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\*in pilot phase

# Smart Health Care Solutions

There are big expectations for the potential of smart health technologies to support the more efficient and effective delivery of health care. While this type of technology is still in its infancy it is expected to be commonplace in the future. At Deloitte, we are committed to ensuring that the application of any “solution” is embedded in a real world understanding of hospitals and the associated changes in processes and behaviors required to deliver a more responsive service. All of our solutions have a clear and compelling return on investment.



**Dr. Stephanie Allen**

**Deloitte Global Health Care Leader**



## ECO – Emergency Care Optimisation

Improving Accident and Emergency (A&E) operations

### Background

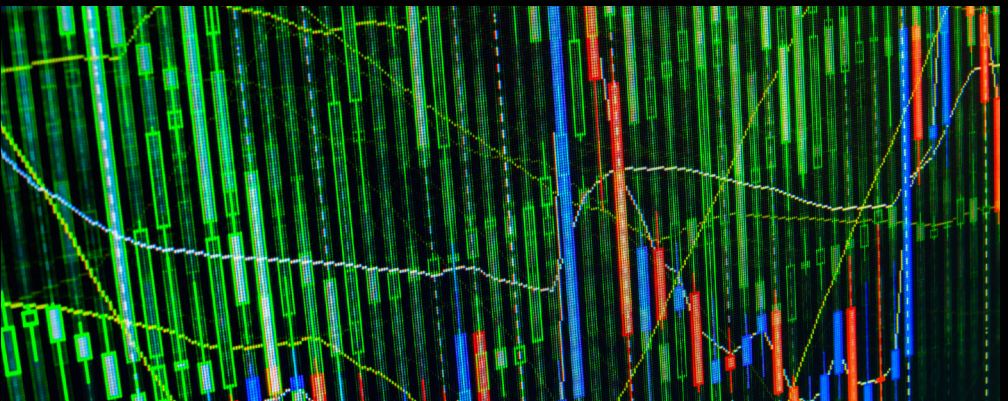
Accident and Emergency departments are under unprecedented increasing pressures so effectively managing resources and driving efficiencies within the departments has never been more important.

To support these challenges Deloitte has created ECO, a data driven simulation model to map patient pathways and staffing. ECO analyses historic data to assist understanding and future design of services. In addition, ECO can be used to diagnose and direct action in real time through a state of the art user friendly dashboard, with displays designed for both clinicians and managers.

ECO has been built using Big Data Analytics, which allows a simulation approach based on granular data to experiment with alternative processes and pathways. The tool has been co-created with clinical and operational experts who provide support in developing, challenging and implementing new processes.

### Impacts and benefits

- **Optimise performance** on four-hour A&E target
- **Reduce conversion rate** of attendance to admission
- Enable sites to create and test **contingency and resilience plans**
- **Dashboard control centre reporting** for clinical staff and management
- **Identify, test and deliver** targeted improvements within A&E around:
  - Process steps that can mitigate avoidable delays within the department
  - Workforce deployment approaches that minimise excess costs and maximise staff value-add
  - Insight-driven decision-making to ensure time, effort and resources are focused on changes that bring real value







## RITA – Referral & Intelligent Triage Analytics

Insightful data-driven demand management

### Background

Most healthcare services are experiencing a significant disparity between demand and capacity. This means seeing the right patient, in the right place, at the right time, having used as little administrative resource as possible to get them there. RITA is about demand management, not providing demand analytics, but actively managing the demand.

### Proof of concept

RITA analysed over 21,500 incoming referral letters identifying patterns between referral letter language and triage pathway. RITA achieved a 96% accuracy at triaging patients with suspicion of cancer and 86% accuracy at predicting the most likely clinic or diagnostic pathway.

### Impacts and benefits

#### 1. Real-time capacity & demand planning

RITA can use incoming referral letter data and historical data to map out:

- Future demand on the service e.g. how many extra clinic or endoscopy slots the service will require to meet targets.
- Individual demand per patient on the service from referral until discharge.

#### 2. Faster patient triage

Automating the triage process is estimated to reduce the overall Referral To Treatment (RTT) pathway by 2-3 days – approximately 15% of a two week wait target.

#### 3. Clinical pathway redesign and variation assessment

RITA can use a 'definitive truth' (for example NICE guidelines) and assess triage for variation from these protocols.

#### 4. Quality Assurance and Education

RITA can assess incoming referrals for low quality, incomplete or insufficient referral information, helping ensure the correct clinical decisions can be made and focusing the secondary to primary care educational agenda.

#### 5. Saving clinical time

Consultant clinicians are released from triaging duties equivalent to multiple hours of administrative burden per day.





## ATOM – Advanced Theatre Optimisation Method

Advanced data analysis

### Background

AATOM® is a theatre optimisation tool that has been designed in conjunction with clinicians. It uses evidence-based algorithms to estimate specific procedure times, accounting for patient complexity. These times are then applied to identify optimal scheduling configuration in order to eliminate unnecessary gaps in schedules and therefore maximise theatre utilisation.

The ATOM® dashboard offers a live forward view of theatres performance including late starts, early finishes, unnatural gap time and theatre flow. The dashboard is also able to account for natural and unnatural downtime in theatres. ATOM® has been deployed in the market for over 6 years and has achieved multiple successes in that time

ATOM® provides distinct benefits for clinicians and operational staff:

- Converting notes in to classified procedures for predicting list flow.
- Generating well planned lists that finish on time.
- Enabling staff to plan in line with current performance.

### Impacts and benefits

- Typically there is a 15% real improvement in theatres utilisation.
- Improved operation visibility of theatres usage.
- Reduced overtime and WLI payments.
- Reduction in cancelled operations.





## OPUS – Outpatient Productivity and Utilisation System

Real, sustainable change

### Background

OPUS is a multi-layered interactive dashboard that illustrates specialty and consultant level productivity opportunities. OPUS provides hospitals with an interactive benchmarking dashboard with which to review and interrogate the performance of their outpatient service, and to benchmark themselves against peer providers. The dashboard allows for a granular drill down to clinician-level productivity, speciality- level patient flow, clinical variation and opportunities for technological optimisation.

OPUS allows providers to identify opportunities for improved productivity and efficiency, based upon technological optimisation, pathway redesign, and demand management.

### Impacts and benefits

**Increases productivity** by reducing the number of appointments that should have occurred but did not.

This is achieved by identifying patients that did not attend their appointment and cancellations where the appointment was not refilled as well as assessing the overall utilisation of the outpatient clinic.

In addition, OPUS is also able to predict which patients are likely to DNA in future appointments and highlights future clinics that are under utilised.

**Releases capacity** by reducing the number of appointments that are occurring in secondary care and reallocating where appropriate to primary care in order to release capacity and improve patient experience.

This is achieved by reducing unnecessary clinic variation in referrals, identifying patients with excess follow up appointments compared to the norm; and highlighting procedures not routinely commissioned.





## ALICE – Automated Live Coding Engine

Reducing the administrative burden smartly

### Background

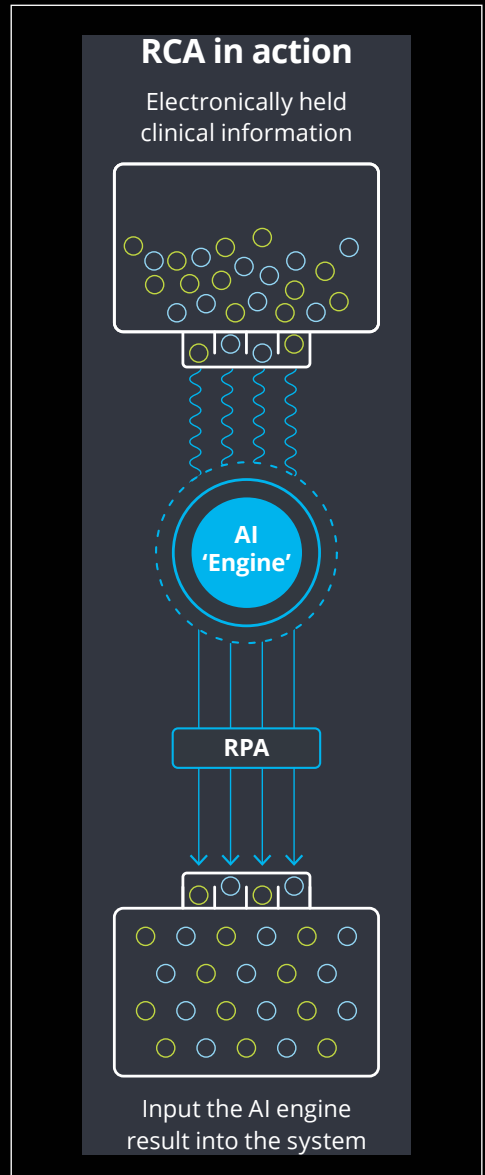
Clinical coding is a key function of every healthcare provider– converting the patients admission into a series of diagnosis and procedure codes to ensure accurate and timely payment of activity and precise reporting of health outcomes to inform data analysis.

Clinical coding is ripe for automation. It is heavily reliant on manual entry and human processing and involves multiple systems to gather information. Furthermore, there is a national shortage of clinical coders with recruitment and retention being a serious challenge.

ALiCE uses a combination of robotic process automation and a cognitive model to automate the existing manual process of assigning diagnosis and procedure codes to hospital activity.

### Impacts and benefits

- Efficiency savings generated from reduced **data entry & administrative burden**
- Higher and faster revenue generation from quicker and more **accurate coding**
- Allows clinical coding resource to focus on more **complex cases**
- Improved health outcome reporting allowing for **improved data analysis** on clinical pathways







# HealthConnect

Connecting through Telehealth

## Background

The Future of Smart Health will primarily aim to sustain well-being, providing care only in the rare instances when well-being fails, and leveraging data as the new healthcare currency to solve some of the most complex healthcare challenges while reducing cost.

HealthConnect is a SaaS-based, off-the-shelf solution, purpose-built to better manage Home and Community-based Care. It is designed to connect healthcare professionals and consumers in order to improve health and economic outcomes. It enables easier access to care, supports new care models, and brings care closer to home. When teamed with the latest Health Interoperability support, HealthConnect provides the key points of engagement for all stakeholders in clinical care.



## Impacts and benefits

### Provide easier access

- Enable telehealth and virtual care models
- Quick access to care network via Chat, Video and Messaging channels
- Access to personal health information when connected to the broader health system
- via health interoperability (i.e. test results, referrals, appointments, and home care / health services plans)

### Support new models of care

- Enable screening and early detection for complex diseases.
- Provide preventative, outreach and health coaching programs to reduce chronic disease and acute care costs.
- Extend virtual platforms for patients to engage with clinical professionals and health coaches.

### Bring care closer to home

- Enable health and hospital at home models of care.
- Connect and coordinate home care services.
- Enable collaboration between care network, healthcare professionals and caregivers.
- Monitor patients' vital signs and home activity, and proactively engage to avoid complications.



# DeloitteASSIST

Transforming patient communication through AI

## Background

Within the hospital setting the majority of patients do not have one to one nursing cover. Patients therefore must actively call for assistance from nursing staff when they need support. Typically this is done by pressing a call button, however for many inpatients their mobility and coordination is adversely affected for a multitude of reasons making appropriate utilisation of the call button challenging. In addition, this process does not indicate to nursing staff what is required and patients receive no feedback to acknowledge their request for assistance until someone physically responds to their request.

DeloitteASSIST is an AI enabled patient communication solution supporting patients to request assistance without the need to press a button. Simply by vocalising the request, nurses are alerted to the patient's need, with AI prioritising and smart-routing requests to the right resource to meet the patient's needs. DeloitteASSIST also provides immediate acknowledgment of their request.

DeloitteASSIST also allows patients to access FAQs and to interact with smart devices in their rooms such as entertainment systems, lights, blinds etc.

## Impacts and benefits

### For Hospital Administrators & Nurses

- Increased nursing time for patient care. Nurses can spend around a quarter of their time completing tasks that are not critical patient care activities. DeloitteASSIST uses AI to eliminate unnecessary activities
- Improved overall management of clinical teams through enhanced data sets and dashboards that support decision making associated with skills development and rostering

### For Patients

- Enhanced overall experience and improved patient satisfaction by providing a modern, patient-centered technology experience with immediate feedback
- DeloitteASSIST provides immediate responses to patients, confirming they have been heard and that a nurse is on his/her way. Patients can also access FAQs without nurse assistance and receive proactive alerts to assist in medication management

DeloitteASSIST connects patients with entertainment services and can enable smart controls of the patient environment (i.e., lights, TV, blinds – if connected and smart enabled)



## DeloitteINDICATE

Reducing waiting list times and breaches

### Background

There is limited visibility on the volume of incoming referrals, no real time visibility of the waitlist, no predictive forecasts to allow proactive preparation for demand increases associated with complex or high volume cases.

Deloitte:INDICATE is a secure cloud-based user interface, accessible on mobile and desktop devices. It provides an integrated, simple view showing real time information on waitlist, predicted demand for the future and upcoming breaches.

### The solution

An algorithm forecasting breaches and waitlist demand based on historical data patterns which may encompass:

- Number, procedure and complexity of cases on a monthly basis.
- Average operating time per procedure.
- Leave & conferences (historical, overridden if planned).

### Impacts and benefits

- Empowers teams to use a proactive decision making approach in addressing forecasted demand, using reporting tools that provide a real time view of the waitlist.
- Supports teams to meet clinical priority waitlist targets through visualisation and forecasts of potential breaches.





## ConvergeHEALTH

Advanced data analysis

Our software solutions help you strengthen your organization by uncovering hidden revenue and identifying opportunities for strategic growth.

The ConvergeHEALTH suite of software solutions are built with the understanding that, in today's market, truly actionable insights are derived from a combination of real-world information, evidence, and experience, not just data. Powered by Deloitte's unparalleled industry experience, our solutions are designed specifically to solve the biggest business and operational challenges that the health care and life science industries face.

### **Use Patient Connect™ to create a meaningful feedback loop with your customers**

Life Sciences companies have a small window of time to break out of the traditional pharma model and operate in the new, customer-centered, digital ecosystem- or risk the falling behind of the innovation curve. The industry's 'new normal' requires more creativity than a tool and a more permanent solution than a consulting engagement. Our hybrid approach to patient engagement couples tested industry experience with a healthy appetite for creativity.

#### **Impacts and benefits**

- Accelerated access: Improve patient access to therapy and provide high-touch, consistent patient interactions across shared business processes and therapeutic programs.
- Informed patient insights: Increase insights into patient treatment and interactions to demonstrate value to Health Plans and improve drug efficacy.
- Facilitated care team collaborations: Provide value to Health Care Providers and partnership through shared patient insights and a
- platform for care team collaboration; facilitate interactions between Health Care Providers and patients.
- Improved adherence: Leverage tools to engage and educate patients; act proactively to
- help ensure product, therapy, and care plan adherence, reducing discontinuation.



### Optimize your physician networks with Network Insight™

The opportunity to look at new and innovative ways to ensure success for health care organizations as it relates to their physician network and ambulatory services significantly impacts the quality and continuity of care to meet changing market demands. Network Insight empowers health care organizations to thrive by deploying an optimal mix of primary care practitioners and specialists to support value-based, outcomes-centred care.

#### Impacts and benefits

- **Market overview:** Make strategic decisions for your physician networks with clear insight into the market landscape, including detailed demographic, hospital, physician and client data.
- **Network optimization:** Optimize your physician network by targeting physicians and physician groups based on user-defined performance and geographic value metrics.
- **Performance management:** Engage your physicians and align their practice patterns across four performance indices: quality, cost, utilization, and care navigation with the Performance Manager desktop and mobile application.
- **Asset efficiency:** Evaluate and restructure your market footprint and assets for greater efficiency and market coverage by evaluating and restructuring ambulatory services footprint and operations against geographic, demographic, financial, and clinical services strategies.
- **Care pattern index:** Create a programmatic approach to improving physician loyalty and patient retention with the necessary continuity to sustain a high-quality, low-cost population management plan.

### Transform your revenue cycle with Revenue Intellect™

Revenue Intellect™ is a cloud-based, guided-analytics platform that is designed to help maximize and sustain financial margin. Revenue Intellect enables users to identify hidden or hard-to-find sources

of revenue loss and access data, ranging from targeted analyses to free-form data exploration, to provide value to all levels of a health care provider's operational structure.

#### Impacts and benefits

- **Preventative denials analytics:** Compare financial performance across multiple metrics against benchmarks compiled from the entire Revenue Intellect client base. Compare current and past performance, while monitoring the effect of specific events (e.g., ICD-10).
- **Proactive underpayment avoidance:** Count on constant updates to the analytics and functionality available within the solution, based on evolutions in the industry and advancements in technology. Our out-of-the-box targeted analytics solution is designed to answer needs specific to health care organizations like yours.
- **Continuous support:** Get access to a dedicated, ongoing Deloitte revenue cycle expert to help with identifying insights within your data and working as a partner to improvement your initiatives.



## CARDEA

Identifying those at risk earlier

### Background

Patients admitted to hospital who are at high-risk of readmission due to heart failure or acute coronary syndrome require out-of-hospital, community care programs to manage and/or recover from their condition after discharge.

However, eligible inpatients are sometimes missed and therefore not referred to the appropriate community care program as part of the discharge process.

This can lead to unnecessary readmissions because missed patients do not access the right community health services to manage and/or recover from their condition when they leave hospital.

It may not be until the patient is readmitted one or more times for the same condition that they are then identified and referred.

### Impacts and benefits

Cardea provides a dynamic data analytics model based on static criteria and machine learning algorithms to quickly and easily identify high-risk patients and the key factors impacting on readmission.

High-risk patients are notified to clinicians daily via a secure user interface.

This provides clinicians with information that enables them to take appropriate clinical action based on a patients' risk profile.

In particular, this supports identifying the high-risk patients that would need referral to community health services after discharge.

This solution could be adapted beyond heart failure and ACS to support a more patient-centred and comprehensive discharge process across other conditions.





## D.Predict

Predicting clinical trial success

### Background

D.Predict is a machine learning model that predicts the success rate of clinical trials. It enables the user to simply enter clinical trial data on a web-based platform of the model and in return find out a prediction of clinical trial results before actually conducting the trials.

D.Predict works by using:

#### Multiple algorithms

D.Predict utilizes 6 different machine learning algorithms including the well-known 'deep learning' algorithm. Different algorithms would process the input data in order to pinpoint the most accurate results.

#### Variable data

Comprehensive set of variables related to clinical trials are input into the model such as data on; drug indication, therapy area, molecule type and trial participants information.

#### Continuous elaboration

The model is repeatedly trained in order to optimize output data accuracy. This is executed through constant reflection of results and adjusting of parameters.

### Impacts and benefits

Prediction of clinical trial success rate is a key variable in pipeline drug valuation. These 'predictions' are complex and resource-consuming and this is possibly why the process itself has remained in the 'realm of art' at best. D.Predict supports both clinicians and the pharmaceutical industry when they are facing R&D decisions for pipeline drugs, wishing to reevaluate the variables for clinical trial design and/or when needing support to rationalize R&D pipeline prioritization.



# Contacts



**Stephanie Allen**

Partner

+61 411 018 014

steallen@deloitte.com.au



**Michael Kitts**

Partner

+61 456 045 600

mkitts@deloitte.com.au



**Steve Burrill**

US Sector Healthcare Partner Leader  
Deloitte LLP

+1 2135901904

sburrill@deloitte.com



**Luke Baxby**

Partner

Financial Advisory in Australia

+61 450 921 748

lbaxby@deloitte.com.au



**Rohan Hammett**

Partner

+61 413 483 433

rhammett@deloitte.com.au



**Giles Nunis**

Partner

+61 427 461 331

gnunis@deloitte.co.au





**Ben Fielding**

Partner

+61 409 037 948

bfielding@deloitte.com.au



**Per Holmkvist**

Principal

+61 455 202 062

pholmkvist@deloitte.com.au



**India Hardy**

Partner

+61 424 203 669

ihardy@deloitte.com.au



**Nick White**

Principal

+61 407 993 619

nickwhite@deloitte.com.au

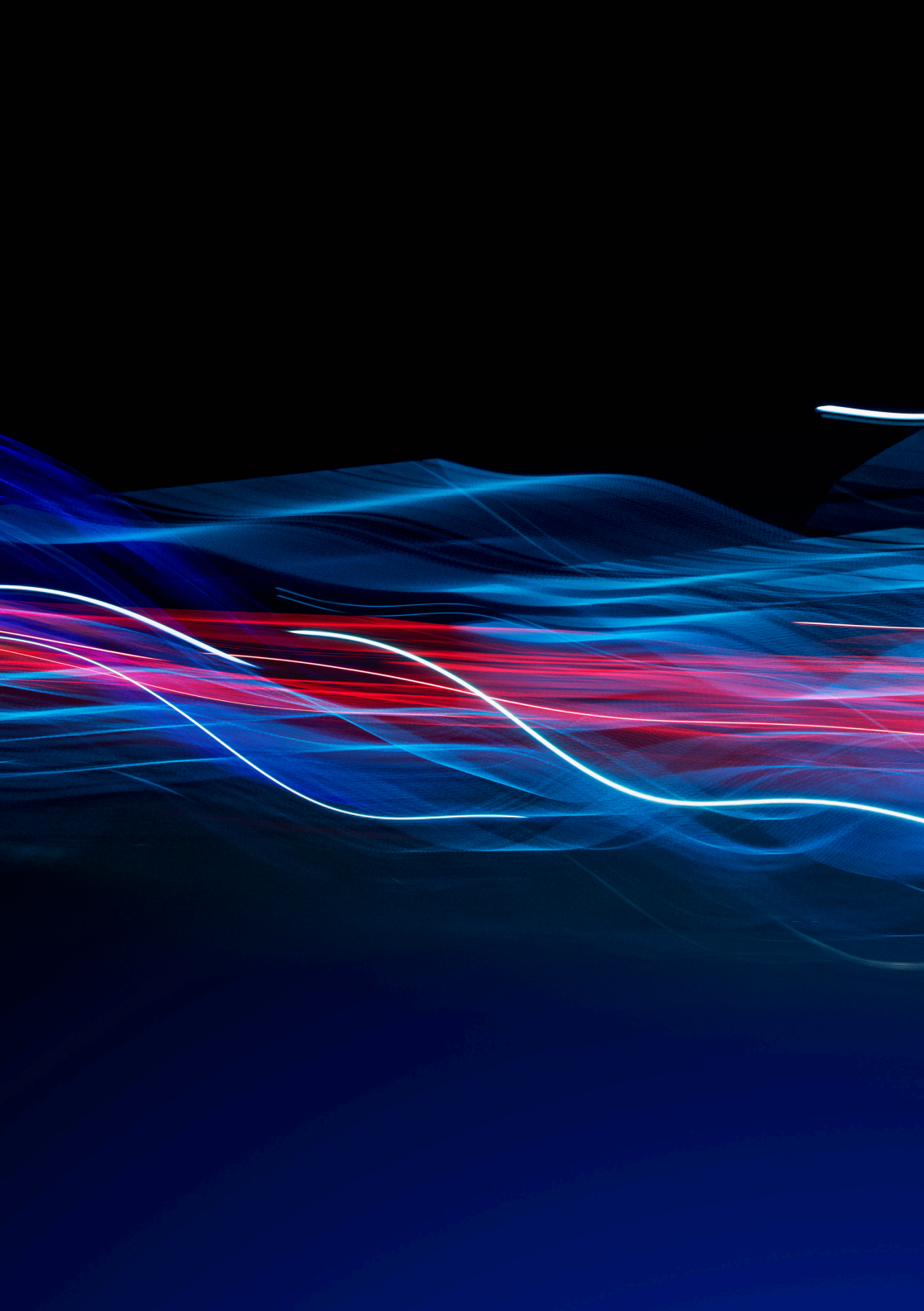


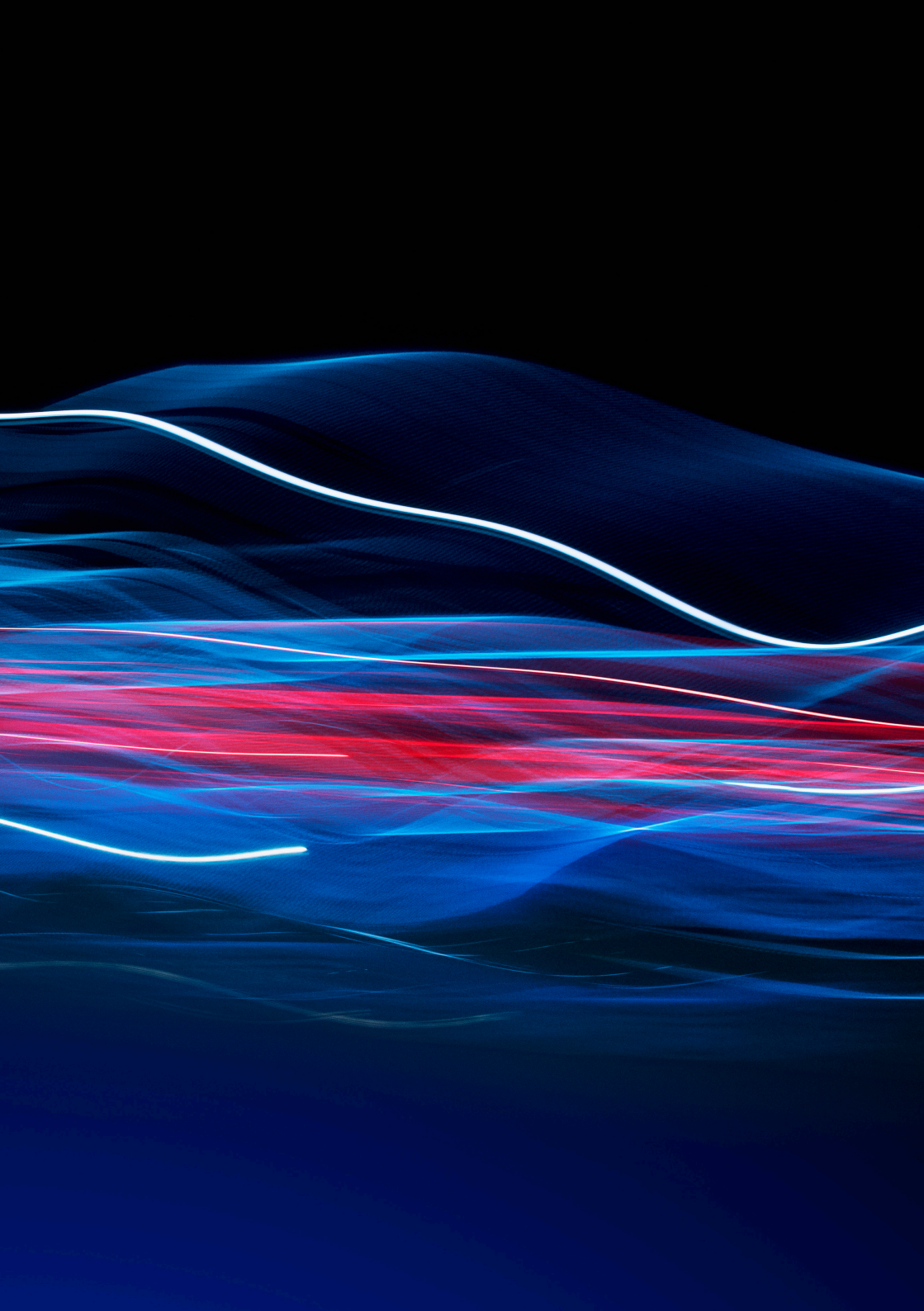
**Pia Clinton-Tarestad**

Partner

+61 417 473 550

pclinton-tarestad@deloitte.com.au







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