Advancing Healthcare
The Case for AI in Care Coordination

In healthcare, AI has the potential to transcend its initial focus on diagnosis, and extend to care coordination. This article advocates for a shift towards proactive, collaborative platforms. It examines the opportunity to enhance EMRs and shared care records and proposes systems focused on future care needs, supported by AI.

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Healthcare systems everywhere are suffering from a shortage of healthcare practitioners. Productivity is under strain from fragmented pathways and inefficiencies built into the way that such systems are designed. New uses of AI in healthcare are being devised and discovered. For a long time, the main thrust was the ability to support more rapid and more accurate diagnoses, especially within imaging specialities.

This article argues that AI's true power lies not just in diagnosis, but in revolutionising the most difficult aspect of healthcare – the coordination of multidisciplinary teams spread across multiple institutions and geographies.

We argue that merging data silos is not the answer. We need instead to create seamless pathways of data, supported by AI, to empower collaboration and support a holistic and helpful view of each patient's journey. This requires real-time communication and the ability of care teams to answer crucial questions and ensure that patients receive the right care at the right time.

Principally, the use of AI in this scenario, we believe, is in focusing practitioners on the 'next best action' for a patient and distributing those actions to the most appropriate person. This is not possible either within current silos or even by merging silos into data lakes or common care records. Instead, what is required is a whole new category of patient record – one that abandons the metaphor that has dominated EMR manufacture until now, the digitisation of the patient's folder of notes, and instead embraces the metaphor of whiteboards and patient lists, where cohorts of patients are managed together, across multiple teams and – most importantly - where AI

can learn from one patient and inform the care of another.

Our view is that we must use new learning models to generate the 'future view of care' and allow practitioners, patients and their families to select from among the choices that are then presented, providing a learning loop within the AI models.

This approach will abandon the exclusive focus on looking backward and recording the care that has been provided in the past and instead use machine learning to drive care decisions and focus on what the patient worries about most: their future.

Two case studies

The following are case studies drawn from the authors' own clinical experience:

Case 1: A five-year-old child suffers an unexpected asthma-like attack while playing outside during summer. The child is brought to the emergency department and a few days later to their general practitioner. The child presents at the ED several times, often at night, and is followed up by the GP on another occasion. There is little improvement in symptoms, despite maximal asthma therapy. The parents visit a private paediatrician who orders extensive blood tests and a chest x-ray. The x-ray is reported by a third party as showing some partial lung collapse. An otherwise reassuring letter is sent to the GP asking that the report is followed up, but this is missed. The child deteriorates over some weeks and is eventually admitted as an inpatient with fever and malaise. A plastic foreign body is eventually retrieved on bronchoscopy and the child makes a full recovery.

Case 2: An elderly man who lives alone suffers an unwitnessed fall at home suffering a clinically insignificant head injury. He is treated at a local emergency department, where he waits for 24 hours before being mobilised and discharged to a rehab hospital in the community. There, he is found to have atrial fibrillation and is placed on warfarin. He makes a good recovery and returns home but soon afterward suffers an acute gastrointestinal bleed, which requires further emergency treatment.

In both of these cases, there was no visibility of the workflow of the teams in different institutions. Once the patient has been removed to the next place of care, the actions that are required to complete the cycle of care become disjointed. In the first of these, a chest x-ray needed to be reported and acted upon. In the second, the INR needed to be regularly checked. ▶

The burden of siloed care

The challenges presented by fragmented healthcare systems are well understood. Siloed care, where information is restricted to individual institutions, creates barriers to effective communication and collaboration among care teams. As patients transition between different care settings, crucial information often gets lost, leading to disjointed care pathways and suboptimal outcomes.

Cases such as the two above are often used as reasons for joining up the care records of individual institutions in order that the folder of notes from one hospital or care setting is visible to the other. This creates 'common care records' from which 'data lakes' can be created.

There are significant disadvantages to this approach. The largest barrier is that these big silos of healthcare data need to be joined together technically and made to work together. As the UK's National Programme for IT (later known as 'Connecting for Health') found after many billions of wasted taxpayer money, doing this is immensely complicated and prohibitively expensive.

The other problem is that there is always, somewhere, a boundary that will not be included in the 'greater record'. For instance, in the UK, Manchester has brought in a common care record that allows emergency services, GPs and hospitals to see each other's records. But there will inevitably be patients who are not covered by this. They

> AI in healthcare must move beyond digitizing patient records to creating collaborative platforms that empower care teams and patients alike.

may be living on the outskirts of the Greater Manchester area, or they may select to be treated outside the NHS or they may migrate into or out of the area from other parts of the UK or the world.

Shifting to a more collaborative metaphor

In our view, addressing these challenges requires a fundamental shift away from the traditional metaphor of the 'digitised folder' as the electronic medical record, towards a more collaborative metaphor based – for want of a better image – on the whiteboard found in wards and other healthcare departments.

These whiteboards are often future-focused and action-oriented; they can be seen, adapted and accessed by many individuals from

many teams. Rather than merely serving as repositories of past medical data, whiteboards facilitate real-time communication and decision-making within and between care teams.

The most powerful whiteboard would be one that could be seen by teams across the entire range of a patient's care journey, in all settings. To re-emphasise, this does not need to be a complete sharing of the medical record from each of these settings. Just enough to make the coordination of care a reality.

It is our view that the thrust of the next generation of healthcare digitisation must create platforms such as these, which provide users with small, highly relevant amounts of distilled information that allows for rapid decision-making and which provide a view of a cohort of patients, rather than individualised, deep silos of information about individuals.

AI's role in care coordination

It is here that the transformative potential of AI can then be made possible.

By harnessing the power of machine-learning algorithms, AI can analyse the information of such patient lists, in real time, identifying patterns and predicting future needs and, in particular, future actions: the 'next best action'. This predictive capability will then enable care teams to intervene rapidly and precisely address specific patient needs bearing 'in mind' the context of the team and the cohort of patients for which the team is responsible.

To give an example, a machine-learning algorithm could analyse the discharge summaries and short-text-based clinical summaries, comparing this data to historical summaries of similar patients managed by that team. From this analysis, can come a list of the most likely next best actions for that patient. These actions can be verified by human users in order to provide further learning feedback for the model.

Once these actions are agreed, they can be assigned to the relevant clinicians, who can then receive automated alerts, prompting them to ensure that these actions are carried out. The AI can assist in care planning by recommending personalised treatment pathways based on best practices and patient-specific factors.

Benefits of AI-powered care coordination

The benefits of AI-powered care coordination extend beyond increased efficiency. As implied by the case studies, the enhanced communication and collaboration will lead to a reduction in medical errors and improved patient outcomes. By streamlining workflows and automating the allocation of actions, AI will allow clinicians to focus more on direct patient care, ultimately enhancing the overall quality of healthcare delivery.

Including the patient in the loop

Perhaps most importantly, this AI-supported care coordination can be used to empower ▶

the patient, by giving the patient an active role in managing their health. Through real-time access to their own care plan and to the multidisciplinary team looking after them, they can make more informed decisions about their care, leading to greater engagement and satisfaction.

Addressing concerns and building trust

While the promise of AI in care coordination is immense, it is not without its challenges. Concerns around data security, privacy and algorithmic bias must be addressed to ensure the responsible development and implementation of AI systems in healthcare.

Robust data security measures and transparent governance frameworks are essential to safeguard patient information and mitigate the risk of unauthorised access or misuse. Furthermore, efforts to mitigate algorithmic bias and ensure the fairness and equity of AI-driven recommendations are imperative to build trust amongst patients and healthcare providers.

The road ahead

As healthcare begins to adopt AI – and the care coordination platforms just outlined become a reality – collaboration and cooperation among stakeholders will become a real possibility.

However, to make this a reality, provider organisations, clinicians, developers and policymakers – and in particular healthcare system designers – will need to work together to design and implement these future-focused, action-orientated platforms that prioritise collaboration.

By breaking down silos and embracing AI as a catalyst for innovation, we can create a healthcare ecosystem that is truly transformative. We need to seize this opportunity to harness the full potential of AI in revolutionising care coordination and improving the lives of patients around the world. ■

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Making handover safe in the ICU.

NHS
Maidstone and Tunbridge Wells
NHS Trust

Background

CAREFUL supports the wider ICU team in the planning and handover of complex critical care patients at a multi-site NHS hospital trust.

The problem

The clinical state of critical care patients changes constantly. Global evidence shows that the prevalence of preventable harm is three times higher in the ICU than in the rest of the hospital.

Doctors and staff from many disciplines need to contribute to complicated decisions quickly, sometimes when not present on the unit.

A complex, forward-looking plan is required for each patient, which must be easily accessible to all members of this multidisciplinary team. The plan needs to be acted on in real-time, together and alterable as needed.

At Maidstone and Tunbridge Wells, senior doctors realised that patient safety would be enhanced, and substantial staff time would be saved, if all team members could see the same critical patient information at the same time, wherever they were.

They also realised that ICU patients being supported on other wards through clinical outreach, or stepped down to the ward, were at higher risk because of difficulty in maintaining clinical oversight of patients outside the unit.

Existing systems were not agile, flexible or mobile enough to provide this.

The CAREFUL solution

CAREFUL is a secure app that has allowed all members of the entire multidisciplinary team to collaborate in real time.

Everyone can see and manage critical information and tasks for patients and visualise the state of the patient and their journey through the unit.

CAREFUL has standardised communication by replacing inadequate systems, as well as informal paper and verbal instructions.

By using its handover functionality, staff going off shift are able to transfer responsibility of critical tasks with full visibility, while actions are logged.

CAREFUL has saved hundreds of hours of time and made safe thousands of handovers by making key information visible to consultants, nurses and AHPs across both sites.

Staff report high impact

Percentage of staff reporting positive impact from installing CAREFUL:

Staff efficiency/time-saving	**91.4%**
Within-team communication	**100%**

Anonymous and confidential user feedback survey after 1 month of use.

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CAREFUL enables clear communication within and between clinical teams, with the USP of facilitating a level of accountability for actions and handover.

It is an incredibly intuitive and user-friendly system, which has been readily implemented by our department.

As a company, CAREFUL are extremely responsive and adaptable, with a clear drive to developing the best digital solution to meet a near-universal need for clinical teams – the safe handover of their patients."

DR OLIVER BLIGHTMAN
Critical Care Consultant and Lead for Innovation
Maidstone and Tunbridge Wells NHS Trust
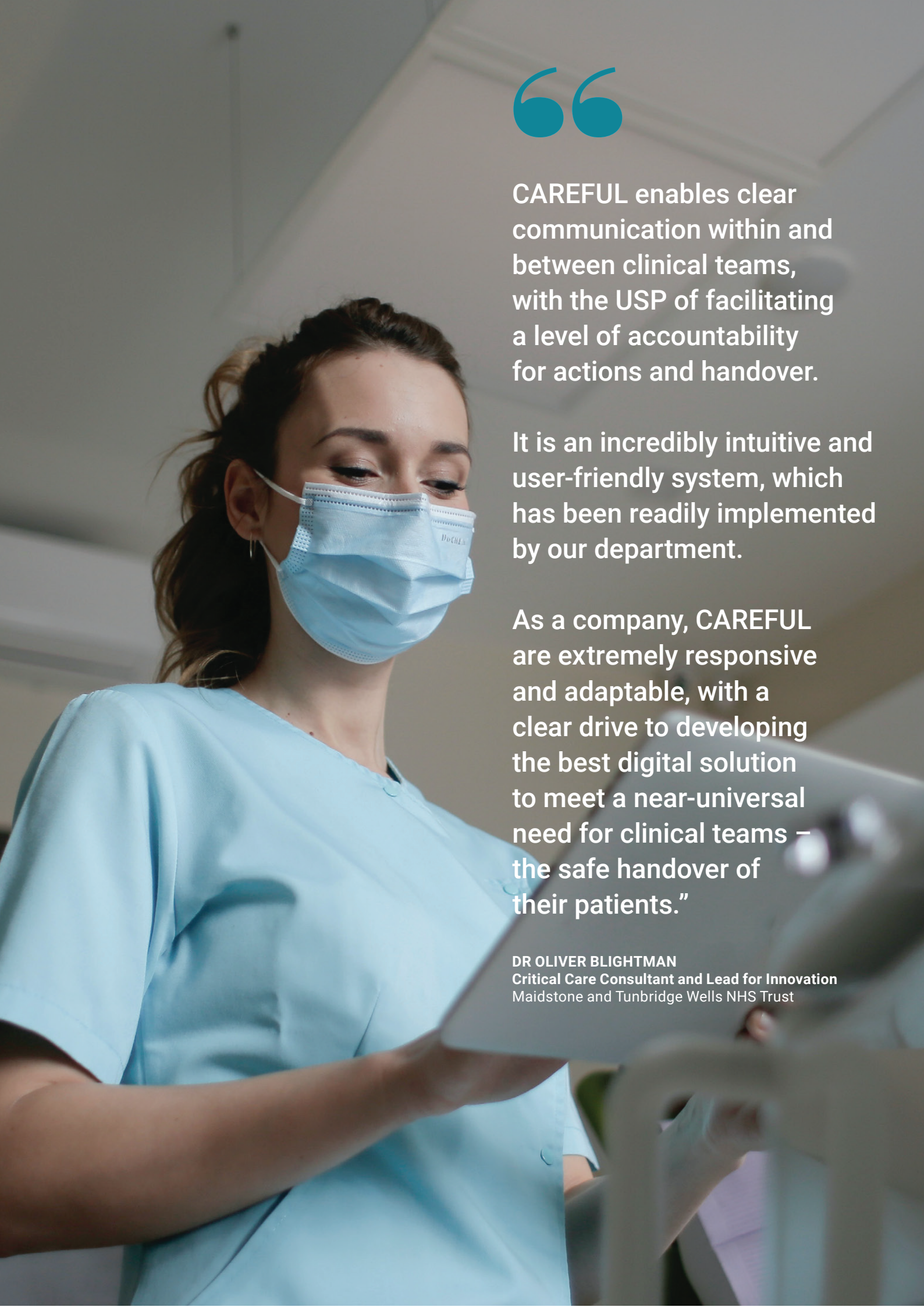
About CAREFUL : the Clinical Care Coordination Platform

CAREFUL transforms the way healthcare teams collaborate and coordinate care, no matter where they or their patients are located. In providing practitioners easy and affordable shared access to important current and next steps, nothing is forgotten. CAREFUL saves clinicians time and allows patients to have faster, safer care.

Available on mobile, tablet and desktop, CAREFUL is a care coordination platform that interoperates with and complements existing patient management systems and replaces unsafe messaging apps, manual and paper-based channels of communication. Based in the UK with clients across the globe.

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