertaken if necessary.

This approach facilitates effective cooperation between tiers of service provisioning. Following the personalised care pathways, every task is well detailed and specified in terms of role and responsibilities. The joint design of the care pathway, that requires multidisciplinary collaboration amongst the health and social care actors, allows an initial agreement to be reached among all the organisations involved in the service provisioning, and also in the monitoring of the care pathway implementation. Furthermore, the continuum of care is guaranteed based on personalised care pathways, including case management and patients' access to multiple points of contact for detecting and solving problems that might arise during the evolution of the disease.

2.5 Information and Communication Technologies

At the moment, the ICT infrastructure supporting SPARRA/ACP case is rather limited. According to the experts interviewed, there are still interoperability issues among existing software applications currently used by the health and social care actors. The limited investment in ICT infrastructures certainly affects the release of the full potential of the SPARRA/ACP approach. Currently the main software that underpins the SPARRA/ACP

[11] SPARRA/ACP service proof of concept began in October 2008, moving to early implementation in January 2010

comprises two modules: an online business objective software and the Key Information Summary.

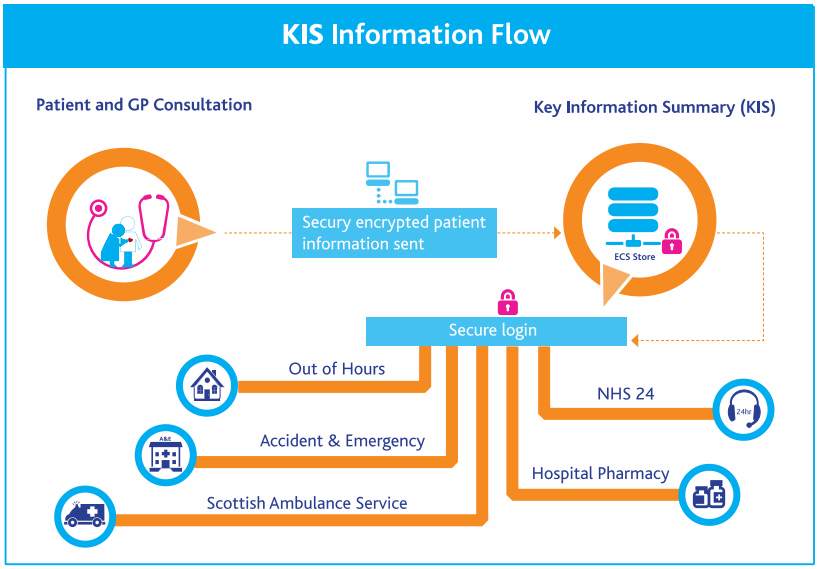
The SPARRA tool based on the on-line business objective software that was developed in 2006 is continuously updated by ISD to improve both its predictive capability in measuring the risk of unplanned hospital admissions and its usability by the local CHPs. This application has been designed to enable a variety of health care users to stratify and analyse their population.

The Key Information Summary (KIS) tool was developed in 2012 by the NHS to support CHPs and local health and social care actors in sharing Anticipatory Care Plans' information. As described in the figure below, the KIS tool is shared securely with all the local health and social care actors to develop better ACP and ISD, so as to calibrate the SPARRA predictive model. Currently, the level of adoption of the KIS system is quite low, with no more than 65,000 individuals registered, which represents only about 1.5% of the Scottish population. Low adoption is also registered at GP level, where until April 2013, only 3,000 KIS records were shared among 86 practices.

Figure 5: Anticipatory care continuum of risk with SPARRA

Key Information Summary (KIS) is a simple and accessible way for health and care professionals to record and share information for people with complex care needs or long-term conditions.

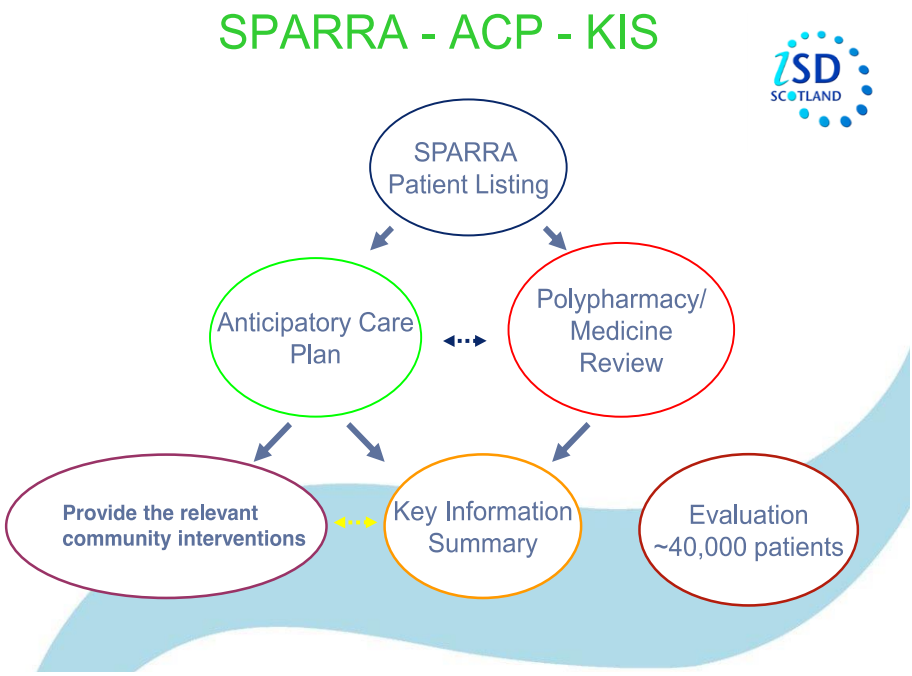
KIS stores important information about patients that can be shared with health care professionals, NHS 24, A&E, Scottish Ambulance Service, Out of Hours, Hospital and Pharmacies. Information includes future care plans, medications, allergies, diagnoses, patient wishes, carer and next of kin details.



Source: NHS, 2014

The rationale behind the two tools and their contribution to the whole SPARRA/ACP integrated care management process is described in the following figure:

Figure 6: Integration of SPARRA, ACP and KIS



Source: McCall, 2013

The SPARRA tool is the entry level of the integrated care process and it allows both the definition of a personalised Anticipatory Care Plan and the review of the medication plan prescribed to any given patient. The information generated by both the ACP and the medication plan is registered in the KIS (Key Information Summary) and provided to the local health and social care team in order for them to implement the care pathway of a given patient.

On the basis of the experiences described above, the ICT infrastructure supporting the implementation of the SPARRA/ACP approach does not seem to be very well developed yet. Moreover, the main aim of the two tools seem more aligned with the need to create a national patients information management system to support the ISD in improving its predictive models, rather than establishing an interoperable information system fully integrated with other eHealth tools (e.g. EHR used in the GPs practices or in the local hospital).

2.6 Governance

The SPARRA/ACP approach has two layers of governance: the national and the local.

The national governance aims to stimulate and diffuse the initiative in all the local communities of Scotland. The key actors of the national governance are the Scottish Government as the promoter and the founder of both the SPARRA Emergency Admission risk model and the KIS tool development, and the NHS-NSS, that has developed both tools thanks to the change funds provided by the Government. The latter structured the SPARRA/ACP approach promoting local health actors to reorganise the health and social care services for their population.

To this end, NHS-NSS has established the Scottish Information Service Division (ISD Scotland) commonly known as the “SPARRA Team”. This organisational unit of the NHS-NSS aims to continuously continuous improve the predictive capability of the SPARRA model. It

works in close collaboration with the NHS Boards, hospitals, general practitioners, Community Health Partnerships (CHPs), local authorities, voluntary organisations, and many other care and service providers to build and maintain the national database of patients.

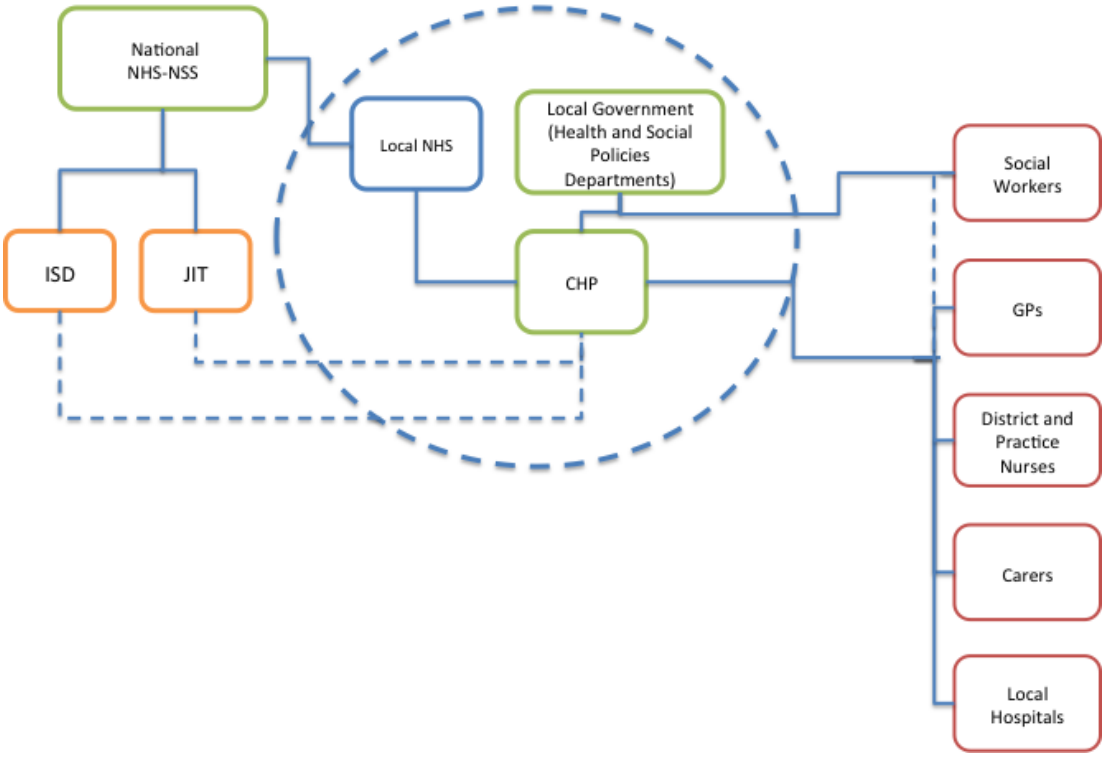
The ISD also supports the local health care organisations in the development of local SPARRA tools to achieve better risk stratification of the population and thus a more personalised implementation of the SPARRA/ACP approach. At the same time, the ISD provides the local communities with updated statistics of the emergency admission risks of the Scottish population, based on the review of patient data that are available at national level, on a monthly basis.

The second operational part of the national governance of the SPARRA/ACP initiative is the Joint Improvement Team (JIT). It is a partnership between the Scottish Government, NHS Scotland, the Convention of Scottish Local Authorities (COSLA), and the Independent and Housing Sector. It provides a range of practical improvement support structures, including knowledge exchange, developmental innovation, improvement capacity and direct practical support to local health, housing and social care partnerships across Scotland in order to implement the SPARRA/ACP approach.

The close collaboration of the Scottish Government and NHS-NSS has created the conditions and the necessary operational and practical instruments to promote SPARRA/ACP adoption by local initiatives. Therefore, the national governance of the initiative is mainly focused on providing the necessary instruments (SPARRA tool; ACP; KIS tool) and the operational support through ISD and JIT to the local communities, rather than forcing the local health and social care organisations and the local government to reorganise the health and social care services for their population. From this perspective, every local community can freely choose to apply the proposed SPARRA/ACP approach and to set up the initiative in a way corresponding to the needs of its population, the characteristics of the health and social care actors and the specificity of the local context.

In general terms, the local governance that steers the SPARRA/ACP approach implementation is described in Figure 7. Local government with its health and social care departments, and the local NHS organisation are the two main players. The two organisations have different roles and responsibilities in terms of commitment to and promotion of the SPARRA/ACP approach in their local contexts. In particular, the local NHS is responsible for the local health care organisations (GPs practices, district and practice nurses, local hospitals, professional carers), while the local government is responsible for the social care workers and for all the social services provided to the citizens.

Figure 7: Local Governance of SPARRA/ACP initiative



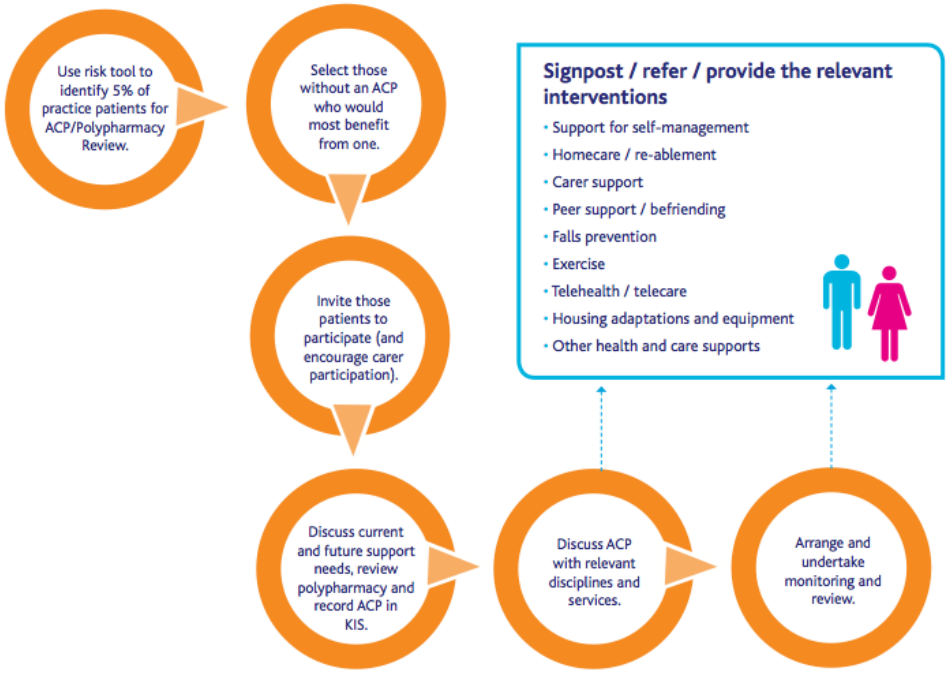
Source: Authors' elaboration

In quite a significant number of local Scottish communities, the close collaboration between the local NHS and the local Government enabled the establishment of Community Health Partnership (CHPs). According to the experiences of the SPARRA/ACP approach and provided that they are well established, the CHPs are in charge of the management of the initiative and of the coordination among the different health and social care actors. However, in spite of close collaboration between local NHS and local government in overseeing the implementation of the SPARRA/ACP approach, and even though this may be done through CHPs, effective coordination between health and social care service management is often lacking. This is because they have separate managerial structures, and distinct administrative and budgeting processes. According to the experts consulted, this weakness in steering the initiative may prevent the full achievement of the expected benefits. Lastly, the ISD and JIT act as facilitators in the establishment, implementation and evaluation of the approach in the local governance of the SPARRA/ACP initiative.

2.7 Organisational processes

The SPARRA/ACP initiative is an integrated care management process that starts with categorising the population according to their risks of unplanned hospitalisation. It supports both the design and implementation of a personalised care pathway to avoid the occurrence of this risk. The generic implementation process of the SPARRA/ACP approach is organised in the following six steps:

Figure 8: SPARRA/ACP approach



Source: NHS-NSS, 2014

According to the experts consulted, there are several ways of implementing the organisational process underpinning the SPARRA/ACP approach.

The complexity of the approach and the need to involve different organisations in a continuum of care service processes require strong coordination. In most cases, this can be provided by the respective CHPs. These are the most successful cases because they are able to clearly define a manager who takes responsibility for the coordination of the care processes and guarantees the integration of the services provided by the health and social care actors involved. The respective care manager assigned by the CHP mainly serves as a facilitator of the process, as he or she has no direct responsibility for the health and social care team established by the organisation in charge of service delivery. However, in the medium-term, the new regulation that is underway could increase the power of the CHP manager and, most probably, could also increase the effectiveness of the care process.

GPs and district/practice nurses are the gateways to the organisational process and in charge of categorising their patients using the SPARRA tool. In most of the examples analysed, the online versions of the SPARRA tool provided by ISD to categorise their patients are being used. In this case, however, the risk stratification is based on average statistics of the population. This may affect the results when risk stratification is implemented at local level. Therefore, in some instances (e.g. Aberdeenshire CHP), the CHP in charge of the coordination of the local SPARRA/ACP implementation preferred to provide the GPs and nurses with a risk stratification tool based on the SPARRA model calibrated with local patient data.

The definition of the care pathway requires joint coordination of several health and social care specialists that support GPs and district/practice nurses to identify patients' and their families' needs, review polypharmacy and design the personalised care plan. In this process, the strong involvement of the CHP manager to facilitate the organisation of the meetings

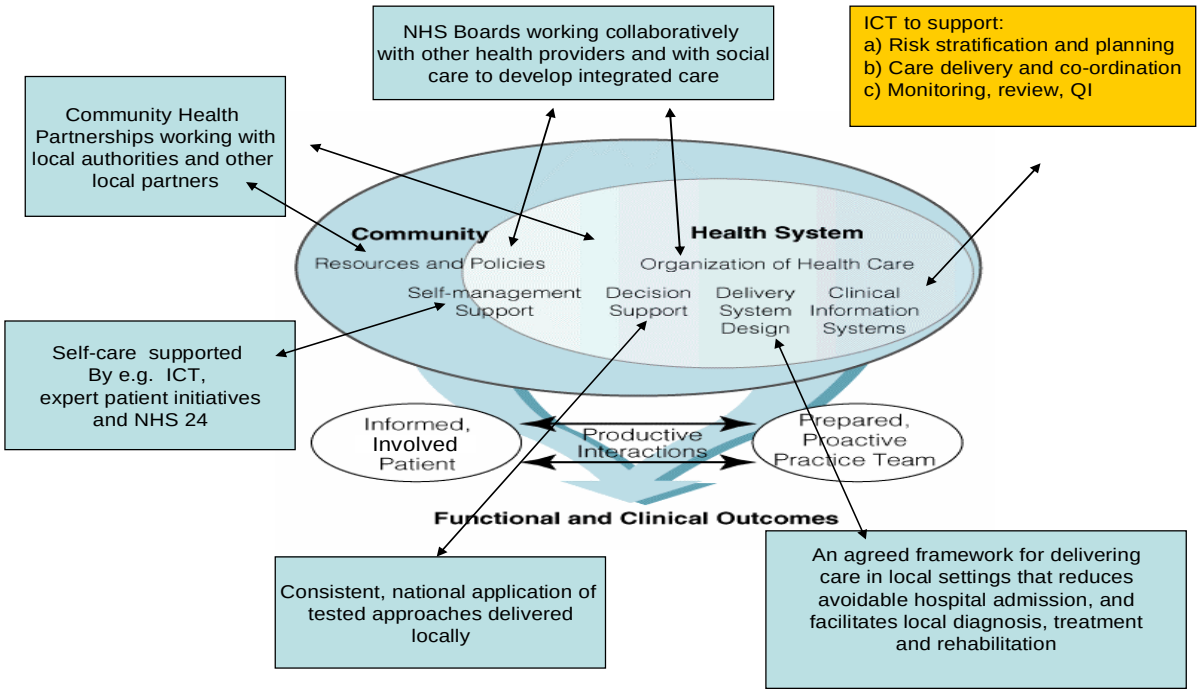
among the health and social care actors and the design of the patient's care pathways with shared goals, clear task assignments and timing is very important.

In the implementation stage, the role of the CHP manager is less important, and the care team of different experts, allocated by the organisations in charge of service delivery, work on the basis of the already-established care pathway. During the delivery process all the care team members are responsible for assessing the changing health of the patients, their needs and the needs of their families, and the patients' degree of responsiveness to the implementation of the care pathway. In case of problems, the CHP manager facilitates the revision of the patient's care plan.

Monitoring activities are the responsibility of the care team, while the review of the results and the periodic revision of the patient's care plan are the responsibility of the CHP manager.

The following figure sketches the Chronic Care Model which supports the organisational process described.

Figure 9: A system of local care: the chronic care model



Source: JIT (2009)

2.8 Reimbursement model and economic flow

The reimbursement models of GPs and the other health care providers in Scotland are still based on a bundled payment plus coordination fee for the implementation of specific activities such as the one foreseen for SPARRA/ACP.

As yet, no innovative reimbursement model has been applied and no outcome-oriented incentives are foreseen for the care managers and health care professionals involved in the delivery process.

The SAPRRA/ACP approach does not affect the cost of the services provided to the patients. These remain unchanged and are based on current practices, whereby the cost of the service depends on the typology of the disease and the socio-economic characteristics of the patient and his or her family.

Lastly, the Scottish Government and the Scottish General Practitioners Committee of the British Medical Association reached an agreement over changes to the General Medical Services contract for 2013/14, based on the results of the SPARRA/ACP implementation. In this new service contract, anticipatory care planning and medication review indicators replace quality and productivity indicators of the emergency admission and emergency pathways. In the short to medium-term, these new performance indicators should affect the reimbursement cost levels of the local hospital emergency units and promote a faster take-up of the approach in other local communities in Scotland.

3 Transferability

The SPARRA/ACP model is currently being applied to different local contexts in Scotland. It includes the SPARRA Tool and the direct support offered to the local communities by the ISD and JIT. However, the most difficult part of the approach is the setting up of the organisational process underpinning the SPARRA/ACP service delivery. The degree of fragmentation of health and social care provisioning at the local level could slow down the implementation of SPARRA/ACP and hinder the effective deployment of the services. The most favourable local contexts where the SPARRA/ACP case could more easily be transferred are therefore those where a well-established CHPs exists, which could function as a catalyst of the initiative.

Efforts to transfer this model to other Scottish local contexts can, however, be regarded as limited, despite the fact that the SPARRA tool is provided by ISD online and free of charge. In addition, the JIT has already set up all the required material and coaching mechanisms that would facilitate the transfer of the approach to the local health and social actors.

Due to the specificity of the approach and the need for the calibration of a risk stratification tool that supports the identification of target patients, all the experts consulted agreed that there is a low degree of transferability to other EU countries. The difficulties of applying the services in other countries becomes apparent in the example provided by England, where the definition of a risk stratification tool was abandoned by the English Government, after several attempts to achieve a shared consensus within the health care community. Thus, SPARRA/ACP requires strong commitment from the local authorities in charge of the health and social care processes, and a very significant organisational effort to coordinate all the local health and social care actors in the delivery service process.

4 Conclusions

The SPARRA/ACP case in Scotland is a patient-centred integrated care management process that could be applied to the entire Scottish population, despite its currently limited application to vulnerable subgroups of patients and patients with complex illnesses in several local CHPs. SPARRA/ACP has been developed over the last 8 years and is based on a combination of a predictive model of risk of hospital admission and a structured Anticipatory Care Planning process.

The starting point of SPARRA/ACP was a change of policy in 2006: this required a shift from a healthcare system focused on hospital-based treatment to one based on a preventive, anticipatory approach to the management of long-term conditions. To achieve this, the main focus of the SPARRA/ACP approach rests on preventive care management and in particular, chronic disease management to avoid risks of re-/hospitalisation.

The full scaling-up of the project has prompted the development of several integrated care initiatives across Scotland in recent years. An example is the Highland Community, where anticipatory care patient alerts (ACPAs) have been implemented for all care home residents and the top 1% of population at greatest risk of unscheduled admission, using SPARRA risk prediction data. Another example is the Lanarkshire community, where the local health and social care partnership has implemented proactive integrated care management across six localities for people identified as high risk by SPARRA. In Ayrshire & Arran, CHPs operate three different models for case management built on SPARRA, real time hospital data and an enhanced service for intensive Co-ordinated Case Management; and in several other local contexts.

GPs and nurses, who play a pivotal role in service implementation, are the gateways to the SPARRA/ACP approach.

The Scottish Government has been a promoter and a founder of the SPARRA/ACP case. It has been fully committed, together with the Scottish NHS' national and local organisations to supporting and diffusing the approach across Scottish communities.

The ICT infrastructure supporting the SPARRA/ACP case is currently rather limited, and there are still interoperability issues with existing software applications used by different health and social care actors. The limited investment in ICT infrastructures has certainly delayed realisation of the full potential of the SPARRA/ACP approach to integrated care management.

To partially overcome the interoperability problems, the NHS-NSS started to test the adoption of the KIS (the Electronic Key Information Summary) to be used among the health practices to share patient health histories, in 2012. By April 2013, over 3,000 KIS records were shared by 86 practices in the CHPs of Ayrshire and Arran CHPs, and during March 2013 alone, these summaries were accessed about 9,000 times by NHS24, Out of Hours and the CHPs of Ayrshire and Arran.

Since the initial implementation of SPARRA/ACP in the Scottish communities, it has been considered extremely important to provide evidence-based results of the impacts produced by the local SPARRA/ACP initiatives. Despite the fact that most of the evidence is not based on a counterfactual evaluation approach, a recent review of the measured impacts undertaken by YEHC (2013) has provided the following adjusted evidence:

- 20% reduction in emergency admissions, with sensitivity analyses using 25% and 15%.

- 10% reduction in length of stay with sensitivity analyses using 5% and 15%.
- £16 million (€21 million) total cost savings in general medicine in terms of the total cost in 2013/2014.
- £90 (€120) saved per person in medication reviews.

However, health care actors agreed that in order to realise the full potential of the SPARRA/ACP approach, the following barriers need to be tackled:

- Inequalities in terms of leadership between NHS and health care providers (primary and secondary care, social and health care).
- Strong institutional and sector-related responsibilities expressed through vertically and organisationally discrete power structures[12], which are linked to cultural, educational, and professional differences among physicians, nurses and social care workers
- Lack of integration among funding streams, budgets and accounting systems among health and social care providers.
- Inconsistency in the quality of care for people, and the support provided to carers, particularly for older people, across the country.

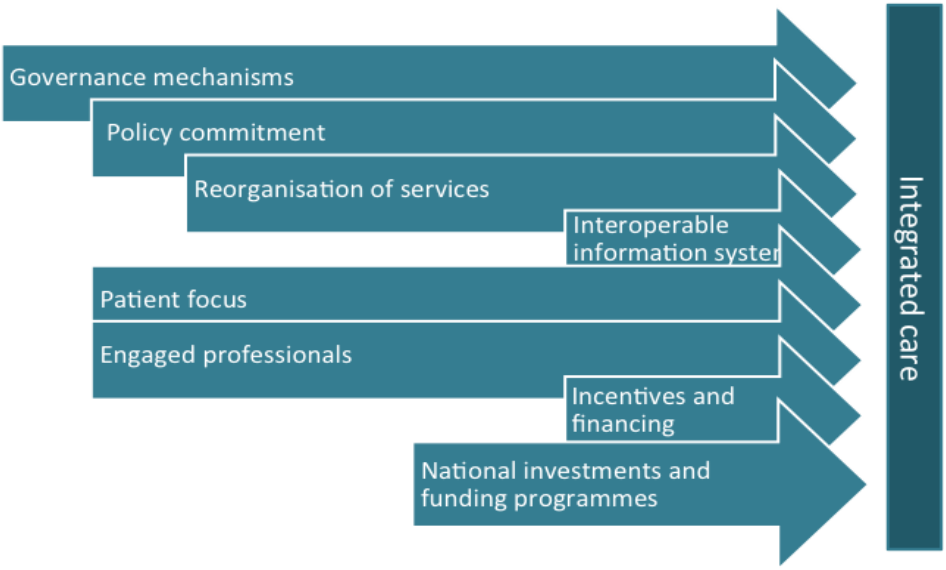
Figure 10 displays the main facilitators of the SPARR/ACP approach. Based on the analysis of the case study, governance mechanisms constitute the most important drivers for the success of the initiative and should be very well established at both national and local level. Strong national governance is needed to support the development of a risk stratification model and tool, and also a common approach to the ACP process implementation. Strong local governance in turn is needed to create the prerequisite for the effective implementation of the approach, which requires wide collaboration among all the local health and social care actors.

Policy commitment, patient focus and engagement of professionals follow as facilitators after strong governance mechanisms. In particular, the engagement of professionals constitutes a very important driver for the success of the initiative. To this end, a strong coordination effort has to be considered, as well as continuous monitoring and periodic evaluation of the performance parameters of the proposed approach.

National investment and funding programmes are mainly important for the development of the tools underpinning the initiative (e.g. SPARRA tool and KIS tool), while the setting up of the services and their implementation do not require specific funding. Interoperable information systems, incentives and financing do not appear to be important drivers of the initiative, but a lack of one of these could hinder the realisation of its full potential. Another important element that has to be considered in the implementation of the initiative is that potential benefits are significant both in terms of cost savings and quality of services. These benefits could, however, remain purely hypothetical if no effective national governance mechanism is put in place to use the results for effective reorganisation of the health care system.

[12] It might be overcome by the new regulation fostering the integration of health and social care.

Figure 10: SPARRA/ACP Integrated Care Facilitators



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