Population Health Management

Part of Better Lives Lincolnshire Integrated Care System

Building system-wide population health management capabilities

A strategic partnership approach

Blueprint guide

Optum

Developed in partnership with Optum UK

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Foreword

Like many integrated care systems (ICSs), Lincolnshire faces a complex and growing set of health challenges that demand new approaches to care and new ways of working across NHS, local authority and voluntary sector spheres.

As we describe in both our Joint Forward Plan and our Integrated Care Partnership strategy, data can play an important part in supporting these changes and helping us to deliver the best possible results for our population.

Our aim is to join up and apply population data in a way that connects our teams together, builds shared knowledge and understanding of the communities we serve, and empowers our frontline professionals to design and deliver interventions that make a lasting difference.

All of this informed our decision in 2022, to develop a long-term strategic partnership with Optum® UK to help us rapidly scale up our population health management (PHM) infrastructure and capabilities: we wanted to create an environment that would support high quality decision-making, efficient resource allocation and robust evaluation.

Two years on, things look markedly different. We now have a person-level linked dataset covering 100% of our population, so we can visualise people's journeys through health and ill-health, understand impact on services and monitor outcomes. Using a suite of analytical tools, we can capture unique insights into health inequalities, the wider determinants of health and other factors such as social vulnerability. And together this means we can confidently plan, predict and measure the effects of any changes in a way we've never been able to in the past.

This blueprint, developed in conjunction with Optum UK, tells the story of how we got to this point, drawing on our own practical experiences and capturing the key lessons.

Specifically, it describes:

- The cultural foundations developed through our Culture Compact and other forms of engagement (Section 2: Culture and leadership)
- The technical intricacies of joining up our datasets and building our analytical capability through training and the roll out of the PHM Analytics suite (Section 3: Data and capability)
- The strategic value of this intelligence, drawn out by careful segmentation, predictive modelling and evaluation (Section 4: Strategic segmentation, forecasting and evaluation)
- The practical application of these insights in the form of small-scale, local interventions to test new approaches to delivering care (Section 5: Designing and implementing interventions)

It's already clear to us that having a fully costed, linked data model will be transformative for Lincolnshire, helping us shift resources toward proactive and preventative interventions and challenging everyone to think, act and work differently.

We also know that delivering change at scale is difficult. One of the benefits of strategic partnership is that it has provided the continuity of support and expertise to embed new ideas and disciplines in a sustained and organic way, developing local expertise along the way. The commitment to fund and establish a PHM programme team with dedicated senior leadership complemented and provided balance with the resource supported by Optum.

Equally important has been the investment we've made in our own leadership capabilities: having a strong executive leadership team to work in tandem with Optum has been essential for maintaining the pace of delivery.

The challenge ahead, as we explore in the final part of this document (Section 6: Next steps and lessons learnt), is to mainstream and normalise this way of working so it becomes an intrinsic part of how everyone in our ICS operates. This will be our focus throughout 2024 and beyond.

For now, we hope this first-hand account of our progress over the last two years – and the many challenges we've faced along the way – can help other ICSs on a similar path.

Matt Gaunt

Deputy Chief Executive and Director of Finance, Lincolnshire Integrated Care Board

Dr Sunil Hindocha

Medical Director, Lincolnshire Integrated Care Board

Section 1: Programme overview

Introduction

Making better use of person and population-level data to shape the way health and care services are delivered forms a major part of the Lincolnshire NHS Joint Forward Plan and Integrated Care Partnership strategy.

Lincolnshire had initially worked with Optum UK as part of NHS England's Population Health Management Development Programme in 2021/22. However, these early efforts to join up primary care data with other datasets only covered part of its population (approximately 50 per cent).

As a result, Lincolnshire ICB and Optum UK agreed a three-year strategic partnership in spring 2022, designed to accelerate progress in scaling up data infrastructure and improving PHM capabilities across the system.

This blueprint describes how the partnership has developed over the last two years, what has been achieved and what practical insights and lessons have been learnt along the way.

About the programme

The strategic partnership allowed Lincolnshire ICS's PHM programme team and Optum UK to work collaboratively on the design and delivery of a long-term strategy for improving PHM capabilities. This is captured in a detailed **PHM programme roadmap** describing the key deliverables, based on the "4Is" of infrastructure, intelligence, intervention and incentives (figure 1).

An early focus was on creating a **linked dataset** incorporating primary care, secondary care and adult social care data, which feeds a suite of PHM analytics tools. This is supported by **extensive staff and leadership engagement, training and capability building**, intended to address cultural barriers, agree the strategic approach and provide all levels of the system with a deep understanding of PHM tools and methodologies.

"This strategic partnership has helped Lincolnshire take a major leap forward in applying advanced population and person-level analytics in their work. The new interventions now taking shape, particularly across primary care, show the value of giving professionals the knowledge and insights to innovate for their communities via access to these powerful linked datasets."

Anita Day, Non-Executive Member, Lincolnshire ICB

Analytical coaching
Training on linked data interpretation and emerging tech needs

Leadership coaching
Change management support for system-wide stakeholders

Outcomes focus
Payment models based on population need and predictive analytics

Infrastructure

Design and implementation of core system and primary care building blocks, including governance and data architecture design

Intelligence

Deployment of advanced analytics and training of PHM tools to identify new and unseen opportunities in your data to drive better outcomes and efficiency through informed decision making

Intervention

Evidenced-based design of high impact interventions based on population segmentations and patient risk

Incentives

Transition from activity-based funding to innovative and integrated funding models with value-based funding models, actuarial techniques, and incentives

Technology and data
Accelerate development of linked data infrastructure

Actionable insights
Analytics tools generate actionable PHM insight for change

Integrated care transformation
Support care redesign

Figure 1: the PHM roadmap for Lincolnshire focused on developing the '4Is': infrastructure, intelligence, intervention and incentives.

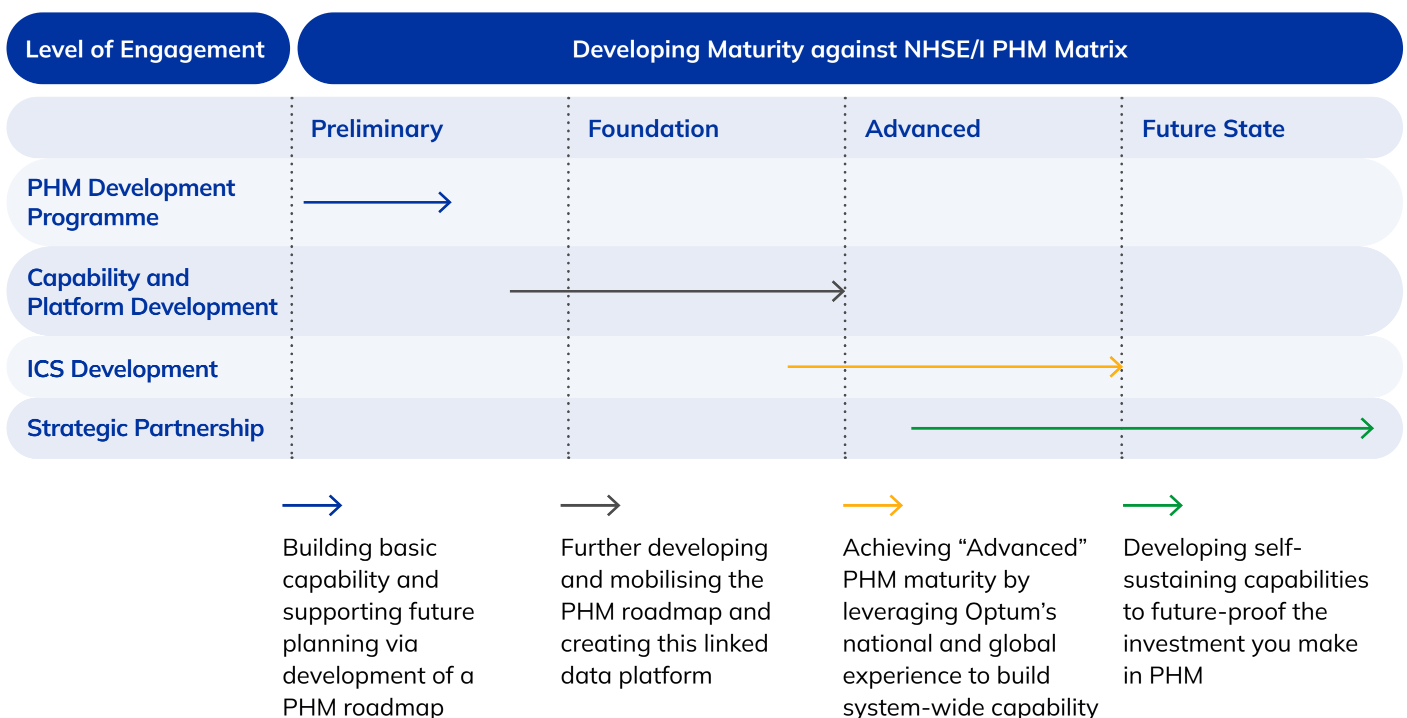


Figure 2: the strategic programme was designed to help Lincolnshire make rapid progress against NHS England's PHM maturity matrix – with the end goal of deeply embedding PHM methodologies across all levels of the ICS in a sustainable way.

Who was involved?

The partnership has involved multidisciplinary experts from Optum UK working with the ICS's PHM programme team and key stakeholders to deliver a complex range of workstreams – the aim has been to create a "one team" ethos regardless of organisational boundaries.

Key to this has been the PHM **programme management office (PMO)** within the ICB, which acted as a central hub supporting key governance processes, managing project delivery against agreed timelines, and ensuring all stakeholders were engaged and involved.

The PMO supports an **executive steering group** which includes senior representatives from all partner organisations across the ICS (figure 3).

The ICB has also invested in two senior roles to direct the programme on behalf of the ICS: a **Programme Director for Population Health** and a **Director of Intelligence and Analytics**. Both have played a critical role in developing and implementing the PHM strategy, securing executive buy-in, and overcoming obstacles to delivery.

Lincolnshire ICS PHM executive steering group

Purpose

- Developing a shared vision, culture, and language
- Supporting adoption of PHM approaches across organisations, programmes and services
- Aligning system-wide leadership practices to support effective PHM disciplines
- Setting programme priorities and overseeing delivery

Membership

- Consists of directors and senior leaders from all main partner organisations
- Representation from ICB, primary care, acute, mental health and community services, plus local authority and voluntary sectors

Figure 3: the PHM executive steering group provides essential leadership and direction for the programme.

About this blueprint

Developed by the Lincolnshire strategic partnership team, this blueprint provides an overview of how the partnership has developed and what impact it has had so far on the system's ability to harness and apply population-level data in planning, delivering and improving services and population outcomes.

It forms part of a series of blueprints created by Optum UK and its NHS partners to share good practice and offer practical advice and guidance on scaling up PHM capabilities. The guide is supported by a **toolkit of additional resources** designed to help other ICSs on a similar path (see Additional resources, p.32).

Section 2: Culture and leadership

Introduction

Building trust and understanding between different teams and professional groups is fundamental for creating the conditions in which challenging, data-driven conversations about future priorities, resources and ways of working can succeed.

In Lincolnshire, Optum UK supported this process by working with the leadership community to develop a **Culture Compact**, a statement of the shared values and behaviours that should be adopted whenever different agencies or teams collaborated.

The Compact was created after intensive engagement involving senior representatives across primary and secondary care, local authorities and third sector partners to agree the core principles and practices that would define their future working relationships.

"The Culture Compact was never about creating a homogenised culture, or making people feel like they couldn't still be part of their existing team. It's about establishing what people value in their working culture, and then using that insight to understand and accommodate those needs in the cultural parameters you agree to uphold."

Rebecca Richmond, Director, Optum UK

How it works

A series of one-on-one conversations and workshop sessions helped to develop the Culture Compact (figure 4). These were initially designed to allow senior managers to reflect on the historic relationships between their organisations and consider how these may need to develop further to encourage deeper collaboration and teamwork based around a common understanding of patient and population needs.

These workshops also helped to establish the critical boundaries, behaviours, and commitments for successful partnership in the future, including open discussion about what might cause issues along the way and how these might be addressed. After this, face-to-face sessions helped to refine core statements in the Culture Compact and explore how these would be reflected in practice.

Five key questions to consider when developing a Culture Compact

1. How would you describe the current relationship between your team/organisation and its key partners across the health and care system?
2. What challenges have you observed that prevent you and your team from working as effectively as you would like with other partners?
3. What key words would you use to describe the future relationship you would like to build with other parts of the system?
4. What changes are within your power to improve the way your team/organisation works with others within the system?
5. What practical commitments are you willing to make, and what do you need from others, to make these changes happen?

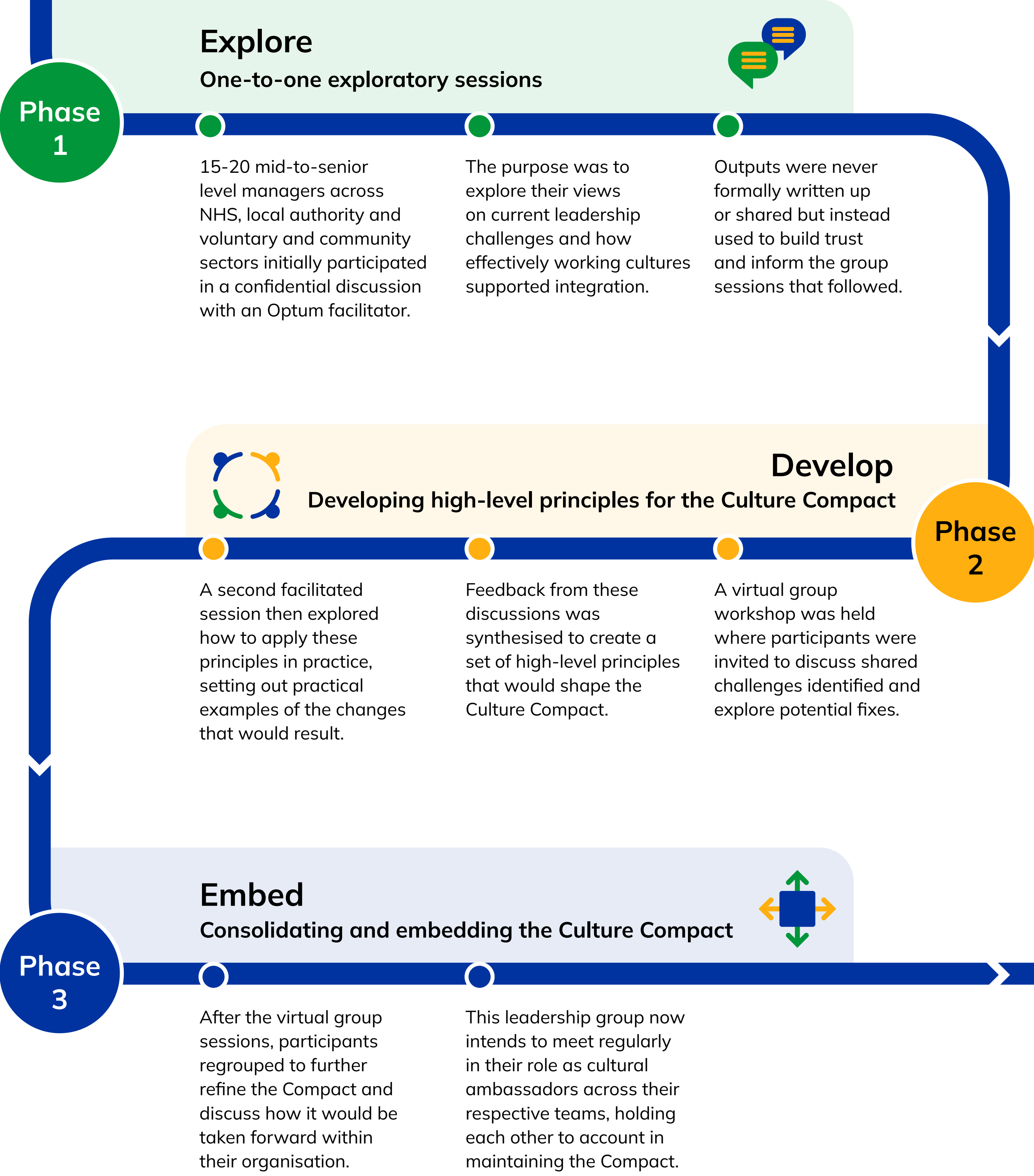


Figure 4: Optum UK worked with a wide range of leaders across Lincolnshire's health and care system on a three-stage process for developing the Culture Compact.

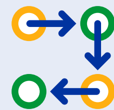
Building broader advocacy and support

Alongside the development of the Culture Compact, senior figures within the ICB team worked with Optum UK to engage key stakeholder groups within the ICS as the population health management model took shape.

This has involved delivering:

Tailored workshops

Training sessions


Action learning sets

Educational content

to a range of professional groups, including frontline clinicians, finance and strategy leads, local analytics and intelligence teams, and professionals working across local authority, voluntary and community sector bodies.

Alongside this, Optum UK continues to provide **one-to-one coaching opportunities** for senior figures across the ICS, where they work systematically with these leaders to establish their goals and explore how PHM techniques can support them.

> "It's impossible to overstate the value of explaining what you're doing and why it matters. We invested a lot of time engaging people across the system and creating early advocates for PHM – I don't think we would have got the same traction and buy-in without having these foundations in place."

Vic Townshend, Programme Director – Population Health Management, Lincolnshire Integrated Care System

Section 3: Data infrastructure and capability

Introduction

A key aim of the strategic partnership was to rapidly build up Lincolnshire's data infrastructure and support its analysts to access and interpret linked data proficiently.

Through the NHS England PHM Development Programme, Optum UK had already worked with Lincolnshire on an initiative to join up their primary care data with existing hospital, community and mental health datasets. This had resulted in around 50 per cent coverage of the population by April 2022.

The value of linked data

Developing a linked dataset is essential for supporting a PHM approach.

Joining up health and care data at a person-level allows decision-makers to view an individual's journey through the health and care system during both health and ill-health.

This helps them to:

- Understand the impact these different interactions are having on services now
- Segment and stratify their populations according to different needs and characteristics
- Consider how care pathways might be adapted to achieve better outcomes in the future

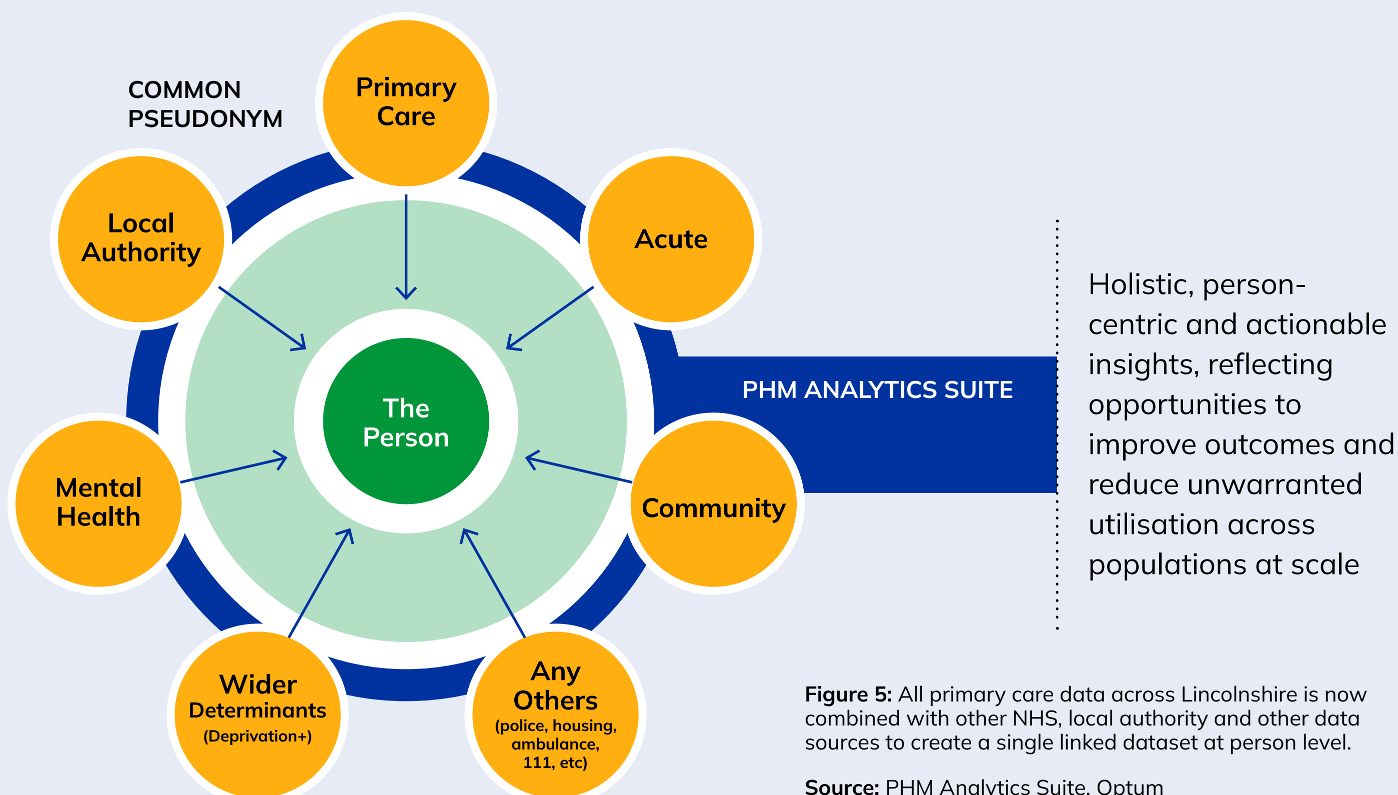


Figure 5: All primary care data across Lincolnshire is now combined with other NHS, local authority and other data sources to create a single linked dataset at person level.

Source: PHM Analytics Suite, Optum

c.815,000

registered population size across Lincolnshire ICS

population coverage within the linked dataset achieved within just 10 months

Since then, Lincolnshire ICB and the local commissioning support unit (NHS Arden & GEM) worked together with colleagues from Optum UK to rapidly expand available data infrastructure and capabilities.

This has included:

Establishing a comprehensive data model across its health and care services, with data sharing agreements in place for all 80 local GP practices ensuring 100 per cent representation of its registered patients (figure 5).

Granting sub-licenses for access to linked data to all major providers, including United Lincolnshire Hospital Trust (ULHT), Lincolnshire Community Health Services (LCHS), and Lincolnshire Partnership Foundation Trust (LPFT), as well as across primary care.

Creating a data improvement workstream to prioritise integration of further data on immunisations, cancer wait times and provider service wait times and supplementing person data with household data.

Designing and launching a suite of data management tools, allowing teams to filter and segment populations, project the impact of proposed changes across the system, and track and evaluate the difference these interventions make.

"The strategic partnership has helped to condense many years of work into the space of just 10 months. It's been a colossal effort from the analytics and intelligence community to get the information governance challenges sorted and the datasets shared so we could achieve full and comprehensive population coverage. We need to continue improving and expanding our linked dataset in the years ahead so we can enrich the intelligence available."

Katy Hardwick, Chief Intelligence & Analytics Officer, NHS Lincolnshire ICB

Building the linked data model – six critical steps

A series of steps were taken to ensure robust governance was in place for data capture and processing. The strategic partnership team also ensured the right support was available to allow analysts and other professionals to access and use the linked dataset effectively.

STEP 1 Pre-engagement with primary care

An initial round of engagement with primary care professionals focused on explaining the rationale for consolidating and linking data to support PHM. These introductory workshops, jointly led by senior figures within Lincolnshire ICB and Optum UK, were designed to provide reassurance on the purpose of gathering primary care data and present the benefits that having a linked dataset could bring.

STEP 2 Building the data specification

To develop the data model, the newly established Lincolnshire ICS Data and IG Leadership Group used national datasets and specifications wherever available: this provided uniformity and helped to ensure the data inputs were familiar to local analytical teams. Where national specifications were not available, it drew upon previously agreed specifications developed as part of the PHM Development Programme.

STEP 3 Information governance (IG)

Key IG requirements included the initial completion of a **data protection impact assessment**, and the drafting of **data sharing agreements** to establish Lincolnshire ICB as joint data controller for patient data held by all GP practices across Lincolnshire. Both Optum UK and the local commissioning support unit (CSU) also secured a **data processing agreement** with the individual practices and a **data access request service** allowing other NHS provider data reported up to NHS England to be processed and linked with local GP data.

STEP 4 Data processing and quality standards

With the appropriate data sharing and data processing agreements established, Optum UK has brought together all data flows into a single dataset known as the **Population Health Person Master Index**. This captures the entire population at an individual level, covering person-level demographics, medical conditions, service usage, cost of care, and other clinical risk factors. It uses pseudonymised data in a way that allows for reidentification for direct care purposes.

STEP 5 Development and launch of reporting tools

Optum UK also worked with Lincolnshire ICB to develop its **PHM Analytics suite**, a digital platform which allows the linked data to be filtered and reported via a series of dashboards. This includes the ability to stratify the population according to selected risk criteria; segment and identify target cohorts using a range of filters; and gather granular intelligence on inequalities and variances across different population groups.

STEP 6 Ongoing training and development

After the PHM Analytics suite had been built, Optum UK ran a series of **initial training sessions for local analysts.** These sessions showed them the practicalities of how to use the reporting tools effectively as well as the wider principles of applying data and intelligence to support decision-making across the system. Since then, a small number of local super-users have been coached to provide advice and disseminate good practice across the analytical community.

The role of Arden & GEM CSU

Arden & GEM CSU has played a critical role in supporting Lincolnshire's PHM approach. Linking to the Data Services for Commissioners Regional Offices (DSCRO), the CSU prepares national datasets according to Optum's specification and then pseudonymises this data and transfers to Optum. It does the same with the data extracted from GP practice clinical systems.

This common approach to pseudonymising an individual's NHS number means that Optum can link an individual's records together across the datasets. It also means that the pseudonymised data can be made identifiable again where a clinician has a legitimate need to receive the NHS number for direct care purposes.

Data quality standards

The linked database supports good practice in data quality, as follows:

- The dataset is accessible to system partners through a population health intelligence platform and provides opportunities for automation and bespoke analysis.
- The dataset includes adult social care activity.
- The analysis produced is replicable, with code shared across ICS partner organisations.
- The dataset allows for wider analysis, including the ability to measure and evaluate impact (see section 6).
- The data includes characteristic and wider determinant data e.g. ethnicity, deprivation, housing and employment which supports understanding of opportunities around prevention and health inequalities.

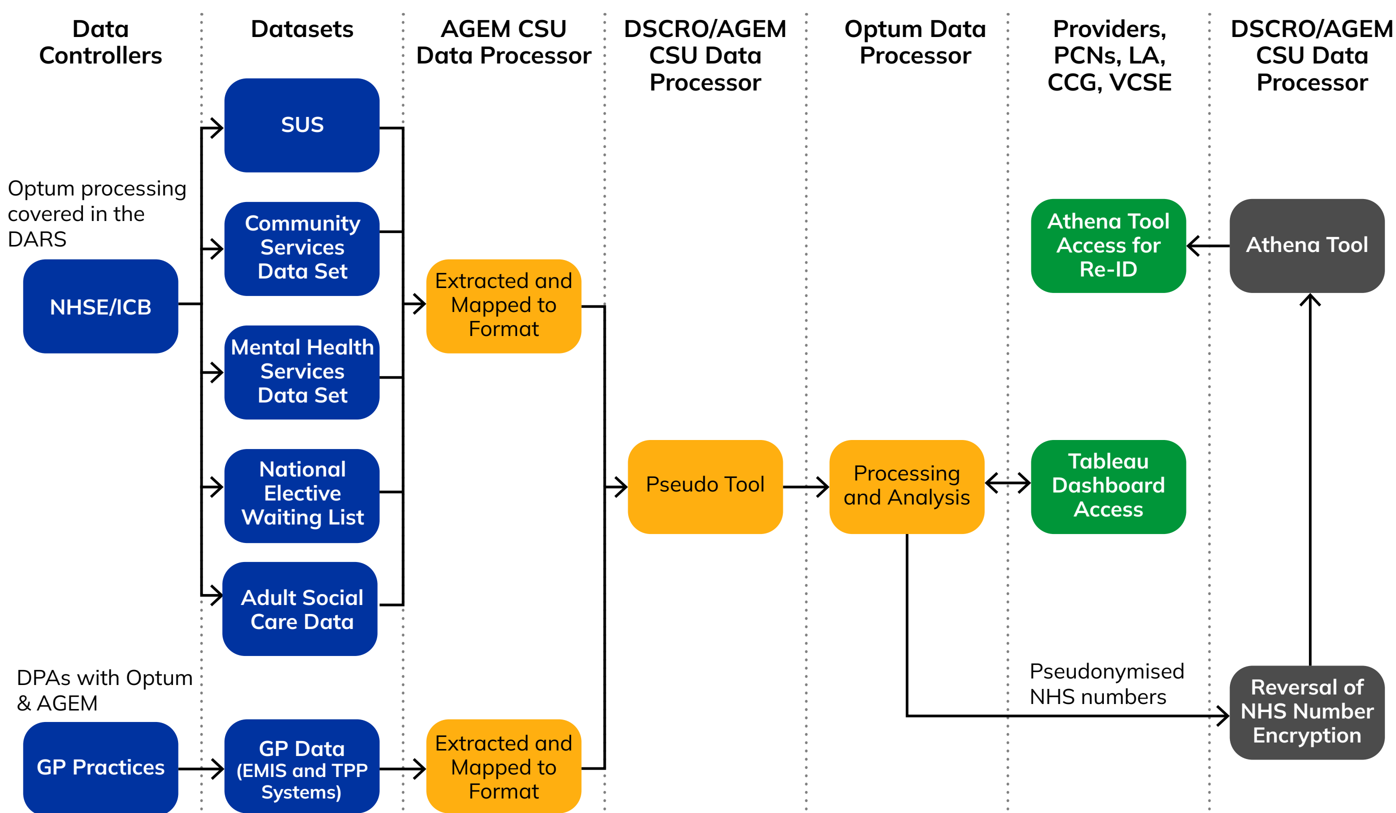


Figure 6: in Lincolnshire's model, individual datasets are extracted, mapped and pseudonymised by Arden & GEM before being processed and analysed by Optum UK to create the linked database. These data can then be reidentified for direct care purposes, again by Arden & GEM CSU.

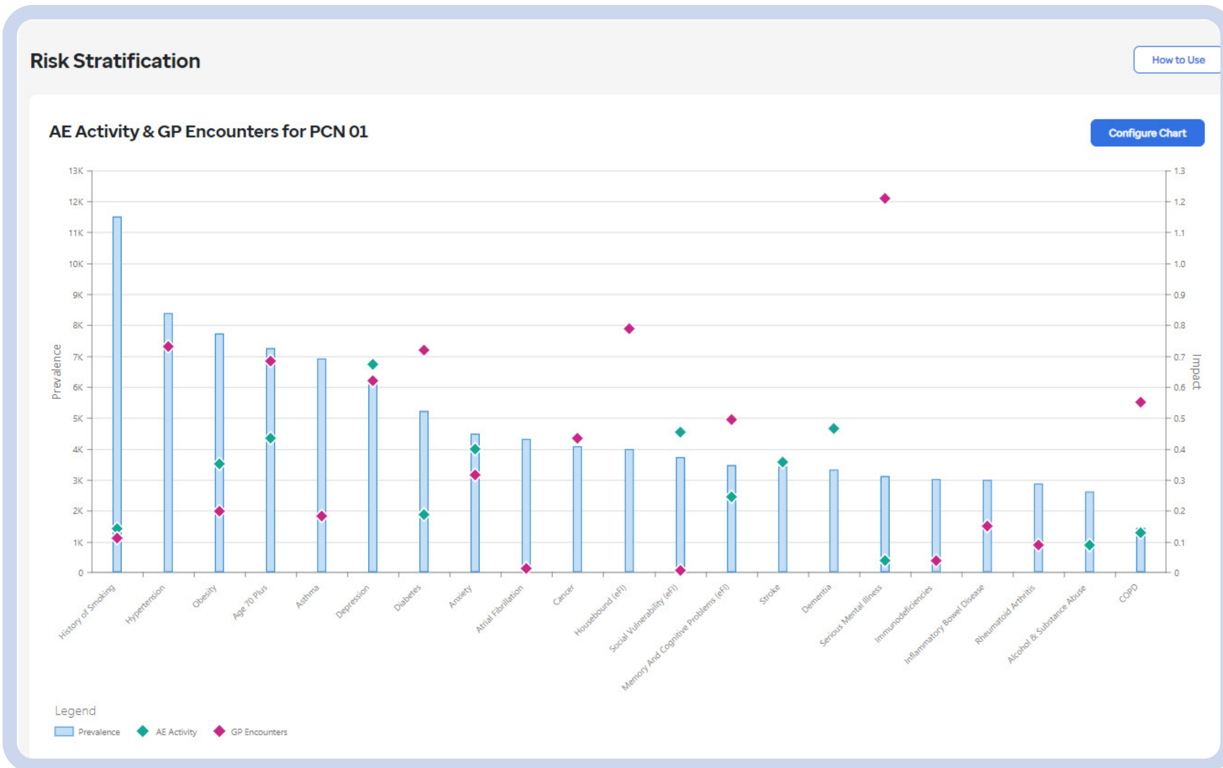


Figure 7: An important function of the PHM Analytics suite is the ability to assess relative impact of risk criteria on service demand and cost. In this illustrative example, a dashboard shows the prevalence (blue bar charts) of clinical conditions as well as the impact in GP (pink diamond) and AE (green diamond) services.

Source: PHM Analytics Suite, Optum

Figure 8: The PHM Analytics suite also allows teams to filter data across a range of criteria, helping to develop intelligent segmentation – in this case, it uses fictional data to demonstrate the relative financial cost to the system incurred by patients at different stages in life.

Source: PHM Analytics Suite, Optum

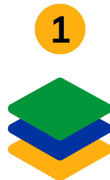
Section 4: Strategic segmentation, forecasting and evaluation

Introduction

For Lincolnshire, the development of a comprehensive linked dataset has opened new ways of understanding local people's needs and circumstances.

Optum UK and the ICS's PHM programme team have developed several important strategic assets that should help ICS decision makers make sense of population needs and support evidence-based conversations about future priorities.

1

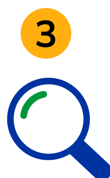


The **strategic segmentation model** uses bio-psycho-social criteria to group the population into segments who share similar condition, risk and actionability. Each person registered with a Lincolnshire GP is classified into one mutually exclusive segment reflecting their overall health status and care needs. The model gives teams across the ICS a more unified way of understanding their patient population and will support future system planning and resource allocation decisions. It also includes an **outcomes framework**, which helps teams to understand and track the cumulative impact of improvement work against a shared set of objectives for each segment of the population.

2

The **PHM projections tool** uses an agreed methodology to calculate the potential financial value that a proposed intervention could bring to the system, along with wider benefits such as reducing pressure on services and/or freeing up hospital bed capacity. As well as helping to forecast the impact of proposed changes on activity and demand across the system, the tool can also be used to build business cases, predict resourcing needs and give teams a defined set of metrics to measure against.

3



The **evaluation module** within the PHM Analytics suite allows local teams to measure how interventions are performing. It works by tracking the outcomes of patients in a target cohort which has benefited from a new service or intervention, and then comparing them directly against a control group of patients who have not.

What is segmentation?

Segmentation offers a way of dividing the whole population into smaller parts based on different criteria or characteristics. Lincolnshire's linked dataset can be filtered according to factors such as age, needs, preferences, demographics or health condition, helping ICSs to identify segments of the population that may experience poorer outcomes, incur particularly high healthcare costs, and/or require more integrated support through targeted interventions.

Knowing who you're serving and how to measure impact underpins value-based care models and interventions across the system

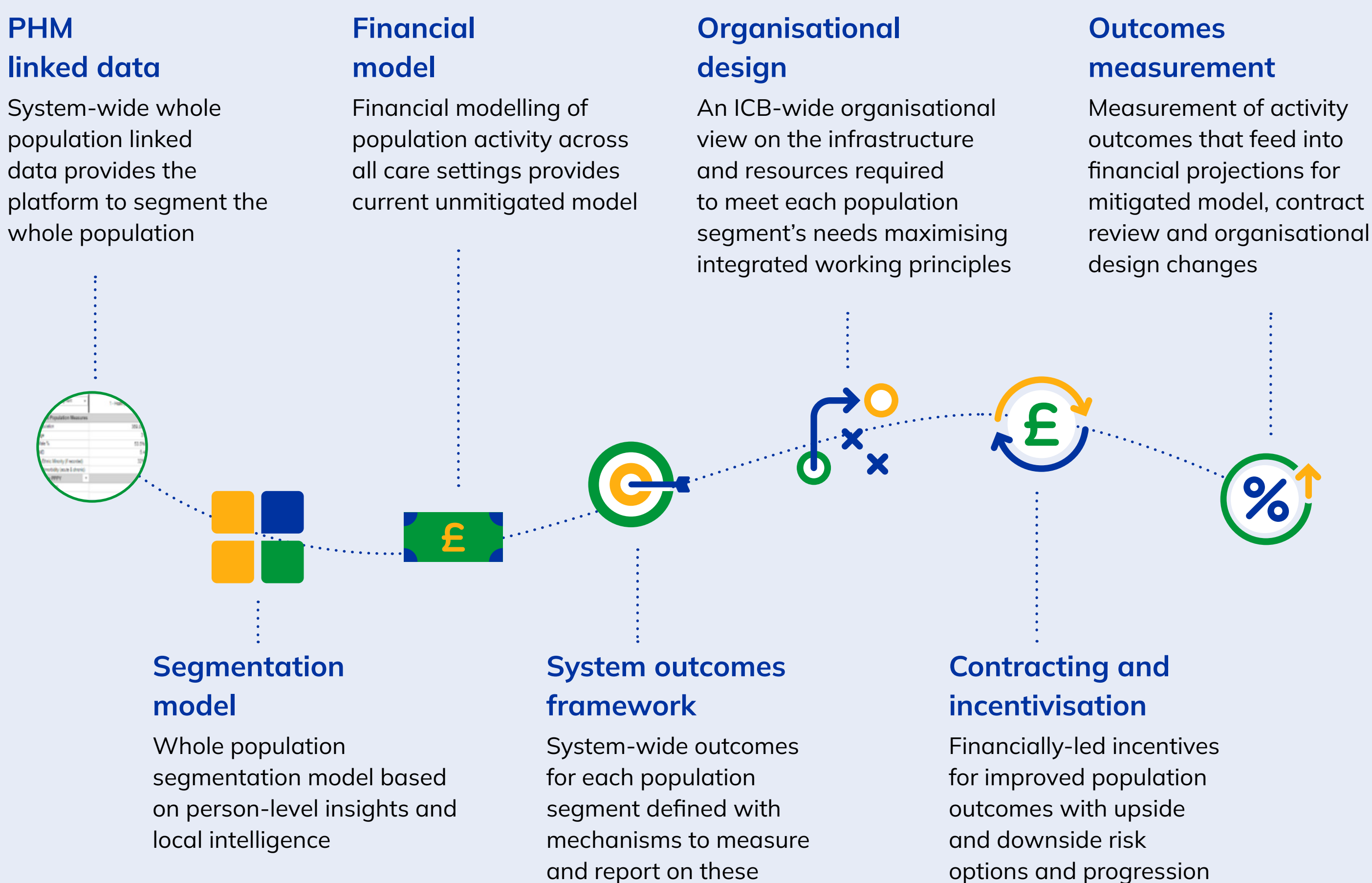


Figure 9: Lincolnshire's strategic segmentation model is a key step towards creating a value-based approach to care, which should fundamentally reshape how activity is planned, measured and incentivised over time.

Developing a strategic segmentation model for Lincolnshire

Lincolnshire's strategic segmentation was influenced by the "Bridges to Health" model, which applies a person-centred approach in segmenting a population around life stages rather than specific clinical conditions.

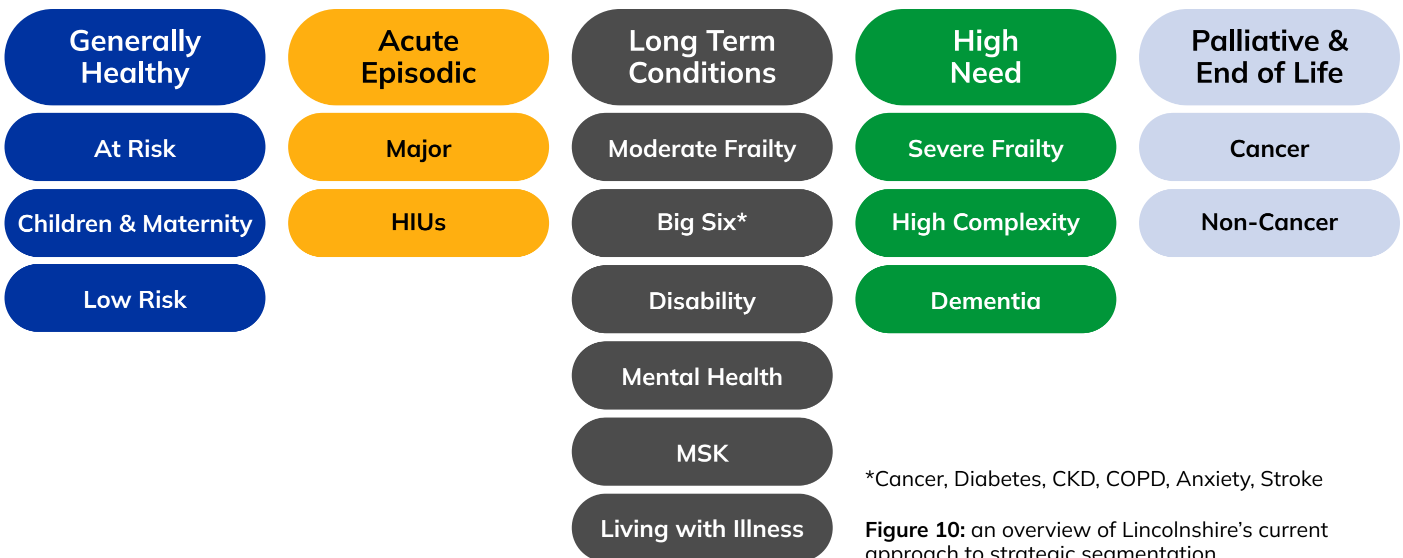
In fact, the original Bridges to Health framework was discussed, dissected and adapted in a series of interactive workshops with senior leaders, service managers, clinicians and analysts to create a **tailored strategic segmentation model** for Lincolnshire.

"Strategic segmentation provides a powerful single lens through which we can view our population. As an ICS, it gives us a shared way of understanding what matters and what works. Ultimately, we want our system to be shaped around people's needs, rather than the needs and preferences of the services they use – that's what our strategic segmentation model will help us to do."

Vic Townshend, Programme Director – Population Health Management, Lincolnshire ICS

How it works

The Lincolnshire model is built around five main categories, which are broken down into a further 16 sub-categories.



*Cancer, Diabetes, CKD, COPD, Anxiety, Stroke

Figure 10: an overview of Lincolnshire's current approach to strategic segmentation.

The model is supported by a detailed **outcomes framework** which describes the objectives for patients falling within each segment and the key results used to assess how services are delivering for them (figure 11).

Work is now underway to embed this approach in the development of future service plans. This has involved engaging widely with partners across the ICS to explain the model and encourage the use of strategic segmentation in the design of new services and interventions (see Section 5: Designing and implementing interventions).

Strategic segmentation criteria have also been built into the PHM Analytics suite, allowing any service manager or clinician to review how many patients fall within each of these segments and explore the contribution each segment makes to cost and service utilisation (figure 12).

Finally, it should be noted that the segmentation model is dynamic and subject to regular review to ensure it remains relevant and appropriate. As well as patient population health outcomes, the framework may be expanded over time to cover outcomes such as workforce ratios, utilisation rates, carer satisfaction or financial measures to create a fully rounded approach to assessing system health.

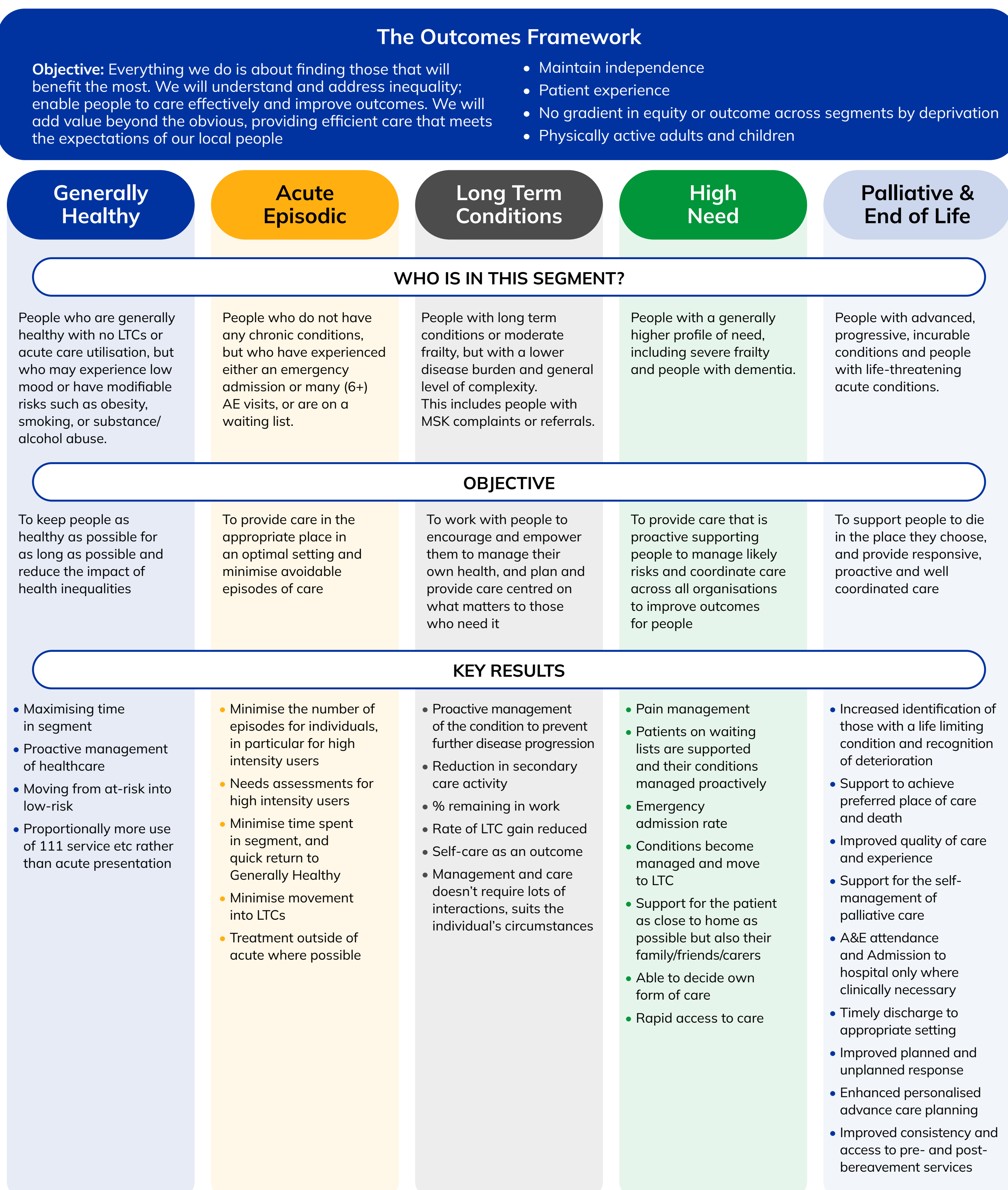


Figure 11: the Lincolnshire strategic segmentation model is supported by a detailed outcomes framework which describes a common set of results that teams should aim for in patients falling within each strategic segment.

Life Course Segment	1 - Healthy			2 - Acute Episodic		3 - Long Term Conditions						4 - High Need			5 - End of Life		Grand Total
Life Course Subsegment	1a - Healthy (..	1b - Healthy (..	1c - Healthy (..	2a - Acute Episodic ..	2b - Acute Episodic ..	3a - High Need (M..	3b - LTCs (Big 6)	3c - LTCs (Disability)	3d - LTCs (Mental ..	3e - LTCs (MSK)	3f - LTCs (Lwl)	4a - High Need (S..	4b - High Need (Hi..	4c - High Need (D..	5a - End of Life (M..	5b - End of Life (P..	
Overall Population Measures																	
Population	93,306	101,274	167,307	8,464	569	16,750	91,929	7,269	146,637	50,664	83,168	12,498	23,714	3,814	835	6,632	**814,830**
Age	48	9	40	24	17	75	65	38	44	30	52	81	71	74	69	77	**44**
Male %	48.2%	49.2%	58.8%	50.0%	52.5%	36.8%	52.0%	55.6%	38.5%	51.8%	54.4%	37.3%	49.0%	44.3%	46.6%	42.0%	**49.7%**
IMD	5.7	5.7	5.6	5.4	4.5	5.8	5.6	5.1	5.6	5.4	5.9	5.6	5.4	5.8	5.7	5.5	**5.6**
% Ethnic Minority (if recorded)	16%	16%	20%	19%	14%	6%	11%	11%	12%	21%	12%	4%	6%	11%	7%	6%	**14%**
Multimorbidity (acute & chronic)	0.0	0.0	0.0	0.0	0.0	3.0	2.4	1.8	1.8	0.2	1.2	5.9	5.7	2.7	4.4	4.3	**1.1**
Finance PPPY																	
Finance Total	£59.73M	£49.53M	£34.40M	£39.71M	£1.49M	£85.37M	£264.39M	£59.13M	£215.14M	£61.18M	£104.83M	£133.17M	£147.88M	£17.91M	£9.71M	£69.03M	**########**
PPPY - Total	£592	£457	£188	£4,358	£2,566	£4,875	£2,662	£8,017	£1,389	£1,139	£1,203	£10,381	£5,951	£4,606	£10,577	£9,929	**£1,571**
Acute Planned Admissions	£236	£111	£72	£671	£392	£1,180	£893	£546	£365	£320	£394	£1,469	£1,403	£490	£2,779	£1,571	**£400**
Acute Unplanned	£79	£117	£16	£2,957	£1,081	£1,204	£467	£471	£318	£464	£246	£3,659	£1,512	£831	£2,040	£2,740	**£380**
Acute Other	£72	£34	£27	£375	£61	£432	£462	£247	£129	£96	£151	£463	£566	£146	£4,280	£1,487	**£170**
General Practice	£201	£80	£75	£295	£344	£1,076	£774	£799	£341	£205	£383	£1,707	£1,359	£810	£1,261	£1,495	**£364**
Community & Mental Health	£47	£148	£12	£387	£694	£683	£205	£1,141	£275	£120	£67	£2,501	£951	£2,096	£1,086	£2,541	**£239**
Social Care	£4	£0	£4	£7	£55	£522	£76	£4,931	£40	£3	£18	£857	£445	£325	£186	£575	**£106**
Activity PPPY - GP Contacts	19.1	7.5	7.7	23.3	27.3	59.9	44.7	36.3	28.8	18.1	29.8	77.8	63.1	51.7	60.4	69.4	**24.8**
Beddays PPPY - Acute EM	0.0	0.1	0.0	2.7	0.1	5.4	1.1	0.7	0.4	0.3	0.3	7.2	2.5	9.7	3.3	5.6	**0.7**
Physical Health																	
Asthma	0.0%	0.0%	0.0%	0.0%	0.0%	15.6%	10.8%	12.8%	16.0%	9.7%	43.2%	22.8%	34.7%	6.9%	14.3%	14.4%	**11.1%**
Diabetes	0.0%	0.0%	0.0%	0.0%	0.0%	26.7%	38.3%	0.0%	0.0%	0.0%	0.0%	43.5%	40.5%	10.3%	19.6%	24.2%	**7.0%**
Hypertension	0.0%	0.0%	0.0%	0.0%	0.0%	68.0%	45.2%	10.6%	13.3%	7.6%	46.7%	86.0%	80.4%	38.8%	50.4%	60.8%	**18.6%**
Obesity	28.9%	0.0%	0.0%	9.1%	4.6%	40.4%	38.9%	26.8%	22.3%	11.3%	25.8%	41.0%	46.2%	19.4%	26.0%	26.0%	**18.5%**
Stroke	0.0%	0.0%	0.0%	0.0%	0.0%	6.1%	5.3%	0.0%	0.0%	0.0%	0.0%	17.9%	13.0%	3.9%	5.6%	11.4%	**1.5%**
Mental Health And Learning Disability																	
Anxiety or Phobias	0.0%	0.0%	0.0%	0.0%	0.0%	24.4%	16.7%	23.7%	67.2%	0.0%	0.0%	35.3%	50.7%	19.1%	22.8%	27.8%	**17.0%**
Depression	0.0%	0.0%	0.0%	0.0%	0.0%	25.7%	18.9%	20.1%	66.1%	0.0%	0.0%	37.0%	54.3%	20.2%	21.2%	29.3%	**17.3%**
Learning Disability	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	0.4%	56.3%	0.0%	0.0%	0.0%	1.7%	1.9%	0.6%	1.0%	2.1%	**0.7%**
Mental Health Flag	11.4%	0.0%	0.0%	3.4%	3.5%	42.8%	31.4%	38.5%	95.4%	3.7%	5.3%	57.0%	69.1%	38.4%	35.4%	47.1%	**27.5%**
Other Characteristics																	
History of Falls eFI	2.1%	1.5%	1.2%	3.6%	2.3%	32.0%	5.4%	7.5%	4.1%	2.7%	3.6%	61.3%	16.2%	27.2%	16.0%	40.4%	**5.2%**
Not Fit for Work - In Year	10.6%	0.0%	0.0%	11.1%	9.3%	4.1%	6.9%	6.5%	13.2%	6.7%	5.0%	1.0%	5.5%	3.3%	9.8%	3.2%	**5.8%**
On a Waiting List	10.4%	7.3%	4.4%	18.8%	24.6%	29.1%	18.6%	16.5%	14.1%	12.4%	13.1%	31.5%	28.3%	15.0%	28.9%	20.9%	**12.3%**
Opioid Prescription	15.2%	0.0%	0.0%	9.1%	8.3%	41.9%	23.5%	15.3%	18.2%	7.9%	14.0%	51.6%	42.2%	23.9%	42.9%	47.7%	**13.3%**
Social Vulnerability eFI	2.7%	0.0%	0.0%	0.8%	0.4%	15.9%	3.3%	19.1%	2.5%	0.9%	1.7%	30.8%	8.7%	14.2%	8.3%	23.2%	**2.9%**

Figure 12: The PHM Analytics suite allows patient populations to be filtered by the strategic segments, enabling service managers and clinicins to understand clinical needs, service utilisation and healthcare costs across these categories.

Source: PHM Analytics Suite, Optum

The development of the PHM projections tool

Alongside the strategic segmentation model, Optum UK worked with analysts across Lincolnshire to develop a **PHM projections tool** which assesses how different interventions may affect healthcare utilisation and spend across the system. This helps decision-makers understand and track the value that a new service or care model can offer compared to the status quo – and hence prioritise their investment accordingly.

"Being able to model and quantify the potential impact of new interventions is a game changer for Lincolnshire. It means we can now have a defined and measurable set of expectations of whenever we implement a new service – this gives us a new level of clarity and control over how we allocate resource, how it aligns with our wider strategy, and what we can expect to get back from the investment."

John Doherty, Associate Director of Finance, Lincolnshire ICB

How the tool works

1

Drawing on a combination of population growth statistics and historic activity data, the tool calculates how spending on various aspects of care is likely to increase in future years if existing services are maintained – this is described as the **unmitigated scenario** and provides a baseline assessment of what will happen across the system if nothing changes.

2

Users can then model the impact of different **mitigated scenarios** on costs across different parts of the system. This includes setting the target cohort size, the scale and cost of the new service/intervention, and the predicted impact of the new intervention on activity and demand elsewhere in the system (such as reduced accident and emergency attendance or unplanned hospital admission).

3

Based on these parameters, the tool calculates the total **predicted financial change** due to the new intervention by comparing this with the unmitigated scenario. Note that as well as financial cost values, the tool can also be configured to forecast impact across other metrics (e.g. workforce capacity or hospital bed days) to provide a fuller picture of the value of proposed changes.

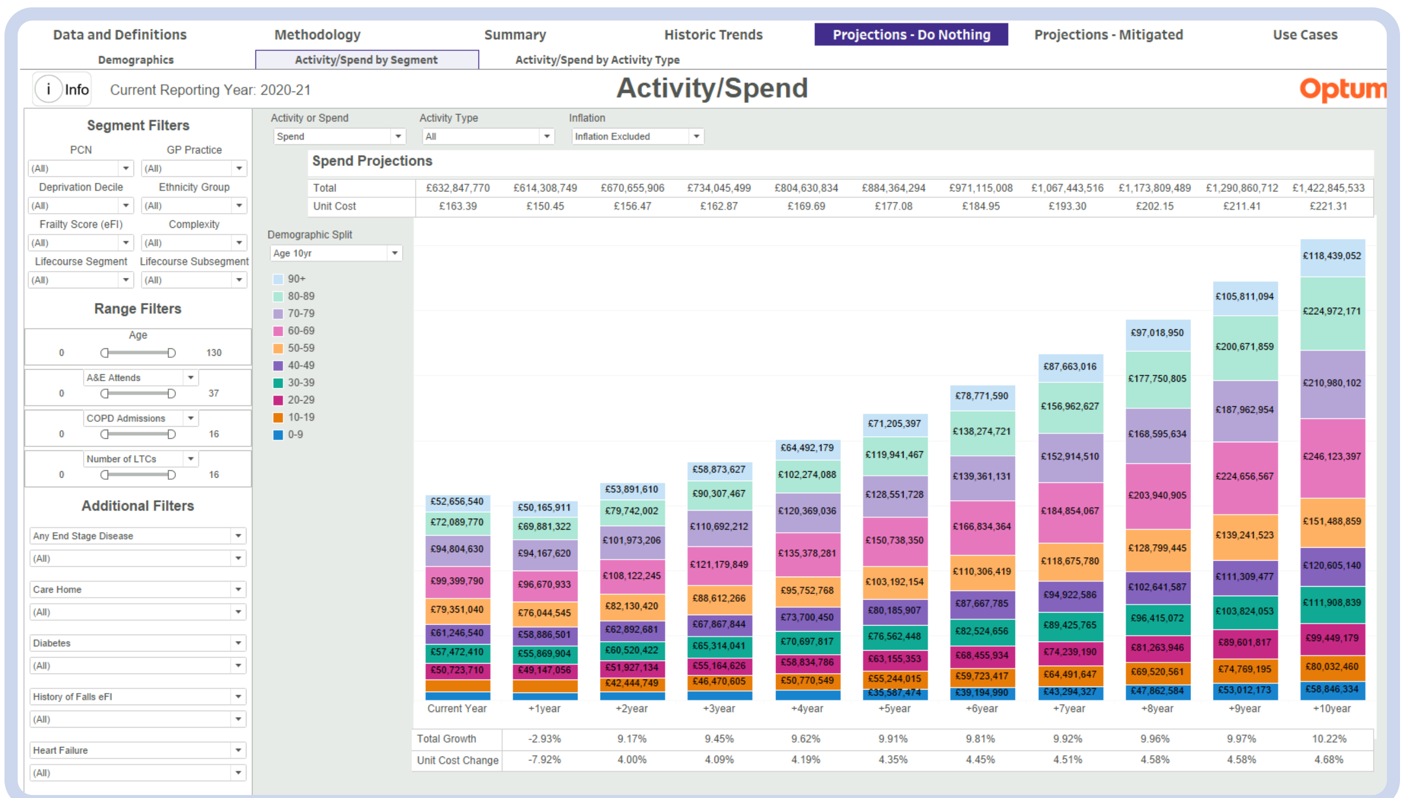


Figure 13: the PHM projections tool provides an agreed baseline of how financial costs to the system will change in an unmitigated or "do nothing" scenario.

Source: PHM Analytics Suite, Optum

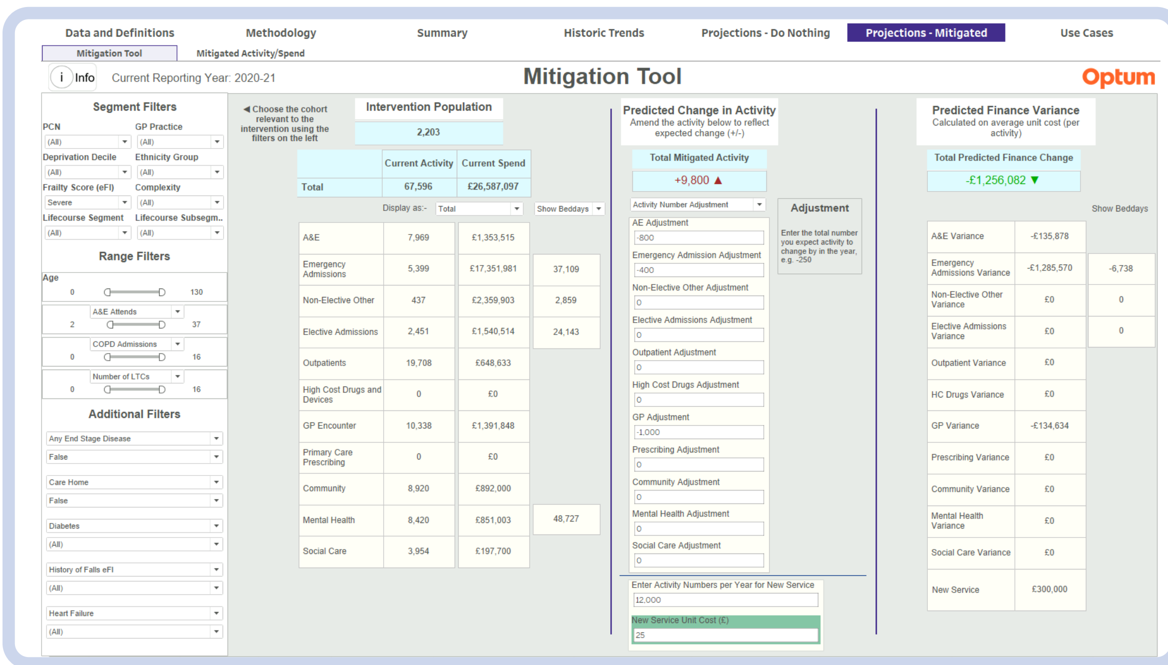


Figure 14: the tool allows teams to precisely model the financial impact of proposed changes – in this fictional example an additional investment of 12,000 hours in a new community service is forecast to reduce A&E and emergency admissions, with a total predicted financial saving of over £1.25 million.

Source: PHM Analytics Suite, Optum

The development of the PHM evaluation tool

Evaluation is an essential part of the PHM cycle. Optum UK has worked with Lincolnshire ICS to develop a bespoke evaluation tool that uses the linked dataset to understand and track the impact an intervention or new service has had against an agreed set of metrics, enabling high quality decisions to be made as to whether to scale up, refine or stop new initiatives.

Forming part of the Optum PHM Analytics suite, **the evaluation module** is an interactive tool that allows users to measure levels of service utilisation, financial spend and other selected clinical or system metrics as new interventions are put in place.

STEP 1
The tool invites the user to select a target cohort that has been subject to a new intervention or service based on selected filters.

STEP 2
An appropriate control group must then be selected to compare outcomes against – for example, monitoring patients from a neighbouring area using the same filtering criteria.

STEP 3
The tool can then summarise the initial criteria and wider demographics for the target and control group to allow the user to check that they are broadly comparable.

STEP 4
Once the intervention is running, the tool can generate dashboards showing differences in activity levels before and after interventions for the cohort group compared to the control group.

STEP 5
It is also possible to view the trends and differences in patient outcomes before and after interventions for the selected cohort group compared to the control group.

New outcomes within the linked data model can also be added and then retrospectively analysed, while the tool can be adapted to allow recording of new outcomes data.

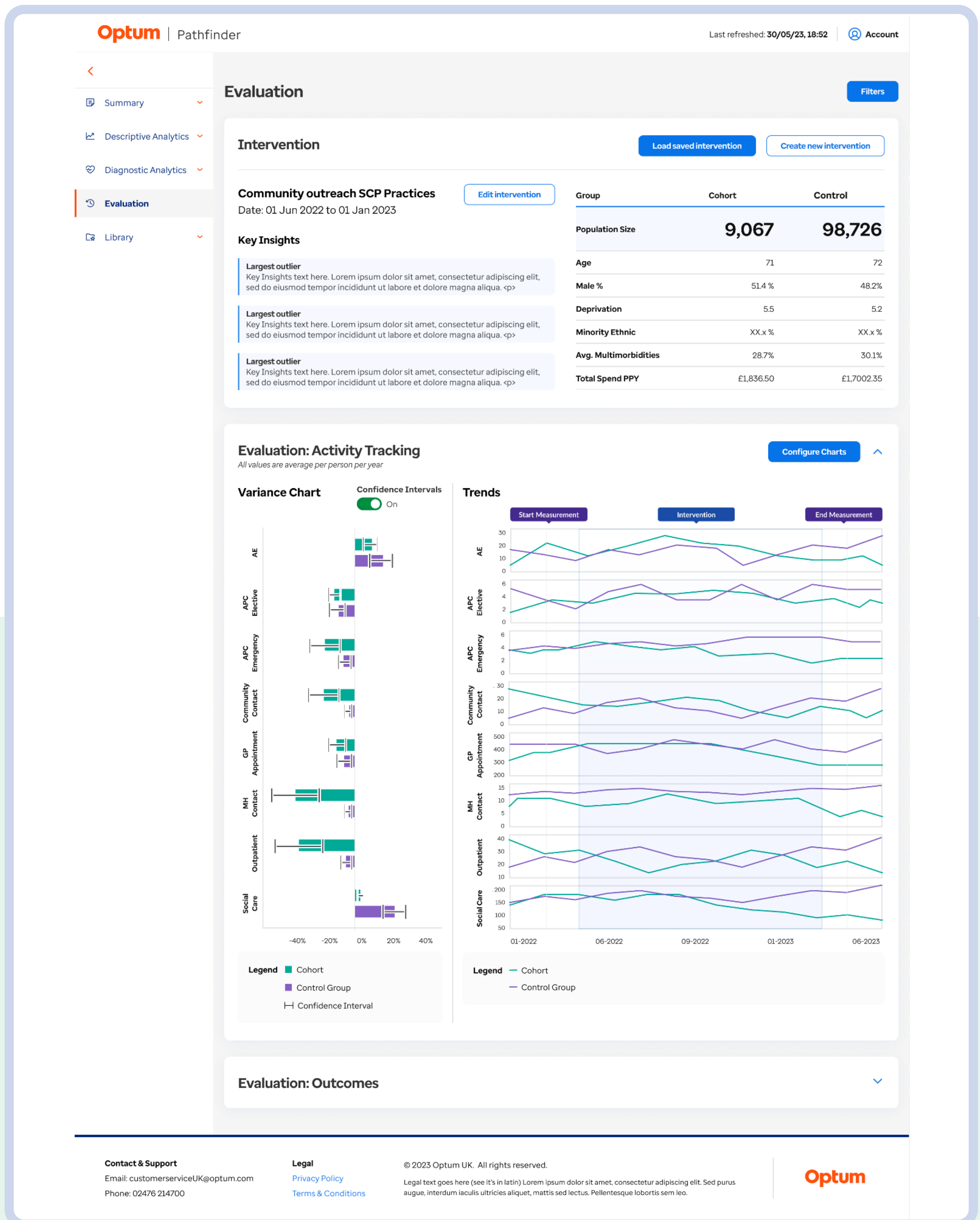


Figure 15: the PHM evaluation tool allows users to track the healthcare utilisation of cohort and control groups before, during and after an intervention – providing a rapid and robust way of evaluating the impact of any changes.

Source: PHM Analytics Suite, Optum

Section 5: Designing and implementing interventions

Introduction

Primary care has been at the heart of Lincolnshire's early efforts to apply PHM techniques in the planning and delivery of services. 14 Primary Care Networks (PCNs) have received technical support to interpret their populations needs and to develop interventions that work through all five stages of the PHM journey (figure 16).

To help them, the ICB is in the process of giving primary care professionals full access to linked data via the PHM Analytics suite. This is being supported by ongoing training and support which explain how to use the tools and extract meaningful insights from them.

This section provides a snapshot of the live projects currently supported through the strategic partnership – with more to follow in 2024.

> "Targeted primary and community-based care offers the single best opportunity to prevent ill health and tackle inequality at scale within our communities. In these early exemplar projects, we're already seeing that the use of the linked data can help teams prioritise their effort and work across service boundaries to support those in greatest need."
>
> **Sarah-Jane Mills,** Director of Primary Care, Communities and Social Value, Lincolnshire ICB

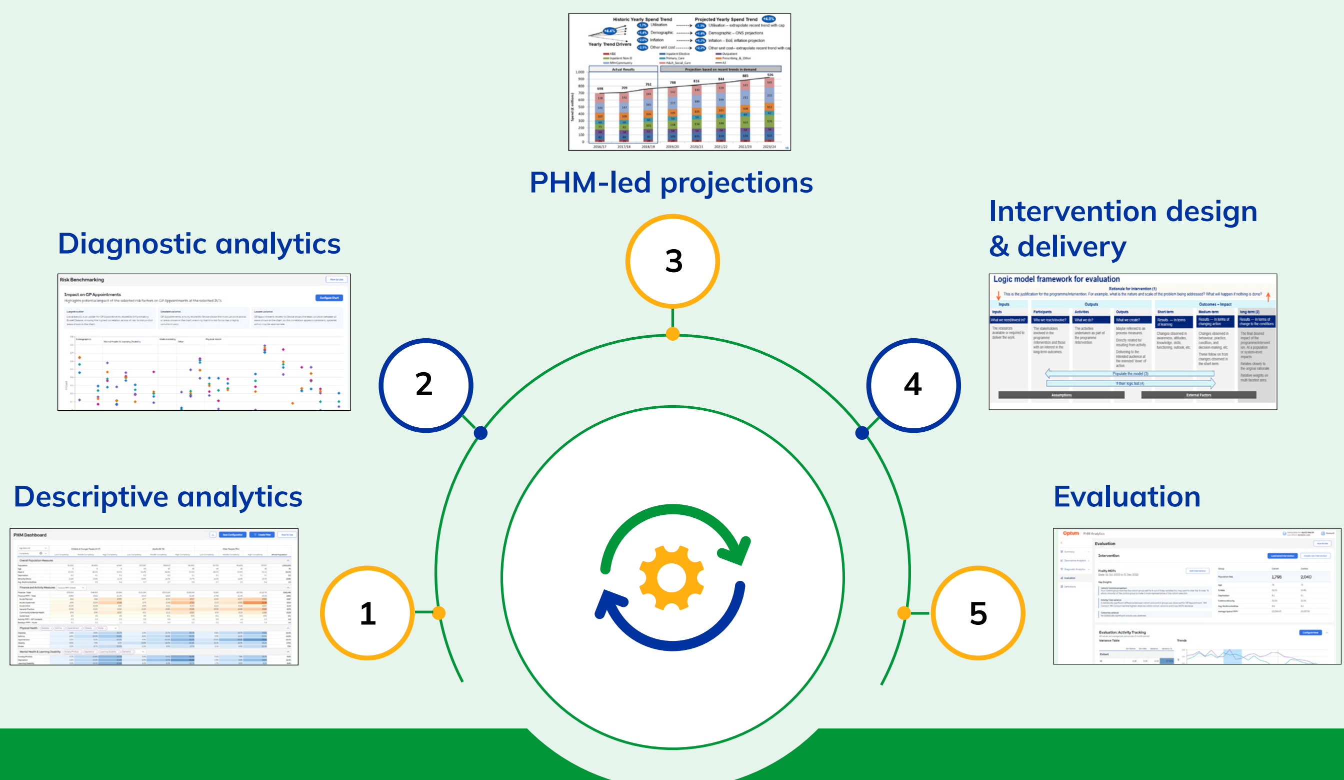


Figure 16: primary care organisations across Lincolnshire are being supported to understand and apply the five stages of the PHM cycle in developing proactive interventions.

CASE STUDY 1

Identifying high intensity users for targeted support (Trent PCN)

Data published by NHS England shows that dedicated outreach services targeting high intensity users (HIUs) have achieved significant reductions in A&E attendances, 999 calls and unplanned hospital admissions in areas where they have been implemented.

In Lincolnshire, a pilot led by Trent PCN is now applying PHM Analytics to identify patients who are frequently using emergency services.

Funded through Lincolnshire's Health Inequalities programme, the service targets vulnerable groups facing multiple challenges due to poverty, co-morbidities, substance misuse, unhealthy lifestyles, homelessness, mental health issues, relationship breakdowns and physical disabilities.

Using defined criteria, analysts provide the local team with a monthly report of locally-registered patients who have used A&E and other health services most frequently over the last 12 months. These patients are then contacted by a link worker and assessed to understand the wider factors that may be causing them to attend services.

After this, the patient may be referred to other clinical and non-clinical services, including mental health, addiction clinics, social prescribing and voluntary or community-based enterprises.

What patients say

"You are honest — I need that."

"People just see me as an alcoholic, they don't see me, but you see me."

"The last 8 months have been the best of my life."

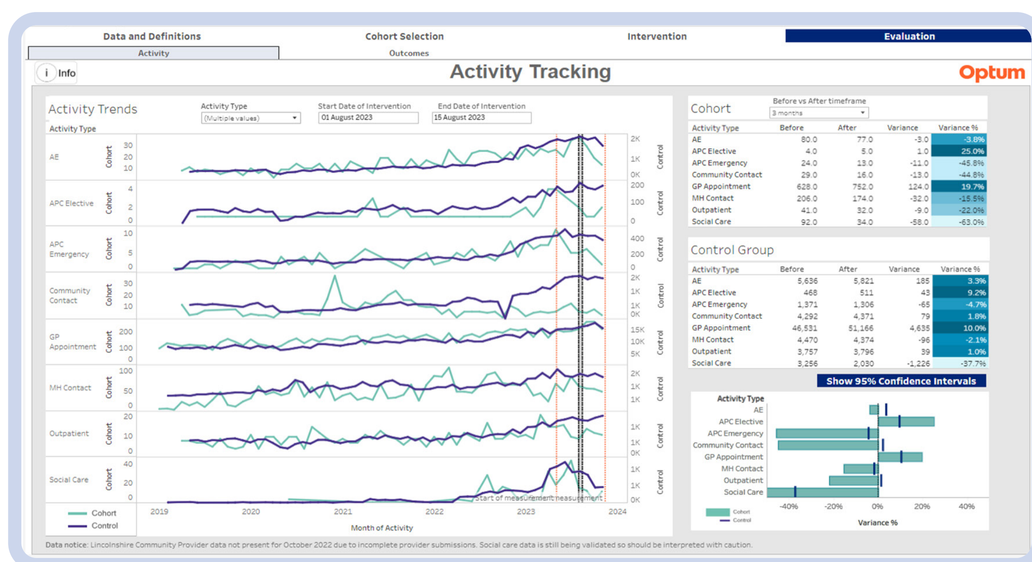


Figure 17: Activity tracking — The Variance Tables on the right shows for each activity type the number of contacts per patient per time period, before and after the intervention. The Trends graph on the left is a time series showing the activity trends for both cohorts for the full extent of the data available.

Source: PHM Analytics Suite, Optum

CASE STUDY 2

Supporting people living in fuel poverty (South Lincoln PCN)

Fuel poverty remains high across South Lincoln PCN and is associated with a range of poor health outcomes – as a result, it was felt that a PHM-inspired care model targeting those at greatest risk of ill-health due to cold homes could provide a useful focus for a new integrated neighbourhood team (INT) approach.

Using the PHM Analytics suite, the local population was filtered down to pick out those with chronic respiratory conditions living in the most fuel deprived areas, producing a target cohort of just over 170 patients (figure 18). Workshops led by South Lincoln PCN and involving partners across primary and secondary care, council services and the voluntary and community sector then helped to design a new process for engaging and supporting patients, including options for onward referral (figure 19).

Patients began to be contacted in November 2023, initially from one GP practice within the PCN – with the project expected to expand to cover others during 2024. Although the project is still in its infancy, early feedback has been extremely positive, with evidence that the approach is successfully connecting people with a wide range of services.

"This project has given all of us the opportunity to learn about population health management in a practical way. It has brought colleagues from different organisations to focus on this cohort, linking our services together to improve outcomes in a truly person-centred and collaborative way."

Sadie Aubrey, Clinical Director, South Lincoln PCN

Cohort criteria	Wider determinants of cohort
Over 40	Average IMD 3.4
Frailty	30% currently smoke/smoked in last 2 years
Chronic respiratory condition	19% are socially vulnerable
Living in top 15% most fuel deprived area	55% have mental health flag
Not in care home	30% are on a waiting list
Not on an end-of-life pathway	34% have heart disease

Figure 18: Selected filtering criteria helped to produce a targeted cohort of high-risk patients for South Lincoln PCN to work with.

Outcomes

Experience outcomes
- PAM 13 Score

Activity outcomes
- Number of Referrals to Social Prescriber
- Number of other relevant referrals
- Referrals to Pulmonary Rehab

Clinical outcomes
- Decrease in the number of short-acting bronchodilator inhaler prescriptions (salbutamol, ipratropium)
- Increase in Preventer inhaler prescriptions
- Reduction of polypharmacy
- Reduction in opioids prescriptions
- Improved MRC dyspnoea score
- Improved Frailty Clinical Outcomes (Rockwood Score)
- Reduction in number of exacerbations

Experience outcomes
- Wider determinants questionnaire

Activity outcome
- Number of Referrals to District Council

Activity outcomes
- Number of Referrals to Specific offer

171 Patient Cohort

Care-Coordinator

Primary and Community Input

Social Prescriber

District Council

System Outcomes
- Reduction in GP encounters
- Reduction in ED Admissions
- Reduction in ED attendances
- Reduction in UTC attendances

Figure 19: the planning workshops helped to establish a more joined-up approach for South Lincoln, led by a care coordinator within the PCN. The sessions also produced a set of target outcomes across primary and secondary care and the district council.

Joan's story

As one of the first patients to be contacted by the South Lincoln service, Joan's story exemplifies how this targeted approach is helping to connect potentially vulnerable people with a wide range of care and support services.

Joan has asthma and was recently admitted to hospital due to shortness of breath. She has regular treatment for a leg ulcer at her GP practice and suffers from mobility problems. She also struggles with some day-to-day activities but does not have any care arrangements in place. Her house is cluttered, and she worries about heating costs. With no close family living close by and little social interaction, Joan often feels lonely and has a history of low mood and depression.

Following an initial conversation with the care coordinator, Joan was swiftly booked in to see a respiratory nurse for an overdue asthma review. Her medication has now been reviewed by the clinical pharmacy team and she has been referred for warm home advice and a benefits check carried out by Lincolnshire County Council.

The care coordinator has also helped to arrange an occupational therapy assessment for her, connected her with a health and wellbeing coach for diet and lifestyle advice, and put her in touch with Age UK's befriending service. Most recently, Joan has been supported to apply for a Blue Badge parking permit and attendance allowance to pay for a carer.

CASE STUDY 3

Supporting a one-stop-shop approach to musculoskeletal care (K2 Healthcare)

Earlier this year, around 150 people attended a first-of-its-kind joint Aches and Pains Hub for Lincolnshire, which saw statutory, third sector and independent providers joining together at a local leisure centre to offer a "one-stop-shop" for selected patient groups and the wider public.

Led by the K2 Healthcare Sleaford PCN and the Lincolnshire personalisation team, the event allowed people to speak to different professionals involved in musculoskeletal (MSK) care, giving them access to a wide range of advice and services without needing to book an appointment.

For example, attendees could have informal discussions with physiotherapists, sign up to weight-loss programmes, get advice on understanding and managing their pain, and enroll in leisure activities and other local social prescribing offers, all in one place.

PHM Analytics played a critical role, allowing us to work very differently. It enabled the PCN to identify and directly invite those who would benefit most from the hub's services - allowing us to 'have conversations with people and not about them'. This cohort included those who were overdue a Health Check, scheduled to have surgery over the coming months, or recently referred to outpatient physiotherapy services.

Initial evaluation suggests that many attendees on the day have successfully signed up and begun attending support groups as a result. Full evaluation of the event is underway in the hope that this way of working can be applied across other health conditions.

"To have a one-stop-shop like this is excellent because if you went through the normal route of being referred to all the different departments, you'd be going here, there and everywhere. Instead, you can come here, spend a couple of hours and talk to practically everybody you're going to need to find out exactly what help is out there."

Peter Palmer, MSK Co-production Group

Section 6: Next steps and lessons learnt

Shaping the future

Throughout its first two years the Lincolnshire strategic partnership has established the core infrastructure, knowledge and cultural relationships to enable an effective PHM approach. Over the next 12 months, the priority is now to embed the use of PHM tools and intelligence systematically across the ICS.

Key priorities for 2024/25 include:

1

The application of PHM intelligence and methodology as our "Business as Usual" across Lincolnshire ICS

All teams, programmes and organisations across the ICS will be asked to apply core PHM methods, tools and intelligence against all key strategic objectives throughout financial year 2024/25. This will drive a step-change in how we inform planning and transformation activities as a system to measurably improve whole person and population outcomes.

2

An advocacy programme to support adoption of the strategic segmentation model

The ICS's PHM programme team will be developing an advocacy approach to support the strategic segmentation model, potentially by appointing new "segment advocates" responsible for influencing and shaping ICS decision-making in line with each segment's needs. This will support a radical, long-term aspiration to anchor the system around the strategic segments rather than traditional service and organisational structures.

3

Ongoing coaching and support to embed PHM as an integral leadership practice

The strategic partnership team will continue to work to support leaders at all levels across the system to embed PHM in their personal practice. The aim will be to demonstrate how PHM disciplines can be applied across the whole decision-making framework, including service planning, financial management and resource modelling, so that it becomes deeply embedded as an integral leadership practice.

Lessons learnt

Finally, what have been Lincolnshire's critical lessons from this work, and how might these be applied to other systems on a similar path? Here is a series of reflections from the programme team and other key stakeholders involved in the programme:

> "Identify and cultivate your PHM "Tiggers" and "Trojan Mice" to help you build a solid base of support for new ways of working."

Make sure to apply the principle of "show, don't tell" when it comes to creating advocacy and support. For example, we gave people across our ICS the opportunity to see our new, linked datasets in action early on, allowing them see their local populations in a level of detail they simply hadn't experienced before. This helped us generate a base of enthusiastic advocates – our PHM "Tiggers" – who have become energetic cheerleaders for the approach.

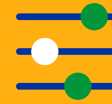
Similarly, we've deliberately focused on small, fast-moving and adaptive pieces of work that help us rapidly embed a different way of thinking and working within a complex system. Primarily led by PCNs, these exemplar projects (as described in section 5) work with small cohorts of patients and citizens to design and test new interventions using PHM techniques and draw on a multidisciplinary team across the community. Having these "Trojan Mice" has been crucial for demonstrating a proof of concept to help us scale up our approach and impact.

> "Consider how governance and organisational structure can support your goals – but don't let the perfect be the enemy of the good."

Push for a cohesive approach to organisational design if you can. It's particularly helpful, for example, if the three enabling methodologies for improving population health – health inequalities, population health management and personalisation – can be brought together. As ICSs continue to evolve, there is a case for rethinking the way ICB teams are organised to provide clearer leadership and accountability for this agenda.

At the same time, don't despair if the ideal structure isn't possible. Lincolnshire's governance wasn't perfectly aligned, and in some ways the ambiguity and imperfections gave us flexibility to be bold in setting a new direction. Remember that achieving change at this scale is about investing in people and relationships – having well-aligned structures can help, but your personal energy, vision and influence will always count for much more.

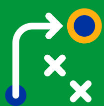
> “Make sure you resource your programme appropriately to reflect the complexity and scale of the task – and be open about the implications for different teams.”



Be in no doubt that developing PHM capability across a system is a major undertaking. As well as investing in the strategic partnership with Optum, we created a dedicated programme management office and hired two senior executive leaders – a Director of Population Health and Director of Data and Analytics. Both have been essential to the programme's success.

You will also need to acknowledge the resource implications on other teams. For example, Lincolnshire's progress in linking together our primary, secondary and social care data required a considerable amount of work from data and analytics professionals across the system, which needed to be factored into their workloads.

Above all, think about what's realistic given the operational realities people are facing on the ground. Be pragmatic and flexible about how you work with frontline teams and the expectations you place on them. Remember that the purpose of PHM is not to generate new demands on already swamped colleagues but to offer tools and solutions to tackle issues they already know about more effectively and identify ones they don't.



> “Think intelligently about how external consultancy can best support your programme – use them in a strategic way to minimise resistance and build trust.”

In Lincolnshire, Optum became a flexible extension of the in-house team, which meant we could carefully adapt how they were positioned based on the needs and circumstances of each piece of engagement: in some cases, it was useful to have Optum leading sessions as the independent, “expert” voice in the room; on other occasions, it was more appropriate for them to be positioned more subtly.

For similar reasons, don't underestimate the value of building an extended partnership. With shorter contracts, there's always a tendency to feel you have to deliver within a condensed timeframe, which may not allow for the organic changes you need to take root. In our case, a three-year agreement gave us the opportunity to work with our people at their own pace, reducing the potential for resistance and change fatigue.

Additional resources

To accompany this blueprint, Lincolnshire ICB and Optum UK have developed a “toolkit” of practical resources to support other ICSs who may be pursuing similar programmes.

Governance and programme management resources

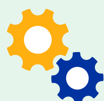
- Guidance on setting up the PMO
- PHM programme roadmap
- ToR for executive steering group
- Job descriptions for senior leadership roles

Data infrastructure resources

- Re-ID process map
- Sample data sharing and processing agreements

Service specifications for selected case study projects

- South Lincoln PCN fuel poverty
- Trent PCN high intensity users
- K2 Healthcare



Training resources

- Primary care guide
- Evaluation webinar

Key contacts

The Lincolnshire strategic partnership team are happy to field enquiries from others embarking on similar programmes.

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