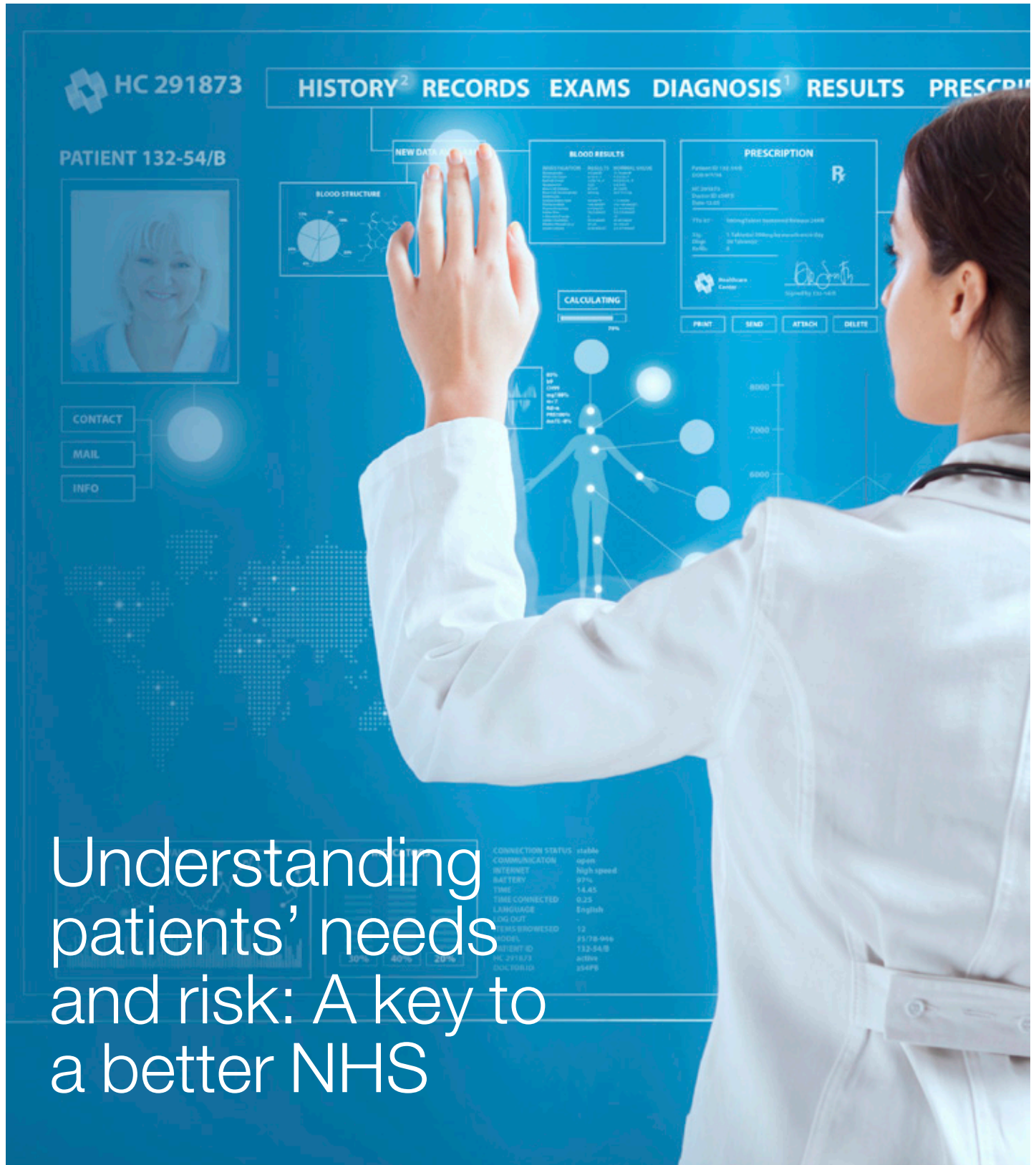


Health Systems and Services Practice



Understanding patients' needs and risk: A key to a better NHS

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Executive summary

By combining information from multiple sources, using patient identifiers to match information about utilisation and spend and risk-stratifying the patients, it is possible to develop a detailed understanding about the health and social care needs of different parts of the population. It has always been hypothesised that a minority of patients consume the majority of total care spend, not only across health, but also across social care. This has now been proven empirically.

Using a combined anonymised data set developed by NHS North West London (NWL) as part of the Inner NWL Integrated Care Pilot effort, we demonstrate that the 20% of the population at moderate, high, or very high risk of incurring an emergency admission account for the vast majority of service utilisation and spend. Together, these three groups are responsible for 70.7% of NWL's total health and social care spend, 73% of all community care spend, 86% of all acute care spend, and 87% of all social care spend.

Not surprisingly, older patient age and the presence of physical or mental health long-term conditions increased the risk of an emergency admission. What was much more surprising was that these three segments accounted for only 36% of primary care spend, partly explained by the fact that the GMS contracts include capitated payments for all of the population regardless of risk profile.

These findings have four implications for the NHS. First, those responsible for care delivery must understand how significantly patients' needs vary if they want to target services to specific population groups. Second, every clinician and commissioner would benefit from having access to a combined data set and the tools needed to access the information in it. Third, commissioners and local authorities need to ask how health and social care could be better organised to support patients, especially those at higher risk. Fourth, commissioners need to consider whether they should modify the way they pay for health and social care.

Oleg Bestsenyy
Tom Kibasi
Ben Richardson

1 June 2013

Spend is highly concentrated: 20% of people account for more than 70% of total spend across health and social care.

Introduction

The NHS currently faces a dual challenge: growing needs (especially from an aging population) and tight budgets (reflecting intense financial pressure). Many within the NHS are therefore interested in the potential of integrated care to deliver higher quality of care and a better patient experience at lower cost.

A widely accepted principle of effective integrated care is that high-risk parts of the population (“segments”) should be targeted so that their specific needs can be addressed. Often, however, comparatively little information is available to inform discussions about exactly which patients should be targeted, what their needs are, what costs they incur system-wide, what set of interventions would be most effective for them, and what the potential impact of successful care management could be.

The NHS has a major advantage over many other health systems in its high proportion of electronic records and use of a common identifier for each patient; as a result, it holds a wealth of data about the population it serves. Unfortunately, much of its data sits in separate silos. In several regions, however, the different data sets have been matched at the patient level. As part of Inner NWL Integrated Care Pilot, the NHS in North West London, for example, has been able to create a single database that captures the primary care, community care, social care, and acute care needs of a population of about 890,000 people.

Following approval by the Caldicott guardian for NHS NWL, we were granted access to a fully anonymised version of this database. Whilst no patient identifiable data was available to our team, we were able to explore, at a population level, which people are most at risk of incurring an emerging hospital admission (an expensive and often unnecessary service), the factors that help predict their high-risk status, and what services they utilise most often. In this paper, we discuss the data set we studied and the methods we used to analyse the data. We then describe the main findings from the analysis and their implications for the NHS.

The result is a detailed patient-level view at how patient needs and care delivery vary across different segments of the population. While many of our findings are in line with the beliefs of most NHS clinicians and commissioners, others may not be. Furthermore, the magnitude of the differences in spend among various groups may be surprising to some.

I. Data and methodology: scope and limitations

NHS North West London (NWL) serves a population of roughly two million people across eight boroughs. To better understand the needs of 890,000 individuals living in four of those boroughs (Hammersmith & Fulham, Kensington & Chelsea, Westminster, and Hounslow), NWL compiled a data set from multiple sources that contains information about activity levels and costs across primary, secondary, community health, and social care as part of its Integrated Care Pilot. Following information governance processes, NWL fully anonymised the data so that none of the information could be used to identify specific patients.

Exhibit 1 summarises the data sources NWL included in the combined data set. As the exhibit makes clear, not all information was available for all individuals. For example, information about community care contacts, primary care contacts, hospital activity, length of stay, and costs for acute care activity was available for only 490,000 people in four CCGs (approximately 60% of the region's total population). However, NWL was able to include the QOF flags for both physical and mental health long-term conditions (LTCs) for those 490,000 people.

Social care activity data was available for only one of the four CCGs and thus covered approximately 182,000 people. Mental health trust data could not be obtained. In addition, the combined data set does not include non-PbR acute spend activity or children's social care services.

Costs per unit for community care, social care, and primary care services were inferred based on total activity count and total spend, and triangulated using NHS reference costs. Scaling factors were then used, where needed, to estimate usage and spend data for the rest of the population.

Exhibit 1: What has been included in the data set

Acute and specialist care	<ul style="list-style-type: none"> ▪ SuS data on interactions of 490k people registered with 100+ GP practices across 4 London CCGs for 2010/11 (including IP, OP, A&E) ▪ Includes costs, admissions/attendances/visits and LOS ▪ IP included at PbR tariff + MFF (excludes any non-tariff activity) ▪ OP/A&E unit costs estimated based on national averages
Community care	<ul style="list-style-type: none"> ▪ RIO data from a Community Health Services trust covering the area (total count of activity = 1,000,000+) ▪ Includes count of activity by patient ▪ Costs estimated based on NHS reference costs
Mental health	<ul style="list-style-type: none"> ▪ QOF flags for Mental Health conditions for 490k people ▪ Includes flags for Depression, Dementia, Learning Disability and Other MH conditions ▪ Does not currently include any mental health trust activity or costs
Social care	<ul style="list-style-type: none"> ▪ Social care activity data for 1 CCG for all people from participating practices (n=182k) ▪ Includes activity counts for care at home and residential care and excludes other services (e.g., meals on wheels or counselling). Total number of people receiving social care = 1,297 ▪ Costs estimated based on average social care worker fully-loaded per-hour costs
Primary care	<ul style="list-style-type: none"> ▪ Count of Primary Care visits for 2010/11 for each of the 490k people in 100+ practices across 4 London CCGs ▪ Costs estimated based on NHS reference costs and FIMS totals
Prescription information	<ul style="list-style-type: none"> ▪ Prescription activity information at the GP Practice level

Despite the absence of some information, NWL's data set is one of the most comprehensive sources of information about the health and social care needs of any large population within the NHS. The goal, therefore, was to examine whether it could be used to identify cohorts of patients at risk of health deterioration and high future spend and then determine what needs those patients had.

Predictive risk scoring was used to segment the patients in the population covered by the data set. The patterns of activity and cost associated with different levels of risk were then assessed. We defined risk as the probability of a future emergency hospital admission precisely because such admissions are often an indicator of the system's failure to prevent (or at least slow) deterioration of a person's health, and acute hospital services are amongst the most intensive healthcare settings.

Many free predictive risk models are available. We chose the King's Fund's Combined Predictive Model (CPM) as the most applicable one for our purpose, not the least because the CPM risk score was already available for the 490,000 people in the North West London dataset.¹ CPM tries to predict the probability of an emergency hospital admission within the next 12 months by looking at previous hospital and general practice activity.

We segmented the patients into five groups based on their CPM scores. The 0.5% of the population with the highest scores was assigned to the very-high-risk category, the 4.5% of the population with the next highest scores was put into the high-risk category, and the next 15% was classified as being in the moderate-risk category. The next 30% was assigned to the low-risk category, and the remaining 50% were put into the very-low-risk category.

We then assessed utilisation rates (activity per thousand individuals) for each of the five groups, and we calculated their total and average spend. We acknowledge, however, that we may have underestimated total and average spend, given that some information was not available in the NWL data set.

II. Findings

The analysis revealed three principal findings:

- Both utilisation and spend were highly concentrated in the 20% of the NWL population assigned to the top three risk categories (those found to be at moderate, high, or very high risk of a future emergency hospital admission).
- The risk of an emergency admission correlated strongly with age, physical health, and mental health.
- Although the people in the top three risk categories accounted for the vast majority of hospital (86%), social care (87%), and community health services (73%) spend, they were responsible for a significantly smaller proportion (36%).

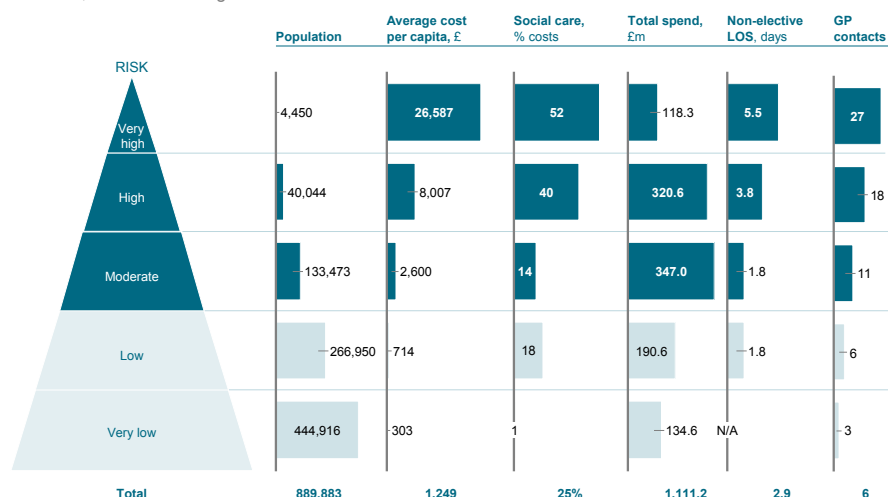
¹ For more information about how CPM works and how it compares with other models in its predictive abilities, please refer to *Combined Predictive Model: Final Report* (http://www.kingsfund.org.uk/sites/files/kf/field/field_document/PARR-combined-predictive-model-final-report-dec06.pdf) and *Predicting Social Care Costs: A Feasibility Study* (<http://www.nuffieldtrust.org.uk/sites/files/nuffield/Predicting-social-care-costs-Feb11-REPORT.pdf>).

Concentration of utilisation and spend

The top three risk categories together comprise 20% of the NWL population, and account for 70.7% of NWL's total health and social care spend (Exhibit 2). This high concentration of costs is in line with international experience. In 2009, for example, the 20% of US patients with the highest overall healthcare spending (not the same definition of risk we used, but still a reasonably good proxy for risk status) were responsible for 81.2% of that country's total healthcare spend.²

Exhibit 2: 20% of population drive 70% of health and social care expenditure

2010/11; 4 London boroughs



¹ Includes elective admissions, outpatient, and A&E
² Includes community health & primary care

SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX; NHS Reference Costs

Closer analysis revealed that:

- Spend was especially concentrated at the top of the risk pyramid.** The 0.5% of the NWL population that was at very high risk for an emergency admission accounted for 11% of the total spend. The 4.5% of the population in the high-risk category were responsible for 29% of that spend. The 15% of the population in the moderate-risk category accounted for approximately 31% of that spend. In contrast, 12% of NWL expenditure is on 50% of the population at very low risk for an emergency admission.
- The variability in per-person spend between the top and bottom risk categories is substantial.** Average per-person total spend was 88 times higher for those in the very-high-risk category than for those in the very-low-risk category (£26,587 compared to £303). Average per-person total spend was 10 times higher for the 20% of the population in the top three risk categories than for the remaining 80% of those in the other categories (£4,416 versus £457).

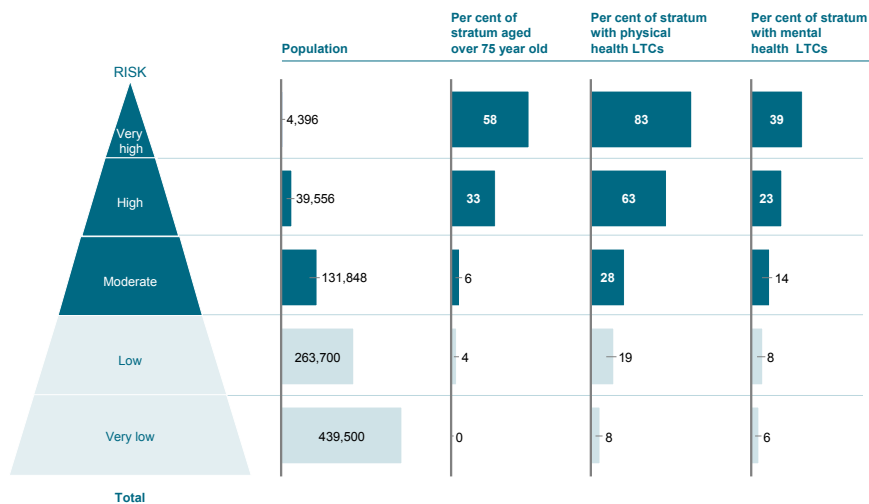
² Concentration of Health Care Spending in the U.S. Population, 2009 <http://facts.kff.org/chart.aspx?ch=1344> (retrieved on April 30th, 2013)

- Patterns of healthcare utilisation also vary significantly within risk categories.** Utilisation of health and social care services by the bottom two risk groups is modest, meaning those and the three higher risk groups produces striking differences. However, within the top three risk groups, the variation in utilisation is large. For example, people in the very-high-risk category had, on average, seven times more emergency admissions than those in the moderate-risk category; three-times-longer length of stay; 2.5 times more primary care contacts; and 22 times more contacts with the community health system.
- Similarly, patterns of social care spend differed significantly.** Social care represented 52% of total spend for people in the very-high-risk category compared to 14% of total spend for those at moderate risk. On average, people in the very-high-risk category received 39 times more hours of social care than did people in the moderate-risk category (549 compared to 14 hours).

Drivers of risk

The primary factors that appeared to drive utilisation and spend, as well as the risk of emergency admission, are shown in Exhibit 3. It should be noted, however, that most of these factors reflect which variables the CPM uses as its most significant predictors.

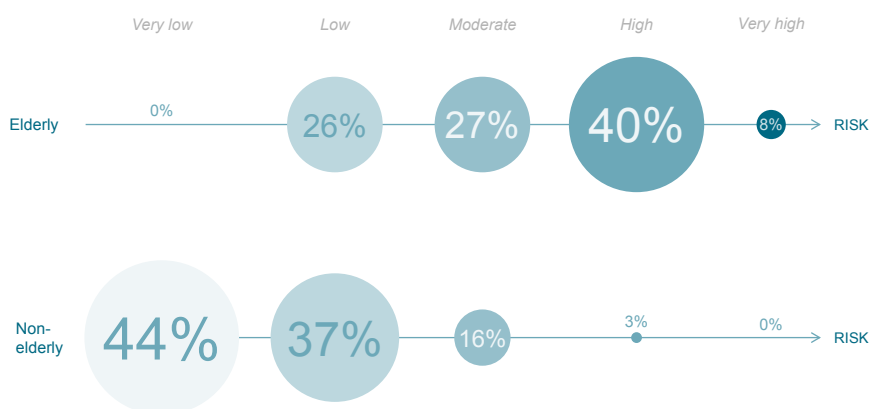
Exhibit 3: People who are old or have long-term physical or mental health conditions, fall into higher risk categories



SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX, NHS Reference Costs

- Age** was a major cost driver and predictor of risk. For example, Exhibit 3 shows 58% of the people in the very-high-risk category were elderly³, compared with 6% of those in the moderate-risk category. Looking at the data another way, Exhibit 4 below shows that 74% of all elderly people were in the top three risk categories; whereas for other adults, only approximately 19% were in these categories. Total costs were, on average 13 times higher for the elderly than the rest of the adult population. None of the elderly fall into the very-low-risk category.

Exhibit 4: Risk distribution of elderly vs. non-elderly

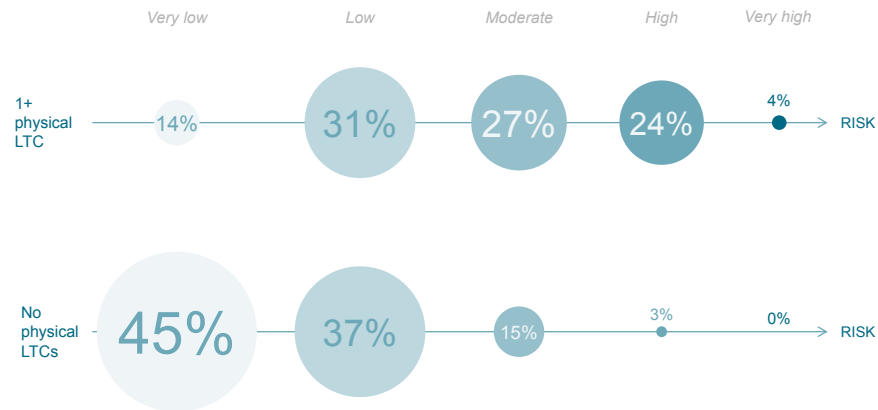


SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX, NHS Reference Costs

- Physical LTCs** (as identified by QOF flags) also correlated strongly with costs and risk. For example, Exhibit 3 shows 83% of the people in the very-high-risk category, but only 28% of those in moderate-risk category, had at least one physical LTC. Exhibit 5 (next page) shows fifty-five per cent of the people who had at least one physical LTC were classified as being in one of the top three risk categories; only 18% of those without physical LTCs were so classified (Exhibit 5). The people in the moderate, high, and very-high-risk categories often had more than one physical LTC.
- Mental health LTCs** were also present disproportionately among those in the higher risk categories. For example, Exhibit 3 shows 39% of the people in the very-high-risk category had at least one mental health LTC, compared with only 14% of those in the moderate-risk category. Exhibit 6 (next page) shows thirty-eight per cent of those with at least one mental health LTC were classified as being in one of the top three risk categories (Exhibit 6); only 19% of those with no mental health LTCs were so classified.

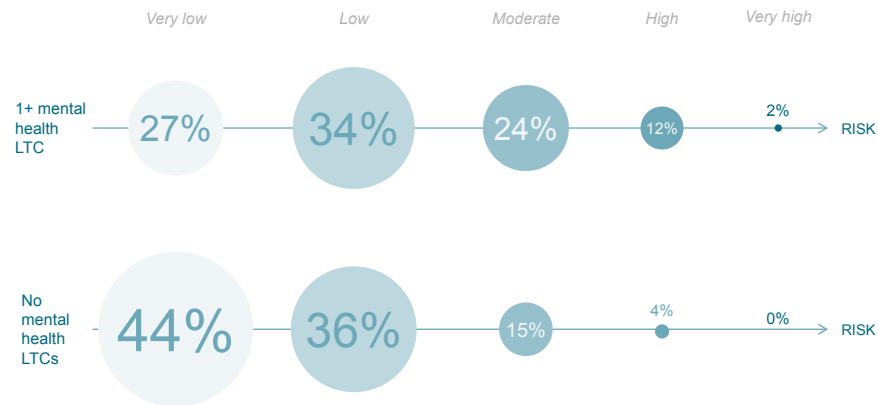
³ Over age 75 years.

Exhibit 5: Risk distribution of people with and without physical LTCs



SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX: NHS Reference Costs

Exhibit 6: Risk distribution of people with and without mental health LTCs

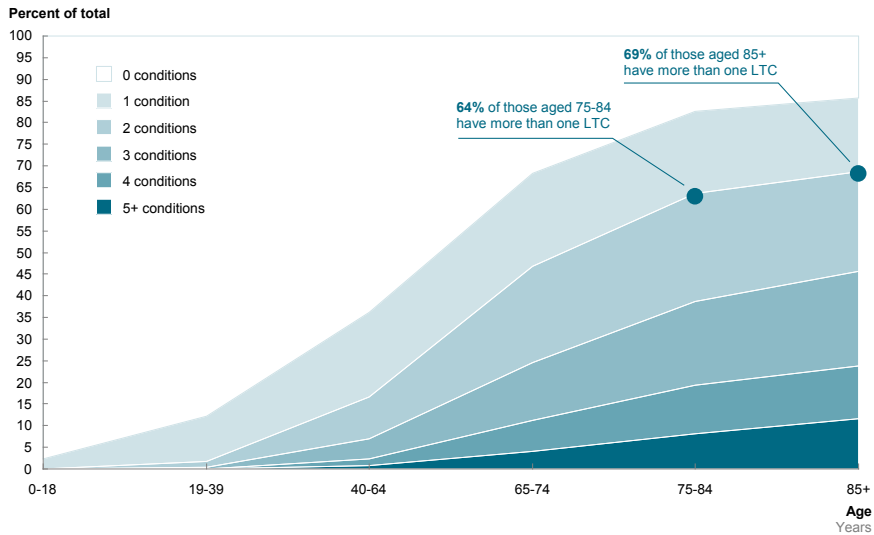


SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX: NHS Reference Costs

As one would expect, there was a strong interplay between age and the presence of physical and mental health LTCs. As Exhibit 7 shows, 64% of the people between the ages of 65 and 74 had two or more physical or mental health LTCs; 39% had three or more. For those age 85 and older, those figures rose to 69% and 46%, respectively. These results are consistent with data reported by other regions such as Scotland⁴.

⁴ <http://www.scotland.gov.uk/Topics/Health/Services/Long-Term-Conditions>

Exhibit 7: Strong relationship between age and prevalence of long-term conditions

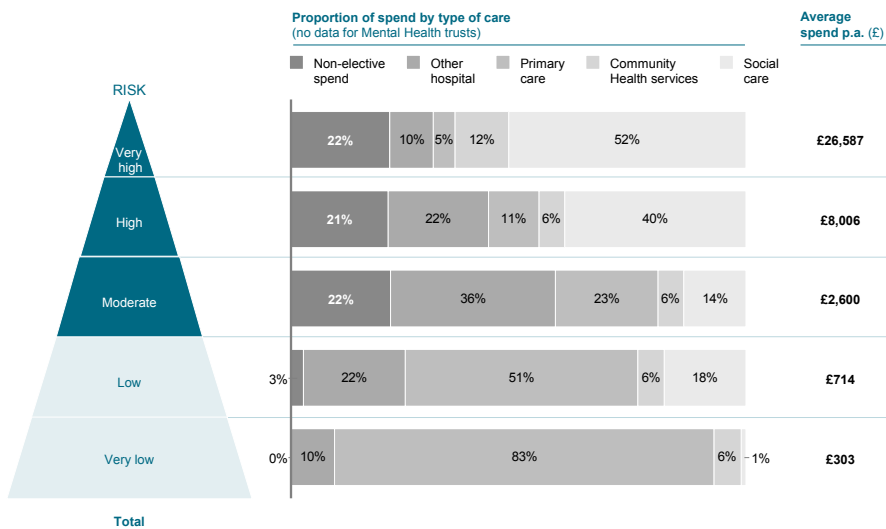


SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX, NHS Reference Costs

Pattern of care utilisation

For the people in the two lowest risk categories, half or more of all spend was devoted to primary care (Exhibit 8). In contrast, the primary care spend for the top two risk categories was relatively small: 5% for those at very high risk and 11% for those at high risk.

Exhibit 8: Spend by type and risk level

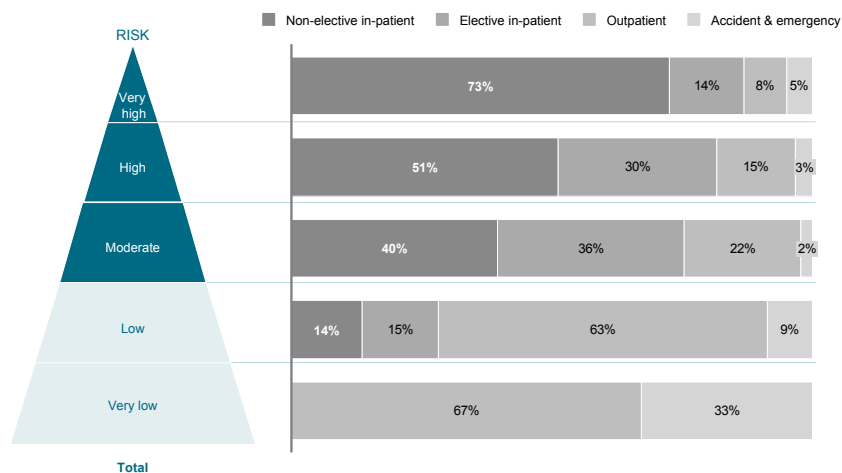


SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX, NHS Reference Costs

Only about 0.5% of the population included in the NWL data set was receiving adult social care at home or in a residential care setting.⁵ However, utilisation of this type of care was highly concentrated: 69% of all adult social care services were delivered to people in the top two risk categories; 87% were delivered to those in the top three categories. Just under 20% of the people in the very-high-risk category and 4.8% of those in the high-risk category received some sort of adult social care. Since the cost of providing this type of care is high, it accounted for 52% of total spend in the very-high-risk group and 40% of total spend in the high-risk group.

The people in the highest risk categories also accounted for a greater share of secondary care spend. Analysis of hospital data revealed that for many of these people, secondary care was often reactive rather than planned. For example, emergency admissions were responsible for the majority of secondary care spend for those in the top two risk categories (Exhibit 9). In contrast, outpatient visits accounted for about two-thirds of secondary care spend for the 80% of the NWL population in the two lowest risk categories.

Exhibit 9: Acute spend across the top 3 risk strata is driven mostly by non-elective inpatient admissions, while for the bottom 2 strata, it is driven by outpatient activity



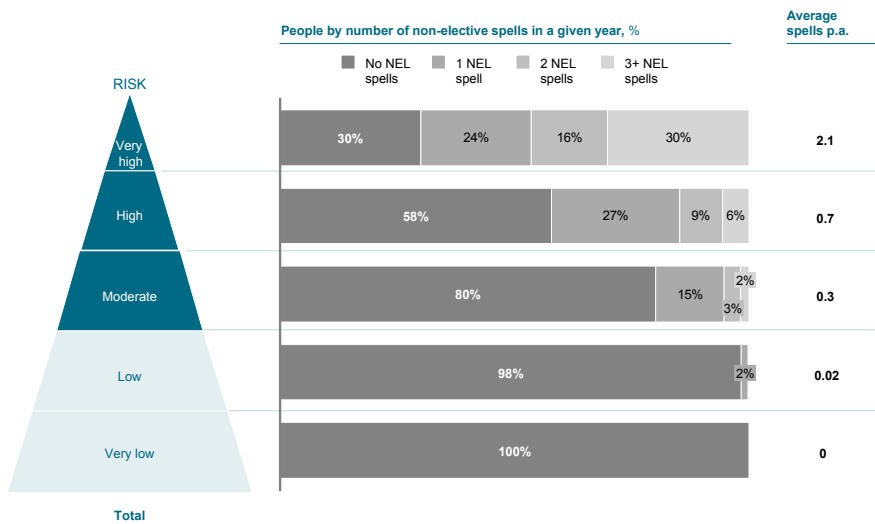
SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX: NHS Reference Costs

As expected, the overwhelming majority of emergency admissions were for people in the higher risk categories (Exhibit 10). Indeed, people in the top three risk categories accounted for 97% of all emergency admissions. Furthermore, the average number of emergency admissions per patient increased significantly as risk status rose: those in the very-high-risk category had an average of 2.1 spells, whereas those in the low-risk category had an average of only 0.02 spells. (The 50% of the population in the lowest-risk category had no emergency admissions.)

⁵ This figure excludes services that are not amenable to integrated care, such as Meals on Wheels. Also, as noted earlier, the data set does not include children's social care services.

As Exhibit 11 shows, the top three risk categories also accounted for 86% of all acute care spend. Social care and community care spend was also highly concentrated; the people in the top three risk categories were responsible for 87% and 73% of that spend, respectively. For primary care, the top 3 risk groups account for 36% of spend.

Exhibit 10: People in the higher risk strata account for the disproportionate share of non-elective activity

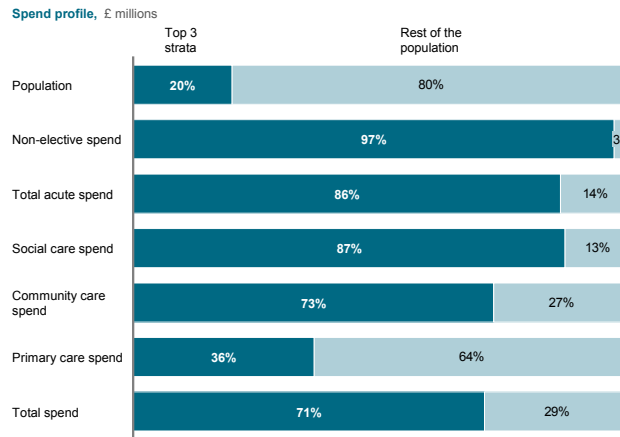


SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX; NHS Reference Costs

The relatively low spend on primary care is partially explained by the way that the GMS contract, which represents a significant part of payments for primary care, is structured: capitated payment for every registered patient. Even so, there is almost no relationship between the average number of GP contacts per person for each practice and the average CPM risk score of the registered list, as Exhibit 12 shows. This is true even adjusted for IMD deprivation factors and practice list sizes.

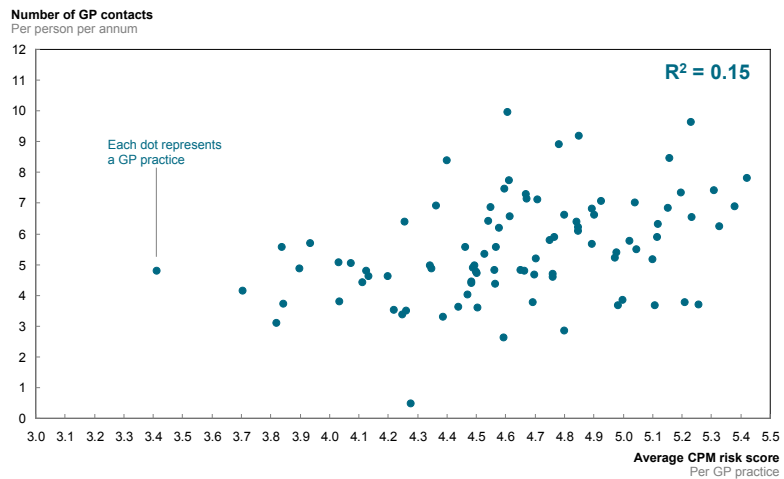
Primary care providers may not be spending an appropriate amount of time on those with the highest risk of an emergency admission.

Exhibit 11: The spend is unevenly split across settings, with ~36% of primary care time spent on those in top 3 strata



SOURCE: McKinsey team analysis, HES 2010/11, FIMS, Q research/NHS Information centre, PSSEX, NHS Reference Costs

Exhibit 12: There is almost no relationship between the average frequency of GP contacts and average risk score of the registered population at a GP practice level



Source: McKinsey analysis

III. Implications for the system

These findings have four implications for the NHS. First, the needs of patients vary significantly, and those responsible for care delivery must understand these differences if they want to target services to specific patients. Second, every clinician and commissioner should have access to local data like this; however, making such data available everywhere will require a concerted effort. Third, commissioners and local authorities need to ask how health and social care could be better organised to support patients, especially those in the higher risk groups. Fourth, commissioners need to consider whether they should modify the way they pay for health and social care.

Understanding the differences in patients' needs

Patient needs vary considerably among different parts of the population. It is therefore important that all local health and social care systems better understand the needs of the different patient groups within their regions so that they can proactively address those needs in a coordinated manner and responds quickly and seamlessly should an unexpected event occur. A number of CCGs throughout the NHS have made progress in this regard; nevertheless, all regions must continue to push towards a deeper understanding of the needs of local patients. Clinicians and the commissioners in each locality should be able to answer such questions as:

- Who are the specific patients most at risk of an emergency admission within the next 12 months? How have various providers interacted with them in the past? How should their care be coordinated in the future?
- What is the interplay of physical, mental health, and social care needs for those patients? How can providers work together more effectively to address these needs holistically?

Matched patient-level data sets covering 100% of activity and spend are foundational to be able to provide good care. All clinicians and managers should have access to data analyses such as these and tools based on them in order to better understand patient population and what is driving activity and cost.

- Which patients are receiving potentially overlapping services from multiple agencies? For example, how many patients are receiving both social care and community care visits the same day?
- More broadly, how can clinicians and commissioners understand the needs of all the different patient groups?

The need for local data sets

In an ideal world, all clinicians and commissioners in England would have access to matched patient-level data sets that cover 100% of activity and spend within their regions, as well as the tools needed to derive insights from the data sets quickly and easily. Together, the data sets and tools would give clinicians and commissioners a better understanding of the local patient population and the factors that are having the greatest impact on activity and cost. Integrated, cross-disciplinary data sets would therefore be foundational to any improvement effort. Yet, despite the advantages that such data sets can provide, few clinicians and commissioners currently have access to them.

Developing data sets that encompass all activity and spend in every region of England would be a major undertaking. However, the NHS has important advantages over most other health systems: it covers the whole population; it already has a high volume of electronic records about the services it delivers; and many of those records include a common identifier for each patient. As a result, the NHS has an unrivalled opportunity to create matched patient-level data sets across all of England.

The creation of such data sets requires four things:

- **Capturing data at the patient level using NHS identifiers.** Most NHS organisations do this already; the quality of data from acute and primary care is particularly good. However, the quality of data from community services and mental health services is of varying depth and quality. In addition, social care data may not be coded with an NHS identifier, and thus it is sometimes difficult to match social care and health care data.
- **Extracting and matching data.** The data from different sources must be extracted into a data warehouse and then matched at the patient level. The data must then be analysed, and the results must be synthesised into regular, easy-to-understand, actionable reports. The cost for these processes is not prohibitive, but a concerted effort is required.
- **Addressing concerns about information governance.** Given concerns about patient privacy, a working group that includes participants from all the relevant providers must be established. The working group can then create a common information governance framework that will enable seamless and timely sharing of data but will also protect patient privacy. Once the framework has been developed, the providers should all sign the necessary information governance agreements.
- **Ensuring that the right technical capabilities are in place.** If the NHS is to develop and maintain matched patient-level data sets, it must have the right technical capabilities in place. For example, even once the data sets have been created, there will be a need for dedicated analysts who can update the data sets and provide reports to stakeholders.

Broader questions about how to meet patient needs

Given the important differences in population needs across health and social care, commissioners and local authorities should examine whether services are aligned appropriately against those needs. They should define their aims for each group and then determine whether the services delivered are optimal for achieving those aims.

- For patients with complex needs who are already at very high risk, the aim might be to manage their conditions as cost-effectively as possible, and to keep them as well and comfortable as possible
- For patients at moderate to high risk of deterioration, the aim might be to mitigate that risk and prevent deterioration through more proactive care delivery (secondary prevention)
- For relatively healthy patients with only routine care needs, the aim might be to provide fast, convenient access to high-quality care and prevent deterioration (primary prevention)

Once the aims for the various groups have been established, commissioners and local authorities can undertake analyses to determine what services would enable them to achieve those aims and how the cost of various services compares. For example, the NWL data revealed that comparatively little of the money spent on the very-high-risk patients went to primary care services. This raises a question: if these patients received more proactive care in the community (from primary or community care services), might they incur fewer emergency hospitalisations or, perhaps, require less social care?

As part of this process, the commissioners and local authorities would have to consider the needs of each population segment, the potential impact of the proposed interventions, and their associated costs. Armed with this information, the commissioners and local authorities could then develop business cases for various interventions and consider how much time and money should be invested where.

How to pay for health and social care

Finally, the findings have implications for how commissioners pay for health and social care:

- If there is a need for greater focus on higher-risk patients to proactively manage the cost of their care, how can that need be addressed, given that comparatively little is spent on primary care services for these patients?
- Given the needs of the higher-risk patients and current patterns of care delivery, where should the “home” for these patients be? Who should have accountability for them?
- Given that investments in new interventions must be made up front and the savings come only later, how should such investments be structured? Who should bear the risk associated with the costs?
- What are the right payment mechanisms, provision vehicle, and governance structure to ensure better care coordination and accountability among different providers?



Conclusion

Our findings demonstrate that by combining the information in various NHS data sets, then using patient identifiers to match that information, and then risk-stratifying the patients, it is possible to develop a very detailed understanding of the how the various population segments utilise health and social care services and what the total and average spend in each segment is.

The results reveal just how widely needs vary in the population, driven by such factors as age, physical LTCs, and mental health LTCs. They also show the extent to which both utilisation and spend are concentrated in the 20% of the population at moderate, high, or very high risk of emergency hospital admission. Together, these three segments accounted for 70.7% of NWL's total health and social care spend, 73% of all community care spend, 86% of all acute care spend, and 87% of all social care spend.

These three segments account for 36% of primary care spend, partially driven by how the NHS pays for primary care through GMS. This finding is surprising, given that better, more proactive primary care might help reduce these people's need for expensive services that result from avoidable deterioration of health.

The results reported in this paper are specific to NWL; each CCG in England is likely to have a different set of findings. In every region, however, the availability of a matched patient-level data set and the tools needed to analyse it, would make a more sophisticated understanding of patient activity, cost, and risk possible. As a result, it would enable better decision making.

Analyses of such a data set would help clinicians, commissioners, and local authorities determine which population segments to focus on, identify where—and how—system resources and population needs are misaligned, and evaluate how much to invest into new interventions. They could then decide how to re-align system resources with population needs. For example, commissioners could redesign reimbursement mechanisms to align incentives across the different providers to encourage the desired new behaviours.

The journey to more proactive, coordinated, responsive, and consistent care is long and arduous. Many factors will have to be put in place before success can be assured; among the most important of these factors are clinically driven changes in care pathways and frontline behaviour, the right payment mechanisms, transparent performance management mechanisms, and the right governance structure. However, the first step on that journey may well be a better understanding of the needs of the local population. By developing matched patient-level data sets for every region and the tools needed to analyse them, the NHS can make better understanding possible.

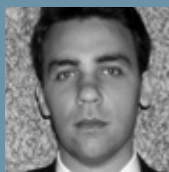
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Oleg Bestsenyy is an associate principal in McKinsey's London office. **Tom Kibasi** and **Ben Richardson** are principals in that office.

For more information, send an email to Integrated_Care_UK@mckinsey.com or contact the authors directly (see details below).



Oleg Bestsenyy
+44 7979 240 949
Oleg_Bestsenny@mckinsey.com



Tom Kibasi
+44 7950 251 057
Thomas_Kibasi@mckinsey.com



Ben Richardson
+44 7825 029 368
Ben_Richardson@mckinsey.com

