



Queen Mary
University of London



Clinical Effectiveness Group (CEG)

Using data to improve population health
in North East London and beyond.

qmul.ac.uk/blizard/ceg

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About CEG

The Clinical Effectiveness Group (CEG) is a not-for-profit unit based at Queen Mary University of London and founded and led by practicing GPs. We have been working in partnership with NHS primary care teams in East London for 30 years, supporting quality improvement in some of the most disadvantaged areas of the country.



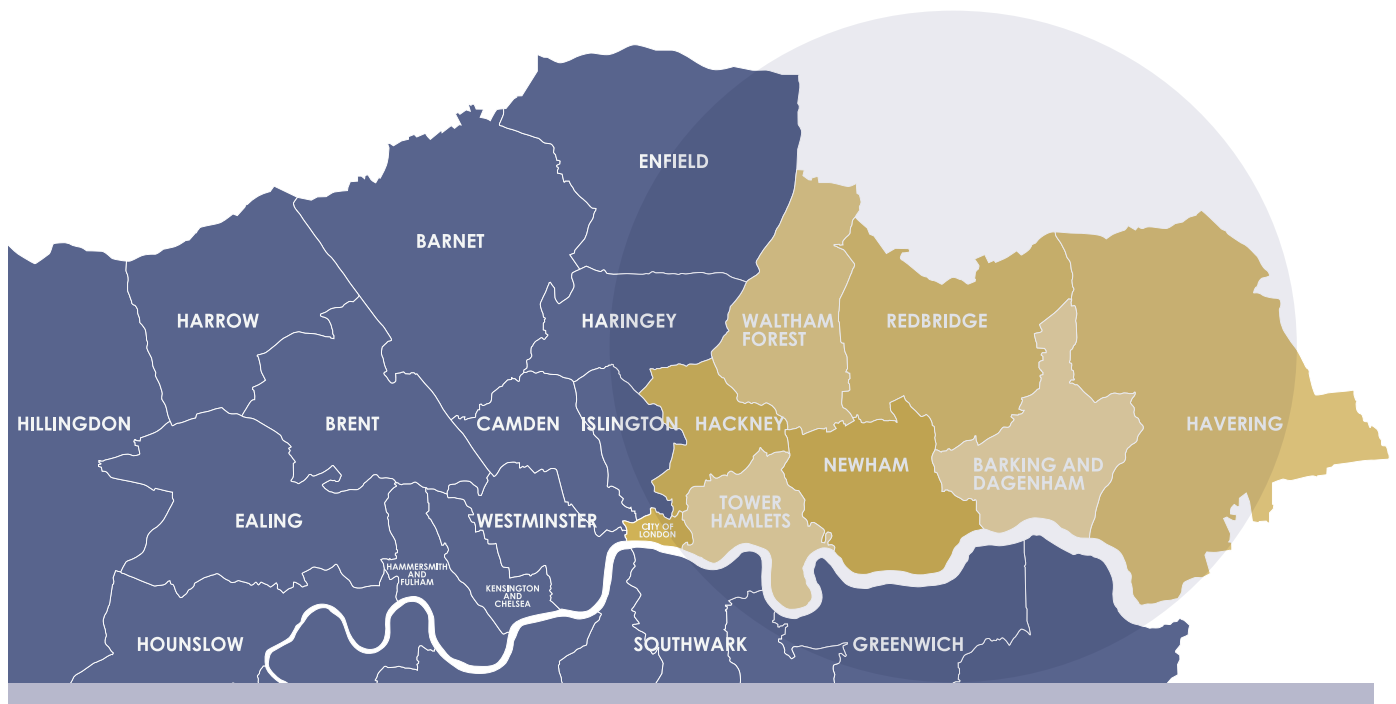
CEG is clinically driven and academically supported. Our multi-disciplinary team of health data scientists, analysts, clinicians and facilitators take primary care data from electronic health records across the North East London Integrated Care System – covering 2.2 million patients – and turn it into life-saving research and innovation.

Our dashboards visualise health data from across the region, providing valuable insight for NHS commissioners and the area's eight local authorities. Our data-driven searches, smart templates, and pop-up protocol alerts are used by 272 GP

practices to improve direct patient care and make it easier to implement new programmes and meet targets.

We also use data to produce nationally significant academic research, build algorithms, and evaluate services and interventions. By bringing academic and NHS collaborators together, CEG supports a 'learning health system' that uses its data to improve the health of the population in North East London and beyond.

**Dr John Robson, CEG Clinical Lead;
Reader in Primary Care, Queen
Mary University of London.**



8 local authorities:

Barking & Dagenham, City of London, Hackney, Havering, Newham, Redbridge, Tower Hamlets, Waltham Forest

47 Primary Care Networks

272 GP practices

2.2 million patients



We address inequalities. If you don't measure it, it's invisible. Using data to fight health inequalities in the socially diverse communities of North East London is what drove us to establish CEG, and it has been at the core of our work ever since. We pioneered ethnicity recording and other indicators of inequalities and offer a range of in-practice tools that ensure no patient is missed and everyone is given an equitable chance of care.

We enable excellence. North East London faces exceptional challenges. Barking and Dagenham, Tower Hamlets, Newham and Hackney are among the most disadvantaged boroughs in the UK. Waltham Forest, Redbridge and Havering are all above average deprivation. But our academic evaluations show GPs in these areas achieving top national rankings for their health services after adopting our tools and support. Through and beyond the pandemic, we are sustaining that excellence and supporting a strong recovery.

We collaborate. We partner with others to produce the best results. We work closely with other universities, local authorities, charities, NHS trusts, commissioners, clinical leads, GP practices and their networks. We also work with industry partners, including Primary Care IT, to complement our expertise and allow our tools to do more for the NHS teams we support.

We are responsive. This has always been true, but the Covid-19 pandemic required extreme agility. We turned Covid-related patient data into seven interactive dashboards (updated on a weekly basis); 170 vaccination searches arranged into cohort suites; and searches, templates and pop-up alerts to support shielding, remote oxygen monitoring and proactive care for people with long-term conditions.

We bring research and NHS partners together. We are building capacity for health data science through Queen Mary's membership of the NIHR School for Primary Care Research, significant funding from Barts Charity to fund three new professors, and our Wellcome Trust-funded PhD programme Health Data in Practice. We also support local GP research, numerous prestigious NIHR fellowships and CEG Quality Improvement Fellows. Most importantly, we work with the NHS to turn knowledge into action and improve clinical care.



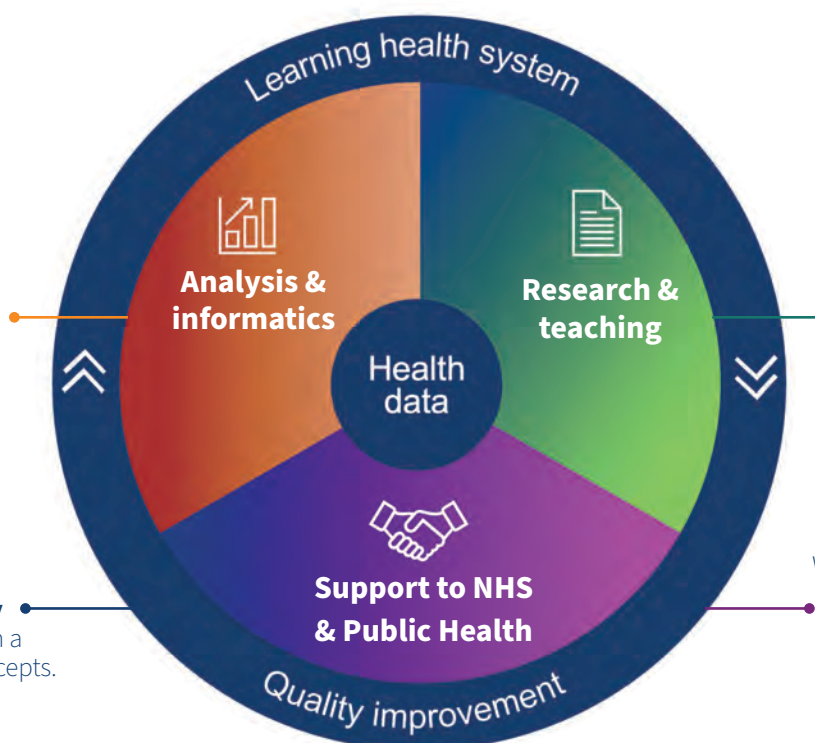
Knowledge

We **link, extract and analyse health data** from GPs, hospitals and the community.

We build **clinical tools, searches and dashboards** that turn data into knowledge.

Data

We support **high quality data entry** and maintain a library of codes and concepts.



Insight

We **publish research** creating actionable insights from CEG's analyses and uncovering **inequalities in population health**.

We lead the Wellcome PhD programme **Health Data in Practice**.

Practice

We **support GP practices, commissioners and public health teams** to improve health in North East London using our insight and tools.

This work informs local, national and international policy and practice.

A year in partnership

The emergence of Covid-19 in early 2020 challenged primary care beyond all previous limits.

With our in-house tool-building expertise, strong local partnerships in place, and visibility of data from across the region, we were poised to support North East London's Covid response, from listing the right people for shielding and vaccination to informing local and national planning. We are also collaborating with Primary Care IT, and other industry partners, to widen the scope and impact of our support to GP practices.

Partnership working allows us to make an impact beyond North East London. **We are founding members of the Discovery Data Service**, a collaborative project uniquely integrating data in near real-time from GPs, hospitals, local authorities and community care with funding from Endeavour Health Charitable Trust. This has been scaled across North East, South East and South West London with £15 million of NHS funding – covering 6 million patients.

We support UCL Partners on population health management in North Central London, Essex and Hertfordshire, and have built tools to assist nationwide health initiatives, such as **UCL Partners' Proactive Care Frameworks** and **NHS England's Blood Pressure Monitoring at Home**. CEG also supported **Clinical Effectiveness South East London** to set up their own organisation. We will be partnering with them to improve health in both regions.



Our Covid response

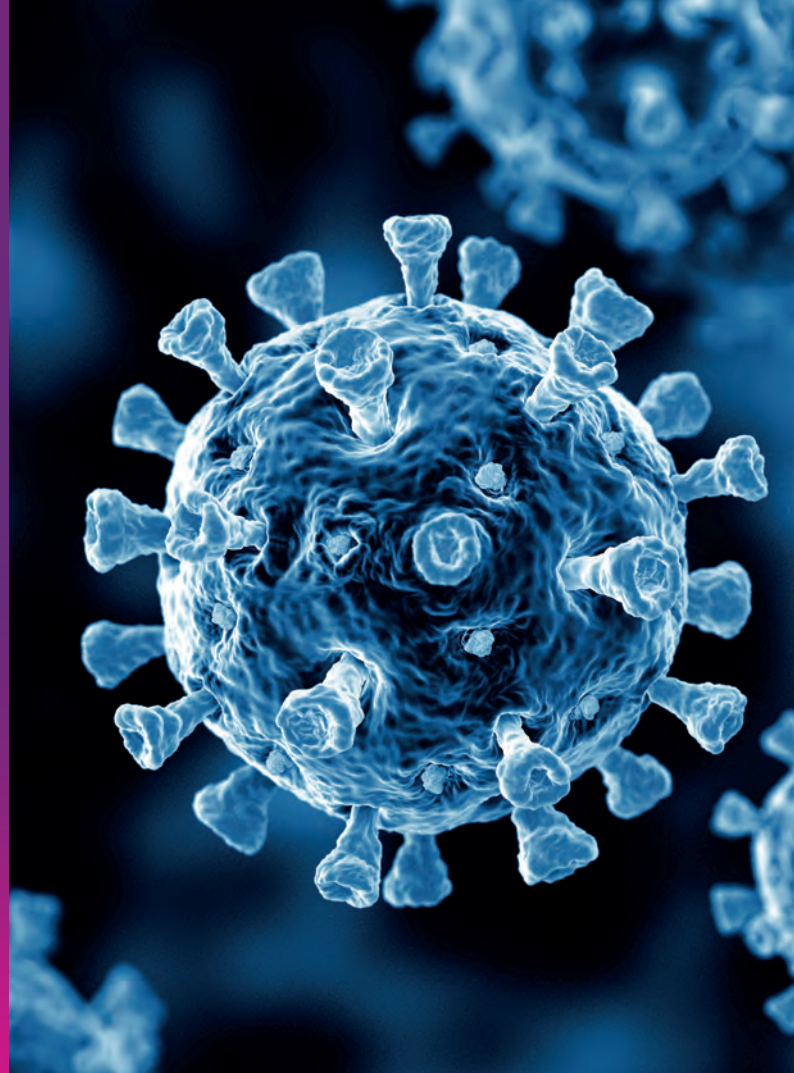
The pandemic commanded a huge collaborative effort to understand what was happening on the ground and rapidly implement new programmes.

In partnership with North East London Clinical Commissioning Group (NEL CCG), we supported the region's primary care teams to turn government guidance into local action, urgently.

With each instruction – sometimes daily – our partnership enabled GPs to implement it effectively using searches, templates and pop-up alerts. We also provided intelligence in the NEL Covid Operational Steering Group and Task and Finish Group, and these discussions informed new dashboards and data-sharing requests.

Communication was key – we sent more than 80 e-bulletins to practices and commissioners in 2020-21, held webinars, released how-to videos and introduced virtual practice visits to share our evolving suite of tools and support professionals to use them.

Having CEG's resources at the heart of operations nurtured a standardised approach across North East London's GP practices, which improved data quality and made it possible for our researchers to analyse the impact of the pandemic.



Protecting the most vulnerable patients

The requirements for shielding changed frequently in the early days of Covid-19. We kept abreast of every change and worked with NEL CCG, clinical leads, GP practices, Barts Health NHS Trust and public health teams to enhance the central identification programme.

The definition of those most at risk had been supplied centrally by the Government, but there was no way to distinguish between patients with different needs, and we felt this could lead to inequitable protection.

CEG's facilitators developed searches to identify sub-cohorts of vulnerable patients - with severe mental illness, learning disabilities and dementia - who were likely to need a different approach.

Emergency COPI legislation (Control of Patient Information) allowed us to share address and telephone details for people in vulnerable groups with local authorities and mental health trusts. They could then contact those patients about the help available during lockdown, and cross-check for additional people being treated in the community so no one missed the instruction to shield.

Translating national guidance into practical tools

In autumn 2020, during the national drive to minimise the impact of seasonal flu, we identified patients who were housebound and most likely to miss their flu vaccination. Using the emergency COPI legislation, we shared patient details with the district nurse service who could vaccinate those people at home. We made similar information available to local authorities to ensure no one missed out on Covid vaccination.

The Covid vaccination programme was a huge and agile undertaking. From the start of the programme until February 2022, **CEG developed around 170 vaccination searches arranged into cohort suites, seven dashboards updated weekly, two templates and three pop-up alerts in partnership with NEL CCG.** During this time, the primary care teams we support delivered an astounding 3.5 million doses.

Recording vaccine hesitancy

‘Making every contact count’ was a national initiative to remind patients about Covid vaccination during their routine appointments. To implement this across North East London, we built a pop-up reminder and an accompanying template.

Our template included systematic recording of the attempts to offer vaccination, including whether the patient declined or deferred. This definition meant practices could try later for those deferring, and it provided a way of counting hesitancy as a reason for patients not being vaccinated.

We built interactive dashboards showing anonymised data on uptake across North East London, with separation by borough, Primary Care Network, and individual practice. These highlight uptake in underserved groups, including people who are travellers, homeless, or living with a learning



Photo by SELF Magazine, licensed under CC BY 2.0

disability or severe mental illness. We continue to provide our weekly dashboards and analyses to NHS commissioners, GPs and local authorities, revealing the picture across North East London and informing action to address areas of concern.

Proactive care for people with long-term conditions

Primary care needs to run more efficiently than ever to respond to Covid-19 while delivering effective routine care.

In collaboration with UCL Partners, CEG developed a set of searches that help GPs provide proactive care for people with long-term conditions. The searches scan the practice’s electronic patient records for clinical codes and identify people with specific conditions, such as asthma, atrial fibrillation, cardiovascular disease, chronic obstructive pulmonary disease (COPD), type 2 diabetes and hypertension.

The searches stratify patients into high, medium and low risk, taking clinical factors and social vulnerability into account. Typically, high-risk groups can be managed by the GP or pharmacists, and the lower-risk groups by healthcare assistants (to support home blood pressure monitoring, for example).

This helps GPs prioritise those most at risk and allows other healthcare professionals to share the workload. Taking a systematic approach to proactive care also helps ensure no patient is missed and everyone has equitable access to the right treatment.

In 2021, UCL Partners’ Proactive Care Frameworks were adopted into the NHS Proactive Care @home programme. This made our searches available in 12 Integrated Care Systems across England – covering around one third of the adult population – to support prioritisation of care for those most in need and reducing the demand for urgent care.

Supporting home blood pressure monitoring across England

In October 2020, NHS England began issuing home blood pressure monitors so patients with cardiovascular disease could record their blood pressure at home and send readings for their GP practice to review. It reduces the need for face-to-face appointments and distributes the workload from GPs to other members of a multidisciplinary team.

If the device around the arm is the wrong size, it can give an incorrect blood pressure reading. If it's too small, the reading will be higher and if it's too large, the reading will be lower.

We used data to fix the problem: Body Mass Index (BMI), available in the patient record, correlates very well with upper arm circumference and this, in turn, determines cuff size. So we developed a tool that uses patient data on BMI to predict how many people may need a non-standard cuff – influencing national and local procurement. We also built a simplified look-up table to assist healthcare professionals in making sure patients have the right cuff. This is available to clinicians nationwide via our website in support of NHS England's initiative.



North East London:

Supporting extraordinary improvement in a challenging region

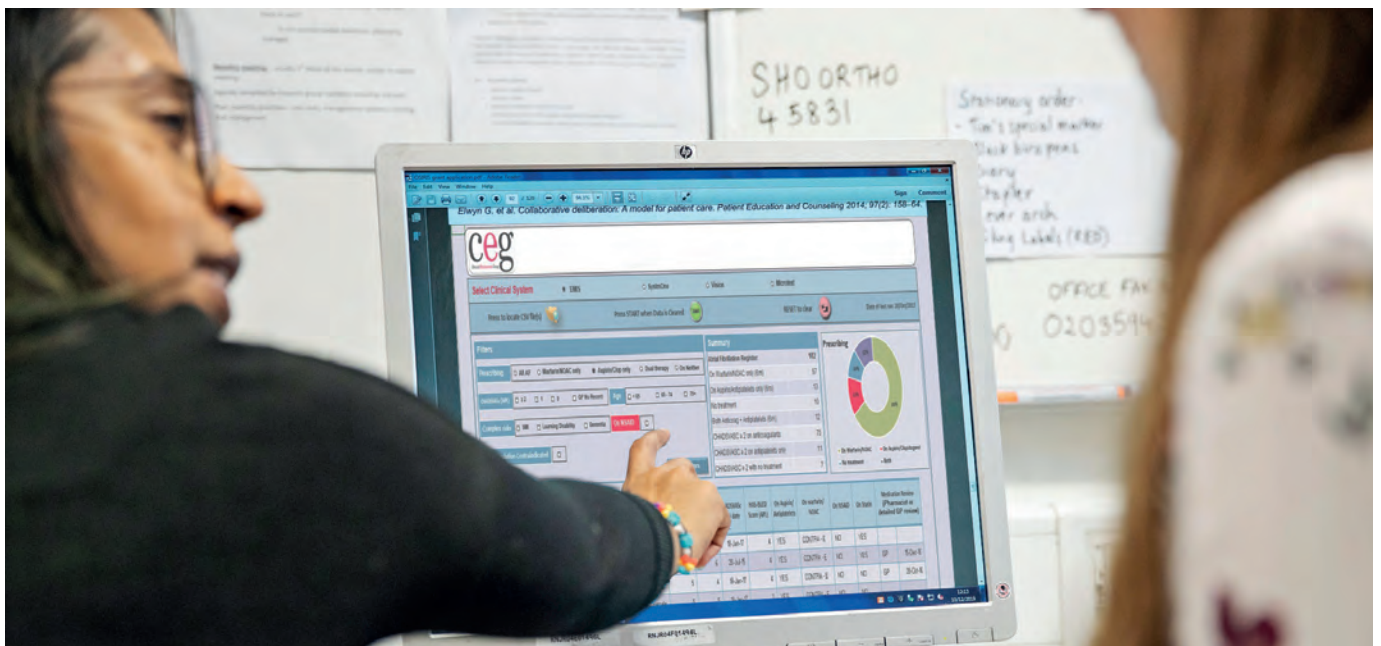
Using data from across the North East London Integrated Care System, CEG maintains more than 100 dashboards, 5,000 searches, and hundreds of smart templates and referral forms.

The dashboards provide commissioners with centralised data informatics for North East London primary care, while the searches and other tools are used within the GP practice to improve patient care and make it easier to meet and monitor targets.

We support:

- National mandatory programmes, including childhood immunisations, NHS Health Checks and cancer screening.
- National voluntary programmes: Quality and Outcomes Framework (QOF) and Direct Enhanced Services (DES) including Structured Medication Review and the Impact and Investment Fund.
- Localised services across planned and unplanned care in each borough, for example to manage long-term conditions or improve women's health.

Our data insights and clinical knowledge also inform CEG-led initiatives which have resulted in extraordinary improvements, for example in reducing strokes and managing chronic kidney disease.



Our tools are built in-house and are developed in collaboration with North East London Clinical Commissioning Group. We facilitate their use across the region with webinars, practice visits, written step-by-steps and clinical guidance, and a dedicated facilitator and support officer for each borough.

🔍 Exceptional QOF performance

For people with hypertension, cardiovascular disease or diabetes, North East London has had the best control of blood pressure and serum cholesterol in the UK.

But this hasn't been easy. The three inner east London boroughs of Tower Hamlets, Newham and Hackney are among the most disadvantaged and socially diverse in the UK. In these areas, rates of ill health are among the highest in Western Europe.

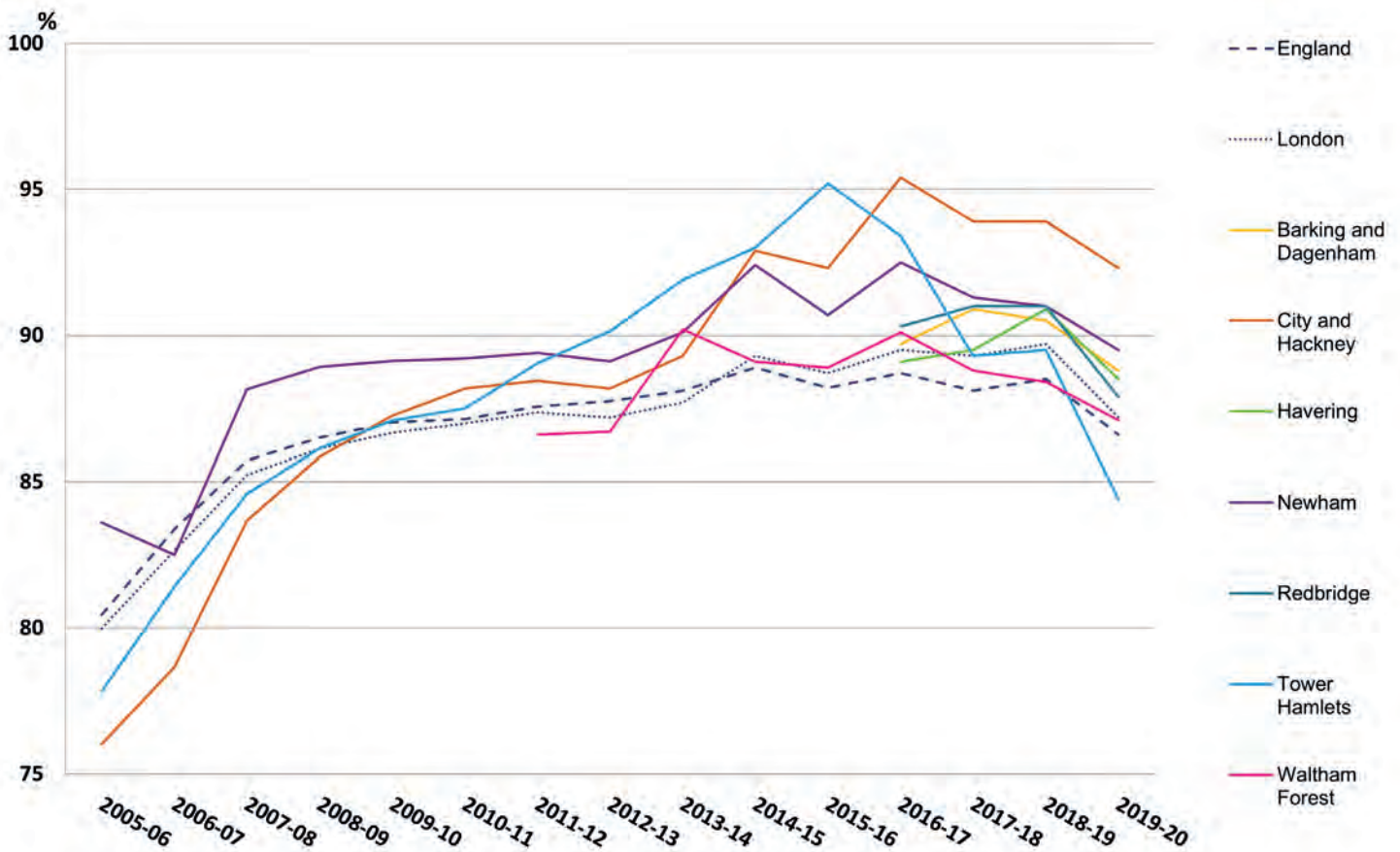
Our data-driven tools have helped to propel those boroughs from the lowest quintile of performance in 2008 to the very top national ranking in the Quality and Outcomes Framework (QOF) by 2018;

nationally ranking first, second or third in 25% of 60 clinical indicators. The outer London boroughs we have supported since 2018 have also made substantial improvement.

During Covid-19, performance across the country has suffered. East London has been very badly affected by the pandemic. Nevertheless, North East London has maintained a high ranking in QOF, performing best in London in 2020-21 for key diabetes and lung disease metrics and a close second for key cardiovascular metrics.

Coronary Heart Disease patients with blood pressure <150/90mmHg

Data: QOF 2005-2020 (no exceptions)



Optimising medications to prevent stroke

The challenge

Atrial fibrillation (AF) is a heart condition responsible for one in five strokes. Anticoagulant medication reduces the risk of stroke in people with AF by more than half, but many patients are not prescribed them. In 2016, we calculated that around 9% of patients with AF in North East London (1,500 people) should have been on anticoagulants but were not. The picture was similar nationally.

What we did

We developed a quality improvement programme, including an in-practice search tool called APL-AF (Active Patient Link for Atrial Fibrillation). Using the tool, a GP or pharmacist can search their practice register in seconds to see a list of patients with AF and whether they are taking an anticoagulant or not. Many factors influence the best treatment, so APL-AF also pulls in relevant information from the patient records, like blood pressure, health conditions and medications, so the GP or pharmacist can 'virtually review' an individual without leaving the tool.

We initially implemented APL-AF in Redbridge in east London in 2016, then in the bottom 10% in England for anticoagulation. The proportion of eligible people taking anticoagulants increased by six percentage points in the first year - an extra 290 people.

Redbridge became the second most improved Clinical Commissioning Group (CCG) in England, and we estimate that in those 290 people, anticoagulation and medicine optimisation prevented 30 strokes over the five years that followed.

London and beyond

In 2017, we implemented APL-AF across the whole of North East London. Our primary care facilitator team worked with the CCGs to educate practices, engage pharmacists, set up multi-disciplinary meetings to consult on complex cases, and support financial incentives to resource and encourage the professionals using the tool. We now publish deidentified data for North East London via a live, interactive Power BI dashboard, available to practices, networks and commissioners.

In 2019, we collaborated with UCL Partners to make APL-AF available across North Central London. In the first year, an additional 1,742 patients were anticoagulated. We estimate that will prevent 170 strokes over five years. APL-AF is now available nationally, free of charge.



Transforming chronic kidney disease management

The challenge

Kidney function can silently decline until it reaches a critical level. In 2015, people with chronic kidney disease in North East London were waiting more than two months to see a specialist (nephrologist) after a GP referral. At the appointment, both patient and specialist found it frustrating that the full GP record couldn't be accessed to see a full picture of their health. Specialists also felt many referrals might have been avoided by an earlier discussion with the GP – but there was no way for a GP to ask for that advice.

What we did

The problem spanned hospitals and GP practices; so did our solution. First, we made it easier for GPs to manage patients with poor kidney function. We supported GPs at 166 practices to increase coding of chronic kidney disease in their electronic health records - this allowed the right patients to be identified in computer record searches. We built dashboards to display relevant information from the patient record, such as blood pressure, so patients could be monitored more easily. And we developed 'trigger tools' to alert GPs when blood tests suggested kidney function was critically declining.

Secondly, we enabled kidney specialists at St Bartholomew's and The Royal London hospitals to view full GP records (with patient permission). With this system in place, it was often unnecessary for patients to see a specialist face-to-face. The specialist set time aside to do a 'virtual review' of the patient's record (an 'e-clinic') and decide on the best course of action. For a few people, that still meant a trip to hospital for further

investigation. But for the majority (more than 80%) it resulted in expert advice to the GP so they could be managed in the community.

Informed decisions, better outcomes for patients

The time to receive an expert opinion from a kidney specialist was reduced from two months to six days. For 80% of patients, it eliminated a visit to hospital - particularly beneficial for people managing numerous conditions and medical appointments, mobility issues or dementia.

Using this service, GPs can make equitable decisions about who to refer for a specialist opinion without needing to consider the upheaval of a patient's trip to hospital. And specialists can review the full patient record to make better informed decisions. With incentives and the support of commissioners, the service makes it easy for professionals to do the right thing.

Our Community Kidney Service tools are available to download nationally, free of charge. Our ambition is to enable equitable outcomes for patients with chronic kidney disease across the UK, as well as encouraging responsible use of health data for more effective and joined-up care.



Research and innovation

Our research covers a huge spectrum of topics and methods, from evaluating interventions to investigating inequalities in vaccine uptake and understanding the determinants of health.

All have two things in common: high-quality primary care data and a drive towards better, more equitable population health.

Primary care data can tell us more when we link it with other sources. So we've enabled innovative data linkage to genetic research, the national cancer registries, school records on height and weight, and we are currently using geospatial data to locate disease hotspots so local authorities can take steps to tackle them. Having academic partners, in-house analysts and our primary care support team on the ground means we can turn our insights into action quickly, improving outcomes for patients across North East London and beyond.

CEG also provides controlled access to population data for research by others, including internationally relevant trials of self-testing for cervical cancer and rapid HIV and latent TB testing.

Our research is supported by a number of funders, including two major awards from Barts Charity. These significant projects: 'REAL Health - Research Enabled Learning Health Systems' (awarded 2018) and 'Precision Medicine' (awarded 2020) use data science to improve equitable disease prevention and treatment.



Revealing the unequal impact of Covid-19

The challenge

When Covid-19 emerged in the UK, it was difficult to know how widespread the epidemic had become and who was affected. There was little to no testing in the community. The only available data came from hospital admissions and deaths, often with a considerable delay. Hospital data also missed the majority of people who had Covid symptoms but were not admitted - the pandemic was spreading in the community much faster than anyone realised.

What we did

We counted GP suspected diagnoses of Covid-19 by searching key terms in the GP patient record for 1.2 million patients across East London. Our analysts presented the data as interactive dashboards showing near real-time suspected infections by borough, Primary Care Network and GP practice. This provided local and national authorities with an early indication of the rising epidemic.

Age, gender and ethnicity are recorded in most GP records, so we could compare rates of infection in different groups. From this, **CEG's clinicians and health data scientists produced one of the earliest research papers that demonstrated Covid exacerbated inequalities.**

People from South Asian and Black ethnic backgrounds were catching the virus at a much higher rate and dying more frequently than the white population.

As the vaccination programme began, our data showed that fewer people from South Asian and Black backgrounds were protected. In the over-80s in Tower Hamlets, for example, vaccine uptake was 71% in the white population but only 37% in the South Asian population and 26% in the Black population. Worryingly, the same groups at a highest risk of catching and dying from Covid were the least likely to be vaccinated.

Time to act

We alerted our network of GPs, commissioners and local authorities and supported them to act on the evidence.

Our dashboards informed the public health teams across North East London, who took action to build trust and understanding among communities where vaccine uptake was lowest.

They produced videos for social media, interactive webinars, a new vaccination centre at the East London Mosque, and worked with imams to allay fears and address misinformation.

Six weeks later, the gap in vaccination uptake by ethnicity had already started to narrow. Vaccine uptake in Tower Hamlets stood at 86% in the white population, 71% in the South Asian population and 58% in the Black population. It has continued to improve since then.





Preventing future measles outbreaks

The challenge

London has a problem with MMR - the Measles Mumps and Rubella vaccine given in early childhood. In contrast to other areas of the UK, no London Authority is meeting the World Health Organisation (WHO) target of 95% coverage, below which there is real danger of a measles outbreak. In 2019, there was an outbreak of measles and the WHO removed the UK's measles 'elimination' status. Over half of the country's cases were in London.

This issue does not affect the population equally. Children living in areas of high deprivation or from Black and Asian ethnic backgrounds are more likely to completely miss, or be late in receiving, these protective vaccines. We want to reduce the impact of underlying inequalities and ensure every child is fully protected. To get there, we need to make it easier to spot children who may be missing out and make sure the health services reach them.

What we are doing

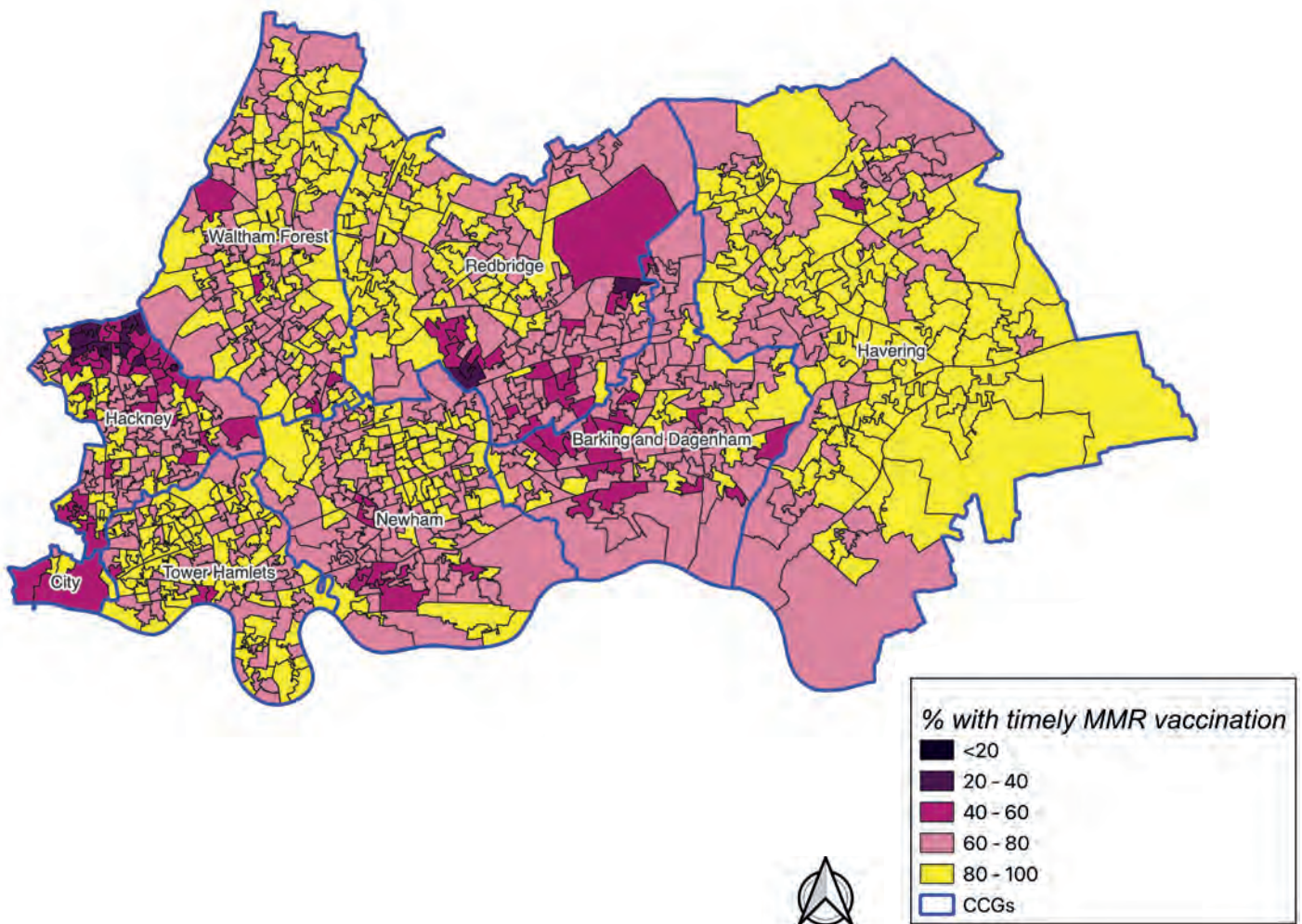
We are using patient data to empower North East London general practices to improve childhood immunisation levels.

We have developed a tool called 'APL-Imms' (Active Patient Link for Immunisation) that uses data from the electronic health records held by GPs.

The tool has two steps: First, it enables staff working in a GP practice to list all children registered with their practice by their age or whether immunisations are due or overdue. Second, the practice team can view all relevant information about each child without leaving the tool, and use this to make an informed approach to parents.

The path to equitable immunity

We know data-driven call/recall systems in general practice really do work to reduce inequalities and get children protected. APL-Imms is part of a wider CEG-led quality improvement programme to address falling rates of childhood immunisations across London. The programme has been selected and funded as a 'pathfinder' for the London Health Data Strategy. It has launched in North East London, with South East London and North West London following later in 2022.



ASSIGN - an algorithm to study how health is impacted by where we live

The opportunity

Linking people to places is powerful – it can help us understand how health is impacted by social and environmental factors, like the characteristics of a household, green space or air pollution. But patient addresses are entered into NHS records as free text so the same address can be written in different ways, making data linkage difficult.

What we are doing

We have developed an address-matching algorithm, in partnership with David Stables of Endeavour Health, that allocates a Unique Property Reference Number (UPRN) to patient records. Every property in the UK already has a UPRN - they are allocated by local authorities and made nationally available by Ordnance Survey, giving every address a standardised format that enables pseudonymised linkage to other sources of data.

The algorithm, known as ASSIGN (**Ad**dre**SS** Match**InG** to Unique Property Reference **N**umbers), compares addresses in the NHS record with Ordnance Survey's 'Address Base Premium' UPRN database, one element at a time, and decides whether there is a match. It mirrors human pattern recognition, so it allows for certain character swaps, spelling mistakes and abbreviations. It also includes

patients' past addresses, making it possible to study the effects of circumstances over time. After rigorous testing and adjustments, ASSIGN correctly matches 98.6% of patient addresses at 38,000 records per minute.

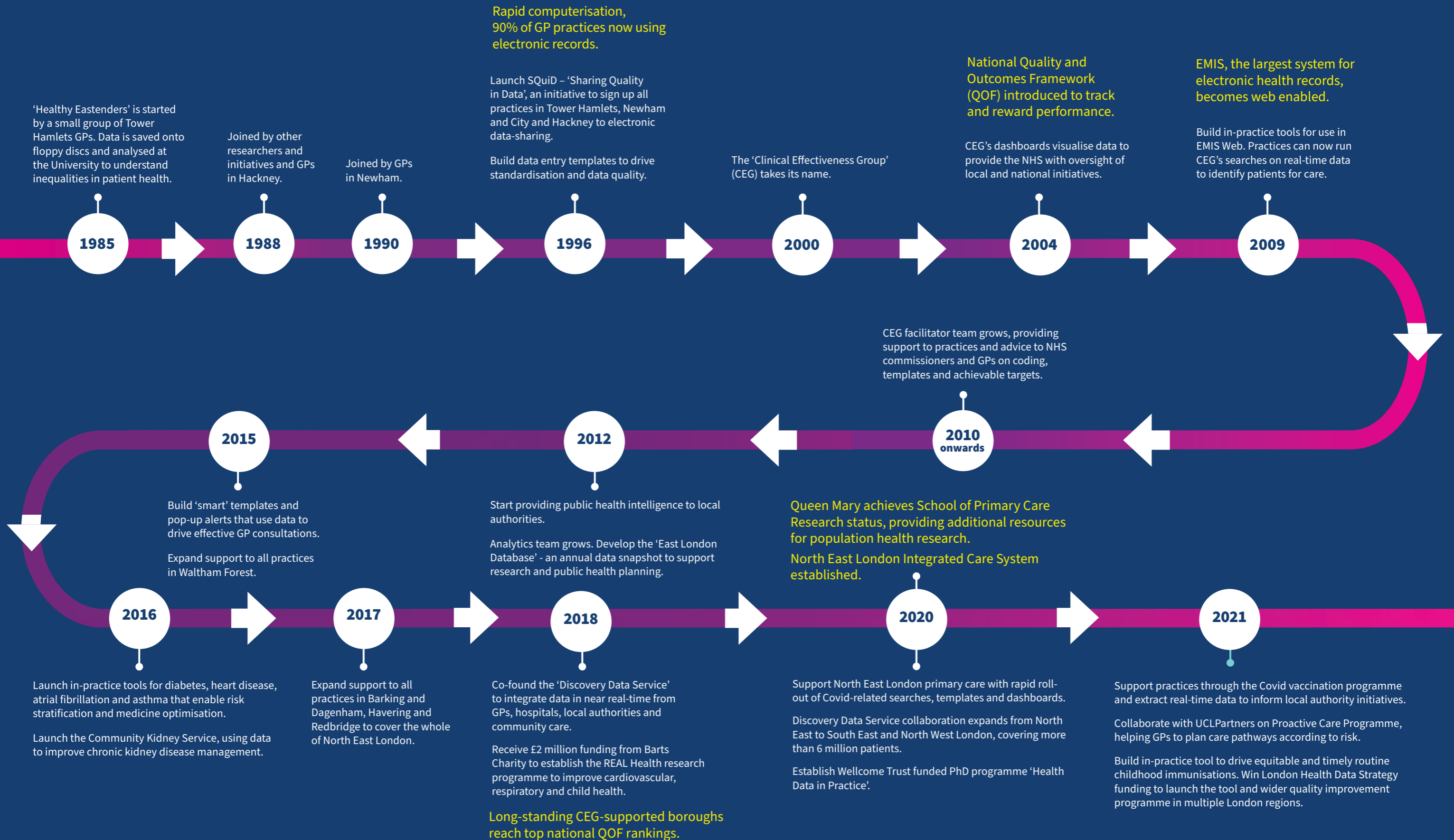
What next?

We are using ASSIGN to map neighbourhoods that have high concentrations of people living with multiple long-term conditions, and to show areas of measles susceptibility as part of our drive to prevent future outbreaks. Using the Discovery Data Service, which receives new primary care data from across London every day, **it will be possible to map these situations in near real-time and provide valuable intelligence to local authorities.**

We're also exploring the many other ways ASSIGN could support better public health. Our researchers are investigating whether overcrowded or multi-generational households are at greater risk from Covid-19, how the health of other household members impacts childhood obesity, and how ASSIGN could enable GPs to identify patients living in care homes more easily so they can provide more effective care. ASSIGN is open source and freely available, creating opportunities for other researchers to link data in this way to inform policy decisions and improve population health across the country.

Our journey

We've embedded the use of data in patient care across North East London, creating a **learning health system** where clinicians and commissioners can make rapid, evidence-based decisions.



How we are funded

The background of the slide is a complex, abstract composition. It features a dark blue gradient at the top, transitioning into a pattern of overlapping geometric shapes in shades of green, yellow, and blue. A prominent feature is a series of glowing, horizontal fiber optic lines in various colors (green, yellow, orange) that appear to be emanating from the right side and extending across the frame. The overall aesthetic is modern and technological.



**North East London
Clinical Commissioning Group**

Covering NHS services in Barking & Dagenham, City & Hackney, Havering, Newham, Redbridge, Tower Hamlets and Waltham Forest.



Trusted with data

The Clinical Effectiveness Group (CEG) is a trusted broker of primary care data. We began as a grass roots organisation and over the last 30 years we have proven the value of our local GP practices sharing data with us. Practices have benefitted through vast improvements in quality and outcomes for patients and through increased income as a result of meeting their indicators. Through CEG, patient data from North East London has provided the foundation for life-saving research, tools and initiatives with local, national and international impact.

CEG is part of Queen Mary University of London and complies with their Information Governance and GDPR policies. We fulfil all national quality standards and submit an annual Data Security and Protection Toolkit (DSPT) to demonstrate our commitment to safely managing data.

Thank you

With special thanks to the practices of North East London.
Without the contribution of their data, none of our work
would be possible.





Queen Mary
University of London

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