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WHITE PAPER

THE ADOPTION OF IOT

THE ADOPTION OF THE INTERNET OF THINGS WITH INTEGRATED CARE MANAGEMENT SOLUTIONS

FROM

ZURI CARE MANAGEMENT

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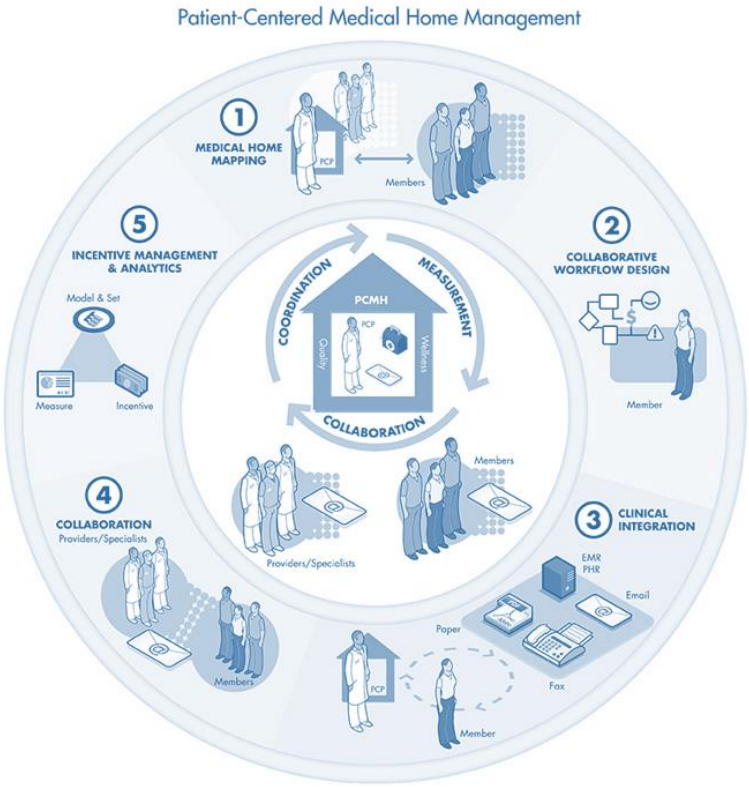
UNDERSTANDING THE CHALLENGES

1. COMMUNITY AND PRIMARY HEALTHCARE CHALLENGES FACING UK COUNCILS

When planning a new Healthcare Service, or improvements to a Healthcare Service, Councils are faced with challenges in relation to the future of the current healthcare Service, a rapidly aging population, growing demand for services, spiralling costs, difficulties with staff recruitment and retention plus the building and facilities needed for a significant overhaul and of course, the financial investment.

1.1. Health Services

People deserve a health service that is safe, affordable, and is sustainable under the health service delivery. This is characterised by services being "wrapped around the individual", with a single point of access for patients / service users and for care professionals, so that individuals can make informed choices and care for themselves as much as possible.



More health and social care services need to be available in individual's homes, in the community and in primary health care settings.

Services need to be provided by a range of professionals, with the care designed for the individual but within a standardised process, i.e. the single assessment tool.

1.2. A rapidly Aging Population

The aging society poses one of our greatest challenges to health, social care and housing. By 2040, we will have almost doubled the number of older people than in 2010, with the greatest increase in the over 85 population. Community services and home care are not provided 24 hours a day, and in addition to long waiting lists for nursing homes and community care facilities, this creates an immediate impact on secondary care services.

1.3. Growing Demand for Services

Emergency hospital admissions are driven by general medical patients, and without step up or step-down facilities, hospital services become stretched and underproductive. Without adequate community services, more people need to be admitted to hospital, leading to more cancelled operations, and increased waiting times for surgeries and admissions.

Patients with COPD, heart disease and diabetes present a significant burden to the hospital when their conditions worsen, particularly over the winter months, thereby increasing these delays.

With reference to the one of the UK Hospital situations; The Emergency Department (A&E) at this particular UK Hospital is one of the busiest A&E departments in the country with 135 000 patients expected to be treated there this year alone.

Nearly 250 emergency patients at this UK Hospital's A&E waited for more than four hours in December while a bed was found for them, newly-release figures show.

NHS statistics for the winter month showed a total of 11,737 people passed through this UK Hospital's emergency department, with 3,285 of them needing to be admitted as urgent cases.

A further 1,147 who did not arrive through A&E were also admitted as emergencies and out of all of them, 247 had to endure a wait for a bed of more than four hours after a decision was made to admit them. This was on top of the time they had already spent waiting to see a doctor in A&E.

2. SOLUTIONS – WHAT CAN BE DONE TO INCREASE AND ENHANCE COMMUNITY SUPPORT

By increasing community support, councils will enable individuals and their carers to live productive and independent lives in their own homes for longer.

If they receive personalised and coordinated services, driven by single assessment tools and supported by professionals who actively help the individual to manage their own care and make informed choices, councils will dramatically reduce the rate of unnecessary hospital admissions.

Similarly, adding services such as:

- Encouraging independent living supported by specialist teams for treatment of frail and elderly people in their own homes.
- Community clinics to support individuals on the end of life pathway
- Community and satellite clinics to provide non-emergency care, intravenous infusions, dressing and medication dispensing to free up emergency departments
- Integrated care software so all team members know what is happening with clients in the community at all times, supported by robust reporting systems
- Safeguarding partnership boards to protect the health and wellbeing of those vulnerable in the community
- 24-hour nursing and domiciliary care support in peoples own homes
- Services of a rapid response team, to respond quickly at any time of the day or night, with an experienced care professional assessing and arranging care for an individual in their own home in order to stabilise them and prevent admission to hospital.

UK City Councils could also consider Incorporating Telehealth by adopting technology such as “Alexa”, Amazon’s virtual personal assistant, which lives inside the company's Echo smart speaker and offers users the ability to dictate commands to the assistant to control products throughout their home, listen to music, and more.

But in a healthcare scenario, Alexa could be used as a way to resolve isolation in elderly people’s lives, by providing something for them to talk too, interact with. Patients could use it to make phone calls for them if their fingers are too arthritic to dial on a phone, etc. Equally, especially with reference to the ethnic diversity in some of the Cities around the UK where multiple languages are being spoken, something like Alexa could be “trained” to assist with this.

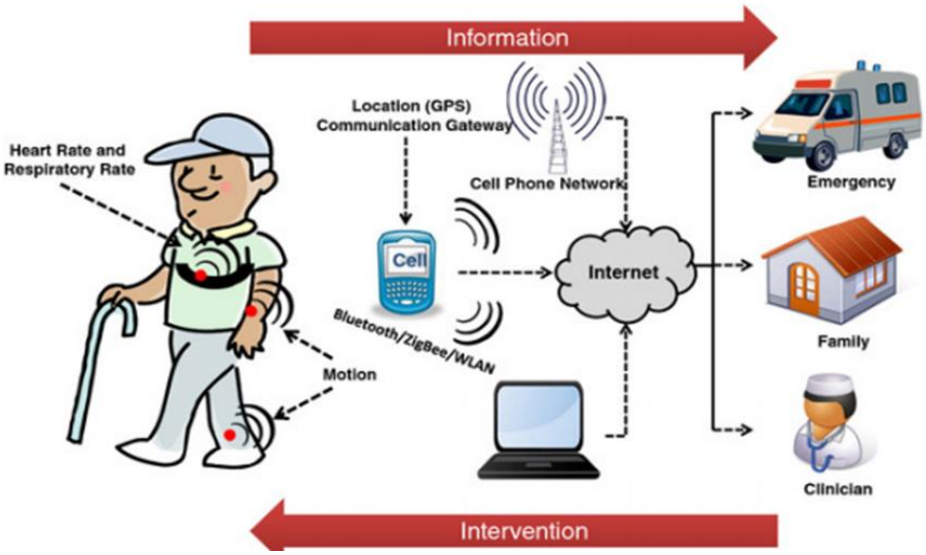
Key Factors for UK City Councils to consider

- Care delivery needs to be efficient, effective, productive, integrated and received in the most appropriate place, provided by the most appropriate professional, and using technology to support the professionals and relieve their workloads
- The ability to use telecare, telehealth and telemedicine as part of an integrated IoT (Internet of Things) set of services, to help maintain people living at home for longer or in a care home, being supported outside of expensive acute facilities.
- Adoption of technology to greatly improved identification of those that are at risk, with a holistic assessment of health and social needs. Artificial Intelligence coupled with something such as Amazon's Alexa device, could detect anxiety in a voice in a person's home. If that person has mental health issues, that could then trigger an early response from professionals.
- Care needs to be provided in less institutional settings, including more community clinics, satellite clinics and in people's own homes.

3. ADOPTING IOT SOLUTIONS TO ENABLE LINKED UP SYSTEMS

Having identified the above-mentioned challenges, UK Councils are encouraged to keep people out of hospitals and facilitate people staying at home for longer, by helping to improve their independence.

By doing so, Councils can ensure that people are being discharged home into a safe environment, and tele-monitoring or IoT (Internet of Things) is the perfect tool to monitor discharged patient's vital statistics and activities to ensure peoples safety, both in their homes, in the community and in day centres.



4. What is IoT (Internet of Things)

The Internet of Things (IoT) simply put, means some form of wireless connectivity that connects things with people across the healthcare ecosystem to health and wellbeing monitoring devices to acquire, aggregate and analyse data in order to gather real, actionable insights.

Sophisticated sensors and chips are embedded in the physical things that surround us, each transmitting valuable data, data that lets us better understand how these things work and work together. By collecting data from bedside devices, viewing client information and diagnosing in real-time, the entire system of client care could be improved, not to mention the client experience.

The rise of the IoT is a potentially lifesaving application within the healthcare industry. Devices can gather and share information directly with each other and the cloud, making it possible to collect, record and analyse new data streams faster and more accurately.

5. How does IoT work in the Healthcare Sector

The process starts with the devices which securely communicate with the IoT platform integrating the data from many devices and applying analytics to share the most valuable data with applications that address industry specific needs.

It is the common IoT platform that brings this diverse information together and provides the common language for the devices and apps to communicate with each other. Communication of this critical IoT information is then sent through the common platform to the healthcare stakeholder group in real time keeping them informed and up to date on all relevant discharged patient data.

ZURI IS THAT PLATFORM

IoT devices can gather and share information directly with each other and the cloud, making it possible to collect, record and analyse new data streams faster and more accurately

The more common use cases in Healthcare involve people, consumers, clinicians and care givers. The ability to connect consumers and patients and effect their behaviour will encourage them to make healthier decisions which in turn will lead to better outcomes and lower healthcare costs. Monitoring patient's vital signs and activities and thus holding them accountable for their healthcare decisions will help further drive compliance and therapeutic regiments.

By collecting data from bedside devices, viewing patient information and diagnosing in real-time, the entire system of patient care through Zuri can be significantly improved, not to mention the patient experience.

Our Vision for Zuri:

Zuri aims to securely manage all patient records and patient data and correlate it with medical data that derives from IoT devices. This data, combined with Zuri's machine learning and analytical platform, is correlated to provide the carer, doctor and medical professional with meaningful, insightful and practical information that is used when making medical and lifestyle decisions.

We aim to be a platform that incorporates the sequencing of patient DNA so custom healthcare can be applied as well as an extension of the care provider so that patients are consistently monitored for optimal results.

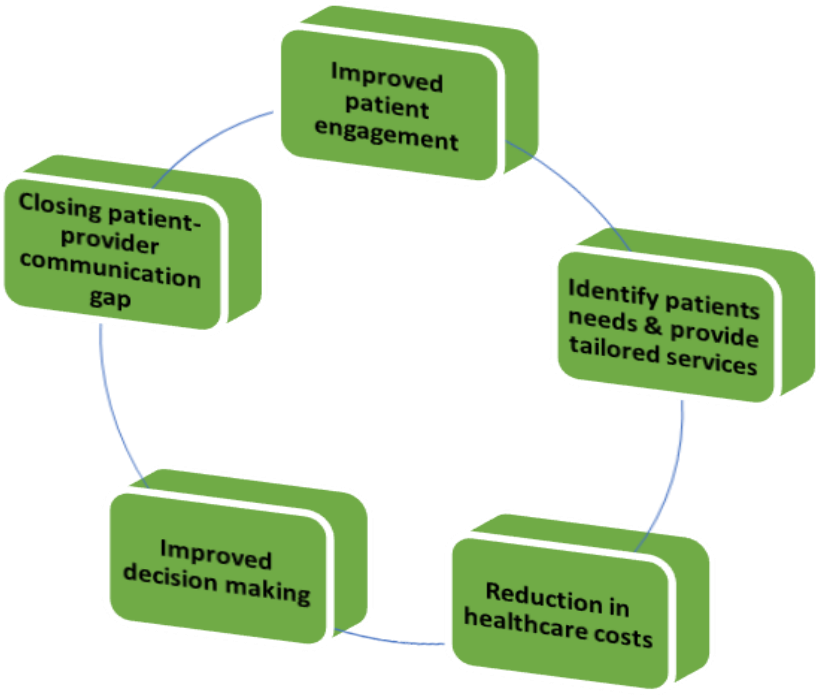
IDENTIFYING THE OPPORTUNITIES

6. A FULLY INTEGRATED IOT CARE MANAGEMENT SYSTEM FROM ZURI

Zuri is a mobile & desktop, web-based care management solution developed by Care Software Solutions which was developed to replace the paper based care file in a multitude of environments such as the client's home, the care home, the residential home and community based clinics that provide outreach nursing and care services.

Zuri offers an exceptional suite of services creating a truly end-to-end care management solution, from Care Planning, Rostering, Time and Attendance, HR and Recruitment, through to medication management (eMAR) as well as facilitating billing and payroll. All client data is securely managed and saved in the cloud for added peace of mind.

Recognising the benefits of a linked up system, coupled with the demands placed on Councils and Community & Primary Healthcare systems, ***Zuri*** engaged the IoT market seeking solutions to these challenges. Proudly, after considerable research and testing, Care Software Solutions has launched it's integrated IoT offering into ***Zuri's*** full-service offering. From wearable technology to advanced sensory based technology, ***Zuri*** has now enabled, through their tablet technology, discharged patients placed in community care to be monitored for their vital signs from weight, blood pressure, temperature, motion sensor, location, sleeping habits, food consumption and medicine intake.



7. ZURI –THE FUTURE OF IOT IN CARE MANAGEMENT

By incorporating ***Zuri's*** IoT service as part of their offering, City Council's will be providing family members the ultimate peace of mind that their loved ones are not only being cared for by their carers using the latest, market leading care management software, but their daily care and medication needs and activities are being monitored by cutting edge, innovative IoT wearable & sensory technology.

If Mom or Dad wish to leave the house for a short stroll in the park, the sensory device, linked to ***Zuri's*** advanced messaging and alert communication system, will record when they leave the house and when they return for safeguarding and peace of mind. Everything from medication administration to eating, personal care and sleep habits can be monitored and analysed for improved care service offering.

Care agency and care home owners can take advantage of this technology to optimise the care service they offer to their clients by being

informed of all their clients activities in a virtual environment and can allocate care workers more efficiently based on carefully analysed human behaviour rather than rigid and parametrised time slots.

Equally, IoT offered by ***Zuri*** is a significant differentiator to the care sector and will provide all ***Zuri*** customers with an all-important competitive edge as the advantages and benefits of utilising Zuri IoT technology will put customers ahead of their competition from a serviceability and cost saving perspective.

From patient heart monitors to temperature gauges, this real-time data already exists in healthcare and now it can be used to create a safer and more effective environment. Through a single application, like ***Zuri*** on a mobile device, patients and staff can secure and manage IoT data. Healthcare analytics encompasses the technologies and skills used to deliver business, clinical and programmatic insights into the complex interdependencies that drive medical outcomes, costs and oversight. Healthcare analytics harnesses multiple data sources including clinical patient data to deliver patient driven outcomes. The adoption of ***Zuri*** IoT networks, data collection and the analytics of that data are accelerating the transformation of the Healthcare industry.

IoT will become mainstream in healthcare in 2020 and beyond. Across the globe there is an evolving focus on improving the health of the population and controlling spiralling healthcare costs. A stronger focus on consumer engagement and an innovative approach to integrated IoT-based healthcare, means your new care delivery models is driving the adoption of connected health technologies.

8. Some considerations for UK City Council's adopting IoT

Because many healthcare devices today operate in data silo's, with over a third of healthcare organisations not applying the data collected from these connected devices to other business processes, inefficiency arises as well as the potential for data loss and mistakes in diagnosis.

By 2019, 87% of all healthcare organisations would have implemented IoT technology. 50 billion devices are expected to be connected by 2020, and by 2025 the global IoT market (not just healthcare) is expected to be valued at £60 Billion. This shows huge growth, and shows us the expectation is that IoT devices will have low individual price points, which may be a further driver for growth.

Over 50% of devices on healthcare networks in the next 2 years will be IoT devices from hand held devices to health records to medical equipment, the industry is embracing the world of connected things.

For care givers, the ability to easily monitor and manage patient health could save precious minutes every day and without having to manually visit each patient every day, the experts can give a remote diagnosis and track medical assets providing quality care more quickly and managing the healthcare environment more efficiently.

9. The Cost Saving Advantage of Adopting Zuri

Medication monitoring, missed doses and omissions are acted upon sooner as the alerts come through Zuri in real time, thereby improving safety and medication compliance. With pharmacy integration at GP and community level, medication compliance will improve even further, saving both time and money by reducing the risks involved in medication administration.

With IoT sensors and medication reminders, people are prompted to take their medication without the need of a care giver, but still allowing the client to be monitored while continuing to lead independent lives at home for longer.

Being able to allocate the right and appropriate staff to deliver the right care and the right time improves reaction and response time and minimises risk.

- Care Managers can update care plans and assessment remotely, reducing traveling and redundant time spent in the car
- Zuri's messaging system allows HCA's to communicate with Care managers and other HCA's ensuring more efficient and transparent exchange of information
- Zuri provides staff and organisation calendars for appointments and visits for example around catheter changes and dressings
- Staff punctuality dashboards – showing % of work completed and all outstanding entries
- Improved accuracy through Zuri with real time reporting and up to the minute care status
- Using Zuri enables more efficient use of care staff's time saving money

	With Zuri	Without Zuri
Per day	30 minutes	**95 minutes**
Per week	3,5 hours	**11,08 hours**
Per month	15 hours	**55.41 hours**

- The above based on 800 care hours delivered per week

Using sensors and wifi, creates the ability to locate the right department in a hospital whilst retrieving essential information, becoming very relevant for both care givers and patients.

Nearly three quarters of healthcare leaders who have adopted IoT believe its key benefit will be to monitor and control medical devices and sensors.

IoT means an easier and more efficient patient care experience allowing staff to do their jobs better, which is why 76% of healthcare leaders predict it is going to transform their industry.

As City Councils and healthcare organisations get ready for IoT they should consider the following recommendations:

- **Transform business and clinical processes** – IoT projects provide an excellent opportunity to think through and then design the entire process of how the consumer product or service experience can be improved

- **Leverage the convergence of passive sensors**, mobile and social technologies. Sensors are becoming increasingly smaller and less intrusive making it possible to embed them in everyday items such as clothing or wearable patches thus improving ease of use

- **Exploit big data and analytics** to derive insights from the data tsunami as analytics will turn data into information that should be presented at the point of decision making so that the patient in question takes the correct action based on the best available insights.

- **Change behaviour and improve the customer experience** – align incentives, especially financial incentives by using insights gathered from information collected by IoT devices to transform behaviour. Be sure to educate consumers and care givers as well as IoT aligned business staff about the benefits of IoT and connected health technologies.

10. ADDITIONAL REFERENCES

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