Cancer networks in Europe: a comparative perspective on the Iridium Cancer Network (Flanders, Belgium), the Lombardy Cancer Network (Italy) and the Catalanian Institute of Oncology (Spain)

FINAL REPORT

by

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EPAAC Work Package 7 (Healthcare): background and rationale

There is evidence that significant European variability exists in both the delivery of cancer services and the outcomes of care, but outcomes could be improved if all clinical practice achieved the same standard level of quality as in the better performing health systems and in the best local practices. This perspective on cancer care was widely supported by the Lisbon round table held under the Portuguese Presidency of the EU (Gouveia J et al, 2008).

The European Partnership for Action Against Cancer (EPAAC) was set up by the European Commission to support Member States in their efforts to tackle cancer by identifying and sharing information and expertise in cancer control. Many scientific societies, patient groups, industry stakeholders, and cancer programme planners contributed to meeting the specific objectives organised through the EPAAC Work Packages (WP). One aim of WP7, which focused on healthcare, was to establish criteria for identifying and assessing best practices, particularly with regard to organisational approaches (table 1).

Table 1. General and specific objective 1.1 of EPAAC Work Package 7

<table>
<thead>
<tr>
<th>OBJECTIVE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>To identify and assess best practices across European health services, promoting the exchange of experiences and focusing on innovative organizational approaches, including patients’ perspectives.</td>
</tr>
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</table>

<table>
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<tr>
<th>SPECIFIC OBJECTIVE 1.1</th>
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<tr>
<td>To establish criteria for identifying and assessing best practices, focusing on organisational approaches in: (a) multidisciplinary care and (b) national and regional networks.</td>
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Methods: Review of published experiences, mapping of existing national and regional networks, and workshop with experts.

Different providers and levels of care are usually involved in patients’ diagnosis, staging, treatment and follow-up, posing challenges in interdisciplinary collaboration during day-to-day clinical practice. The effectiveness of interventions is highly dependent on the organisational contexts in which cancer care is delivered. Physicians can no longer make clinical decisions on cancer case management in an isolated way, making it necessary to ensure integrated frameworks for decision-making and care provision as a whole.

Underpinned by this rationale, the first objective of WP7 dealt with multidisciplinary care and national/regional networks as the two approaches with the greatest potential to integrate all aspects of cancer care. In the framework of this objective, our team carried out a systematic review of the literature on the effectiveness of multidisciplinary teams (MDTs), as well as reviewing several case studies of regional cancer networks.
Cancer networks in Europe: a comparative perspective on the Iridium Cancer Network (Flanders, Belgium), the Lombardy Cancer Network (Italy) and the Catalanian Institute of Oncology (Spain)

Introduction to the study and conceptual framework

The dynamic nature of cancer care, which requires patients and clinicians to cross both organisational and professional boundaries to manage complex problems (Roy et al, 2013), underlines the need for structured interprofessional collaboration. Many organisations are increasingly relying on networks for knowledge and expertise, and some European regions and countries have implemented network models at a regional and even national level; the UK is one Member State that has epitomised this approach (Woods, 2001).

For different reasons, networks have great potential to increase equity and quality of care while making better use of scarce expertise. They create opportunities to disseminate knowledge, clinical expertise and evidence-based best practice, although it should be noted that few complete experiences have been properly assessed and published. However, a coordinated regional approach to cancer care based on networking performance stands out for its potential to impact the different dimensions of cancer care (clinical outcomes, coordination of services, and access to clinical trials) from a multi-provider perspective. Networks achieve better alignment to scientific evidence at all levels and make better use of expertise, thus reducing the variability in clinical practice (Edwards, 2002). The greater integration achieved through networks also applies to other elements, like the reorganisation of patient flows and the ability to provide patients access to clinical trials (Brunet, 2006). In Europe, network development in the UK was followed by similar activities in the Nordic countries, the Netherlands (OECD, 2013) and some regions of France (Ray-Coquard, 2002), Spain (Borras, 2009) and Italy (Lega et al, 2010).

The goals and policy arena of cancer networks vary among European regions and countries, and even though these approaches continue to gain traction in policy, they lack consistent evidence-based support. Many differences related to governance and network communication emerge upon analysis of organisational approaches; our study aimed to provide an in-depth understanding of how cancer care is structured in networks by comparing three European experiences.

General and specific objectives of the project

The general purpose of this research is to analyse different European cancer networks and set up a structured description and comparison in order to highlight the key aspects of their organisation and implementation. This project is ultimately intended to promote an informed debate among European cancer patients, scientific societies and representatives
of cancer plans in order to generate recommendations on cancer network organisation at the EU level. The specific objectives included:

- To provide in-depth insight into a selected number of European cancer networks, by focusing on the mechanisms of network management and their strategic and organisational determinants.
- To define the substantive criteria and best practices in the network implementation process and its links to other organisational approaches.
- To elaborate a list of key messages to support cancer policy from an organisational perspective.

The main research questions were:

- What are the principal empirical features of cancer networks?
- What lessons can be learned from the existing experiences in Europe?
- What are the specific advantages and challenges of this approach in organising and managing cancer care?

**Conceptual framework**

The phenomenon of interorganizational networks for the delivery of public services has been studied from scholars in multiple fields. For the purpose of our analysis we make reference to two main conceptual angles that complement each other. On one side, the organization science perspective (e.g. Jones et al., 1997) looks at networks as the response to the interdependencies which exist among different organizations. When a (public) service is provided by multiple interdependent actors or organizations which have to perform complex tasks, when interactions are frequent, when multiple individuals or units perform “boundary spanning” roles, a network form of organization allows to manage interorganizational coordination. On the other side, the political science perspective considers public networks as the solution for managing complex societal problems. The establishment of a network is appropriate when multiple stakeholders must be included in the decision making process, when it is necessary to combine complementary or competing value judgments, when non hierarchical relations among institutional actors must be dealt with through “horizontal” forms of governance (Klijn, 2008). Therefore, according to the first perspective networks are the answer to the question “how can complex integrated services be coordinated?”, while in the second one networks answer the question “how can diverging interests be governed?”. Both angles are useful to study interorganizational networks for the provision of healthcare services, and in particular cancer networks.

Networks have become a popular topic in health policy making, and sometimes they are described as a panacea for a number of key issues such as leveraging the quality of care, favouring patient centered care pathways, increasing equity in patients’ access, fostering professional knowledge transfer or making a better use of scarce resources, including finances, technologies, and clinical expertise (Lega and Sartirana, 2011). However, these goals are different and sometimes diverging, and therefore it is urgent to increase our
knowledge on the different forms of networks and their capacity to address the expectations of different stakeholders.

Multiple taxonomies of healthcare networks exist. Building on Ferlie et al (2010) we propose the following, which distinguishes three main types of networks according to the strength of the interorganizational ties and degree of service integration:

- **Learning and informational networks.** These are established by professionals to share best practices, knowledge and information. They are characterised by ‘soft’ networking mechanisms, flat structures and non-integrated delivery systems. Because personal and professional relationships drive network creation, their stability is linked to the benefits perceived by members. Like social networks, learning networks are not usually imposed or mandated; instead, they spring from the initiative of individuals or groups of professionals, for example, networks promoted by scientific societies to develop clinical guidelines or telemedicine.

- **Coordinated networks.** These networks, known as ‘Managed Clinical Networks’ (MCNs), go a step further in the integration of service delivery. The model is characterised by the existence of formal coordination mechanisms among units in independent healthcare institutions. MCNs have been defined as “hierarchically linked groups of health professionals and organisations from primary, secondary and tertiary care working together in a coordinated manner, unconstrained by existing professional (and organizational) boundaries to ensure equitable provision of high quality effective services” (DoH, 1999).

- **Fully integrated networks.** In integrated delivery systems, or managed care networks, resources are centrally managed through a hierarchical structure and the network is responsible for providing the entire clinical pathway. This model cannot be considered a network of independent organisations but rather a network organisation. An example is the large North American Health Maintenance Organizations, like Kaiser Permanente in California, which directly provides the full spectrum of primary, outpatient and acute care.

In most instances cancer networks are structures and mechanisms established to favour collaboration between professionals or specialties in different independent organizations. Therefore, although the nature, strength and formalization of these interorganizational bonds may vary significantly, cancer networks they can usually be described as Managed Clinical Networks (MCNs). In facts, the very concept of MCNs was developed in the United Kingdom when the first cancer networks were established in the late nineties. In that context cancer networks were seen as a tool to increase clinical quality and solve the inefficiencies in the quasi market model which prevented collaboration among healthcare providers (Calman and Hine, 1995). A three-tiered hub-and-spoke network model was introduced, made of cancer centers providing third level highly specialized care, cancer units located in district hospitals treating the most common forms of cancer and primary care services responsible for early diagnosis, referral and follow-up (Ferlie and Pettigrew, 1996). Networks favoured the development and adoption of clinical protocols and care pathways, the set up of clinical audits and the specialization of professionals and units
(Livingston and Woods, 2003). In particular, in each network Tumor Groups were established to discuss clinical cases, decide which patients should be transferred to the cancer center, establish or adopt protocols and guidelines, and suggest reorganization of care processes or referral mechanisms. This network model of cancer care organization was studied in the last 20 years by multiple research contributions in the fields of management and health services research, it has been the reference point and benchmark for most MCNs projects in Britain and for cancer networks developed in countries like Australia, New Zealand or Canada.
Methodology

The methodology of the project is based on a multiple case study design, which included conducting interviews and assessing available data from the networks studied (Flyvbjerg, 2011). The case study methodology facilitated the exploration of a complex phenomenon as well as the contextual conditions relevant to its understanding, even in the absence of accurate knowledge regarding its nature and boundaries. We were able to collect and integrate different data sources and reach a global understanding of both the phenomenon being studied as well as the context of the specific processes being undertaken (Baxter and Jack, 2008; Yin, 2003). Some inclusion criteria were set up to better focus the unit of analysis. These were intended to produce a homogeneous context of analysis, given that the multiple case study methodology requires the comparison of similar cases. Criteria were as follows:

- The networks were generalist with regard to cancer care (i.e., those on specific diseases were excluded).
- A model of cancer care resulting from collaborative approaches was the main focus of analysis.
- The research focused primarily on multi-hospital networks, although linkages to primary care were not excluded.
- One of the nodes of the networks was a tertiary hospital, but professionals from outer nodes were also interviewed.
- Any selected case for analysis was endorsed by the regional/national cancer plan.

The cases included in the study were the Iridium Kankernetwerk, located in Antwerp (Flanders, Belgium) and its surroundings; the Rete Oncologica Lombarda (ROL), covering the whole region of Lombardy (Italy); and the Institut Català d’Oncologia (ICO), with locations in three areas in Catalonia (Spain).

The analysis focused on three core issues of cancer networks: (1) organisation and governance; (2) managed care delivery, including the model of interprofessional cooperation and the degree of integration of clinical pathways; and, (3) innovation and knowledge management. The expected outcome was to understand why cancer networks developed as they did and to extract lessons for policy recommendations.

In order to bring order to the collection and organisation of the data, these were electronically coded using the software package Atlas.ti (v6.2, 2011). The study design comprised three stages:

- Reviewing scientific and grey literature, policy reports and any related data regarding cancer networks. Literature searches were helpful to this end by showing recurrent areas of interest.
- Conducting semi-structured interviews to professionals and managers involved in the network operation. The fieldwork consisted of 45 interviews, performed during three on-site visits (see table 1).
- Assessing these specific experiences using the case-study methodology.

Table 1. Breakdown of the selected 45 participants.

<table>
<thead>
<tr>
<th>Role</th>
<th>Iridium</th>
<th>ICO</th>
<th>ROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional manager</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Hospital manager (CEO or operation position)</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Medical director</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Medical oncologist</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Radiation oncologist</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Haematologist</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgeon</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPs</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Nurse</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Pharmacist</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Programme coordinator or clerk administrator</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient representative</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Interview data were examined inductively, using content analysis to generate categories and an explanatory framework. Grounded theory methodology was considered appropriate for describing the organisation and process of health professionals and managers belonging to the different networks (Strauss and Corbin, 1998). Our study was theoretical and aimed at incorporating the organisational context in which collaborative networking performed. Whereas the content analysis enabled language use to be understood and professionals' beliefs to be communicated, the method of constant comparison ensured that recurring views and experiences were obtained. The consistency of coding/interpretation was checked during analysis by reviewing the transcripts at different moments in time. This process allowed for labelling and developing a reference of the data for subsequent exploration and identification. Accordingly, a thematic framework based on networks' governance, model of care and innovation management was identified. A specific effort was made to capture this stage of interpretation, i.e., by mapping, creating typologies and finding associations among themes (Bryman, 1993).
Cancer networks in Europe: a comparative perspective

In February 2013, an EPAAC expert meeting was held in Barcelona to assess and discuss the role of networks in cancer care and research. Twenty-three experts from eight European countries attended the meeting. Besides the representatives of the cancer networks involved in this research (who were partners or direct contributors to EPAAC), participants from Rhône-Alps (France), Eindhoven (Netherlands), Denmark and the UK contributed to the workshop discussion, as did experts from Bocconi University (Milan, Italy), the European Observatory on Health Systems and Policies (EOHSP), the European Society of Breast Cancer Specialists (EUSOMA), the European Health Management Association (EHMA) and the European Commission, who presented the European reference networks (ERN) for rare diseases.

Like the present study, the discussion in Barcelona highlighted different forms of cancer networks as well as their results concerning compliance with clinical guidelines, their impact on medical practice, and key issues such as the role of patients in the network context. The conclusions of the meeting and the results of this study constitute the main outputs of EPAAC Work Package 7 as regards cancer networks.

1. DEVELOPMENT AND RATIONALE OF CANCER NETWORKS

Insofar as cancer care is shaped by the need for specialists and care teams to exchange knowledge for very specific areas, organisations should facilitate interprofessional interaction by formalising channels of cooperation. The cancer networks included in this study accomplish this. However, as with any organisation, their development has been shaped by the specific conditions of their creation, the related expectations, and the attributed primary goals. Below, the basic characteristics and developmental context of the networks are described:

**Iridium cancer network**

![Iridium cancer network diagram](www.iridiumkankernetwerk.be)

The cancer network operating in Antwerp, Belgium and its surrounding regional area (home to approximately 250,000 inhabitants) takes its name from a chemical element involved in
the medical application of radiotherapy. The germ of the network was a radiotherapy facility in a tertiary hospital, where five area hospitals agreed to centralise most radiotherapy services. They set up a financial platform whereby costs and financial returns were regulated in accordance with the generous funding schemes for radiotherapy in the Belgian health system.

Once this structure was established, interaction among medical staff at the different hospitals (mainly medical and radiation oncologists) took place spontaneously. Two of the hospitals later set up satellite radiotherapy facilities, with management of staff and technical procedures still based in the hub. It was then that the potential to create a common framework for the management of all cancer services was first perceived. Instead of setting up other bilateral or service-based agreements, the Iridium Kankernetwerk was created. Partners included the hospitals GZA-ziekenhuizen (Sint Agustinus), AZ Klina, AZ Nikolaas, AZ Monica and AZ Sint-Jozef Malle.

There were different advantages in the network approach: patients would not be referred to centres outside the area in such a high number; medical expertise and clinical practice could be pulled together and shared; information on difficult cases could be systematically exchanged; the economy of scale for clinical studies would widen and hence patients’ recruitment and access would improve; and the use of human and technological resources could be optimised. All in all, it was expected that quality of care would improve.

Beyond the agreement on radiotherapy, Iridium was essentially an initiative of the medical staff of the different hospitals, but meso-management mechanisms and network decision-making processes markedly reinforced its organisational strength. As explained later, a supra-hospital governance system based on the action/representation of three committees was created. Likewise, Iridium set up a formal cooperation agreement with the University Hospital of Leuven in 2010, one of the main research centres in Belgium, to gain access to quaternary care (rare cancers, etc.), exchange clinical expertise, and foster cooperation for clinical research.

Some elements of the network formation and its context can be highlighted:

- There is a lack of correspondence between the network coverage and the geographical catchment area, that is, other hospitals provide cancer services in the same regional area.

- Distribution of therapeutic procedures in Belgium is highly scattered in comparison to other European health systems. While a few pathologies are concentrated in the hub (e.g., bone marrow transplantation), most centres provide care for a wide spectrum of cancer diseases (e.g., sarcoma). Thus, Iridium differs in important ways from the UK ‘hub and spoke’ network model, that is, a ‘cancer centre surrounded by cancer units’.

- Iridium’s member hospitals collaborate, but they also compete for patients. Thus, the strategy for cooperation put forward by the network overlaps with ongoing competition in other dimensions.

- Some of the partners making up the network keep liaisons with other hospitals (i.e., they may belong to a wide corporation including elderly facilities, etc.) or universities.
- Iridium professionals and managers consider the network a young, evolving structure.

- Although patients are free to go to the hospital of their choosing in Belgium, migration is not important in the area.

- Iridium is made up of more hospitals than partners, as some hospitals share ownership.

Catalonian Institute of Oncology (ICO)

L’Institut Català d’Oncologia (ICO) is a cancer institute (including cancer care, research and epidemiology services) set up in 1995. Shortly thereafter, the underdevelopment of oncology services in some areas outside Barcelona gave rise to formal agreements governing the medical services offered by ICO to surrounding hospitals. A ‘hub and spoke’ model (with some constraints) was then formally developed, with signed agreements between local hospitals and ICO as a reference centre. The fact that local hospitals were too small to be considered freestanding providers (with one exception, none had more than 200 hundred beds) facilitated the development of hierarchical ties.

Local hospitals implicitly understood that medical services would be largely controlled by ICO. The regional spread of such interorganisational model precipitated the formation of the ICO network, which was firmly supported by the Health Department. However, the key lever was the agreement among different hospital managers and medical specialists bridging institutions, which cemented the networking of cancer services (Borras et al, 2009).

The Health Department directed the ICO network to areas where there were no nearby tertiary hospitals; there was clear added value in the improved access to specialised cancer services. Later, the ICO network incorporated two other teaching hospitals, which seemed to imply a reconfiguration of healthcare services and the onset of a unified brand. However, the identity of local hospitals was preserved.

Nowadays, the network is made up of these tertiary hospitals (located at different geographical sites in Catalonia: Hospitalet de Llobregat, Girona and Badalona), as well as the above-mentioned cancer institute (surgical services are provided by the allied teaching hospital) and sixteen local hospitals. Three sub-networks have been set up across the territory, each covering about one million inhabitants. As a public provider of cancer services, ICO and the hospitals making up the network carry out 40% of the therapeutical cancer procedures in Catalonia (7.5 million inhabitants).
Key aspects of the ICO network rationale and its development include the following:

- The level of local cancer care provision (defined by bilateral agreements with each local hospital) is set up in accordance with the services pacted with the hub.

- The organisational structure of the three hubs consists of integrated, tumour-based units; this structure is particularly evident in the mother centre.

- The migration of patients among structures is significantly constrained within the Catalan NHS.

- In spite of the payer-provider split which distinguishes the Catalan NHS, the three hubs of the network are public service hospitals.

- Some of the local partners making up the network keep liaisons with other hospitals (e.g., belonging to another corporation).

- Interprofessional cooperation and network organisation is considered to be mature and stable in two out of the three sub-networks.

**Lombardy Cancer Network (ROL)**

![ROL logo](www.progettorol.it)

The Rete Oncologica Lombarda (ROL) was launched in 2005 alongside other Italian and European networks (OASI 2010). Significantly, ROL is a young network that boosts collaboration from a relational perspective; this, in addition to other reasons, limited the degree of effective implementation and operation at the time this study was carried out. Thus, aspects related to its implementation are as relevant as those of its operation in our analysis.

ROL aims to improve the global response to cancer for all cancer patients in the Lombardy region, so no area of intervention or potential actor is excluded. In the long term, the creation of a coordinated network of cancer services is envisaged.

ROL is set up on a relational-mode basis, lacking any hierarchical tie among the components of the network (hospitals and primary care physicians). This model responds to the competitive environment in the region, where quasi-markets and free choice are still core values of the dominant discourse. The network manages functional overlaps between different providers (public and private) by creating IT channels and tools to facilitate the exchange of information and communication on the cancer care process. In doing so, ROL
attempts to address some of the problems faced by the Lombardy healthcare system, such as the lack of interhospital collaboration in both care and clinical research.

The Lombardy region (9.7 million inhabitants) has a mixed-model health system, in which private, accredited providers have a significant role in the delivery of cancer services. It is remarkable that the region provides 30-40% of Italian healthcare, and up to 60% for some oncological diseases. The national and international reference centres in Milan have led to a de facto split in regional dynamics and coordination needs between the Milan metropolitan area and the rest of Lombardy, a phenomenon known as milanocentrismo. This reality should be taken into account when considering the potential reciprocity between peers or between the ‘hub’ and ‘spokes’ of the ROL network.

ROL is the most evident sign of the new direction that the government is giving to the Lombardy healthcare system. ROL is expected to be the main driver in promoting clinical cooperation (second opinions, clinical pathways structuring, etc.) and ultimately in fostering a transition from a competition-based to a network-based model (Ferlie et al, 2010).

The homogeneity in the administration of therapeutic procedures came out initially in the process of goal setting. In this line, ROL promoted a consensus initiative in order to develop clinical practice guidelines for the most prevalent diseases in Lombardy. Since ROL’s formation, the health policy context has changed so that some of the network priorities have been revised:

- An oversupply of some cancer services in the region, such as radiotherapy services, coexists with a significant scattering of the delivery of other complex treatments.

- In a context of budgetary constraints and rationalisation of resources, cost-effectiveness rises as a key criterion when setting priorities on health technologies acquisition and the utilisation of care resources.

- Variability in clinical practice in cancer care emerged as a key policy issue.

- The role of primary care in the management of survivorship for some specific patient profiles emerged.

- The haematological network (REL) and the palliative care network were created before ROL; this raises the question of integration and interaction between networks.

- The rise of the BRICS countries (Brazil, Russia, India, China and South Africa) in the performance of world class clinical research emphasises the need for cooperation between institutions in order to attract and retain a greater proportion of clinical trials.
2. NETWORK ORGANISATION & GOVERNANCE STRUCTURES

2.1 Network governance systems: main features

The governance models and structures—that is, the norms, shared values, and informal behaviours—developed at a network level to foster strategic decisions or to manage day-to-day issues, are an important aspect of this study. Problems and opportunities related to this sphere are critical for Iridium, ICO and ROL; unlike the UK case, these cancer networks did not result from a comprehensive cancer policy and top-down mandatory regulation. Their most relevant structural features and primary goals are described below (figure 1).

Fig 1. Structural features and goals of Iridium, ICO and ROL

<table>
<thead>
<tr>
<th>Components of the network</th>
<th>Iridium Cancer Network</th>
<th>Catalonian Institute of Oncology (ICO)</th>
<th>Lombardy Oncological Network (ROL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network model</td>
<td>Five hospitals in the Antwerp metropolitan area and a partnership with University Hospital of Leuven</td>
<td>Three teaching hospitals and sixteen local hospitals</td>
<td>All hospitals (public or private-accredited) and GPs</td>
</tr>
<tr>
<td>Institutional and geographical correspondence</td>
<td>NO</td>
<td>YES</td>
<td>YES, but lacking ‘mandatory’ involvement</td>
</tr>
<tr>
<td>Policy arena within cancer care</td>
<td>Service improvement and clinical research</td>
<td>Service improvement</td>
<td>Evidence-based medicine and clinical research</td>
</tr>
</tbody>
</table>

2.1.1 Iridium cancer network

a) Governance model

The Iridium network is self-regulated through ad hoc statutes. A supra-hospital set of institutions was developed for consensus-making at managerial, medical and daily operational levels, thereby shaping interhospital coordination and giving rise to a new path-dependence approach. Although Iridium has a ‘hub and spoke’ structure at a functional level, from a governance perspective, the network should be considered a peers’ structure. Nonetheless, the weight of the partners when voting and making decisions is to some extent related to their functional dimension.
b) Governance structures

(1) Management committee: Directly responsible for daily network issues. It is made up of hospital managers and nursing and medical directors (no CEO members). It also includes the three Iridium coordinators, the ‘faces’ of the network: a general coordinator (chairman of the management committee), a medical coordinator, and a nurse coordinator. The committee operates from one of the hospitals, and its members are elected for 3-4 years. Although they lack formal power, they generally show outstanding abilities for problem solving and seeking feedback.

This committee is also in charge of the organisation of crosscutting working groups (see 3.1.1). The management committee meets every two months.

(2) Medical committee: Aims at assessing and setting priorities on the acquisition, allocation and organisation of clinical resources at a network level. It is made up of ten members, two from each hospital. Of these, one is the representative of each hospital’s local medical committee, and the other is a hospital physician representative, designated ad hoc. Interestingly, such a degree of representativeness means that the network medical committee can be considered a reliable sample of all five hospitals’ medical committees.

The medical committee has a reference advisory position in Iridium. In fact, strong relational dynamics take place between this body and the council of administrators (see below). Physicians formulate recommendations and proposals for the council’s discussion and decisions; at the same time, the latter also seeks the medical committee’s advice.

Discussions deal mainly with resources, particularly the acquisition of new technology or human resources. Meetings take place every two months. A specific procedure was established to submit a candidacy to be coordinator. It should be mentioned that the Belgian NHS enforces by law the endorsement of CEO decisions by medical committees, thereby guaranteeing a role for doctors in the management of the hospital or, in this case, the network.

(3) Council of administrators: High-level board of the network made up of hospitals’ general managers, who meet 2-3 times a year. All strategic or key operational decisions concerning the network must be approved by the council, which also oversees the management committee (1).

Each committee designates a chairman, on a rotary basis.

c) Process of decision-making and legitimacy of decisions

Discussions of relevant issues in Iridium are managed transparently. The three committees, each representing different interests and roles in the network, are well conceived. This is remarkable when considering that the medical committee plays a double role in consensus: all decisions are endorsed by both the network medical committee and the five local medical committees.

Although the governance structures guarantee the legitimacy of decisions and strong internal cohesion in the network, decision-making processes are widely perceived as ‘complex and heavy, filled up with lots of meetings’. Local and network interests do not
always match, and constant negotiation increases transaction costs and erodes decision-making processes. At the same time, though, managers and professionals express that this system does work, saying, ‘We can cope with this’. Satisfaction with outcomes, good diplomatic skills among leaders (managers and health professionals) and a ‘learning by doing’ rationale applied since the network’s configuration, contribute to ensuring its institutional strength.

Network members accept the leading role of the hub in the provision of radiotherapy services and some complex procedures, but they do not consider the hub the ‘leader of the network’. Constant negotiation and lobbying are critical elements of Iridium. Reaching agreements on how to share medical resources, and whether to centralise/decentralise some techniques in/from the ‘hub’ are always an issue. Variation in partners’ positioning entails some lack of stability.

The governance procedures are really slow; everyone tries to defend their own interests. It takes a long time to make some decisions; everyone looks to each other to know what they think.

‘We had a problem in the past: we needed a haematologist. And they say “it’s not necessary, we can keep the haematology in the hub”, and when we vote they had more votes and so we had to fight really hard to get it. We didn’t want a consultant one, but a physician working here. Now we are happy, but it took a lot of time. In case we had been separated, we wouldn’t have had any problem. Now you need to firmly justify it.’

2.1.2 Catalan Institute of Oncology (ICO)

a) Governance model

ICO is a non-profit public provider of specialised cancer services, including medical oncology, radiotherapy, clinical haematology and palliative care for three sub-regions of Catalonia, which comprise a population of about three million people, or about 40% of the region’s total. In each sub-region, cancer surgery is offered in partnership with a neighbouring university teaching hospital. In turn, these ICO hubs provide oncology services to local hospitals in their respective areas. In general, the three hubs show a high degree of centralisation compared to the role played by small hospitals; interaction and network dynamics depends greatly on the hubs.

The ICO network is centrally governed through a double hierarchy: the central hub (the ‘cancer institute’, the mother centre) oversees the other ‘hubs’ (tertiary hospitals), and these supervise their ‘spokes’ (local hospitals). Thus, the different agreements and service contracts regulating the network are characterised by certain obedience to a central provider. This system (clear in its conception) exemplifies nonetheless a model of governance lacking a real network executive board. The existing interhospital commission for monitoring of agreements, made up of general managers of hospitals of each area, is certainly not a multilateral alliance provided with mechanisms for governance and deliberation.
b) Governance institutions

The ICO Cancer Institute, the mother centre, acts as a hub of hubs; the board of directors is based here. However, notwithstanding the governance model, functional cooperation with the other two hubs is close, and some professionals from the other hubs assume leading roles in key areas of the network (e.g., radiation facilities). Furthermore, besides the aim of achieving uniform standards of care, good organisational practices at each hub are not only respected but benchmarked. Breakthroughs in sub-network organisation can be attributed as well to the different roles (i.e., spurring or passive) played by the decentralised NHS authorities (there are seven in Catalonia).

ICO has clinical directors (manager profile) in charge of running ICO services at each hub. These professionals are entrusted with two main functions. First, they act as gatekeepers with respect to managers and medical directors of the ‘host’, tertiary hospitals. This connexion is a relational one given that ICO directors do not have any formal power over other services (gynaecology, urology, radiology, etc.) involved in cancer care. Second, they manage the engagement and any issues that may come up with local hospitals. Such a manager profile does not exist in local hospitals, where there are some self-organised oncology units comprised of medical oncology (radiation oncology is engaged in tumour boards), haematology, palliative care, and support. Therefore, the ICO network shows two levels of governance: that of the ICO and the hubs, and that of the tertiary and local hospitals.

In order to foster standards in network organisation and clinical performance, four crosscutting leaders in specific fields (scientific, physics facilities, nursing care and quality) were identified.

c) Decision-making process and legitimacy of decisions

ICO shows a successful level of cooperation among professionals, but the governance system is weak, and this has consequences on the perception that ‘host’ hospitals have of their relationship to the hubs. Initially, the bilateral agreements between hospitals were intended as a channel to develop a model of cooperation to improve cancer care. However, such agreements are increasingly perceived by many partners (especially for local hospitals) as a matter of outsourcing; they feel they have just ‘externalised cancer services’ (oncology, radiotherapy and haematology) to ICO.

The medical and radiation oncologist model of cooperation (see 3.1.2) embodies the internal cohesion of the network. Such streamlined relationships for medical care contrast with the centralised governance model. In fact, in the absence of a stage for open, managerial deliberation, the sense of belonging to the network has weakened. The management within the network takes place at the sub-network level, but an overall perspective of the whole network is only possible from the central position. Governance of this ‘double periphery’ is becoming even more challenging as ICO steadily grows as an institution.

A lack of a crosscutting responsiveness implies that decisions made on one side easily impact the performance of healthcare services on the other (e.g., closing operating theatres
during holidays; or reluctance from a teaching hospital manager to accommodate the ‘excessive’ use of emergency services by the ‘ICO cancer patients’). ICO network relationships are extremely dyadic; every point is locally negotiated on the basis of bilateral agreements, and thus, very dependent on local or hub interests and personal relationships. The legitimacy of decisions could be favoured by establishing a common framework for all key stakeholders involved (especially the hubs, the patients and the NHS authorities). This might facilitate strategic decision at a network level.

2.1.3 Lombardy Oncological Network (ROL)

a) Governance model

As a developmental network (learning, informational, non-hierarchical) (Agranoff, 2007), ROL promotes virtual integration among its components, which should be considered peers. Importantly, ROL is centrally steered by a regulatory core placed outside the network. The regional government, strongly committed to the project, plays this role. Given these ‘soft’ networking mechanisms, partners’ interaction is mainly based on the new IT tools, put in place through a top-down process. From this perspective, ROL is formulated as an indirect system of governance.

Another key aspect is reliance on the Istituto Nazionale dei Tumori (INT) of Milan for part of the technical development of the network. The INT satisfies an important part of the cancer care and research needs in Lombardy, acting as a main agent in some key areas in ROL (see below). Nonetheless, the regional government plays the cohesive role and defines the global strategy.

b) Governance institutions

The regional government and the INT, owing to their position in key areas of the network, are identified as the leaders of ROL. However, regional coordination also depends on other important parties:

(1) Strategic leadership. Any strategic decision is shared and discussed at the Regional Oncology Commission (COR), which is the technical advisor of the regional government in cancer control. In addition to the regional government and the INT representatives, different scientific societies (including for GPs) and patient organisations are included. The region provides technical and financial support to the network.

(2) Operational management. The network’s director (from the ROL office, placed in the INT headquarters) is responsible for disseminating the information generated by all initiatives and promoting its exchange. This includes identifying the ongoing clinical trials (and their manager), making clinical practice guidelines (CPG) available, and providing information on pharmacovigilance. The ROL website is important in this regard. The ROL director should coordinate efforts (CPG development, IT tools implementation, etc.) and account for the network’s effective implementation. Besides this, ROL structures its operation around sixteen work packages devoted to specific issues.
(3) Scientific and research development. The INT is identified as the scientific leader of the network. Their participation, together with the scientific community elite (both from public and private-accredited providers), boosted the creation of tailored CPG to the Lombardy reality in an attempt to set priorities. The INT identified the clinical experts to be engaged.

(4) IT tools and systems development was commissioned to Lombardia Informatica. This public firm, which is corporately owned by the regional government, is also in charge of key information systems in the region.

(5) Adoption and local implementation. Regional directors of the ASL (local commissioners) and a relational institution known as DIPO (Interhospital province-based cancer departments), locally implemented across Lombardy, assumed the territorial adoption of the IT platform and boosted the use of the ROL-DOC template (see 3.1.3). It is worth noting that the DIPOs, which correspond to a specific health area, were identified at the beginning as ‘sub-networks’ of ROL. Nowadays they are considered a local setting for discussion on ROL’s coordination and implementation.

c) Decision-making process and legitimacy of decisions

A widespread perception is that the leadership of ROL corresponds to the regional government, but through Lombardia Informatica for the supply of IT services and IT tools, through the INT for the CPG, and through the DIPOs for its local implementation. Beyond the required, functional role assumed by the different parties, there is some fragmentation and inconsistencies in governance. This situation blurs the lines of authority, responsibilities, and associated commitments. In other words, despite having a common umbrella of ‘public administration’, there is a lack of synchrony (or flexibility) among the parties in promoting the various sub-projects and the global network’s guidance.

'The government of the network is complex, “made by lots of hands”.

Part of ROL’s appeal is that it is so different from the other two networks included in this study. ROL includes the characteristics of the ‘learning networks’ based on professionals rather than on structural reconfigurations, but it aims to impact the organisational supply of cancer services. Certain drivers, such as the new IT interface, are widely expected to lead to the further development of the network. The involvement of network components (professionals, organisations) is essential in this regard. However, development also seems to be hindered by the high costs of information and permanent bargaining in the implementation of the network. Moreover, the IT link between public and private entities is considered the weakest link in the implementation of ROL.

Functional leadership is essential since all the big levers of change are found at the regional scale. Isolation of the ROL leader (the regional government) from both the network and the dimension of the challenges assumed entail some implementation difficulties, although political commitment and the steering role shown by the Lombardy Region are clear.

On the role of the INT, there were some initial misgivings (2006-07) concerning its position of technical leadership, although the multidisciplinary and multicentric experience in the development of CPG largely changed this view. Instead, the presence of INT is uncomfortably perceived because of the management positions it holds in ROL’s guidance
2.2 External accountability: role and approach of the of the regional/national government

The differences between cancer networks are clear with regard to the external accountability, that is, the extent to which networks are answerable to a higher authority and should disclose appropriate information (results, decisions) on their operation. While ROL was implemented through a top-down process by the government, both Iridium and ICO respond to a professional-based cooperation reinforced by hospital agreements. The latter two can be considered meso-managed networks existing within a specific policy context, while ROL comes directly out of a regional policy. This does not imply that external accountability does not make sense for ROL, but that it should be approached differently.

2.2.1 Iridium

External accountability is considered weak in the case of Iridium. Network creation is self-regulated through statutes lacking specific regulation or surveillance from the regional or federal levels of government. Cancer policymaking in Belgium (e.g., breast units implementation; see 2.3.1), does not take into account any organisational structures apart from freestanding hospitals. Nonetheless, cancer networks in Belgium (and Italy) receive informal approval from the government; contrary to ICO, Iridium and ROL are not the only cancer networks in their respective countries. In any event, networking cancer services is not rewarded by the government, and the need to receive support, for instance in tackling the IT hospital systems fragmentation, has been emphasised.

Iridium has an important challenge that the government could play a role in resolving: there is a lack of correspondence between network cancer services’ supply and its geographical coverage, that is, other hospitals providing cancer services can be found in the same regional area. To some extent, potential cooperation with these other hospitals is denied by the closeness of the network (external), but it could make sense from a population-based approach. As a matter of fact, at times patients and GPs cannot work with area hospitals on cancer care issues.

The closeness of Iridium should draw the attention of policymakers. Losing patients is a sore point at the managerial level. For instance, radiotherapy satellites (deconcentrated and controlled from the mother centre) were enabled following an ad hoc Belgium law. Before this law, every hospital asked for this service (pursuing thus the associated high reimbursement). Significantly, the decision to place a satellite in one of the network partners only came after much lobbying, and above all, after the nearby University Hospital of Antwerp (outside of Iridium) obtained one. Refusing the satellite location would have implied losing many patients in the network. This experience shows how maintaining commitment to the network may lead to making important healthcare decisions.
However, far from having a problem in this sense, Iridium entails a real breakthrough in terms of rational allocation of resources, access to expertise and cost control. This might entail benefits to both network partners and the whole healthcare system. External accountability should validate and endorse this process.

‘Network collaboration is ok, but we have the ambition for all the patients of this region. The history is not the following: “we have a problem with oncology in our region and how can it be solved together”. This problem has the origin in the fact that the starting point of Iridium is not oncology, but radiotherapy, referring patients to the same centre in Antwerp.’

‘Many patients wonder “why I have to go so far” when looking for an alternative to their hospital. There are other hospitals in their place not belonging to Iridium. To patients we say “no, no, we are working in a network, with good quality standards” and so on.’

‘The money of the cancer plan could have been spent much better in my opinion. For example, the cancer plan supports translational research, which I don’t think is the duty of the Ministry of Health. So it would have been much better to know about the compliance with guidelines or supporting academic clinical trials, where you can “gain” money. There are many academic and clinical trials that almost cannot continue any more, like surgical trials, radiotherapy trials, or out of patent.’

2.2.2 ICO

External accountability does not play a comprehensive role in the ICO network configuration. In spite of the split between commissioners and providers that characterises the Catalanian NHS (as also happens in Flanders and Lombardy), ICO is perceived as a stakeholder that is somewhat close to Health Department interests. The Catalanian NHS endorsed ICO’s agreements with local hospitals and, furthermore, a unified brand was created when introducing ICO within the two other hubs. In case of the bilateral agreements with local hospitals, the network aimed to improve access to specialised care in areas where oncology services were underdeveloped. Most local hospitals see this collaboration as successful, although others feel it has been imposed. Concerning the hubs, the process was considered arduous, requiring changes even in the statutory legislation of human resources.

The Catalanian NHS played an important initial role in engaging new hospitals in the network. Afterwards, it lacked some policy monitoring in order to follow the network progress. Unlike Iridium, ICO has not been provided with a set of supra-hospital rules, nor has it been created from a regional enactment like ROL.

With the clear exception of the three ICO sub-networks (corresponding to different areas of Catalonia), the NHS does not help to streamline communication among the different providers. This exception shows how local NHS commissioners contributed to reaching an agreement on some quality indicators regarding a common IT system and the financing rules on day-hospital chemotherapy.

Policy accountability seems to be crucial, as the ICO model combines the effective centralisation of difficult cases on the basis of expertise and allows for local treatment of most patients. This is the real added value of the ICO network. However, the tailored
bilateral agreements between tertiary and local hospitals require constant trading and updating. On the other hand, the relationship among the three hubs shows greater stability. Difficulties occur because medical and technological changes in the cancer care scenario are permanent, and there are different uptake speeds in network involvement by the different hospitals. In this sense, some hospitals are willing to increase collaboration while others do not.

The overall picture shows greater interorganisational interdependence but growing imbalances among the different components, posing a challenge for network management. This is particularly clear in one of the sub-networks areas, where the relationship between the ‘hub’ and the ‘spokes’ is much looser than in the other two. For example, professionals’ engagement is not really strong, and local centres seem to merely refer complex cases to the hub. This situation, sometimes based on ingrained institutional inertia or even poor personal relationships, should be rectified by network managers and policymakers.

The management of the ICO network is challenged by the lack of a global governance approach and a marked utilitarian perspective on the agreements among partners. As mentioned in section 2.1.2, some hospitals see their relationship to the network as based on outsourcing, while professional and institutional engagement on behalf of patients’ interests would require a more solid relationship. Aligning objectives is of great importance for a network made up of almost twenty hospitals.

‘There is no common spirit of saying “let’s take care of the network among CEO Managers”. And the regional government did not contribute to this either.’

‘An MDT unit on oesophagogastric tumours has been just created in one of the hubs because of professional determination, not because the hospital managers promoted it. It shouldn’t happen this way.’

2.2.3 ROL

The ROL network is directly steered by the regional government, not by an agency or any other institutional body. Although ROL has a director and the INT plays a key role in some areas of the project, they follow the tight policy guidance defined by the regional government. The network has a shortcoming in terms of accountability in decision-making, as both political control and accountability cannot be effectively executed by one party (in this case, the regional government). The Regional Oncology Commission (COR) (see governance institutions, 2.1.3) plays a formal oversight role by endorsing any strategic decision made in regard to ROL, but its large size (approximately fifty members) hampers external control.

In fact, one of the main challenges for health authorities is the coexistence of two views, somehow incompatible, that professionals and managers have about ROL:

- ‘ROL as a network of specialists’

The network should respond to the need to generate and implement scientific evidence tailored to the requirements of the Lombardy health system. The network has a marked
hospital basis and is intended to promote clinical consensus and adherence to agreed decisions and common protocols.

- ‘ROL as a tool for care management’

The network should become a managerial-operational instrument to effectively respond to patients’ needs at all stages of care. It should contribute to shaping professional and interorganisational relationships, favouring effective and efficient common actions by expert teams and professionals, second opinions, agreements with GPs, etc.

It should be acknowledged that, due to ROL’s nature, the creation of a new model of cancer care is not feasible. However, the network could and should contribute to solving existing problems. To that effect, the ‘network of specialists’ view is widely seen as a problem because most improvements require the implementation of structural and organisational changes in the healthcare system. Priorities in the evidence-based medicine arena should be maintained, but clearly disengaged from approaching the specific care coordination needs that both patients and healthcare providers perceive. In this light, two assessments are worth noting: first, the heavy weight of the INT in ROL provided an overly scientific bias to the network, and second, a clinical governance approach is only possible by setting up a governance structure able to promote and monitor changes in the supply of cancer services.

ROL was designed to improve the exchange of information, facilitate the connection between centres based on expert opinions and reach a consensus on evidence-based clinical practice, which could be validated afterwards through an IT platform. Creating a technical core—institutionally separated from the government—would likely lead to a more managed network able to make a greater impact on cancer care delivery. This step is widely perceived as necessary in order to foster compliance with ROL’s main goals. However, analysis on the likelihood of this development is beyond the scope of this study.

Lastly, the haematology (REL) and palliative care networks are already in place (there is a palliative care group within ROL on this matter). Taking into account the willingness to develop a generalist cancer network, interaction and integration between networks is identified as another element of complexity.
2.3. Management agreements and impact of health policy issues

When the high complexity of some diseases requires clinical coordination either for a second opinion, to fully take care of patients or to refer them to another centre to continue treatment, many issues seem to be at stake. Clinical coordination takes place in a context where health policy questions, especially in the arena of hospitals funding, are often very important. However, mutual reciprocity cannot be implemented as such; it must develop organically and be felt as a situation in which a win-win strategy makes collaboration worthwhile. Collaborative networking is undoubtedly reinforced or impaired by management agreements and institutional commitment. In this regard, two recurring health policy issues are brought up for the three networks:

- First, the Diagnosis Related Groups (DRG) system of classifying (and invoicing) hospital cases is widely perceived as a barrier to the interorganisational collaboration that networks require. Networking may involve the centralisation of cases showing some degree of complexity, and some hospitals fully invoice for these patients when they were actually referred by other hospitals.

- Second, the lack of clinical accountability of clinicians and managers in regard to the cost‐effectiveness involved in their decisions is commonly criticised. Also, appropriateness is often stressed in the use of cancer drugs, but not in regard to overall treatment procedures or diagnostic test use. Other common issues are shown in table 2.

<table>
<thead>
<tr>
<th>Strategies implied in network operation</th>
<th>Iridium Cancer Network</th>
<th>Catalonian Institute of Oncology (ICO)</th>
<th>Lombardy Oncological Network (ROL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy for cooperation is overlapping competition for medical oncology and surgical treatments</td>
<td>Fight for contractual power among ‘hub and spokes’</td>
<td>Loose cooperation and overlapping competition, particularly in Milan</td>
<td></td>
</tr>
<tr>
<td>Direct funding mechanisms stimulating the network or capitulative‐based systems?</td>
<td>No, but when hospitals working together decide to centralise one technique, the other/s are compensated</td>
<td>No</td>
<td>No, but the experience with CREG (chronic patients) and PDTAs leads to changing perspectives</td>
</tr>
</tbody>
</table>

Major health policy issues and implications for each network’s agreements are dealt with below.

2.3.1 Iridium

Unlike freestanding hospitals, Iridium represents an attempt to coordinate and prioritise the use of human and technological resources through a rational, consensus‐based process.
carried out at network level. Management agreements on radiotherapy triggered the network creation (see 3.1); this association implied a financial structure by which the income derived from radiotherapy service delivery was shared among all hospitals. The successful collaboration in radiotherapy services inspired the extension of the network to general cancer care, and a ‘hub and spoke’ strategy was then assumed and promoted. It is also worth noting that Iridium has the same radiotherapy machines and technical platform as the University Hospital of Leuven, its main scientific partner.

Network decision-making mechanisms were described as successful (see 2.1.c), although, beyond the radiotherapy financial platform, decision-making is slow and hindered by certain difficulties, for one, the fact that hospitals and professionals (except in radiation oncology) compete with each other for patients. This is the challenge but also the added value of Iridium: contrary to freestanding hospitals, network members try to deal with the many ‘grey areas’ of management through a joint approach. In fact, Iridium members compete on two levels: within the network, and against other providers in the same geographical area. The only exception to this rule is rural hospitals, whose relative isolation shields them from competition on the basis of geographical proximity.

Coordination is not easy as some professionals, especially medical oncologists, surgeons and some managers, show resistance in terms of specialising, sharing patients, acquiring new technologies, and redefining the portfolio of services. The large financial impact of cancer care at each hospital is an important factor in this equation. Further cooperation could somewhat limit their ability to treat as a permanent goal of hospitals making up Iridium.

With regard to the way forward, two health administration and policy issues were mentioned:

a) Treatment scattering: opportunities and tension among partners

Many cancer treatments in Belgium are, according to local views, too scattered across the health system. In this context, there is potential for tension behind a network approach, for example, in the case of deconcentrating radiotherapy services (described in section 2.2.1).

However, there are also opportunities:

- The robotic surgery programme is placed in one hospital (not the hub), so the others refer patients there for prostate cancer surgery.
- Reconstructive breast cancer (deep flap surgery) is offered at different hospitals, but performed by one plastic surgeon, who commutes.
- Haematology patients who need transplantation are sent to the hub, whereas before they were referred Gant, Leuven, or another centre.

These examples show a stable way to take care of network patients. Control over treatment delivery implies concentrating expensive treatments, by centre or by specialist.
I have to be aware that sometimes some people are unrealistic as they want to develop some techniques but only for few patients in their hospital. This implies a problem of quality and finance, because you have to foresee a lot of money for a few patients.

b) Differences in salaries as a barrier for cooperation

With the exception of radiation oncology (a single service despite deconcentration), the exchange of professionals across different structures entails receiving compensation for services by different financial systems. Beyond this, salaries vary depending on the medical specialty, the specific cancer programme adopted by the hospital, and the quantity of procedures/services that professionals perform. The system is seen as reasonable, although there is some criticism from professionals who want more equitable compensatory schemes because ‘we are all working for the same network.’ Managing differences in professionals’ salaries (especially for the first medical specialties incorporated into the network) is one of the pending challenges to be tackled by Iridium coordinators. Some aspects in this regard were specifically stressed:

- The salary of medical oncologists is low compared to that of radiation oncologists, who are traditionally well reimbursed in Belgium.

- Medical oncology is mostly integrated in other clinical departments in Belgium (internal medicine, gastroenterology, etc.) (Popescu et al, 2014).

- Medical and radiation oncologists are paid from a common budget line in the mother centre, where the strong integration resulted in a more even distribution of salaries.

- Agreement on the reimbursement for radiotherapy service either at the mother centre or at hospitals hosting satellites could satisfy hospital managers. However, some professionals hosting satellites do not feel properly compensated.

Crosscutting, multidisciplinary cooperation at both hospital and interorganisational levels seems somewhat hampered by these disagreements. Iridium aims at standardising procedures, but some specialties, especially medical oncology, ‘do not feel equal to others’. The need to deal with this issue is pressing; ‘otherwise, the referral of patients to the hub for radiotherapy or transplantation is not so well seen’, and some have the feeling that ‘the hub grows thanks to us, and we want more recognition for that’.

‘People talk about having a higher percentage of this fee [radiotherapy]. Medical oncologists work more hours than them, and sometimes medical oncologists are called in at night. So they are always frustrated about financial issues.’

‘What they [the hub] earn from treating patients here in radiotherapy goes in the hub’s pot, and this is not honest. We must come together all in one pot and then divide. If it had been arranged at the beginning, we wouldn’t have this discussion right now.’

‘We are no longer the young brother of the network. We should go for a full partnership, also financially.’
"It is also in the statutes of Iridium that we must think on cancer care programmes: how we can perhaps think to do things together, but it is not easy, because when I send a patient to another clinic, this not good for my clinic."

2.3.2 ICO

ICO is a public provider of cancer services embedded in three teaching hospitals; it takes over local oncology services by implementing an interprofessional model of cooperation (see 3.1.2). The institutional basis of the network hinges on two regulatory frameworks: first, a ‘disposal contract’ signed among the three teaching hospitals and ICO, which is supported by the Catalan NHS. Second, each hub formalises one-on-one agreements (periodically updated) with nearby hospitals; thus, there are as many agreements as pairs of relationships. An interhospital commission in each regional area was created for monitoring, but this cannot be considered a deliberative network mechanism (discussions are local and based on financial issues). It is worth noting how network boundaries are mostly crossed by professionals, not by managers, and here lie some of the management problems and advantages of the ICO network.

a) Managing a network performance in a context of one-on-one agreements

A central discussion for management deals with the shared cost of resources by hospitals providing oncology services. Interhospital agreements are not accurate in setting limits on care delivery, and costs are mostly calculated on the basis of human resources (direct costs) as regards network-based medical and radiation oncologists (for whom cost is related to their scale of involvement). However, these amounts do not match the related hospital income from the insurance/payer, which is attributed and assigned to local hospitals on the basis of service provision (e.g., first consultations, day-hospital visits). This funding mismatch is at the origin of the management dispute.

ICO states that the mismatch is ultimately supported by its internal financial structure, but the problem seems to be aggravated by the increase in staff needs upon including new hospitals in the network. Local hospitals argue that ICO has been over-funded by the NHS because of its importance as a cancer institute, which was true for some time. Likewise, the reimbursement price for the local day-hospital is lower than that of the tertiary one, although ICO professionals carry out some ‘specialised tertiary activity’. Also, the ‘hub and spoke’ network model allows the ICO hubs to take advantage of all the ‘atypical income related to contact with the pharmaceutical industry’. Updating agreements in such a fragmented context is, in all events, a difficult task.

Budget pressures have brought local hospitals to desist in treating some patients and directly refer them to the hub. This adverse selection has begun to increasingly take place in the spokes for patients generating big expenditures (e.g., day-care hospital) reflecting inadequate funding policies and/or an excessive scattering of some complex treatments. Also, in a context of one-on-one agreements, that is, lacking a common management set of rules and mechanisms, decisions on one side easily impact the other (e.g., closing operating theatres during a period of holidays, causing bottlenecks). Effective communication and
coordination, especially at a managerial level, should be promoted. Stronger institutional capabilities would improve the management of contingencies but also the possibility to develop integrated care pathways (see 3.2).

Neither the ‘custom-made’ agreements nor the funding of cancer policy fosters a comprehensive network approach to cancer care. The high transaction costs and the misunderstandings come up as a result of a weak institutional basis, characterised by the spread of one-on-one agreements. Setting network priorities, aligning basic goals of the different stakeholders, and developing the management approach seem to be a key change necessary to realise the potential of the network as a whole.

'We find it very difficult updating agreements with some hospitals, especially in regard to financial headings.'

'The ICO network is in practice a formula for providing manpower services to other providers. However, it lacks much of other kinds of feedback.'

b) Vertical network reform: the case of the ‘ICO pharmacy network’

ICO is gradually taking over the local hospital pharmacies with regard to chemotherapy and cancer drug treatments (in line with the Espoq programme development, see 4.1.2), and the mother centre also leads negotiation with the pharmaceutical industry (clinical trials, purchase, etc.). This has led to the centralisation of the purchasing of some cancer drugs for many of the hospitals making up the network, even if priorities for high complexity treatments are set up at the Catalonian level of the NHS. This way, ICO also ensures their direct reimbursement by the Catalonian NHS.

'We tell the pharma that these drugs are for the ICO network.'

This change is mostly based on a rationale of taking advantage of the network’s economy of scale, and it can be seen as a positive step. ICO has long been a very active stakeholder in developing a ‘pharmaceutical care policy’ in the context of the Spanish NHS. As a process per se, the ICO pharmacy network is positively perceived since the meetings concerning drugs prioritisation are both multidisciplinary and open to the participation of local professionals. However, in a context of increased sense of outsourcing towards ICO, this change is hardly perceived as a network-reform approach. This kind of vertical integration should be properly balanced with the different dimensions involved in the operation of a cancer network.

2.3.3 ROL

ROL symbolises the willingness to transition from a market-oriented healthcare system to one in which collaboration can shape healthcare services. Even when many of the stakeholders look favourably at this approach, change is difficult for a region where entrepreneurship is so entrenched and health services performance is generally very good.
In managerial terms, a key aspect to ensuring network operation is closely related to the effective implementation of IT tools, IT systems interoperability and their effective use. Shortcomings related to these areas are identified as the greatest weaknesses of the network. For example, compliance with ROL guidelines cannot be measured as planned (see 4.1.3). Thus, ROL has not yet become a system *per se*, with a set of rules and objectives to be actively achieved. The initial idea was to extend the adoption of ROL among public stakeholders while the privately accredited centres were gradually engaged through a free association process. However, the autonomy of hospitals overrides this target in a way that operative implementation is not fully effective, calling into question the merit of the initial strategy.

At the root of this dilemma are some agents involved in the implementation of ROL who did not play the key role they were expected to. The incentives placed by the regional government to local commissioners (ASL) and hospital CEOs worked in many cases, but the rationale of the network did not change all behaviours. ROL was launched for all of Lombardy, and sub-networks areas were defined initially but then abandoned (see 2.1.3). Local cooperation (through IT tools) did not take place spontaneously, and the network was not perceived as accountable to the population, which ultimately hindered its adoption.

Nonetheless, the ROL project makes full sense when considering its objectives and, globally, cancer care coordination and integration needs. Health policy issues impacting perceptions on ROL can be summarised in two dimensions:

a) **Cancer services oversupply and the need for increasing specialisation and centralisation of cases/clinical procedures**

With regard to some procedures and technologies acquisition, the growth in the supply of oncology services has been pronounced in the last decade. This entails a problem when facing the need for more sub-specialisation, multidisciplinary integration and crosscutting cooperation at hospital and system levels. Standardising the delivery of treatments and reducing the variability in clinical practice and cost-containment have become different sides of the same overall goal. ROL, in this crossroads, cannot be left out of such debates.

The overall situation is labelled as ‘the high scattering problem’. There is wide consensus on the need to better coordinate the extensive resources available and to identify who can do what and how. Too many clinical departments (some, quite close in distance) are dealing with few cases or lack comprehensive processes of care for some pathologies (Belgium and Spain are no exception to this). Local commissioners stress that they have enough information (e.g., post-surgery mortality rates) to justify the need for changes. In the event of tackling such a situation, two strategies consistent with the emergence of ROL were mentioned:

- Firstly, to define cancer care areas and/or programmes and promote interorganisational relationships among the different centres in order to stimulate sharing (not exactly ‘losing’) patients, taking advantage of each others’ areas of expertise. This way, certain treatments could be completed while guaranteeing a high quality of care and ensuring the devolution to the local hospital. A successful model of experience is the rare tumours referral system.
However, what was put forward here was something likely to take place at the province-based level.

- Secondly, the experiences of EUSOMA in accrediting breast units and of the Joint Commission in colorectal cancer are cited. Their importance lies in having clear organisational criteria (e.g., a critical mass of patients) and integrating every resource for a specific pathology. This is in line with preventing the spread of cases and thus enabling subspecialisation, as well as including cost-effectiveness criteria when assessing the appropriateness of interventions.

  The fact that the hospital system is so big and mixed, unlike other Italian regions, means that you cannot force people to not treat. However, we all know that there are lots of truly useless liver or lung metastasectomies, a lot of surgeons who do not carry out properly the rectum resection, and there is a disproportionate use of cancer drugs.

b) DRGs and the hospital funding system: a challenge for interorganisational cooperation

ROL development entails opening new ways for interorganisational cooperation, for instance ‘sharing patients’ not only on the basis of expertise but also on a rationale of cost-containment or personalised care (with GPs involvement). In this sense, the in/out logic of the DRG funding system is perceived as a barrier. Two proposals have been put forward:

- Firstly, a section of the DRG could be paid by a referring hospital, this way, ensuring a high quality of care (e.g., thoracic surgery) for some treatments that cannot be properly delivered locally. This would benefit both structures, also ensuring the devolution of the patient (in the absence of complications). The local purchaser (ASL) might help in controlling and regulating these flows. This formula might be particularly interesting for structures and professionals outside the highly competitive Milan, or for peer structures taking advantage of each other’s different degrees of expertise as regards the different tumour sites and patient profiles.

- Secondly, the regional government could use the reimbursement mechanisms to stimulate population-based approaches for highly complex treatments. According to this scheme, the reimbursement will not be made if certain criteria or results are not met.

The free choice and especially the reality of competition may make sense for a part of the healthcare system, but it also masks the real need for formal collaboration between many centres. Access to expert professionals/teams can be duly supported by most of stakeholders if this is perceived as an opportunity to improve quality of care. Discussions on ROL’s direction easily bring up this kind of assessment.
3. NETWORK-MANAGED CARE DELIVERY

3.1 Model of interprofessional cooperation

3.1.1 Iridium

The model of professional collaboration in Iridium is based on different kinds and levels of professional linkages as well as specific mechanisms of cooperation. It embraces everything from the full, hierarchical integration among radiation oncologists to the loose relationships among supportive care professionals who just share information and exchange best practices.

Clinicians: sharing expertise and networking cancer services

Radiation oncology is a fully integrated clinical department in which all physicians working across the network obey the hierarchy stemming from the mother centre. Satellites (with two machines each) are placed in two hospitals of the network, and radiation oncology staff is distributed among the three network access points: (1) the mother centre, (2) the two satellites and (3) weekly visits to other hospitals for local MOCs (multidisciplinary team meetings), some ambulatory consultation and preparation of the simulation appointment. In the latter case, substitution is provided if needed. When this is not possible, medical oncologists advocate for them and if a clear radiation issue comes up, they wait until the next MOC for specific advice. The ICO network does the same.

Planning and organisation of the technical delivery is organised according to the criteria of the mother centre. There is intensive cooperation between the satellites and the mother centre (for second opinions, etc.) and in rare, very complex cases, patients may be referred to the mother centre. It should be noted that patients are often asked where they would prefer to undergo treatment (the closest, the preferred, etc.).

Haematology, medical oncology and radiotherapy in the hub make up a single clinical department. On the other hand, radiation oncology is quite isolated from hospitalisation, surgery or complications units in the case of the two satellites, although they are engaged in the MOCs.

'We can do our job in [hospital] without taking into account the other physicians of the hospital. Our service is integrated within the hospital but it works alone. For medical oncology it's more difficult, because patients are hospitalised, there is a local integration with other disciplines, and it’s different.'

Relationships among medical oncologists at the different hospitals take place on a free basis through horizontal, non-hierarchical ties. Sometimes they are associated to other medical specialties of the site, as they are not the only ones providing chemotherapy.
Because of this, standardisation of treatment delivery is not considered to be as high as that of haematology and radiation oncology.

The original goals among the speciality members of the different centres was to share best practices and agree on structural issues (informally, or at the medical committee) rather than focusing on the expertise distribution across the network. Medical oncologists admit the existence of a hub in iridium but contrary to radiation oncology, medical expertise is scattered and, in fact, sub-specialisation by tumour site among medical oncologists has not been firmly fostered or developed. However, a number of consultants and junior medical oncologists from the peripheral hospitals work part-time (e.g., two days a week) in the hub’s day-hospital to update working procedures and be acquainted with the staff, so that that ‘the network is not so virtual’.

Despite the great variability in medical oncologists’ engagement, boundary-spanning exchanges are understood as good practice to bridge institutions and organisational cultures. Criticism arises because this engagement often overlooks sub-specialisations by organ or tumour site; professionals ‘often do the same at both hospitals’. A primary step should be making decisions concerning pathologies like sarcoma or melanoma (identifying reference experts, etc.). In another vein, keeping continuity of care for patients is of great importance, not only for patients referred between providers, but for those who are followed by physicians working at two network sites.

The need to achieve more synergies among medical oncologists on medical issues is a recurrent theme, especially when clinical departments do not exist as such and the speciality is embedded in other departments. In this regard, a ‘medical discussion platform’ (MOP) was created in order to gather medical oncologists (and other specialties) from the whole network (see 4.1.1). The MOP is intended to promote consensus on the use of specific procedures or to question why similar cases follow different clinical pathways. Good cooperation on education is already put into practice when postgraduate meetings are held at the different hospitals.

‘We are going to meet three times a year to talk about big issues, like treatment protocols, which deserve a lot of discussion in Europe... in order to treat all the patients the same way.’

The five Iridium haematologists incarnate a real network team, a set of professionals organised across the network. The hub holds the reference unit for bone marrow transplantation, isolation of patients, etc., but they work as a crosscutting specialty team, covering the needs for the whole network and attending the MOCs. Nonetheless, when the idea to hire two other haematologists came up, they were finally hired by the hospitals that wanted them (not by the hub), underlining the perception of ‘individual resources’ and their effective, day-to-day integration in the local multidisciplinary teams. The small size of this service, combined with a clear willingness for cooperation, explains its high integration, which is reinforced by evenly splitting the workweeks of two specialists between the mother centre and their ‘home’ centre.

‘Sub-specialisation is important for clinical studies and training. And we have a commitment among us that if we have a difficult case then we ask for expert advice from each other. We have
a close interaction; we are also like a scientific group. We also have local guidelines, and periodically we come together to discuss and update.'

Surgery was not formally involved in the launching of Iridium, but the involvement of this specialty is a matter of discussion, and in fact they participate in the different network committees. They are organised on a speciality, hospital basis. Integration with other surgeons or surgery specialties remains a challenge, especially when planning the centralisation of some treatments (e.g., brain, pancreas, sarcoma). Transmural cooperation takes place in the case of breast units or other pathologies like pelvic surgery, whereby an expert gynaecologist from the hub treats patients in other hospitals of the network, participating on different teams and avoiding referral of patients.

'Surgeons make up one group at each site. Integrating that in the network is almost impossible. The only thing you can do is promote the adoption of the same guidelines.'

General nurses working in cancer services feel underrepresented; they are not engaged in a specific work package for ‘day-to-day problems’ (beyond specific topics, see below), nor are they properly represented in the governance committees.

Paramedical specialties: Exchanging information and best practices

The Belgian cancer plan boosted supportive cancer care in 2009 by directly funding paramedical specialties. The number of these professionals included at each centre was associated with the number of MOCs carried out. These specialties included psychooncologists (psychiatry background), oncocoaches (broadly speaking, nurses dealing with emotional issues), social workers, nutritionists and data managers. Such initiatives entailed a significant increase in paramedical specialists working in hospitals, constituting a whole cancer support team.

In some cases, the increased number of professionals facilitated their specialisation on the basis of tumours or care phases, particularly for breast, digestive and lung cancers. However, their incorporation in MDTs and the effective running as a consistent group was not easy. This process took place in the absence of specific guidance from the planning stages, and every hospital organised such settings differently. This led to some lack of cooperation with clinical teams in place as well as within paramedical specialties themselves due to overlapping roles and competences. Sometimes they were included in the hospital through work settings lacking a direct relation to cancer services, hindering their engagement in multidisciplinary teams.

'I have to communicate very well with the head department of nutrition (head of the kitchen) in order to commit the tasks of the onconutritionist.'

Different work groups were organised including most of these profiles and others at network level (e.g., nutritionists; pathologists discussing the registry forms). They aimed at exchanging best practices and learning from each other’s modes of collaboration (a key issue, given their incorporation). Some members of the management committee of Iridium are responsible for their organisation, interaction and contents. The importance of these groups has increased since its creation. At the time of this assessment, they were preparing
a common educational programme for all network patients. Also, a specific group was created to better manage all the initiatives launched by the Belgian cancer plan.

‘From now on social workers and psychologists have to go together in a group. They’re not happy about this because they have other purposes. A good thing is that they have to work together.’

The partnership of Iridium and the University Hospital of Leuven (UZ Leuven)

The University Hospital of Leuven (UZ Leuven) and Iridium signed a cooperation agreement by which a formal process for feedback was set up for clinical research, expert updating for radiation oncology (e.g., brachytherapy), medical oncology, haematology, some surgical interventions (e.g., gynaecological cancer) and physics. Exchanges take place when consultant professionals move to/from both institutions once a week/month, especially in the case of radiation oncology and haematology. These consultants are not junior doctors, but staff members who give advice on new developments. UZ Leuven assumes the role of quaternary centre relating to Iridium as regards some rare cancers. Regular meetings between both partners are held to improve the young partnership.

The dimension and importance of UZ Leuven for Flanders and Belgium is worth briefly noting. The university concentrates 60% of the medical students of Flanders and is a central hub of a network of hospitals comprising more than 13,000 beds. Funded by the National Scientific Board for research, the university is located in the small city of Leuven (90,000 inhabitants). Interorganisational cooperation is essential for this institution, and significantly, many Iridium physicians were educated there, which is an advantage in terms of trust, mutual understanding, and potential cooperation. However, medical oncology exchange still lags due to different views on clinical trials organisation and the above mentioned fragmentation in Iridium.

‘In case of Leuven’s network, we have the same clinical protocols and when we want to change it, we discuss it also with Iridium as this might impact them too.’

‘A lot of physicians are trained in Leuven and physicists. Clinical doubts are contrasted in both ways. We have two radiation oncologists on our team who are working one day a week in Leuven, this way we maintain the liaison.’

3.1.2 ICO

The connection between hospitals is set up on the basis of medical and radiation oncologists of the hub staff working at both the hub and the spokes. Some of ICO’s medical oncologists (who, unlike in Iridium, control all chemotherapy-based treatments) are specifically hired, designated and decentralised for this task, becoming network-based medical and radiation oncologists. Interorganisational cooperation is based on the
distribution of their work time: medical oncologists work three days a week in the spoke (where they use the local dressing gown), and two in the hub.

Thanks to their connection with the hub, medical oncologists act locally as general oncologists while keeping part of their specialisation, attending tumour boards, and receiving firsthand information on new treatments and clinical trials. This system seems rewarding for them, but some are discouraged by the lack of recognition for their specific tasks. As a matter of fact, their boundary-spanning role may have a great added value for ‘peripheral’ patients while, in fact, a split workweek hinders the doctors’ potential involvement in clinical studies, which ‘seem to give more prestige than anything else’. It was also noted that there is mismatch between medical oncologists of different spokes in terms of caseload management: variation ranges from 150 to 250 visits a year. One of the network’s medical oncologists is responsible for dealing with day-to-day issues like professional turnover but lacks any formal power.

Some medical oncologists have been hired locally in recent years, a sign of some grey areas in this system. In general, engagement with local teams is considered successful, and this is the main strength of the network.

**Radiation oncologists** bridge hub and spokes by attending local tumour boards (every week or two) and visiting some patients. As with Iridium, some consider this insufficient, and medical oncologists play the role of advisor of this specialty within the tumour board whenever radiologists cannot attend it. This situation might prevent patients in the spokes from receiving as much radiotherapy as those in the hub’s immediate vicinity.

Highly complex procedures in *haematology* are concentrated in the three hubs, where patients are referred. However, unlike medical oncology, this specialty is not controlled by the hub, as every local hospital has its own staff. The level of cohesion and coordination at network level is nonetheless very high. Local haematologists are regularly invited to the hub to exchange best practices and learn from each other’s expertise through a group-learning dynamic.

On the whole, such an interprofessional system allows the networking of medical cancer services on the basis of clinical complexity. However, some other services belong to the ‘guest’ (local) hospital (e.g., radiology, urology) and some services (like palliative care) are offered at both the hub and at the local hospital. It is worth noting that professionals working in local hospitals (e.g., medical oncologists, palliative care specialists, etc.) make up ‘cancer units’, that is, a much more relational organisation than that of the hub. This challenges the integration of the whole spectrum of specialists and the standardisation of clinical pathways. The engagement of hub professionals with local, surgical specialties (e.g., urology, gynaecology) is a key dimension.

Good coordination, rapport and mutual trust are essential in aligning a common approach to cancer care and managing day-to-day issues. A step forward in this regard has been the small proportion of referrals between organisations through the use of local tumour boards and integrated tumour-based units in the hub as clinical gateways. This configuration is not yet systematic, as these hub units (or quite comprehensive tumour boards) do not always
fulfil key organisational criteria (e.g., multidisciplinary and integrated care planning for all patients).

Beyond the role of medical and radiation oncologists, the way forward for the ICO network at the professional level seems to lie in strengthening professional ties by providing common educational programmes, creating crosscutting work groups or streamlining IT communication. This could be a first step to later on developing integrated care pathways (see 3.2) taking into account the reality of the three sub-network areas. Greater standardisation of procedures and clinical decisions could be achieved if managerial and governance structures were better developed (see 2.3.2).

3.1.3 ROL

ROL leaders contend that the purpose of sharing clinical information, and to some extent structuring processes of care (e.g., second opinions, interhospital cooperation, etc.), is enabled when ‘everyone speaks the same language’. To that effect, standardising the documents likely to be managed by the different nodes of the network is especially important. This is ROL’s basis for action.

Information systems for clinical management integration

Interoperability is the most critical element for a network like ROL, which is based on professional interaction through an IT system and aims at data exchange and communication improvement. ROL implementation entails normative goals in the use of information and communication channels to be used by stakeholders involved. This is considered a first step in overcoming part of the heterogeneity and fragmentation that characterises specialised care in the Lombardy NHS.

ROL defines a communication model based on the interaction of three IT systems or tools:

(a) **Socio-Healthcare Information System (SISS)**, which is a common IT platform provided by the regional government. Using SISS is mandatory when a provider agrees to offer health services. The fifteen local commissioners gather and control the hospitals and GPs activity data through SISS, and in turn, these data feed tumour registries. Lombardia Informatica, a public firm controlled by the government, is responsible for managing the system by patient.

(b) **Electronic Health Records** (in its Italian acronym, FSE) and the **ROL medical folder**. The FSE, embedded in the SISS, gathers all documents generated by the single patient (programming, etc.). Both GPs and specialists can access the records, although technically, the FSE is separated from the ROL medical folder, a kind of electronic platform/warehouse embedded in SISS that collects all cancer related information.

(c) **ROL-DOC template**. The ROL-DOC template, created through the ROL medical folder, is a global oncology report reflecting all the relevant clinical events of every single cancer patient (e.g., referrals, test results, etc.). It is defined by standardised clinical
grammar and organised by disease stages in a way that matches ROL’s clinical practice guidelines structure. Its implementation would imply both the possibility to systematically aggregate relevant clinical information and validate appropriateness of clinical decisions. It is intended as a medico-legal document and, ultimately, as the key source feeding administrative databases. This last step would allow connection of clinical and administrative databases, making valuable knowledge available on patient flows and resource utilisation per patient as well as the related clinical outcomes.

In any event, most professionals are electronically engaged just by accessing the SISS. The idea behind the ROL medical folder and the ROL-DOC template is to facilitate real-time data consultation of discharge reports, outpatient visits, etc., by any provider (with proper access) from the healthcare system. Assessment of this model is summarised as follows:

- The ROL-DOC is stressed as the most important unifying element of the ‘cancer healthcare system’. Thanks to this, standardised information can be generated and shared. However, its level of implementation is low because for most of professionals, its effective operation involves filling in clinical data twice: first in the hospital’s IT system (or paper-based reporting) and second in the ROL-DOC template. Only a minority of professionals can generate this document automatically, which has led to many professionals giving up the ROL-DOC fulfillment, impairing potential connections among professionals/hospitals. The extent of its use is a real condition for network operation.

- Taking into account the high degree of IT fragmentation in hospitals (similar to that of ICO and Iridium networks), many technical problems hinder the potential for IT interaction. For example, documents included in the FSE are non-modifiable PDFs (at the time of study), effectively impeding interaction.

- The ROL platform aimed to create a comprehensive and standardised medical history for all cancer patients in the Lombardy. This is mostly considered a failed attempt.

- The SISS already allows a shared follow up and monitoring of patients between specialised care and GPs (including a warning notice when a test is needed or the drafting of the patient summary, which includes a global health perspective). Professionals demand to take advantage of SISS.

3.2 Degree of integration and organisation of care pathways

Intensive, network-managed care delivery may trigger the development of integrated care pathways with a network perspective. None of the networks making up this study can be considered a ‘fully integrated network’ (Ferlie E, 2010), and therefore the creation of integrated pathways cannot realistically be assumed to be an objective—at least right now. Integrated Care Pathways (ICP) are defined as structured, multidisciplinary care plans which detail essential steps in the care of patients, according to their specific clinical problem. Such a tool makes sense in a network context, as it can formalise patterns of care across clinical departments and hospital boundaries, adding predictability and providing for a
transfer of knowledge (Davis N, 2005). Intensified interaction among the selected networks has led to some steps in this regard.

Planning ICP development is facilitated when there are IT pathways—medical files exchange, access to electronic health records, videoconferences, etc.—in place. ICO and Iridium hospitals are fragmented in this sense, unlike ROL, where a structured approach to this dimension is a cornerstone of the network’s conception. In any case, these IT pathways also raise confidentiality issues, which are an important consideration.

3.2.1 Iridium

Beyond the fact that some procedures were centralised around certain network sites, especially the hub, formal care pathways have not been created in Iridium. Theoretically, the perspective of increasing crosscutting clinical pathways would be facilitated by Belgian cancer policy. This consists of setting the level of cancer care delivery in accordance to three different programmes, broadly speaking, ‘basics’, ‘medium’ and ‘high’. On a practical level, this approach implies that ‘basic’ or ‘medium’ programmes would include clearly bound competences for some treatments (e.g., for breast cancer) and others (e.g., sarcoma) that would likely be coordinated and shared with other structures. However, significant grey areas, or ‘cognitive boundaries’ remain between these two poles, and given the ongoing competition for patients and incomes related to the capacity to treat, hospitals try to permanently increase the available portfolio of services.

Iridium sensitively modified the operative scale for cancer care provision. On the one hand, patients potentially referred to Gant, Leuven or other hospitals of Antwerp are now mostly managed within the network. On the other, Iridium concentrated cases for high-complexity pathologies and promoted access to expert advice, often keeping the patients in their own hospital. A lesser degree of pathway coordination was achieved from a clinical expertise perspective, limiting an effective sub-specialisation by pathology.

One professional said, ‘It’s difficult to agree on this kind of situation [coordinating care and using agreed protocols] because oncology is always moving forward and when you make a handbook, [a] half year later you can rewrite it.’ Nevertheless, at the moment of conducting this analysis, a discussion was being held about centralising complex surgery for pancreatic or liver cancer, implementing in this attempt some kind of ICP. Overall, changes are mostly perceived in Iridium in intra-hospital terms (relationship among clinical departments), that is, just as in Lombardy, the most important transformations arise as a result of multidisciplinary, integrated approaches to cancer care and local sub-specialisation.

Referring patients between structures is neither frequent nor rare (except for radiotherapy). When it takes place, the comprehensive use of MOCs ensures good clinical integration upon arrival or departure from the hospital. From a patients’ perspective, pathways are not standardised, but migration in Belgium is common and professionals are used to receiving and providing care to ‘migrant patients’.
3.2.2 ICO

In comparison to Iridium and ROL, ICO hubs have an advantage in terms of clinical governance: most of the spokes (local hospitals) are small, which somewhat limits potential professional turf wars over competences and patients; expertise is highly centralised in the hubs. Indeed, the ICO network is the oldest of the three, and grey areas have been navigated through evolving relationships of trust (and conflict) over the years. However, no integrated care pathways have been implemented.

Local cancer care provision is informally constrained by clinical complexity, range of services offered (e.g., intensive care unit, day-hospital length of time), and the availability of technology and tumour specialists. Local hospitals and hubs agree on the level of cancer services delivered in the spokes, and since there are as many agreements as pairs of entities/relationships, the strategic functionality of the network is strongly conditioned by a dyadic logic (one-on-one agreements).

There is a critical need to clarify the responsibilities of the physician in charge when treatment delivery is co-managed by both institutions, for example, when a patient undergoes local surgery and is referred for radiation therapy or a clinical trial, or when local treatment takes place after consultation with an expert tumour specialist at the hub.

'This should be clarified in the agreed services portfolio: clinical tracks and monitoring. I don't care if they [the local hospital] follow patients treated here: however, if they do so and a patient worsens while being at an advanced state of the disease, he cannot be referred here in ambulance at 3 pm. This is unacceptable.'

'The network empowers the hub, especially if care pathways are well-defined.'

Like Iridium, the ICO network increases the degree of pathway integration by taking advantage of multidisciplinary settings. For the minority of patients who need to be referred, local tumour boards (generalist or, in some case, specialised in breast, colon, lung and urological cancer) work with integrated tumour-based units in the hubs to refer or accept patients. Such a tumour board’s system controls both patients treated locally and those referred. However, their level of implementation is not fully achieved, and data on this is not yet available. Still, some cases are sent directly without the local team monitoring but ‘in accordance to the clinical protocol locally agreed, and later reported to the tumour board’. It is worth noting that local tumour boards do not have administrative support. In any case, changes made in this field have contributed to lessen the feeling that many cases were ‘lost’ because of the informal contacts between services. Such a smooth transition through tumour boards is also facilitated by the significant constraints in patients’ migration imposed by the Catalan NHS.

An important problem relates to patients’ devolution to local hospitals. While there are clear points of access to the hub, devolution is not supported by a proper organisational approach or by the fragmented IT systems. With some exception, there are no crosscutting case management systems to formally articulate care pathways. However, even if the network’s medical and radiation oncologists are not official case managers, they play a key role in streamlining interorganisational pathways. It is not rare for a patient to be met by
the same oncologist in two centres; this is greatly reassuring to the patient. Furthermore, patients’ awareness of their physicians’ split workload across two institutions increases their acceptance in the event of a transition or referral. The recent implementation of electronic health records in Catalonia shows great potential to operate through bypass IT interfaces, but organisational responses are nonetheless needed.

Functionality of the tumour-based units in the hubs (e.g., head and neck clinical unit) is also enabled by two elements. First, nurse case managers (mainly available for the most prevalent diseases) span across clinical departments and act as a reference point for both patients and professionals. Second, clerical data in the hub is efficiently managed by an administrative structure that standardises patient referrals by ensuring that the right clinical information is included. ICO is currently addressing the need to hand out a comprehensive report to the patient at the end of the process.

3.2.3 ROL

Unlike the other two networks/regions, Lombardy (and part of Italy) has worked intensively to foster integrated processes of care. The so-called PDTA (‘diagnosis and treatment care processes’) are, broadly speaking, a comprehensive approach to care and planning for specific pathologies across all dimensions of cancer services. Its effective implementation implies dialogue and interaction between providers and organisations, and the idea of ‘translat[ing] the ROL’s network idea into a PDTA discourse’ is frequently mentioned. ROL and PDTA share the same primus movens: impacting the behaviour of providers so as to increase their capacity and willingness to cooperate as stakeholders through a coordinated approach to cancer care.

A healthcare system like the Lombardy one, in which patients freely migrate between facilities, should have a system that guarantees the quick and safe exchange of information. ROL, firmly supported by an IT system, corresponds to such a need. However, implementation problems hinder the assessment of current experiences in terms of collaborative networking. Cultural and local perceptions also matter in this regard. On the one hand, there is worry that a network approach would trigger ‘an excessive migration of patients, particularly towards Milan’. On the other, managers and professionals are also concerned about the best way to achieve certain policy targets, namely, comprehensively managing complex cases or allowing GPs to play a role in survivorship.

An improved transition among providers may certainly be achieved by ROL. The reduction of information costs among operators and a greater control of clinical care by the regional government can be achieved. However, policymakers and professionals point out ‘more managed’ solutions. For instance, professionals stated that some tumours (e.g., rectum) should be clearly approached through structured pathways and accreditation systems. In ROL discussions, surgeons call for a greater professional specialisation and a reduction of treatment scattering.
The ability to network cancer care and clinical research in the sense described above gives full meaning to the existence of ROL. Competition among suppliers may make sense in policymakers’ minds for the city of Milan; for the rest, ensuring the most appropriate service delivery (professional expertise and availability of technology at a rational cost) may require the development of population-accountable approaches. As Iridium and ICO experiences show, network ties can be compatible with retention of most patients in their reference centres and assurance of good quality care.

Cooperation at a network level is a recurrent theme in relation to the level of multidisciplinary care development (tumour boards and tumour-based units in the case of ICO, and MOCs in the case of Iridium), a key element when planning integrated care processes. Regardless of its specific forms, and with significant exceptions, the implementation of multidisciplinary care in Lombardy is considered weak. Two aspects were stressed:

- First, a more integrated approach is required, away from the traditional model based on ‘exclusive’ professional competences (ultimately, bureaucratic privileges), which some specialties have had for a long time (i.e., urologists in prostate cancer). The status quo is that treatment planning is often dependent on professionals or clinical departments acting as gatekeepers, without any multidisciplinary decision-making process or consultation. However, changes are taking place at hospital level. A greater cooperation is emerging due to a new wave of physicians willing to cooperate, get specialised and share clinical results.

- Second, the process of ROL-clinical practice guidelines development (see 4.1.3) shows a sense of ‘professional community’ that did not previously exist, especially for medical oncologists and surgeons. Such successful experience should be considered promising in multidisciplinary terms too.

The need to verify in the ROL-DOC document whether or not treatment decisions are made in a multidisciplinary way was proposed as a way to foster consensus mechanisms and cooperation. This discussion is framed as well in regard to the ageing population context and the need to improve the interface between acute and chronic care.

‘Concerning the colon cancer, a general surgeon should be able to operate it even in the hospital of Sondrio [mountainous region]. But in the case of locally advanced rectal cancer, the approach should be integrated, multidisciplinary, with high clinical competence and available technologies that not all sites have. The patient could be operated locally (or referred) and, taking advantage of ROL mechanisms, referred afterwards for radiotherapy. Then, the reference hospital may well retrieve the patient and administer adjuvant chemotherapy. Or maybe, thanks to the network, the small peripheral hospital may decide to keep the colon and refer all rectal cases. Obviously, such decisions are favoured if you work in the context of a network.’

‘Tricky but essential elements in a network are the second opinion. These must be experienced as an almost natural mechanism, and not as a threat to losing patients. The maturation takes time and years. The network, in short, is the only way to bring together interests and skills.’
3.4 Primary care and networks interface

Although this study primarily addresses hospital networks, primary care engagement was also included, as this level of care has an emerging role in cancer care (e.g., early detection and follow up of survivors).

Figure 3. Main features and experiences between levels of care in cancer organisation

<table>
<thead>
<tr>
<th>Primary care provision type</th>
<th>Iridium Cancer Network</th>
<th>Catalonian Institute of Oncology (ICO)</th>
<th>Lombardy Oncological Network (ROL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formally engaged in the network</td>
<td>No</td>
<td>No</td>
<td>Yes; a work package is devoted to GP issues</td>
</tr>
<tr>
<td>Main experiences between levels of care (unsystematic)</td>
<td>GPs involvement in MOCs (tumour boards) &amp; shared follow up of some patient profiles</td>
<td>Shared follow up of some patient profiles at one sub-network area</td>
<td>Shared follow up of some patient profiles (especially breast cancer patients)</td>
</tr>
<tr>
<td>Main experiences between levels of care (systematic)</td>
<td>Report of the acute process of care sent by the nurse</td>
<td>Fast-track system for referring suspicions of five tumour diseases</td>
<td>-</td>
</tr>
<tr>
<td>Possibility to refer patients to different specialised providers</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.4.1 Iridium

GPs are invited to participate in the treatment planning discussion of their patients. Regardless of their participation (which essentially depends on their work schedule), GPs are sent information on the MOC decisions and a report at the end of the acute process of care. This is not a network-based decision, but a cancer policy action for Belgium. Their effective involvement is compensated through a fee from MOC’s reimbursement scheme.

Direct communication between levels of care improved as a result of the implementation of MOCs. Involvement of GPs is reported to be easier in the case of small hospitals:

‘We have a transmural agreement with GPs about how to follow a patient. In the first two years the patient is seen every three months, once by them, once by us. Then, it’s shared on the basis of six months, and then, after ten years, the oncologists don’t see the patients anymore; it’s just the GP. We try to make sure that all GPs do a proper follow up, because some do examine the women, others do not, etc.’

3.4.2 ICO
The relationship between specialised and primary care within the ICO network is a local matter. ICO hubs show some problems with the (informal) devolution of patients to local hospitals; implicitly, this means that most transitions are not formally followed at the primary care level.

It is worth noting the change entailed by the Cancer Fast-track Programme for referring suspicions of breast, colorectal, lung, prostate and urinary bladder neoplasm, which has developed in Catalonia since 2005. It was the first formal engagement of GPs and primary care nurses with cancer care, and it has improved communication between levels of care (Prades J et al, 2010).

3.4.3 ROL

Unlike in the other two networks, GPs have been involved in the ROL project from the beginning. They have a position both as technical advisors of the network in the COR and on the work package devoted to primary care issues (Fait et al, 2007). Furthermore, GPs in Lombardy use the same regional IT platform as hospitals (the SISS, see 3.1.3), and this allows them to consult clinical documents from the electronic health records of patients (mainly, referrals, discharge and recovery reports) and the ROL-DOC document, if available. This way, both parties can verify that a follow up is properly carried out (i.e., diagnostic tests, etc.).

Several experiences are reported concerning the shared follow-up of cancer survivors, especially for breast and colon cancer patients. Indeed, some plans originated in the DIPOs and were implemented thanks to the ROL IT platform. However, positive experiences did not lead to any specific assessment or regional interest to streamline best practices, which would have enabled benchmarking. Nonetheless, it is thanks to ROL that discussions on cancer survivors emerged as a key issue for GP participation, breaking a markedly hospital-based model. As one GP argued, ‘these are emotions to be ruled’.

For GPs, ROL has created the possibility to develop a culture of integration between levels of care. However, they find operative difficulties in making such involvement effective through ROL.

‘Without a proper evaluation, lessons to be learned from local projects are lost and, what’s more, many experiences in sharing follow-up lacked any continuity when their implementation was initially funded by the regional government.’
4. INNOVATION AND KNOWLEDGE MANAGEMENT

4.1 Use and adoption of scientific evidence

Sharing a common body of evidence is a current concern for all cancer networks. Although perspectives and goals differ in this regard, a context marked by easy access to the multiple, existing clinical practice guidelines (CPG) actually hampered initiatives made at a network level. Ultimately, physicians’ actions are not based on the framework of a single CPG, and evidence used results from a compilation of different sources. The inherent dynamism of cancer care with regard to the use of knowledge is an important challenge in managing networked organisations.

Figure 4. Main features of CPG and clinical knowledge discussions.

<table>
<thead>
<tr>
<th></th>
<th>Iridium Cancer Network</th>
<th>Catalan Institute of Oncology (ICO)</th>
<th>Lombardy Oncological Network (ROL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common network-CPG?</td>
<td>NO</td>
<td>YES, the ‘ICOpraxis’</td>
<td>YES, the ‘ROL linee guida’</td>
</tr>
<tr>
<td>Multidisciplinarity</td>
<td>NO</td>
<td>NO, lacking surgical specialties</td>
<td>YES</td>
</tr>
<tr>
<td>addressed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relational or IT structure for medical discussion?</td>
<td>YES, the ‘MOP’ (medical discussion platform)</td>
<td>NO</td>
<td>Meetings organised by the region with specific targets (non-systematic)</td>
</tr>
<tr>
<td>Data on compliance with any guideline or protocol</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

4.1.1 Iridium

Every hospital in Belgium develops a cancer programme, in line with a national, specialty-based handbook (for example, medical oncologists use a handbook set up by the College of Oncology), and endorsed by health authorities. Some hospitals have multidisciplinary ‘quality handbooks’. In practice, the use of evidence in Iridium is mainly hospital- and specialty-based.

For physicians and managers, having common guidelines was perceived as a potential problem, as many interests would be on the line. The process of information and negotiation in this area was perceived as very difficult and ‘perhaps, just for details’. Setting up uniform clinical standards would entail a ‘cultural challenge’ and a management problem, especially for a young network whose launch implied the establishment of different consensus mechanisms at the professional level. Guidelines—an evidence-based
The discussions, however, have not been without their challenges. Iridium guidelines are perceived as ‘external’. At the same time, any attempt to create real Iridium guidelines would not be ‘as big as those of Leuven’. Lastly, the added value of the Iridium-Leuven partnership is mainly associated with access to professional expertise.

The need to align evidence and clinical practice at a network level remains a problem, as this cannot be pursued through national or scientific societies’ guidelines, ‘which are rough at the end’. Iridium dynamics include a growing scientific discussion and awareness about the need for clinical consensus. The ambition to streamline the use and adoption of scientific evidence at a network level exists because its fragmentation is identified as one weakness of the network. Specifically, there is a need to align clinical protocols in the medium term and, globally, to foster the standardisation of clinical pathways, without infringing on each hospital’s decisions regarding the organisation of cancer services.

The use and adoption of scientific evidence should be framed by the fact that the level of medical sub-specialisation in Iridium is considered quite low, while the range of cancer services provided at each hospital is wide. Lack of sub-specialisation by tumour site might work against the need to better focus and control scientific evidence at a network level.

An important step was taken to change this situation. In order to promote medical discussions, the medical committee of Iridium set up a network-based Medical Discussion Platform (MOP) with the goal of sharing medical topics, synchronising the use of CPG, and discussing variability in medical practice to promote standardisation. The MOP is considered an ongoing virtual platform, but physical meetings also take place three times a year.

‘MOP will be important in regard to the use of particular technologies, like antiemetic. But also for collaboration among specialists in order to discuss why the same cases show different pathways. For instance, the involvement of the specialists (e.g., a stomatologist) for a particular neoplasm is [a] given in one hospital but not in others.’

The strong integration of the radiotherapy service and strong ties among haematologists has prompted their reputation for being ‘stand-alone specialties’ within the network; a good example of this is that they have a single clinical protocol. On the other hand, medical oncology shows a higher fragmentation by hospital in managing knowledge. Ultimately, the MOP is not only interesting in terms of consolidating monodisciplinary linkages, but also multidisciplinary-based consensus views.

Finally, it is worth noting the wide consensus about the weakness of accountability for clinical decisions (transparency, peer review). ‘Controls’ to check adherence to CPG or local protocols are mainly internal, that is, originating within the same clinical department. In fact, hospitals have had to take initiatives to correct this at the behest of the federal government. There is an increased policy interest in developing indicators and linking them
to guidelines, and some kind of funding mechanisms are being implemented. However, professionals insist on the need of ‘proving that CPG are followed and that quality of care is good’.

Some experiences in postgraduate education can also be identified.

4.1.2 ICO

Some elements of the ICO network show an evolution from a professional-based network to one another where vertical forms emerge through network management structures in some areas. However, management of evidence from a network perspective is still far from the current case.

Icopraxis: the ICO network clinical protocols

There are clinical protocols for nine pathologies that have developed since 2007, the so-called Icopraxis. The result of a consensus process among specialists of the three tertiary centres and some of the local hospitals, the Icopraxis are aimed at increasing standardisation among all centres making up the network. However, a clear limitation is that they do not include surgical treatments, which utterly limits the possibility to link clinical results with their use (as more than 75% of cancer patients undergo surgery) or increasing control on cancer services performance.

Two contextual elements related to this process should be noted. First, ICO is a public provider of cancer services hosted by the hubs, that is, within other providers and involving their professionals (diagnostic and surgical specialties, etc.). Naming these protocols Icopraxis was thus perceived as intrusive. Also, the Catalonian cancer plan was launching guidelines at the same time, and the evident lack of synergies between both sides was not positive.

The Espoq software and the parallel pharmacy network

Interestingly, though, such clinical work, plus the leadership of the ICO pharmacy service, was further used to develop a key network change: a system able to control the acquisition and delivery of chemotherapy treatments. The Espoq software, created by the pharmacy department of the mother centre, served to this change. The request for chemotherapy is only made through this software, which is based on the algorithms defined in the Icopraxis. This way, the delivery of chemotherapy matches the medical practice agreed at a local level.

The spread of this software to some of the network partners is not easy for technical reasons, but also because it means that medical oncologists would have to relinquish some control; in relation to the ‘grey areas’ of decision-making. Clinical protocols are agreed and, when Espoq is implemented in local hospitals, constraints in the requests for chemotherapy are created.

Clinical accountability and interorganisational ties
The model of interprofessional cooperation (see 3.1.2) entails to some extent linking teams from different structures. The work of network-based medical oncologists is particularly relevant as, informally, they contribute to disseminating innovations (e.g., when the sentinel lymph node procedure was introduced) and standardising work systems across the network. In fact, some network medical and radiation oncologists stressed the need to ‘work hard’ in order to introduce certain medical treatments (e.g., neoadjuvant chemotherapy) in non-specialist environments.

Accounting for clinical rationales and decisions made with regard to patients referred between hospitals teams can be an important issue; sometimes treatment is prescribed locally and then the patient is switched to the hub, which is normal given the higher specialisation there. However, some local professionals may disagree or just see such decisions as an external issue. In all events, sharing the rationale on decisions seems to be an opportunity to align clinical practice across network nodes and thereby increase compliance with network goals and values. At the time of this study, only the Head and Neck MDT-unit of the mother centre accounted for the decisions and treatments applied to patients referred by other centres by writing a weekly report.

Lacking systematic clinical outcomes at the network level hinders the ability to assess quality, boost clinical expertise and benchmark among institutions. A project to reverse this situation has been initiated in the form of the Office of Oncological Results (in its Catalan acronym, ORO), which is intended as a scorecard able to detail network patients’ survival.

‘If we want to have a regional view of cancer care outcomes, it is important to share data generated at network level. There has been neither the appropriate instrument nor an active interest in evolving in this direction.’

4.1.3 ROL

ROL-clinical practice guidelines (‘Linee Guida’, ROL-CPG)

Developing tailored clinical practice guidelines (ROL-CPG) for the most prevalent diseases has been a central project of ROL. The Istituto Nazionale dei Tumori (Milano) was appointed as the leader of the initiative, and then experts were identified for each target pathology, and work groups were launched.

Important elements in the design of this initiative were as follows:

- The development of ROL-CPG, including professionals both from public and private-accredited centres, was very fruitful, earning praise as the ‘first successful multidisciplinary and multicentre work in the region in cancer care’. Experts from all areas were approached for their involvement, and some were proposed by the DIPOs.

- All meetings took place in the central headquarters of the regional government; strong political commitment was clearly voiced and perceived.
- In creating the ROL-CPGs, the idea of tailoring the guidelines to the specific reality of the Lombardy healthcare system was emphasised.

- The ROL-DOC document (see 3.1.3) corresponds in its structure to the ROL-CPGs (e.g., stages of the disease, etc.). This way, verification of decisions can be effectively made.

However, the policy framework designed to accommodate such a consensus process on ROL-CPG showed some problems in its operational development:

- ROL-CPG indications are not at all mandatory. What is agreed at network level is by no means locally binding. A key operational weakness, then, is the lack of strength of clinical recommendations and control thereof.

- Difficulties in updating ROL-CPGs and their low use are seen as a consequence rather than a cause. If ROL-CPGs ‘are really setting up the rules, then professionals are those primarily interested in their updating’. Instead, ‘control mechanisms [of clinical decisions] reside somewhere else.’

- A common criticism describes ROL-CPG as ‘too inclusive’. It should be understood that the degree of appropriateness in decisions have not been properly achieved, as ‘ROL-CPGs are not really prescriptive’ and ‘the original idea was not producing other merely scientific guidelines’.

- Lack of ROL-DOC implementation weakens potential knowledge on compliance with indications proposed by ROL-CPG as well as the verification of appropriateness of decisions.

- ROL-CPGs are the result of intense work carried out between the regional government and the professional community. However, ROL-CPG implementation is not accompanied by a strong role for healthcare organisations and local commissioners, whose efforts were instrumental in the case of the IT tools implementation.

- Once the ROL-DOC document and the ROL medical platform are effectively installed in the clinician’s computer, a treatment modality can be chosen in line with ROL-CPG recommendations. However, in the event of choosing another course of treatment, the physician just records it without needing to justify the decision. For a young network like ROL, this nonetheless suggests its huge potential.

‘The ROL-CPGs attracted much attention but ultimately it remained abstract.’

‘The idea of the regional government was to make a sort of agreement with professionals, that is, not to redo scientific guidelines, but it was to say ‘in the Lombardy we agree to do so in this way, so tell me what is acceptable with respect to cost and quality’. Despite problems in implementation, discussions held show that were are moving forward. It has been a sign of maturity.’

Some considerations have been made to improve this situation:

- ROL-CPGs set down some indications that then clinicians should adapt. Any significant variation from such agreed indications should be justified (e.g., preoperative chemotherapy for rectal cancer is not administered when needed). Furthermore, if the CPG (based on
professionals’ consensus) are intended to be normative for all professionals, the regional government could not reimburse the delivery of some treatments. This is seen as a ‘critical but necessary step.’

- Variability in clinical practice is also highlighted in discussions on ROL-CPGs adoption. For some diseases, the development of regional guidelines could be complemented by tighter criteria in cancer services organisation (e.g., integrated units, critical masses, reference centres, integrated processes); otherwise, standardised treatments will be even more difficult to achieve.

- The PDTAs (integrated processes of care) are consistent with ROL-CPG, as ‘a translation into practice of what is theoretically defined by the guidelines’, including with regard to cost-effectiveness and other concerns. Both PDTAs and ROL-CPGs should be implemented and strengthened together.

- The involvement of healthcare organisations, commissioners and scientific societies should increase to facilitate compliance with ROL-CPGs or with specific, consensus-based recommendations.

4.2 Potential for clinical and outcome research

Clinical and translational research

Cooperation in the field of clinical research is one of the main pillars of ROL. Advantages of the virtual integration put forward by ROL are evident: the potential for cooperation is for an entire, very populated region. Widespread knowledge of available studies among professionals is included among the objectives, and potentially benefits include a more effective referral of patients. A context marked by the rise of BRICS in biomedical research is clearly spurring such a systemic approach. In this regard, it is observed the need to take advantage of the high quality of data offered. Within the ROL framework, several multicentre cooperative research projects took place in 2012 (43 operative units were involved). In clinical trials, making information available is seen as a first step. In the medium term, the interaction of the IT system in this area is contemplated, for example, by enrolling patients who meet a specific profile for a given clinical study.

Two appeals are widely shared: (1) to accelerate the bureaucratic process for the so-called ‘centres of excellence’ that perform advanced clinical research; and (2) to engage the participation of professionals from smaller centres, not just researchers from the Istituto Nazionale dei Tumori (Milano) or the Istituto Europeo di Oncologia (IEO), which are already leading international cooperation in the region.

‘ROL should become the framework for the coordination of experimental research, for example, providing treatments for second or third lines at different centres while control is exercised from a given driving centre.’

Iridium clinicians draw attention to the fact that cancer networks cannot be considered a single partner for the pharmaceutical industry. The reason is that ethical committees are
hospital-based; current legislation for clinical trials is clear on this. For instance, recruitment of patients cannot be organised at a network level. This problem occurs when industry evolves towards working with recognised centres, ‘big partnerships able to offer big numbers in shortened times’. Although this problem is common for all networks, Iridium faces the main challenge because it is the smallest network. However, increased collaboration with the University Hospital of Leuven, including translational research (e.g., inflammatory breast cancer in Iridium or rare and gynaecology cancer in Leuven), should be taken into account.

Clinicians cooperate in Iridium (e.g., mielodisplasia in AZ Klina hospital) as well as with Gant experts for specific pathologies. It is worth noting that networks show limited collaboration in this field. The referral of patients to other hospitals hosting clinical trials is the prevailing perspective.

‘It is not allowed to be the PI (principal investigator) for five hospitals.’

‘There is a lot of discussion in the European Commission about clinical trials. Legislation perhaps will be changed in 2015. For academic trials, one ethical committee per country will be fine. They are going to centralise a little; apparently this would improve our tasks as clinicians. The legislation to carry out a trial is enormous.’

It is expected to implement an intranet among all ICO network hospitals to streamline the selection of patients that enter clinical trials. Agreements between hospitals do not deal with this issue; however, there is no question that most of trials are carried out in the hub, as the spokes are mostly small, local hospitals.

**Outcomes research**

**ROL** also shows great potential in outcomes research. For instance, the region would fund a new cancer drug for melanoma that exceeded budget (costing approx. 80,000€ per patient) only if professionals/ hospitals report the related data (i.e., response, survival, toxicity, etc.). This would shed light on how effective a drug is in relation to what is stated in the trial, as the centres would react instantly under the penalty of including the cost in their internal budget.

Another example would be an expensive drug like Imatinib and its use for chronic myeloid leukaemia. By reporting the data in real time, there would be a possibility of safely suspending the therapy under certain conditions (starting with patients’ informed consent).
5. THE ROLE OF PATIENTS IN CANCER NETWORKS

Cancer networks and patients

The role of patients in cancer networks has been addressed only by ROL, as some of their representatives were included in the Regional Oncology Commission (COR), the technical advisor of the regional government in cancer control. The rationale was that if providers were engaged through a network model, patients’ associations should be networked, too. Interestingly, this process helped clarify and define the different ‘coverage’ that patients associations (globally, the third sector) offer; some diseases or patient profiles (e.g., paediatrics) are clearly covered and represented, while others are not.

For Iridium and ICO, which are more managed networks, such involvement is not that easy, but it is probably more important, as their approach is strongly committed to quality of cancer care in their respective regions. Patients should validate the mission and goals of networks and put forward their specific needs. Managers do not deny the importance of incorporating patients into advisory positions of the network, but no steps have been taken in this regard. As demonstrated in ROL, by achieving some kind of network of patients’ associations (if a regional federation is not in place), their representation would be stronger, and tokenism (symbolic involvement) would be avoided.

The UK experience with managed cancer networks showed the difficulties of selecting a proper patient profile for this task. They considered the need to count on a real representative of patients rather than a paid patient advocate, a ‘professional patient’.

Networking may imply an important change in healthcare services performance and, either by directly impacting its configuration or indirectly its decision-making processes, patients should be aware. A new structure of cancer services supply, such as a network, implies the need to rethink patient-centred approaches, whether they are referred between network nodes or not. Keeping or increasing personalised care in the context of a big network seems essential for patients’ confidence in their care.

Continuity of care (as a matter of fact)

Continuity of care should be a main organisational criterion for networks. How patients are referred, informed, admitted, and devolved to their reference hospital is of great importance in order to reduce the complexities of the healthcare system and to help them cope with managing uncertainty and logistical issues.

Mobility of patients, for different reasons, has been noted as a key element in the different networks; there are traffic jams in the metropolitan area of Antwerp, long distances between some nodes in the ICO network (an ad hoc bus system has been arranged) and mobility challenges for an ageing population in ROL. Beyond the internal organisation of cancer services, achieving seamless care across the patient pathway should mean approaching this dimension, too. To achieve high quality care, population-accountable networks may refer patients to other centres for specific procedures; this makes sense, but
the perceptions and needs of elderly patients from rural areas, who are reluctant to receive treatments far from home, should also be taken into account.

**Empowerment & interaction**

Actions addressed to improve patients’ wellness have only been promoted from a network perspective in *Iridium*. Each hospital holds organised working groups with patients on fatigue, oncorevalidation, group sessions, or mindfulness, with breast cancer being the most active group. ROL and ICO showed different experiences, but these were hospital-based, not network-based.

*ICO* hubs decided to improve their information policy by providing ‘hosting guides’ to patients, who would explain both the facility and care pathways, thus reducing the healthcare complexity. Also, the whole ICO network is served by the ‘ICO 24hrs’, a hotline that patients can call at any time for a first, fast response to any doubt related to their treatment.

Some of the *ROL* hospitals are involved in the HuCare project (HuCare, 2009), a reference experience in Italy. Its main aim is to implement evidence-based interventions that improve the psychosocial status of patients and their families. Measures include providing specific training for professionals and screening for distress throughout the care process. Likewise, it is worth noting that ROL IT development will include the possibility for patients to directly contribute to their own electronic health records by adding relevant data on their health.
6. SUCCESS FACTORS IN NETWORK IMPLEMENTATION & ASSESSMENT

Factors related to cancer network implementation can be categorised in four areas of interest: clinical governance, regional health system accountability, professional identity and culture, and network configuration.

Clinical governance

- Networking cancer services may imply, especially for managed networks like Iridium and ICO, the exchange of professionals and patients across different providers. In this context, continuity of care can be a challenge, as integrated pathways were not implemented and interoperability among the different IT systems was not fully achieved (or even pursued). Whatever the rationale behind the mobility of professionals and patients, continuity of care should be fostered by adequately taking care of the patients referred, streamlining communication between clinical teams, and properly arranging the devolution of patients to the reference hospital of the patient and primary care. For instance, professionals working at different network sites may offer specialised care access to patients in a local hospital, but this may entail lack of contact during part of the visiting time of the week. Any model of interprofessional coordination should be endorsed by firm, stable coordination and communication mechanisms to preserve seamless care.

- Whether a network represents a win-win strategy is to a great extent a matter of perception, although this seems very important for compliance with network missions and goals. ICO, due to its high degree of centralisation around the three hubs, and the lack of a real executive board beyond interhospital agreements, showed some problems in this regard; some partners (spokes, but also some hubs) feel they do more outsourcing than sharing in their cancer care. In fact, the sense of belonging to the network has eroded in the three networks, as centralisation of services also drags along the associated research. Clinical leaders and managers should oversee the clinical governance of the network in order to avoid partners and professionals feeling like ‘winners’ or ‘losers’.

Regional health system accountability

- Some aspects on network implementation should be addressed with regards to the role played by commissioners and health authorities. Such stakeholders are of extreme importance for the implementation of a top-down network like ROL, where the leader is isolated from the network, and the implementation process has been entrusted to relational mechanisms and incentives rather than on mandatory integration (in this case, through the adoption of IT tools). For meso-managed networks like Iridium and ICO, the role of health authorities contributes to, validates and to some extent legitimises their creation. It is worth noting how some drivers were taken for granted in the implementation process (like use of IT tools or the cohesion among professionals). However, the adherence to a network—a system of interactions, not one organisation—is a complex process. For instance, apart from the competition between hospitals, many centres are part of a larger
corporation or a public consortium, that is, many parallel factors can potentially influence network implementation.

- Some aspects should be addressed on network **organisation and operation** with regards to the role played by commissioners and health authorities. First, the position of the network is relevant with respect to close, competing providers, especially when exchange at network level is somewhat hindering potential cooperation with them, which could be of interest for patients and primary care. ROL and Iridium show how strategic cooperation may overlap and coexist with competition. This situation may be sustainable if it does not invalidate the advantages that cooperation offers in the context of the network. Secondly, the significant growth of the network, the development of vertical management mechanisms, and a centralised governance system (such as in ICO) create implications for how the network is entangled with its own regional context. In some European regions, like Tuscany, the cancer network is essentially the regional cancer provider; therefore, there is little doubt about the legitimacy of the network when fostering new approaches to cancer care through regional decisions. Lastly, the role played by **leading providers** (ICO or INT in ROL) emerged in the study as a key element. They are big public providers playing a key role in a way that the Regional health departments underpin essential functions of the network or its very presence on them. Since they are not just ‘one more’ provider, their role in relation to other providers should be clarified. In general, external accountability should be ensured through specific measures in order to evaluate the progress of networks and promote their stability.

**Professional identity and culture**

- Since professionals, rather than managers, are the operational nodes arranging the daily life of the network, their ability to cooperate as a **multidisciplinary team**, in their own hospital, is critical. Indeed, such internal cooperation is a necessary foundation for subsequent clinical collaboration with others at a network level. Asking for second opinions or referring a patient may make no sense for many patients when multidisciplinary cancer care is not ensured in the reference hospital of the patient. Such a perspective has been highlighted clearly in the case of ICO and especially in Iridium, where multidisciplinary care has been embedded in cancer services through the establishment of tumour boards for all cancer patients. Still, some professionals defend ‘exclusive’ professional competences that impair this approach. MDTs should be implemented in a coordinated way within networks.

- Each network illustrates the coexistence of **different clusters of professional linkages** and levels of integration within them. For instance, radiotherapy services in Iridium or medical oncology in ICO showed a marked vertical integration, while more horizontal but cohesive forms defined other specialties like haematology. On the other hand, surgical specialties were identified with a lack of network integration. In order to align interests (and cultures) of the specialties of the different hospitals, some network-based associations were promoted in Iridium, especially among the core professionals of the network. Also, crosscutting working groups were created for medical (e.g., pathologists) and paramedical specialties (e.g., nutritionists), and a multidisciplinary discussion platform was created to
deal with medical issues. In this line, the creation of ROL clinical guidelines was identified as a seminal experience in developing a sense of professional community in the Lombardy, both multidisciplinary and by specialty. In the case of ICO, its main strength resides in the level of exchange and cohesion of medical and radiation oncologists and haematologists. Importantly, every network has core professionals, and cohesion within and among these specialties should be actively sought and ensured by managers and clinical leaders.

**Network configuration**

- Belonging to a network entails advantages, and the partners sometimes strategically stress this fact to reinforce the network’s brand and increase the **perception of quality** among cancer patients. This is the case of Iridium, where any leaflet created in regard to cancer services, other than a complete website, includes the logo and projects the perspective of the network. It should be noted that Iridium is competing with providers of attached catchment areas. On the contrary, local hospital brands have been markedly preserved in most of ICO spokes, although patients are well acquainted with the fact that ‘physicians coming from a teaching hospital’ are involved in their care, which is by no means hidden by local hospitals. Regarding ROL, there is a need to boost the association between effective involvement in the network and a system ensuring access to quality care. Partners use the network in accordance to their interests, but in general they identify the network with higher quality standards in cancer care delivery.

- The focus of this research was not the advantages of networks as larger **economies of scale**. However, these are not only evident in their formation but pursued over time and throughout their development. ROL was particularly clear with regard to the clinical research opportunities in the network in terms of streamlining knowledge on new and open randomised clinical trials among professionals, thereby improving access and recruitment of patients. Increasing a critical mass of patients in the radiotherapy service is at the root of Iridium’s origin. Also in the case of Iridium, it is worth noting that increasing the portfolio of services to an extent in which the network is able to supply every cancer service (just like other big regional providers) has been a key issue. The prioritisation, use and control of cancer drugs have been the most evident example of economy of scale for ICO. Undeniably, economies of scale should be taken into account when assessing network guidance, but this should not become the main determinant: cancer care improvement, in its different dimensions, is the overarching reason for creating a cancer network.
7. CONCLUSIONS. LESSONS LEARNED

1) Internal and external pressures impact network stability and decision-making processes at clinical and managerial levels. Permanent growth in the range of cancer services (an internal dynamic feeding competition among nodes), and the top-down policy of reaching a critical mass (e.g., breast cancer units, highly complex procedures, etc.) are good examples of these pressures. For meso-managed networks (Iridium, ICO) or more virtual ones (ROL), a cancer network is not a concept entailing rights and duties in many dimensions. The positioning of hospitals making up the network is not static, and compliance with network goals and mission may erode if there is not a perception of mutual benefit. Certainly, networks consist of a new framework gathering some vertical integration (e.g., ICO model of interprofessional cooperation and pharmaceutical agreements) or new institutions for deliberation and consensus (e.g., Iridium committees). However, unlike the UK case, the networks included in this study did not result from a comprehensive cancer policy and top-down mandatory regulation. In this context, external accountability of patients and health authorities rises as a key component of their clinical governance. They should validate and provide guidance on their configuration, rationale and specific goals.

2) Multidisciplinary cancer care, either as a formal mechanism or as a common cultural background, is a key lever able to trigger or impair collaborative networking. Cancer networks are, to a great extent, population-accountable systems based on professionals working at different levels of clinical complexity. Managing such a multilevel outlook is never done from ground zero; professional linkages (mono- or multidisciplinary) and the intensity of the ties shaping them are always different at the origin of the network. Their integration as network groups can be strong (e.g., radiation oncologists in Iridium or medical oncologists in ICO), or not. However, if the degree of multidisciplinarity at each of the nodes is weak (professional turf wars are not rare), fostering clinical pathways integration or adopting a common body of evidence promoted at a network level meets greater resistance and is implemented in a more limited way. The different layers of discussion and consensus are not independent, as many hospital issues can be approached, to a greater or lesser extent, at a network level. Thus, multidisciplinary care within the nodes should be tackled as a specific area of interest while launching and looking for adherence to a cancer network.

3) Cancer policy and health system funding are focused on organisations, not on networks. This means that cancer programmes fostering new organisational approaches (e.g., breast units, quality indicators) or financial incentives (e.g., pursuing appropriateness) are still set up on the basis of a single hospital’s performance. Unlike other European regions, the model of cancer networks in Flanders and Catalonia coexist with freestanding hospitals providing cancer services. Lack of a specific policy framework may become a disincentive for hospitals making efforts in coordinating the supply of cancer services. The network perspective should be taken into account when planning and funding cancer services, as these structures can disseminate knowledge, clinical expertise and evidence-based best
practices across organisational and professional boundaries, potentially leading to higher quality cancer care. Especially in Lombardy, the DRG system was seen as a barrier, and there were calls for reforms to trigger interorganisational collaboration.

4) Clinical expertise is never evenly distributed, so a network can provide a proper scenario to take advantage of access to expert professionals and teams. Either for second opinions, dissemination of knowledge or patient referrals, all the networks made steps in this regard. However, the network is also stressed as a ground where such expertise can be developed, starting from an effective sub-specialisation by pathology. Focusing on these approaches is a matter of great importance for professionals, but network agreements do not include such aspects, which are left to the organisations and the professionals themselves. Four aspects seemed of special relevance: (1) managing human resources in accordance to clinical expertise distribution; (2) developing mechanisms (databases, communication channels) for exchanging information on patients showing a special complexity; (3) promoting crosscutting learning mechanisms for ‘experts’; and (4) stimulating clinical accountability for the decisions made, as clinical expertise cannot be self-declared.

5) According to the network taxonomy referred to in the methodology (Ferlie et al, 2010), there are ‘learning’, ‘managed’ and ‘fully integrated’ networks, which are by no means pure categories. The experience of Iridium, ICO and ROL showed that no matter how managed a cancer network may be, learning and informational mechanisms should be developed in parallel to actively tackle the multiple ‘grey areas’ (that is, potential conflicts) making up clinical care. The successful experiences of ROL and ICO in creating CPG/protocols or the Medical Discussion Platform implemented in Iridium are of great importance for the network consolation. Thus, a learning network should overlap any kind of managed network.

6) Pre-existing and informal cooperation among clinicians has encouraged the development of cancer network design in all three cases analyzed. Cooperation among clinicians is a necessary condition for the effective implementation of clinical networks. Network models generally balance the collaborative and competitive pressures existing within systems. Good levels of collaboration among the professionals who diagnose and treat patients balance the potential competition for patients and resources.

7) All three cancer network experiences showed that clinicians play a key role in designing and managing cancer networks. In fact they have been involved in projects promoted both by hospitals and regions. This raises the issue of representation of professional communities as institutional partners for hospitals or regions: who represents the medical or radiation oncologists in the cancer network’s choices regarding its organization and management? This is a problem that they have faced and solved in different ways in the three cases analyzed. In each experience, has been identified a mechanism of representation of professionals. More professional communities (oncologists, radiotherapists, surgeons, etc.) are cohesive, the more likely they can find expressions of the representation of shared knowledge and community.

8) In the case of very large catchment areas to reduce the inconvenience of patients due to the distance, the management of cancer services is organized into sub regional networks. They are made according to the hub and spoke model that allows to manage the most
common oncological diseases but that poses a matter of coordination between them for the management of rare diseases. It is a phenomenon already observed in UK cancer networks.

9) The different organizational models are based on the objectives and operating conditions of the networks. Health policies, competition between providers, financial pressures, organization of cancer services, different levels of expertise, etc., are crucial for cancer network design and implementation. The observation of existing models help institutions and clinicians to find out organizational and managerial solutions to achieve better quality standards for cancer services and improve patients’ outcomes. However, adopting an aseptic and mimetic approach towards a new cancer network model could be dangerous if the relations between the model and its goals are not known. The three cases of cancer networks represent feasible solutions only if they respect healthcare system contingency.

10) Information exchanges between clinicians to improve clinical practice is a hallmark of cancer networks observed. The multidisciplinary models are active in many of the hubs of the network. But to manage many patients through the multidisciplinary approach is necessary to organize differently the work of all the specialist units involved (oncology, surgery, radiotherapy, etc.). To share the multidisciplinary expert approaches with spokes, fully integrated models should be adopted, creating bigger supply nodes of the network or developing projects of ehealth or mobile health. These technologies are not always accessible due to the costs and implementation time.

11) The observed cancer networks have explicit models of governance. The roles of the various stakeholders and the rules of operation of the network have been identified even in the absence of policies on cancer and top down mandatory regulations. The governing body shall represent all the interests that the network itself protection including government, professionals, and patients. In all the experiences there are different governance models, excluding in any case the voice of patients and primary care professionals (e.g. GPs). Further development of cancer networks towards primary and intermediate care has to consider these stakeholders too.

12) Many experiences of cancer networks in Europe are hospital based. The involvement of primary care and general practitioners always occurs after the integration between hospitals. The reason lies in the difficulty of involving professionals that have the function of gatekeeping or first contact with the healthcare system. It is important to look into the future evolution of the current cancer networks with the aim of integrating and coordinating even the professionals in primary care. They will have an increasing role in managing cancer patients living longer and with multiple chronic diseases.

13) Networks are dynamic models. They are the result of alliances between autonomous stakeholders or providers who decide to collaborate as collaboration is more useful to achieve their own goals. When the reasons for collaboration change, there are consequences on the network’s functions and roles. Cancer policy changes, increased competition between hospitals, economic pressures are some examples of forces that can influence cancer networks development. For this reason the constant observation of existing and emerging network models is necessary.
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