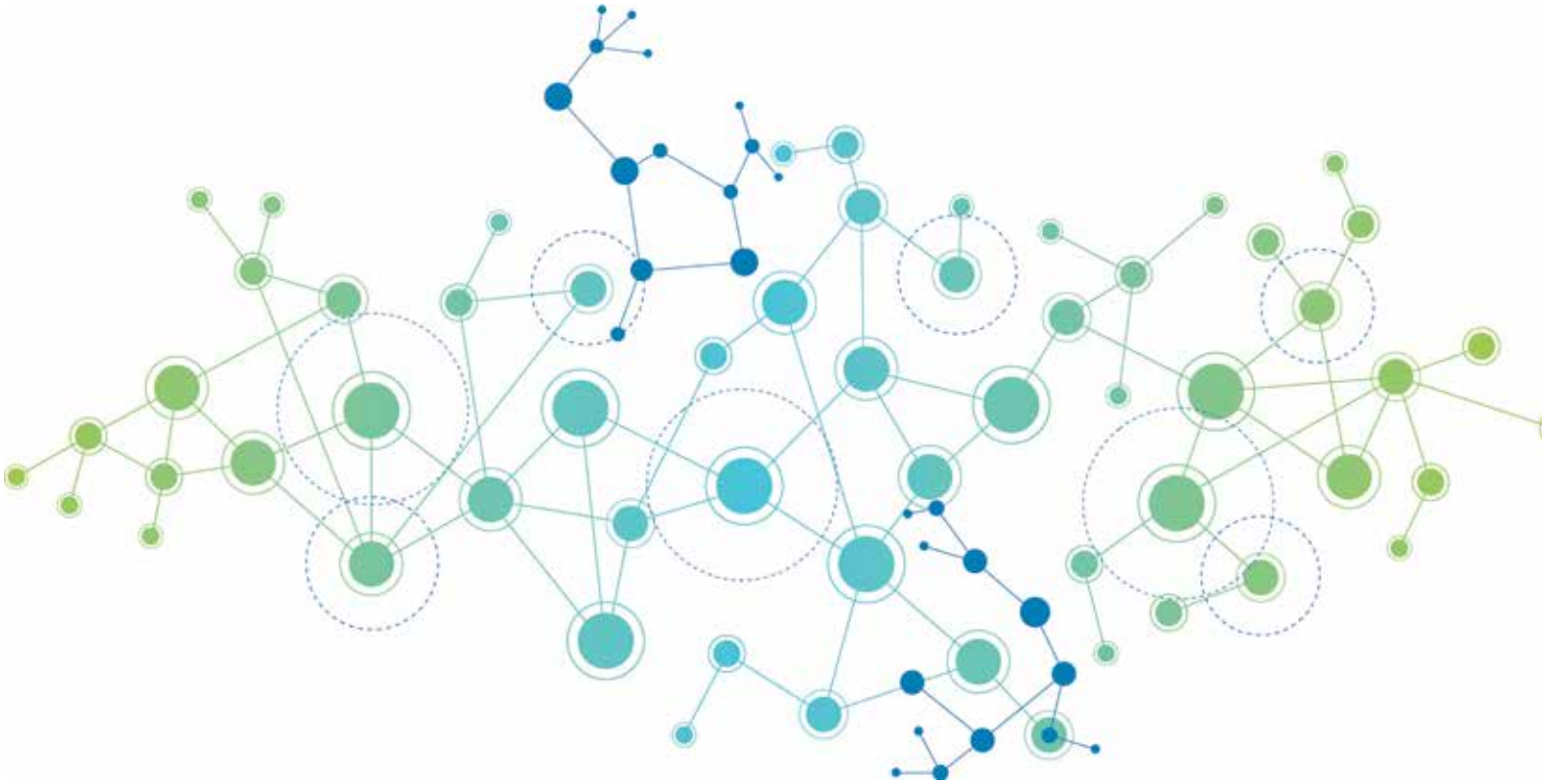


Strategic Interoperability in Germany, Spain & the UK

The Clinical and Business Imperative for Healthcare Organisations

Contents

Strategic interoperability — The key to connected care

The aging population and increasing incidence of chronic diseases are putting unmanageable pressures on healthcare services, not just in Europe, but worldwide. The current models of healthcare are unsustainable in the face of increased demand for services and rising costs. This was evident even before the financial crisis led to severe cuts in healthcare budgets in many countries.

Patients are increasingly relying on multiple specialists and healthcare organisations for treatment, due to the complexity of their medical conditions and the healthcare delivery system itself. Care providers need accurate, up-to-date, and reliable information from a complete patient record to deliver safe, high-quality care. Today's model, with its silos of care and multiple unconnected records, is no longer suitable: systems and organisations need to be interoperable. This means that healthcare organisations must look at interoperability from a strategic point of view so that information is available when and where it's needed across the continuum of care. Health and social care organisations will have to adapt to the changing environment in order to provide the best care for patients — and to survive financially.

The Royal College of Physicians in England produced a 2013 report called *The Future Hospital: Caring for Medical Patients*, in which it outlined a new model and role for hospitals: "Conventional models of health service design, in which a hospital site is the sole focus for the delivery of emergency, acute and elective services, are dated. These models often lack the integration, collaboration, communication and information sharing across hospital and the healthcare settings necessary to effectively meet patient needs and provide streamlined and seamless care."

The report recommends fundamental changes in the way hospitals organise and deliver care, along with new ways of working that span medical teams, hospital wards, and service providers across hospitals and community-based care organisations. According to the report's findings, integrated workflows, shared outcomes, and real-time communication of information among such health and social services partners will become the norm.

This is the vision of patient-centric care — care that is designed around the needs of the patient rather than the disease, treatment, service, or organisation in which the patient is seen — and it is applicable to any healthcare system.

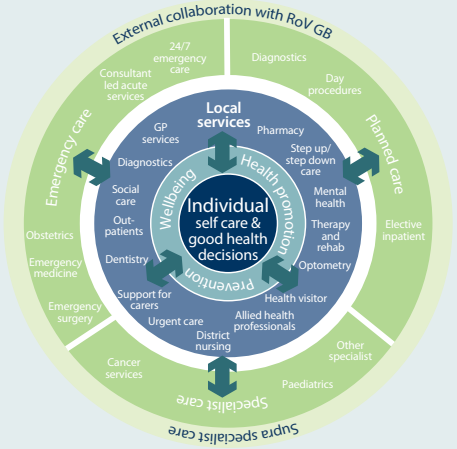
Technical obstacles

Comprehensive electronic records are the basis of high-quality care. Clinicians need them to make and record clinical decisions, to audit and improve quality of care, and for professional regulation and revalidation. Managers and clinical leaders use aggregated data from patient records to monitor and improve care, and regulators, commissioners, and the public need this data in order to monitor and research quality of services.

The software, medical devices, and IT systems used in health and social care organisations are often incompatible, which makes sharing patient data securely difficult, time-consuming, and expensive. It also leaves healthcare professionals with less time to spend on patient care and results in duplicate data collection at the multiple points of care provision and management.

Only by achieving interoperability across disparate systems and across organisations (Figure 1) will it be possible to achieve the quality and safety benefits of a comprehensive, up-to-date electronic patient record — a tool that is vital for providing integrated healthcare.

Figure 1. An example of a model of integrated care services



Source: DHSSPS NI. Transforming your care: a review of health and social care in Northern Ireland, 2011.

What is interoperability?

Interoperability has a wide range of meanings to different people and organisations. At its simplest level, interoperability has been described by healthcare interoperability standards body HL7 as "the ability of two or more systems or components to exchange information and to use the information that has been exchanged."

The HIMSS Board approved an expanded definition of healthcare interoperability in April 2013. HIMSS defines interoperability as the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged. This means that health information systems can work together within and across organisational boundaries in order to advance the effective delivery of healthcare for individuals and communities.

HIMSS defined three levels of health information technology interoperability:

1. **Foundational interoperability** allows data exchange from one information system to be received by another and does not require the receiving information technology system to be able to interpret the data.
2. **Structural interoperability** defines the structure or format of data exchange (i.e., the message format standards) where there is uniform movement of healthcare data from one system to another, such that the clinical or operational purpose and meaning of the data is preserved and unaltered. Structural interoperability defines the syntax of the data exchange. It ensures that data exchanges between information systems can be interpreted at the data field level.
3. **Semantic interoperability** is the ability of two or more systems or elements to exchange information and to use the information that has been exchanged. It takes advantage of both the structuring of the data exchange and the codification of the data including vocabulary so that the receiving information systems can interpret the data.

The Semantic Community categorises semantic interoperability into four orders according to the information processing ability:

- "Blobs" of data that are meaningful to the user at each end of the transmission, but not to the underlying computer applications. An example of this would be a handwritten clinical note faxed to another clinician.
- Free text that has no defined structure and that can be read by the receiving application. Developments in natural language processing will allow some interpretation and further use of unstructured information by the receiving application.
- Classification systems that set up hierarchical models for specific descriptions of diagnoses, procedures, activities, etc., such as the International Classification of Diseases (ICD-9).
- Standardised clinical nomenclature within structured messages. These are often called reference terminologies and use compositional expressions that can be post-coordinated to produce standard names, and also be mapped to multiple ontologies (formal specification of a term). An example is SNOMED Clinical Terms, which define unique meanings for terms and can be used to represent clinically relevant information consistently and reliably in electronic healthcare records.

The Semantic Community also describes a higher level, called process interoperability, which derives from systems engineering and involves the design and implementation of human work processes. This is important in critical care situations where information relevant to a very specific situation is needed quickly. Medical information organised for critical situations has significant process-driven characteristics, such as filtering, summarisation, and alert triggers — where time is critical and workflows must be smooth and quick. These characteristics may override more structural ones, and comprehensiveness and need for detail can fall prey to time constraints and explicit external mandates.

Cross-border healthcare in Europe

The free movement of citizens across member states of the European Union adds a unique level of complexity to strategic interoperability efforts. The European Commission has recognised that ensuring that health systems can communicate with one another would offer significant benefits in delivering care across the EU.

The EC prepared the eHealth Action Plan 2012-2020 to promote the widespread adoption of information and communication technologies (ICT) to "increase efficiency, improve quality of life and unlock innovation in healthcare". However, a lack of interoperability among eHealth solutions was second on a list of major barriers to the deployment of the plan.

The EC estimates that use of open standards to enable interoperability would save the EU's public sector €1bn annually. [http://europa.eu/rapid/press-release_IP-13-602_en.htm]

The EC is also developing the eHealth European Interoperability Framework to guide, support, and coordinate work among member states. The Commission's Information Society Directorate General is leading the study, building on the developments of several EC projects (epSOS, CALLIOPE, HITCH, eHRQTN, STORK, NetC@rds, SmartPersonalHealth, and the Network of Excellence in Semantic Interoperability), and it will collaborate with related political initiatives such as the eHealth Governance Initiative. The EU-funded SemanticHealthNet is a "Network of Excellence" that will develop "a scalable and sustainable pan-European organisational and governance process for the semantic interoperability of clinical and biomedical knowledge, to help ensure that EHR systems are optimised for patient care, public health and clinical research across healthcare systems and institutions".

The EC's Digital Agenda for Europe is working to ensure that new IT devices, applications, data repositories, and services interact seamlessly anywhere — just like the Internet. It is developing legislation on ICT interoperability to reform the rules on ICT standards so they can be referenced in public procurement, EU policies, and legislation. In October 2013, EU leaders agreed to create a connected continent and promote the role of digital innovation in the economy.

As a result, strategic interoperability is becoming a pervasive factor in all sectors, not just healthcare. But healthcare organisations in particular cannot ignore it.

Strategic interoperability survey

HIMSS Europe conducted a phone survey with IT managers in 140 hospitals in Germany, Spain, and the UK to understand the current status of interoperability in healthcare organisations and provide insight into strategies, drivers, and budgets related to interoperability issues.

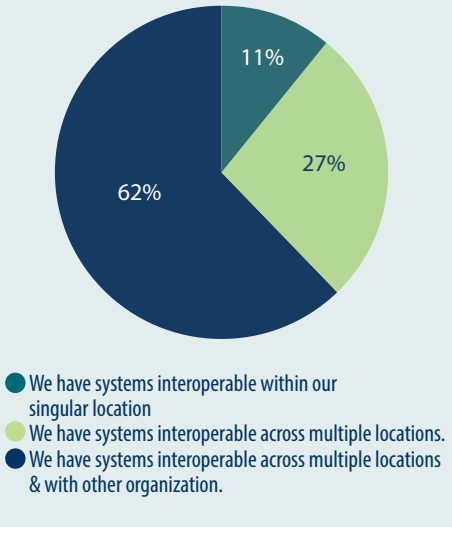
Spain

Spain's National Health Service (NHS) consists of 17 regional health departments managed by the country's 17 autonomous regional governments. The NHS is funded through general taxation and is coordinated by the National Health System Interterritorial Council, which includes representatives from all of the regional health services and is presided over by Spain's Minister of Health. Regional health departments fund primary healthcare and hospitals, including their IT services, through a budget that accounts for 30% to 40% of the regional governments' total annual budgets. Private companies manage some of the public hospitals in some of the regions and may be paid on a per-capita basis. HIMSS Europe interviewed CIOs at 40 hospitals for the survey.

Availability of interoperable systems

More than 93% of hospitals have interoperable systems. Of those, 89% are interoperable across multiple locations, and 62% are also interoperable with other organisations (Figure 2). This high rate can be attributed to the regional management of healthcare. According to Manual Vallina, Senior Advisor Spain, HIMSS Europe, "The majority of the budget for IT, about 95%, is in the hands of the regional health authorities, through a regional CIO, and not in the hospitals, but obviously the hospital CIO contributes to the regional policy. HL7 is broadly standard in Spain, not because of national policy, but because everyone accepts it as the preferred standard for exchanging information. There are many self-developed systems in hospitals, so vendors of laboratory or radiology systems have to exchange data through HL7. Most hospitals and the regions are developing strategies such as a master patient index, so they implement interoperability engines to connect to laboratory and radiology systems, laboratory systems in primary care clinics with the hospitals, and for sharing information between hospitals, such as basic messaging and clinical orders."

Figure 2. The interoperability status of IT systems



Strategic value

According to Vallina, the regional government system requires interoperability among healthcare organisations within each region, as well as compliance with national strategy, which the regions contribute to. They also must comply with pan-European interoperability strategy. As a result, interoperability is ranked highly in healthcare organisations' overall strategies.

Providing quality of care has a high strategic value for Spain's healthcare organisations, not just because it is their basic mission, but because they are also continuously held accountable for their performance by the regional governments. Cost reduction is a priority because of the country's ongoing financial crisis, which is necessitating spending cuts to reduce the national debt.

"The good news is, we have a national understanding that integration and messaging through standards is a key enabler, and we have many connected systems," says Vallina. "However, the strategic value is not only to achieve that; we now have to make

more effort at the semantic level, through the use of SNOMED CT. Spain contributes to its development, so the licence is free for the regions and paid for by the national Ministry of Health. There is a lot of effort going into that, such as for alerts on allergies, etc., and in trying to push all the regions to adopt it and convert the clinical data. So there are still many steps to take to achieve semantic interoperability."

Patient engagement is increasing in importance because Spain is debating how to establish a road map from private health records to public health records.

Mergers

The majority of hospitals are public and, as mentioned earlier, managed by the regional authorities, so merger-and-acquisition activity is minimal in Spain. Hospitals are given a yearly budget and have to regularly report activity to their respective regional authorities. Madrid has put some hospitals under private management and, for historical reasons, Catalonia has a mix of healthcare providers — municipal, private, and a few public hospitals. The regional management of healthcare in Spain would make it likely that each region already has a general policy in place regarding the integration of systems within the region.

Roadblocks

Survey respondents reported a range of roadblocks to achieving interoperability, but data security combined with legal requirements for data protection emerged as the leading issue in Spain.

Lack of expertise and the difficulty of meeting evolving standards were also leading factors, although, as Vallina points out, Spain has a large number of HL7-qualified people (the third-highest number worldwide, after the U.S. and India). Despite the achievements of the regional authorities, resourcing issues continue to hamper further progress.

Relatively few respondents pointed to vendors as a source of roadblocks; only 5.4% reported difficulties working with vendors, while 8.1% complained of a lack of standards support. Such figures illustrate the significance of the widespread acceptance of standards in the Spanish NHS, and the ability of the regional authorities to specify compliance with standards in contracts for IT systems across their regions in all levels of the care system. The Office of Standards and Interoperability of TicSalut in Catalonia, for example, provides an accreditation service so that suppliers can ensure that their products comply with the health system's interoperability requirements.

Jesus Redrado, CIO at Hospital Universidad Navarra in Pamplona, notes, "I think the factors such as data security are explained by the need to comply with the Data Protection Act. The costs and the lack of internal resources are a clear reflection of the current situation, in which it is not easy to justify initiatives based only on economics."

Figure 3: The major risks and challenges for the organisation in implementing interoperability

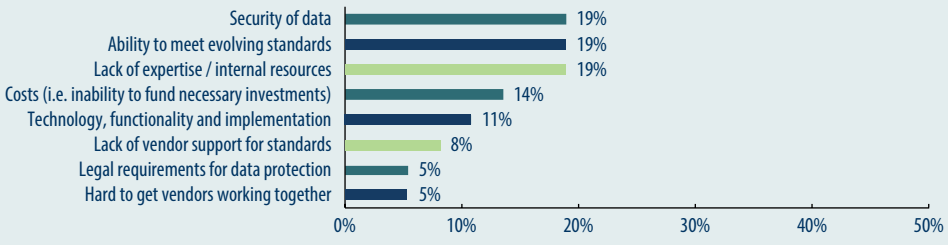
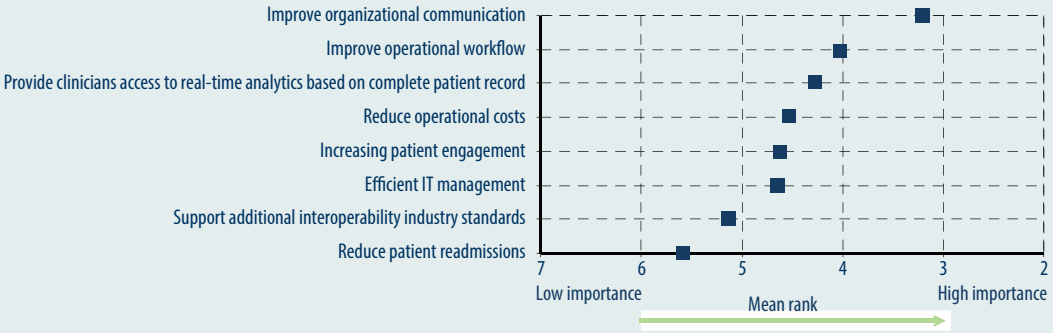


Figure 4: The internal drivers for interoperability ranked in order of importance



Drivers

The main drivers for interoperability within organisations were improving communications and streamlining operational workflow (Figure 4). Given that hospitals are managed regionally, respondents might have interpreted "organisation" on a broader level rather than as a single hospital, however. The general policy for regions is for interoperability among hospitals, and between hospitals and primary care providers.

The third most important factor driving interoperability is the need for real-time analytics based on the complete patient record. This shows that healthcare providers recognise the value of data and its potential application in monitoring performance and improving service.

The top three drivers identified by respondents align with the strategic value attributed to interoperability and the priority of quality of care. The collection and analysis of operational data points also enables organisations to identify areas of inefficiencies and high costs.

National policy is also playing an important role in driving priorities. Redrado explains, "There are a number of initiatives at the state level: the health insurance card that is interoperable in all regions; electronic prescriptions; the royal decrees regulating the information that must appear in medical reports, which justifies the focus on initiatives that improve the quality of care through the sharing of health information; trying to obtain complete patient information from all providers; and also, of course, the requirement to report data to the Ministry of Health."

Public health registries, identified as the top external driver, are linked to the third-ranked driver, data sharing with outside entities — which, in this case, are likely to be outside

Figure 5. The external drivers for interoperability ranked in order of importance

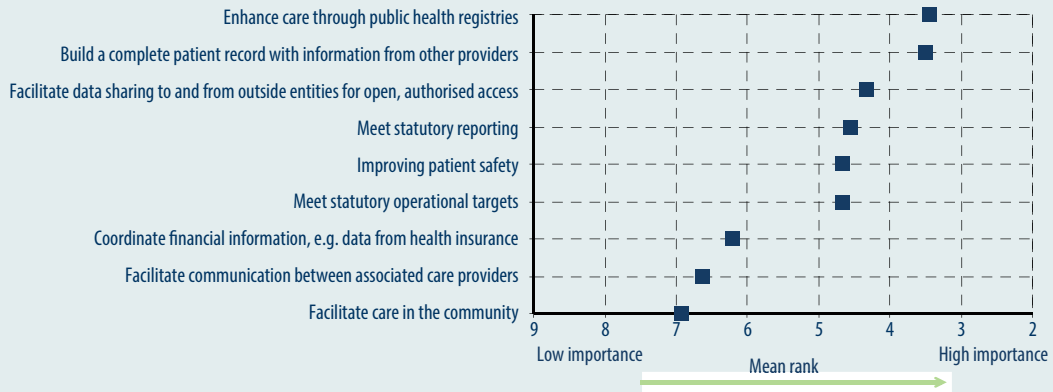
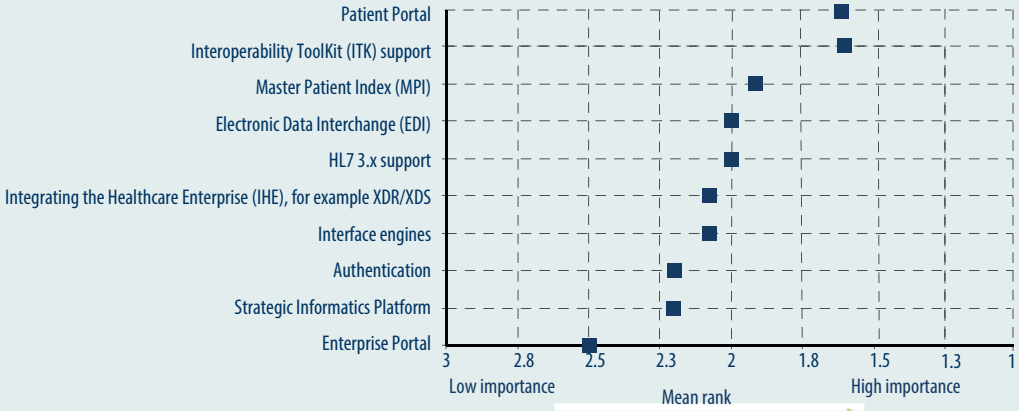


Figure 6. The most important technical capabilities needed for implementing the interoperability strategy



the regional health system (Figure 5). "Public registries for cancer, diabetes, etc., are starting to be integrated with IT systems," said Vallina. "For years, they were completely separate from the IT strategy, but now IT health authorities are starting to consider the registry data as a consequence of the IT workflow, so you can just extract the data you need for the registry."

Building a complete patient record using information from other providers was ranked second as an external driver for interoperability. This could be influenced by the regional authorities' push for interoperability between hospitals, and between hospitals and primary care providers. Spain also has a national EHR programme in which all the regions are connected to a central exchange so doctors can access basic patient information, such as a summary record and discharge summaries when patients move from one region to another.

Technical capabilities

The most important technical capability cited by respondents was a patient portal, which reflects Spain's status as one of the most advanced countries regarding interoperability (Figure 6). Regions can specify interoperability requirements for connecting to their systems, so it is not surprising that interoperability toolkit (ITK) support is second on the list. A master patient index, the third-ranked technical capability, is a mainstay of electronic records for identifying patients and their health information. This is followed by electronic data interchange (EDI) and HL7 Version 3 support. The use of international standards for EDI is widely practised in Spain. The Spanish Society of Health Managers (SEDISA) and HL7 Spain signed a collaboration agreement in February 2013 to promote the adoption of HL7 standards among members, and the Andalusian Health Service has mandated use of HL7 throughout the organisation.

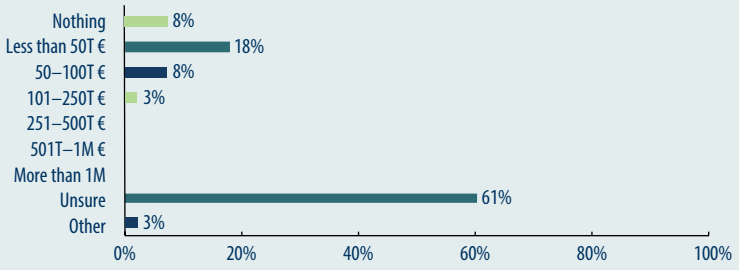
Juan Fernandez Brea, CIO of Hospital Povisa in Vigo, commented, "Obviously, to achieve a goal of integration and consistency, we need the knowledge and tools that make this possible, but we should not forget that we are dealing with legacy medical record systems almost always supported by paper, which lack structure and are difficult to reuse. This, in my opinion, should be taken into account before offering patient-access systems, such as a portal.

"It is first necessary to give access to medical practitioners and other health professionals, who give coherence and integrity to medical records. As always, it is easier to acquire technology than 'create culture' among our professionals and, of course, among our patients. "We must make progress on these fronts in a realistic way, before offering our users systems that are incomplete, unreliable and inconsistent, with the risks that these will pose."

Budgets

Around two-thirds of respondents reported that they were unsure of budgets for interoperability for both 2013 and 2014 (Figure 7). This shows that budgets are not allocated specifically for interoperability, or that under the regional management, the budget is outside the authority of the local IT manager. About a third of the hospitals, however, reported budgets of €50,000 to €500,000 allocated specifically to interoperability, which means some regions have identified specific measures as a priority.

Figure 7. The budget allocated for interoperability



United Kingdom

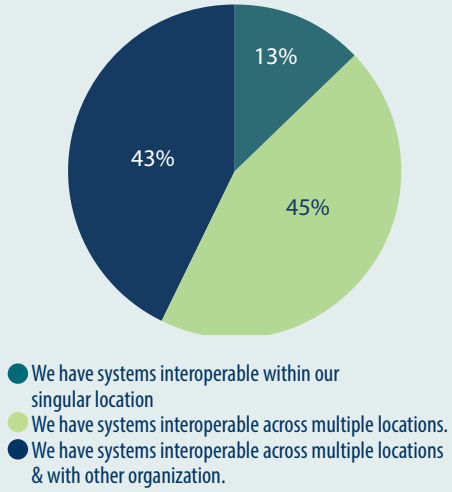
The UK has a National Health Service (NHS) funded by general taxation that is free at the point of care. However, the four countries of the UK have independent health services that can develop their own policies and IT strategies. England encourages competition among providers, while the other countries favour collaboration. Northern Ireland has an integrated health and social care service. NHS hospitals are managed by Trusts, which can comprise more than one hospital. The better-performing Trusts are afforded a higher level of independence and are deemed "foundation Trusts". They do, however, have to report to several monitoring bodies, and they must reach multiple operational targets, with financial incentives and penalties built in. HIMSS Europe interviewed CIOs at 42 hospital Trusts for the survey.

Status of interoperable systems

Ninety-five percent of the UK hospitals surveyed reported having systems that are interoperable (Figure 8). Although paper-based patient notes are still widespread, all main hospitals have some computerised systems such as a patient administration system and PACS (provided to all hospitals by the National Programme for IT) and a range of other clinical systems. All NHS organisations are connected to N3, the NHS intranet, which gives access to secure NHS-wide email; and to the NHS Spine, which includes a patient demographics service, messaging, a hospital appointment booking service, and electronic prescriptions for general practitioners.

The majority of hospitals (88%) said they have systems that are interoperable across multiple locations. This is because most Trusts have multiple sites, ranging from full hospitals to clinics in the community. Only 43% reported having systems that are interoperable with those of other organisations; that includes the ability to exchange patient bookings and discharges with general practitioners' practices.

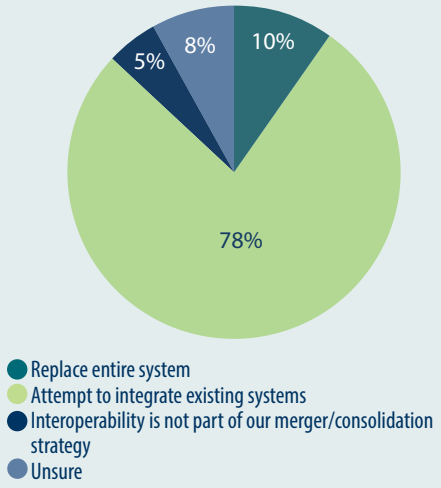
Figure 8. The interoperability status of IT systems



Strategic value

Quality of care is the overriding driver for interoperability in the UK and is influenced by both internal objectives and external pressures. Hospital Trust management uses analytics to assess performance and outcomes, of course, but monitoring bodies also require large amounts of this data — which means different organisations are often asking for similar data. This explains why analytics ranked as the second strategic priority. Cost reduction is also a major factor in the current financial climate; NHS Trusts are facing a third year of efficiency savings of 3% to 4%, which is resulting in reduced payments for medical procedures. Multiple drivers for improving quality and efficiency make interoperability an important part of overall strategy, especially with the recent higher awareness of the importance of IT systems.

Figure 9. The interoperability strategy regarding acquiring and merging with other hospitals



Mergers

Mergers and acquisitions are relatively common among UK NHS Trusts. They typically involve consolidations of services in a geographic area to improve quality of care and reap financial savings. NHS Trusts can get into debt and be declared bankrupt, in which case neighbouring Trusts, or the private sector, are encouraged to take over the organisation and attempt to turn it around.

Nearly 80% of respondents reported that their strategy is to integrate existing systems Figure 9), which reflects the current Department of Health policy, following the winding up of the National Programme for IT, to promote "connect all" rather than the previous policy of "replace all". Inevitably, some NHS Trusts still need to replace systems either because they are too old to be maintained, suppliers decide to leave the UK market, or the systems fall short in meeting the Trusts' changing functional requirements.

Roadblocks

The major factor reported as preventing interoperability is technology, functionality, and implementation of systems, with a quarter of respondents highlighting this issue (Figure 10). Although an ITK has been available from the National Programme for IT, and now the Health and Social Care Information Centre, for some years, the NHS and vendors have been slow to adopt interoperability standards. This was, however, boosted in 2012 with the Government's Information Challenge Fund for projects based on the ITK, which saw 43 projects awarded funding (totalling a modest £1.67m). NHS Trusts are free to procure their own systems and thus can choose whether to adopt communications industry standards such as HL7.

Lack of expertise and internal resources is the second roadblock, with 20% reporting this factor. Vendors were mentioned as a problem in only a small number of cases, with 12.5% reporting that it is hard to get systems to work together, and 10% pointing to a lack of support for standards, though this survey option might have been selected if a Trust didn't regard standards as important. However, new government-approved primary care supplier framework contracts for England have stipulated that the supplier must supply Trusts with open access to the data in their applications.

Figure 10. The major risks and challenges for the organisation in implementing interoperability

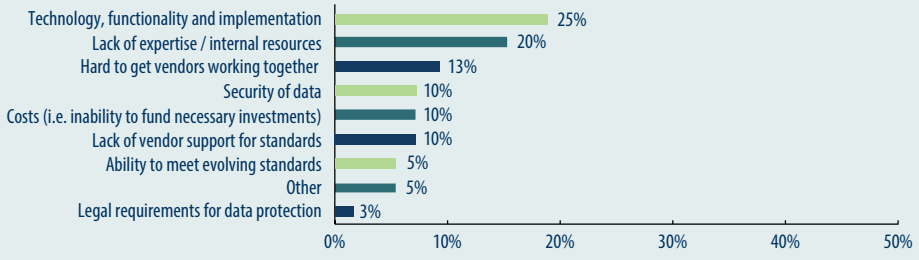


Figure 11. The internal drivers for interoperability ranked in order of importance

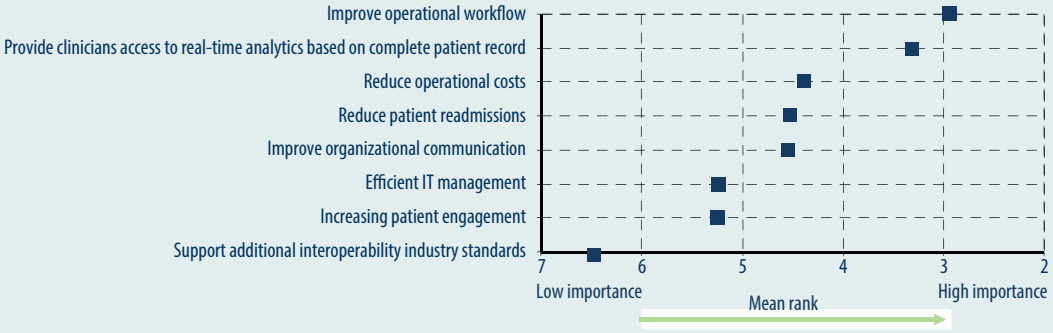
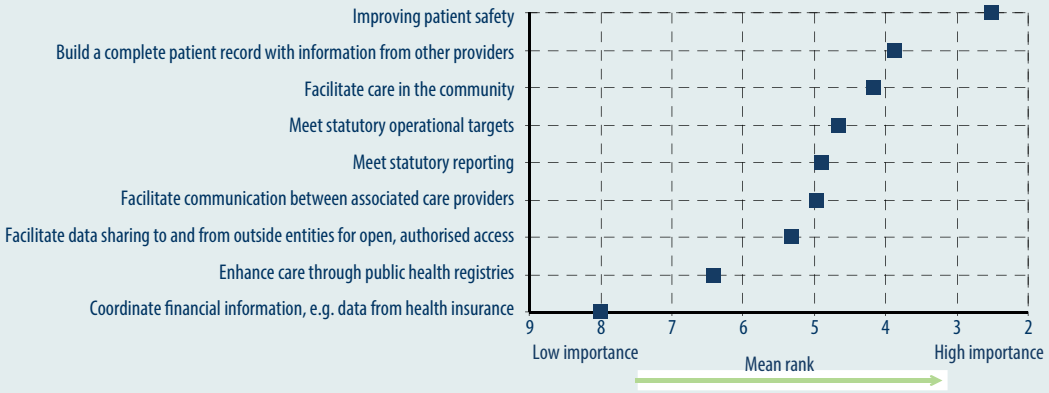


Figure 12. The external drivers for interoperability ranked in order of importance



Drivers

Improving operational workflow was identified as the leading internal driver for interoperability (Figure 11). Paper records are still widely used in the NHS, so it has become a priority to move to paperless or paper-light systems — with the government setting a target of 2018 for NHS Trusts to achieve it. Providing real-time analytics based on the complete patient record was ranked second and is another basic operational capability enabled by electronic records. Reducing costs again ranks highly, and it is also related to reducing patient readmissions — the fourth-ranked driver — given that NHS Trusts can be penalised for patient readmissions within 30 days.

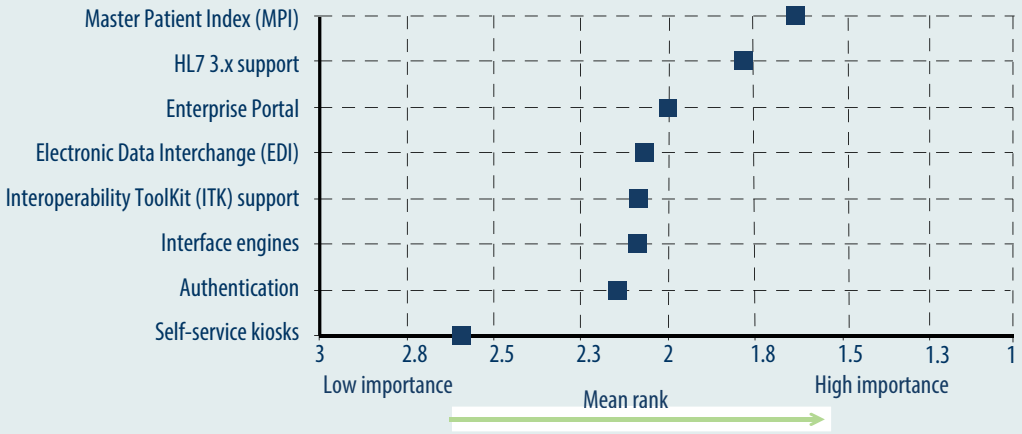
Improving patient safety is ranked as the top external driver, followed by building a complete patient record with information from other providers (Figure 12). Primary care, out-of-hours care, social care, and mental health Trusts are the main providers that hospitals would link to for building a complete record, with private providers of specific services such as scanning and some minor operations included in some cases. Under the NHS Constitution, however, patients have a right to make a hospital appointment anywhere they choose, so accessing records from more distant organisations will become more common.

Facilitating care in the community is ranked third and likely represents increasing awareness of the need for more specialist services to be provided out of the hospital setting, in order to reduce hospital admissions by improving preventative care. There are several common drivers moving care from hospitals to the community, including lack of acute services, the lure of lower costs, and the need for patient self-help and better patient experiences.

Technical capabilities

A master patient index is seen as the most important technical capability required for

Figure 13. The most important technical capabilities needed for implementing the interoperability strategy



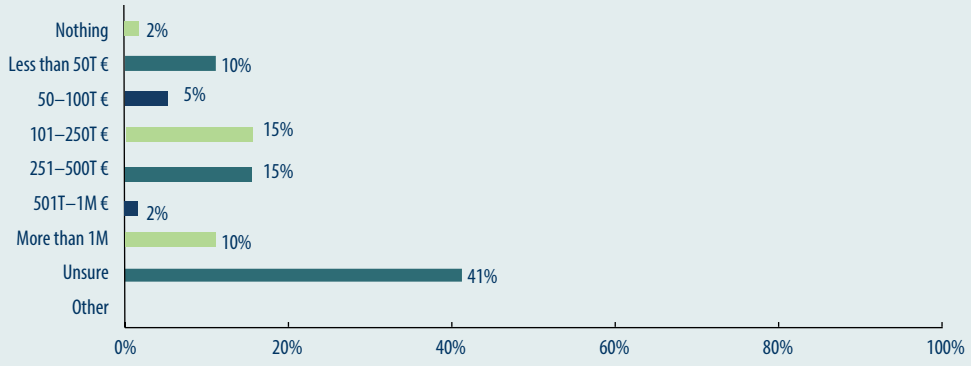
interoperability in the UK (Figure 13). The NHS has long issued every person with a unique NHS number, but most hospitals still also use a separate hospital number for their own purposes. There has been a drive to use only the NHS number, and even some social services have adopted it to ensure proper identification of people in the care system.

Support for HL7 Version 3 is ranked second, which is surprising, considering the historically slow uptake of the ITK, which is ranked fifth. Enterprise portals are the third-most-important capability and could be seen as part of the "connect all" strategy, in which portals can be the interface to connect a range of new and legacy systems. However, it remains to be seen whether portals provide more than a short-term, high-profile fix. When multiple systems are involved, the semantic and workflow mismatch requires mediation. Yet, the best place to manage the quality of data is in the operational systems at the point of data entry and reporting, and making these systems more interoperable would address the problem at its source.

Budgets

About half of respondents reported having a budget allocated to interoperability, with an even spread of budget amounts ranging from under €50,000 to over €1m (Figure 14). There is little difference in the planned budgets for next year. A significant number (41%) said they have no specific allocation for interoperability.

Figure 14. The budget allocated for interoperability



Germany

Healthcare in Germany is funded by a compulsory statutory health insurance system operated by a large number of sickness funds that people pay into. This ensures free healthcare for all at the point of care and a free choice of where people can go to obtain treatment. There are three main types of hospital: public hospitals run by local authorities, towns, and the states; voluntary hospitals run by churches or non-profit organisations; and private hospitals run as commercial enterprises. However, about half of beds are in public hospitals, a third in non-profits, and only 16% in commercial facilities. Management of the healthcare system is shared among the states, federal government, and civil society organisations, and includes multiple layers of decision-making.

Status of interoperable systems

Over half of the 58 hospitals surveyed — primarily those with fewer than 500 beds — reported having systems that are not interoperable, a much higher proportion than the other countries surveyed. In comparison, almost all small hospitals in Spain have interoperable systems. Additionally, Spain's regional governments manage hospitals' IT budgets, whereas in Germany, budgets are based on the hospitals' incomes. Almost two-thirds of the hospitals that reported having interoperable systems in place said that their systems are interoperable with those of other organisations, a proportion similar to Spain's. About one-fifth said they are interoperable across multiple locations, while another one-fifth are interoperable with just one other location (Figure 15).

Strategic value

Cost reduction is the top driver for interoperability in Germany. Quality of care — the highest priority in both Spain and the UK — ranked second in Germany, with analytics from complete patient records also identified as having a major strategic value for the organisation. Interoperability was ranked significantly lower in importance than in the other countries surveyed, although this masks a distinction between the large and smaller hospitals; those with fewer than 200 beds valued it less.

Mergers

The results for mergers and acquisitions contrast with those of the UK and Spain, with 45% of German organisations reporting that they do not have a strategy for interoperability of IT systems or have no consolidation planned at all (Figure 16). Of those that have an interoperability strategy, a larger number (35%) plan to integrate existing systems, while one-fifth want to replace their entire system.

Figure 15. The interoperability status of IT systems

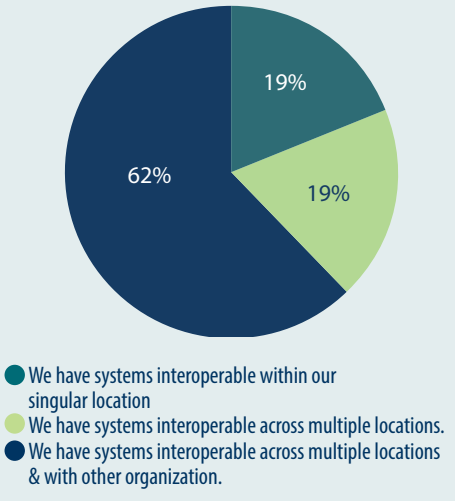


Figure 16. The interoperability strategy regarding acquiring and merging with other hospitals

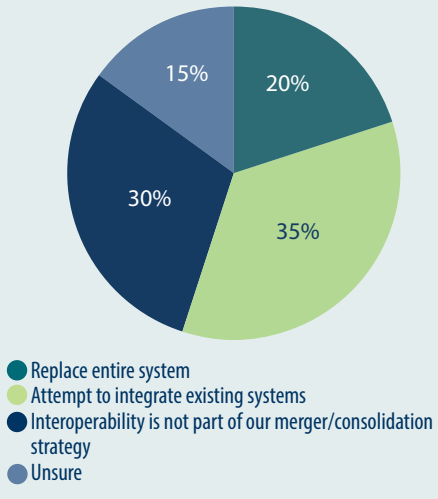
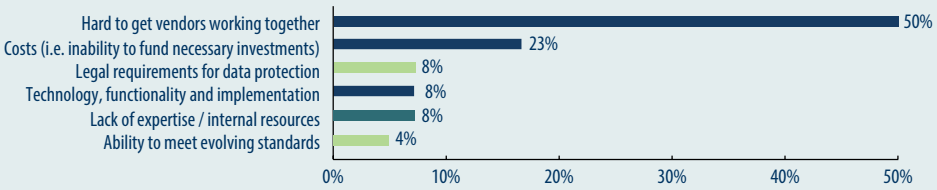


Figure 17. The major risks and challenges for the organisation in implementing interoperability



Roadblocks

Vendors were ranked as the predominant roadblock, with half of respondents reporting them as a hindrance to interoperability due to the difficulty in getting them to work together — although they were not mentioned at all as lacking support for standards (Figure 17). This contrasts sharply with the results for the UK and Spain, and could be an indication of the attitude of German vendors toward one another.

Almost a quarter of hospitals reported costs as the biggest challenge to interoperability. Unlike in Spain, with its regional management of IT, and in the UK, which has had government programs to help achieve some level of interoperability across the NHS, German hospitals fund their IT systems from their operating budgets. Lack of expertise and resources, technology, functionality and implementation were also mentioned, but were less significant than in the other two countries.

Drivers

Internal drivers for interoperability were similar to the other countries', with internal processes seen as benefiting from interoperability (Figure 18). A desire to improve operational workflow, and the ability to perform analytics on patient data, reduce costs, and improve communications, were all ranked highly as drivers for interoperability of systems in hospitals. This shows common needs regardless of the healthcare system and ownership model.

Improving patient safety is ranked highly as an external driver (Figure 19); it is often

Figure 18. The internal drivers for interoperability ranked in order of importance

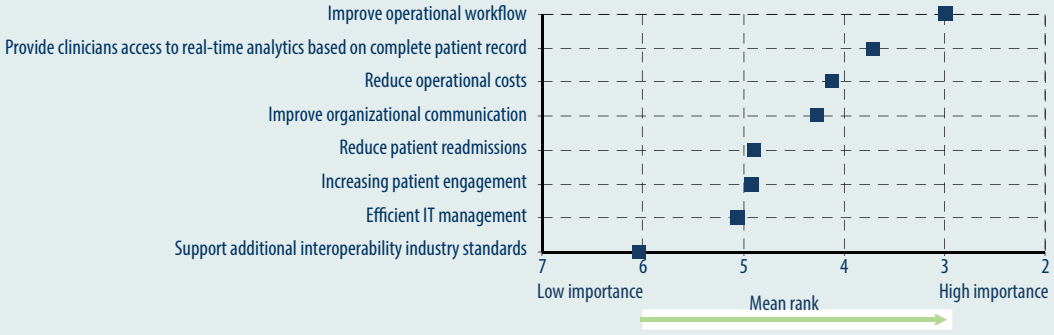


Figure 19. The external drivers for interoperability ranked in order of importance

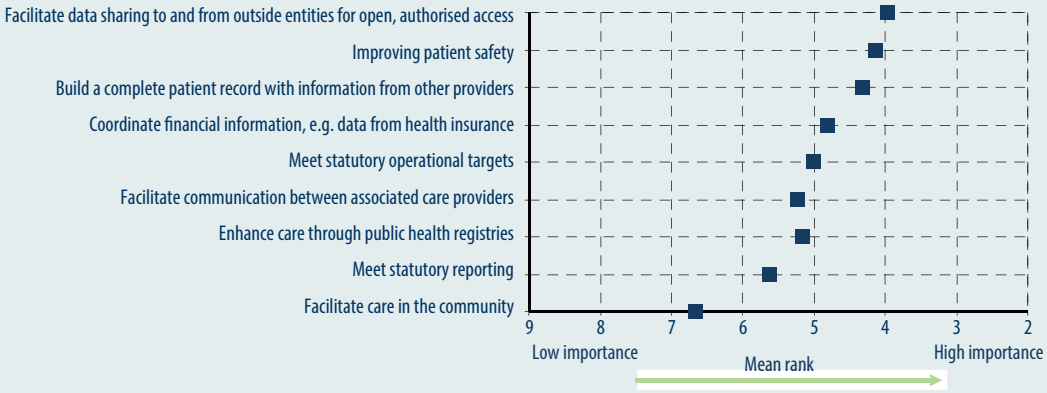
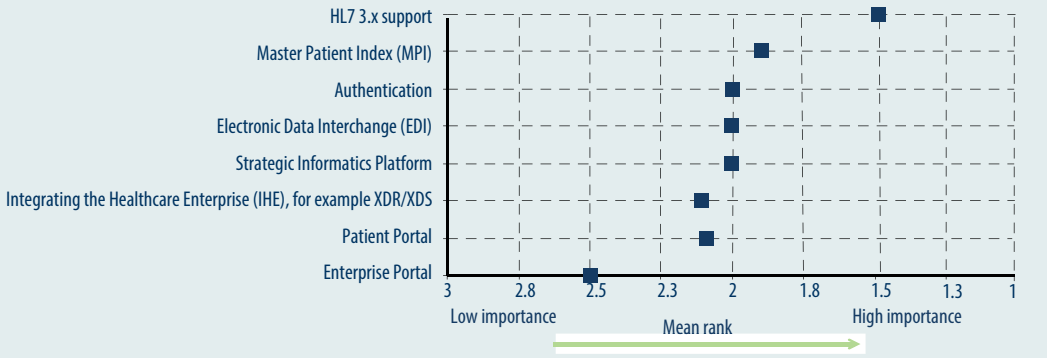


Figure 20. The most important technical capabilities needed for implementing the interoperability strategy

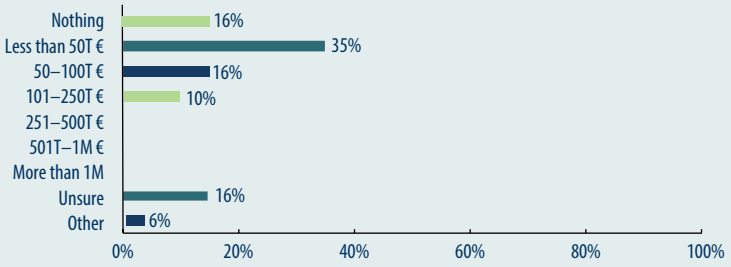


prioritised based on government reporting requirements for quality indicators in order to enable the comparison of hospitals. The top place, however, was given to facilitating communications among associated care providers, as well as building a complete patient record from other providers. Integrated care among providers and for chronic disease management has been promoted through legislation with the introduction of specific funding models. The fourth-place ranking for coordinating health insurance data is naturally a priority in an insurance-funded healthcare system.

Technical capabilities

Similar to Spain and the UK, in Germany support for HL7 3, electronic data interchange, and a master patient index are seen as important capabilities for implementing an interoperability

Figure 21. The budget allocated for interoperability



strategy (Figure 20). System user authentication is given a higher status, while portals, whether an enterprise portal or for patient access to records, are not seen as significant capabilities in Germany.

Budgets

Around 80% of hospitals that already use interoperable systems have allocated budgets for interoperability in the current fiscal year, but the amounts are mostly below €100,000 (Figure 21). However, feedback from CIOs in Germany indicates that the figures may be misleading, as interoperability tends to be funded as part of other projects, with no distinct budget or strategy for interoperability. The smaller hospitals (fewer than 200 beds) also dominate in the lowest budget category. Fewer hospitals have allocated funds in the next fiscal year, and a higher number are unsure of their budgets, compared to Spain and the UK.

Conclusions

In Europe, there are common variables driving the need for interoperability, including population demographics, the increasing complexity of healthcare due to chronic diseases, and — as shown by the survey data — a range of common operational factors such as cost, quality, safety and efficiency. There are multiple layers of interoperability, ranging from the pan-European level down to national, regional, organisational, departmental, and system levels. However, each level has its own additional set of drivers, creating some unique characteristics at the country level and significant differences among organisations.

Understanding national and regional factors is important in seeing beyond averaged data and understanding the reasons for the differences, such as public health registries and patient portals in Spain, communication between associated providers in Germany, and care in the community and enterprise portals in the UK.

Spain appears to be more advanced than the other countries due to its more widespread acceptance of interoperability and more focussed direction at national and regional levels. The UK has a high level of interoperability within and across organisations in some basic areas, due to previous top-down national programmes. However, it is also in the process of making up for previous failures and delays in other areas resulting from national programmes — and this time, every hospital trust is on its own, so interoperability strategy is determined mainly at the organisational level.

Germany appears to be less advanced than other countries at both technical and strategic levels, with a lower percentage of hospitals with interoperable systems, more reported problems with vendor cooperation, and a higher level of cost constraints. Germany's health system structure and a government that operates at very granular levels may factor into its having less central direction and coordination across organisations.

All the countries are facing cost pressures, but their differing approaches to funding hospitals puts pressure on different areas of their respective healthcare systems. Reported budgets vary widely, but because the definition of interoperability varies and it is rarely itemised in budgets, it is difficult to compare these results. A clear finding from the study is the need to create more awareness of the value of strategic interoperability at all levels, among both IT and managerial staff.