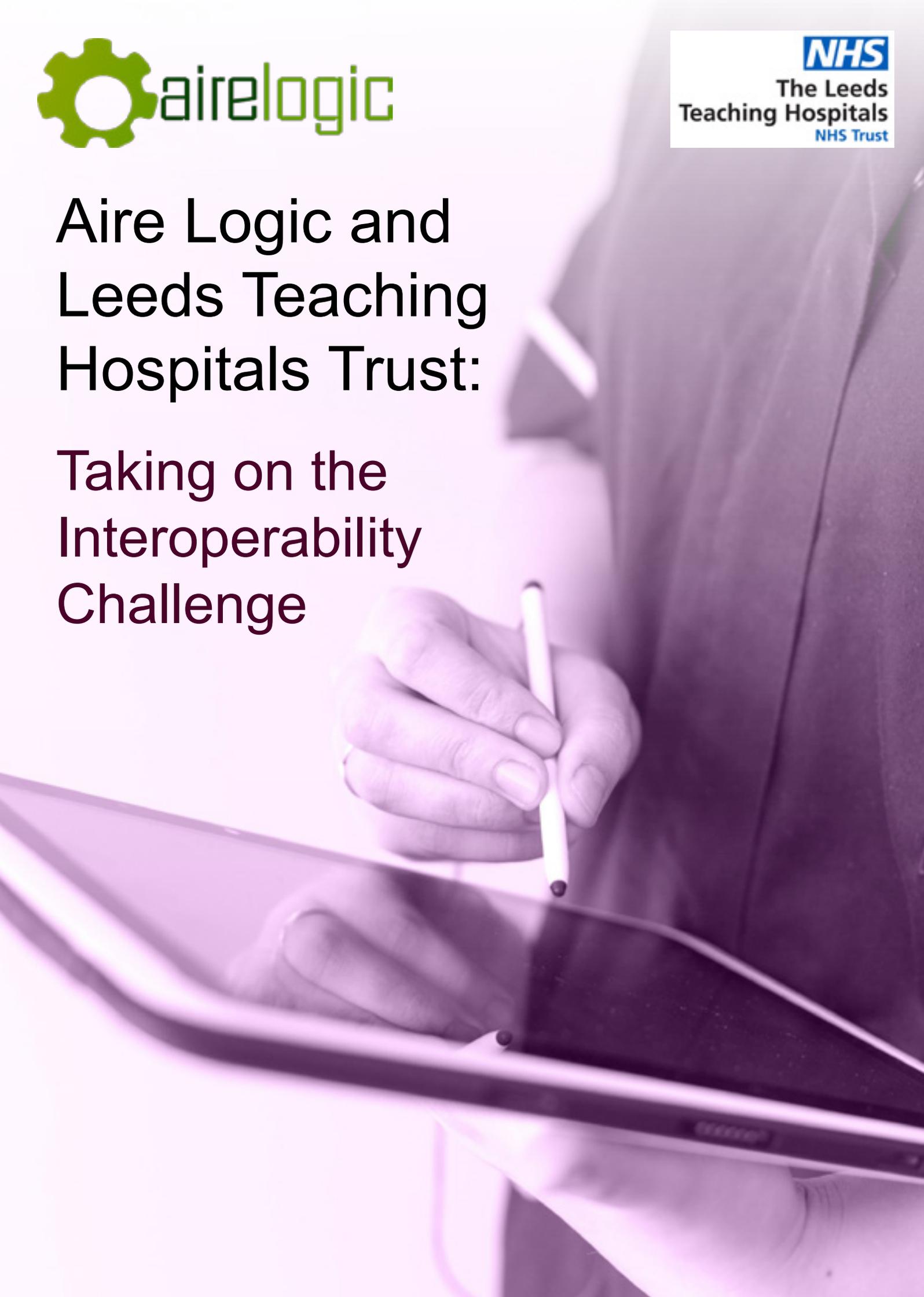




# Aire Logic and Leeds Teaching Hospitals Trust:

## Taking on the Interoperability Challenge



# OVERVIEW

In 2014, Leeds Teaching Hospital Trust and Aire Logic began work on a new EHR solution, PPM+, aiming to prove the NHS could build and deploy its own EHR cost-effectively. LTHT is one of the largest trusts in the country with 7 hospitals, over 16,000 staff and an annual budget of £1 billion.

The solution was specifically designed using digital forms-based technology, enabling massive scale roll-out and expansion with relatively small effort and cost to the trust. The resulting model is innovative, efficient and completely transferable.

PPM+ has become mission critical to the operation of the trust and wider region. It supports around 350,000 paperless record submissions every month (with this figure rapidly increasing). The system has ~16,000 users, with around 5,000 actively writing into the EHR.

With PPM+ firmly established, over the last year LTHT has implemented several new initiatives, bringing wide-ranging benefits to the Trust, clinical staff, and patients, and saving millions of pounds.

Beyond LTHT, PPM+ supports West Yorkshire's shared Acute Oncology Care Record, the Yorkshire & Humber Genomics Medical Centre, the Yorkshire Ambulance Service (early pilot), and the Leeds Care Record (LCR) which integrates health and social care across the city.



# Integration and Interoperability with the eForms solution

With around 300 systems across the Trust, LTHT and Aire Logic collaborated to deliver an enhanced, integrated EHR. LTHT did not want to rip and replace well-established systems, but integrate best of breed solutions to provide an overall patient care record. Going a step further, PPM+ was designed not only to integrate with the diverse systems across the trust, but with the wider healthcare landscape.

The resulting solution has extensive interoperability capabilities, using international standards such as HL7 and openEHR. This year many projects have focussed on FHIR APIs including GP Connect, (the first organisation to integrate with this live service) the National Record Locator Service, eRS APIs. LTHT is dedicated to achieving greater integration between systems and organisations and, through contributions to the West Yorkshire and Harrogate STP, is one of the driving forces behind regional interoperability beyond Leeds.

PPM+ incorporates varied data from systems across LTHT, including patient administration, radiology images, and blood results. This means vital information is communicated quickly, without risk of misplaced or damaged paperwork, and patient data is stored in one place, easily accessible to relevant clinicians. The comprehensive EHR allows staff at LTHT to provide quality, holistic patient care, and ensures continuity with other settings.

Beyond its primary purpose supporting LTHT's complex day-to-day needs, the PPM+ EHR is the heart of the Leeds Care Record. A collaboration involving over 140 organisations, The LCR is used in all 105 GP practices across Leeds, the local mental health trust, Leeds Community Health, Leeds City Council, and Leeds' two major hospices, ensuring that care records are available wherever an individual engages with the local health and care system. PPM+ also contributes to the Acute Oncology Care Record and the Yorkshire & Humber Genomics Medical Centre, using eForms to gather relevant data for the 100,000 Genomes project.



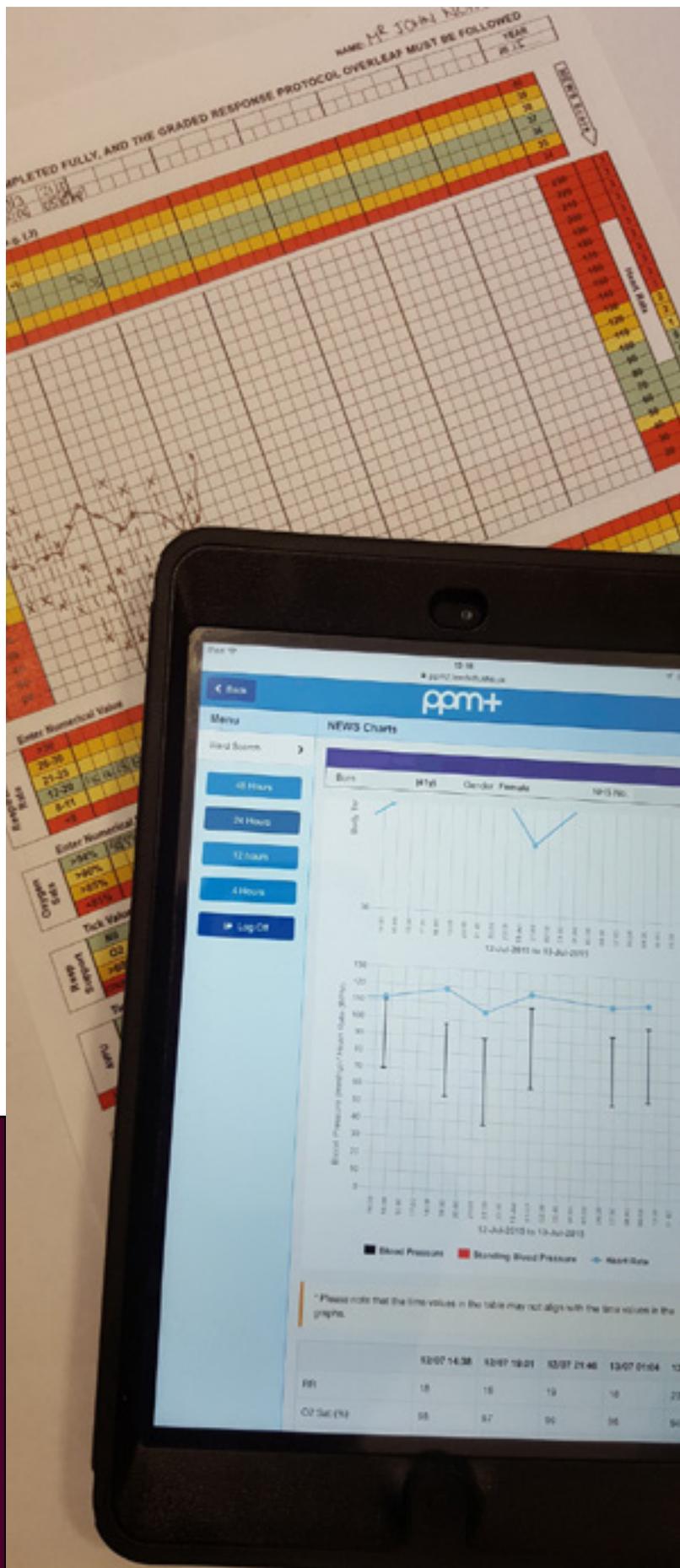
# A creative and innovative solution that works 'on the ground'

The programme has now delivered the eForms solution which enables unlimited expansion and roll-out of PPM+. The solution allows clinicians and subject matter experts to design their own screens using a WYSIWYG designer, and share them with colleagues in a safe sandbox environment. This accelerates collaboration and agreement on new features, and puts the clinicians back in control of their healthcare IT. This in turn enables a rapid roll-out with both high quality and low defect delivery. Once published into live, the eForms are immediately usable on any device, supporting mobile working and increased productivity.

The ease of development and deployment has meant that forms can be amended and improved as clinical experience and usage inform better practices.

In line with the FYFV paperless 2020 objective, the PPM+ solution's ability to rapidly transform paper forms into fully functional eForms benefits clinicians and healthcare professionals through standardised data collection, ease of access, and decreased clinical risk (using smart form technology). Inbuilt Clinical Decision Support and clinical tools, such as the NEWS calculator, provide guidance and advice as forms are completed, prompting relevant actions based on the patient information. All data captured across the system is readily available for reporting, allowing LHT to analyse care delivery and target areas for improvement.

**The introduction of an event-based architecture (CQRS) not only means the system can scale to the needs of the trust and region, but also allows it to become proactive in the management of patients. For instance, rather than passively displaying information to end users, the event processing engine can create additional tasks and notifications when certain rules are met. such as a reduction in a patient's NEWS score suggesting the patient's condition is deteriorating. This supports timely intervention and proactive patient care.**



# Delivering improvements for better healthcare

PPM+ underpins activities across LTHT, delivering far-reaching improvements in healthcare outcomes. From reducing bed-blocking, to ensuring more personalised, timely patient care, the shared, integrated EHR means information is available at the point of care, and all necessary administration is completed quickly and efficiently.

In the last year, LTHT implemented several new initiatives:

## eWhiteboards

eWhiteboards were introduced across all LTHT wards, making this one of the largest eWhiteBoard implementations in the country. They integrate with PPM+, showing up-to-date information about each patient on the ward, including pending tasks, such as NEWS, VTE or falls risk assessments. Updates show immediately on the eWhiteboard (also viewable real-time across the city via the LCR), allowing staff to instantly get an overview of the patients on the ward and to prioritise actions.

## eObs

eObs allows nurses to input blood pressure, heart rate, temperature etc. into PPM+ at the bedside using a mobile device. The system automatically calculates an 'early warning score' (NEWS) which supports early recognition of deteriorating patients and automatically highlights on the eWhiteboards. On paper, this score can be miscalculated, potentially leading to delayed interventions, poorer outcomes and increased length of stay.

## Handover

The handover eForm has currently been deployed to medicine, elderly care and oncology teams, as well as nursing teams on 35 wards. It ensures continuity of care for patients during shift handover, reduces the risk of tasks being delayed or missed, and facilitates timely discharge, freeing up beds. Now, over 50,000 handover entries are made every month.

## Scan4safety

In 2017, LTHT embarked on a major new project, Scan4safety. This will make aspects of the EHR available on mobile devices, allowing staff to open the EHR by scanning the patient's wristband, and perform activities such as associating the patient with products (e.g. heart stent) or locations (e.g. ward and bed number.)



# Usable, Scalable and Flexible

With PPM+, LTHT and Aire Logic have produced a system that has not only been successfully implemented at scale, but which is built in-house by the NHS, with the potential to provide improved patient outcomes and massive cost savings for other trusts and the wider NHS.

Central to PPM+ is the forms framework, which gathers, stores, shares and analyses data from across the whole trust. The framework was designed to facilitate easy adoption and rapid roll-out. New eForms, created by LTHT staff, can be ready for roll-out approval within hours. In one instance of another internal system failing, an eForm went from early pilot to full roll-out and use by ~60 people in 2hrs, allowing LTHT to mitigate the disruption. That same form is now in regular use, with ~2,000 submissions a month. This highly responsive model allows the Trust to quickly react to the changing healthcare landscape, whether by monitoring disease outbreak, or complying with new NHS standards.

One early eForm (eDID) enabled wards to electronically request social care or community referrals when discharging patients, with PPM+ showing the referral progress in real-time. After piloting, eDID was successfully deployed to the whole Trust (~100 wards) in one go, and has already reduced bed-blocking.

This year, the main focus for new eForms was wards, but they were also implemented in cardiac, rhesus, microbiology and pre-operative assessments. Over 16,000 users across LTHT now make ~350,000 form submissions every month, with this number rapidly increasing. More recently, an eObs form was rolled out from an initial pilot of 4 wards to 30 in just 3 months, with an additional 442 users now recording observations digitally.

Regarding wider roll-out, PPM+ is used in numerous care settings across Yorkshire through the LCR, and contributes to research including the YCN and 100,000 genomes project.

The screenshot shows a patient record for 'Patient 3 of 25' with a name 'BUNN, Myrtle (Mrs)'. The form includes fields for 'Date' (24-Aug-2016), 'Gender' (Female), and 'MRN No.' (828 478 1818). It features a 'General Summary' section with text about medical history and a 'Handover Comments' section. There are also checkboxes for 'Discharge Review' and 'Consultant'. At the bottom, there is a table with columns for 'Ward', 'Bed Patient', 'Consultant', 'Speciality', 'LDA', 'EDD', 'MYD', 'Planning', 'Needed For Discharge / Transfer', 'All', 'GRC', 'VTC', 'Eub', 'Fut', 'Mon'.



# Efficiency and Value for Money

The PPM+ project has enabled massive cost savings. In 2016-2017, the Leeds Care Record efficiency benefits alone were over £3 million. By digitising processes across the Trust, the system not only saves expenses on resources like paper, ink and storage, but saves time for both administrative and clinical staff, and improves efficiencies trust-wide.

One new initiative that has already achieved substantial cost savings is the PPM+ Unplanned Patient List (UPL). The UPL lets staff monitor patients being admitted to the trust acutely. Patients are added to the UPL when the decision is made to admit or further assess them, ready for bed allocation, and the patient is then admitted on PAS on arrival.

As a communication tool, the UPL has significantly reduced the number of phone calls, faxes, and unnecessary administrative work, streamlining the admission process. Currently in pilot in Cardiology, Abdominal Medicine and Surgery, Primary Care Advice Line (PCAL) and assessment areas, the UPL has enabled a Cost Improvement Programme of £150k.

***In 2016-2017, the Leeds Care Record efficiency benefits alone were over £3 million.***

Through PPM+, the rate of eForm submissions has been increasing by ~3,000 per month as more interactions, previously conducted on paper, are digitised. Purely on paper and ink used for forms, LTHT are saving approximately £15,000 a month, with significant additional savings in administrative time, storage, printer maintenance and so on. PPM+ also enables the electronic transfer of over 70,000 discharge and outpatient letters a month to all GP systems across Leeds (previously hard copies), providing further cost savings.

The PPM+ financial savings extend beyond the trust, across Leeds' integrated services, as communication between organisations can be conducted electronically. For example, PPM+ has already meant a reduction in calls into Leeds GPs, as users access GP summaries, test results, etc. using the platform instead of calling or faxing data. This saves staff time and resources for both organisations.



Aire Logic has spent the last 10 years working across the healthcare sector, with services ranging from IT enterprise architecture consultancy to creating software solutions, such as our forms4health product.

Our experience in healthcare strategy and agile delivery mean we can provide a meaningful implementation for your organisation to find the solution that is right for you and help you to deliver the best standard of care to your patients.

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To find out more about our eforms product and how it could help your business achieve its desired outcomes, please visit our website **[www.forms4health.com](http://www.forms4health.com)** or feel free to contact us for further information:

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