

## PATIENT 360 AND TELEHEALTH

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Telehealth has been a subject of interest since the 1990's. It took a global pandemic like COVID-19 to accelerate its adoption overnight. Today, telehealth is being widely adopted in multiple specialties ranging from general medicine, dermatology, gynecology to mental health.

By all indications, telehealth is here to stay beyond COVID. Patients find many aspects of remote care appealing, finding answers online, follow up treatments, consultation, diagnostics, delivery of medicines, and especially home monitoring. The convenience of cutting out the travel, ease of appointment availability, and time saving is an allure that goes beyond COVID risks.



The timing is in many ways coinciding with the overall digitization of commerce (eCommerce), which already laid the foundation of remote sensing over time by means of mobile computing, IoT, cloud computing, and AI. Patients easily jump on digital services that connect their care journey using the same channels they are already used to.

With the ever increasing consumer demand for personalization and immersive experiences, the patients are also embracing the finicky purchasing habits of any buying population. As the saying goes “The best experience we get anywhere becomes the experience we expect everywhere”.

### IMMERSIVE EXPERIENCE

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The concept of Experience Economy was promoted by authors Pine and Gilmore as early as 1999. In today's climate, no brand can afford to remain agnostic to its principles. A patient centric provider system can improve the overall treatment experience, which directly leads to a greater degree of trust and affects clinical outcome.



Many of the experiential devices and gamification concepts have found their way into patient interactions. VR headset based devices are being used for upper extremity rehabilitation and motor cognitive exercises. Patients can try various exercises to improve range and smoothness of motion. There are Virtual treatment room products providing cognitive training games, and generating personal health data through precision measurements of processing speed, attention and decision making.

Improvement of the patient experience goes far beyond gamification. It includes ease of booking appointments, interactions with customer service, prescription drug refill, tracking insurance claims and even paying bills. With the right information, a customer support

person can quickly and fully assess the patient's situation and needs. Besides consultation with doctors, all secondary functions from marketing to finance can now be personalized and consistent throughout the care journey.

## TELEHEALTH LEADS TO A CONTINUUM OF CARE

Telehealth technology creates a continuum of care which benefits patients with disability challenges who often fall through the cracks of the traditional delivery system. An elderly patient with multiple conditions like chronic heart failure, diabetes mellitus, kidney failure, osteoarthritis and depression may find it hard to visit her PCP regularly. Her doctor has no other means of finding out about her recent hospitalization. The patient's isolation only exacerbates her hypertension, depression and diabetes.



With telehealth connectivity, the provider network can exchange discharge care plans. Her PCP would be kept informed of her treatment and pharmaceutical history, and can simply monitor her condition at home, and identify emerging issues right away. Home care nurses can coordinate with the PCP, schedule meals on wheels, and set up transportation for clinical visits. Telehealth supports immediacy in response, and ensures consistency in care across acute and ambulatory settings.

## PATIENT 360 VIEW

Central to a complete digital transformation of care is the patient 360 view concept. Today the patient journey remains for the most part highly disconnected with critical care information residing in disparate systems. As the patient travels from PCP, to lab, urgent care, hospital, to specialist, to therapist, no one has the complete and current medical data to treat that person properly. Uncertainty, duplicate procedures, and potential mis-procedures creep into the patient journey.

## THE STATISTICS ARE ALARMING.

Only 59% of hospitals notify the PCP in an emergency room encounter.

95% of clinicians agree on the importance of care collaboration for reducing readmission, yet only 25% actually consult with colleagues.

Faulty handoff between providers accounts for 20% of malpractice claims.

Miscommunications during care transition results in 80% of serious medical errors.

Cloud based integration can consolidate information from EHR, clinical notes, claims data, wearables, family history, genomics and even social determinants. Patients, providers, caregivers alike should have easy access to the necessary information at the point of care. A true team based healthcare is not possible without such interoperability.



Non traditional health data, such as social determinants are increasingly coming into focus. Factors like food security status, housing stability, access to transportation all contribute to a patient's ability to stay out of the hospital and lead a healthier life.

Consolidating across these information silos requires solid skills in data integration, a team experienced in standardization of API and web services implementations. Attention must be paid to the various levels of access privilege in compliance with HIPPA and other

regulations. Oftentimes, data quality, canonical schema, master data management all get worked into one rigorous architecture, addressing specific requirements of all stakeholders and ensure longevity of the system post deployment.

The diversity in clinical communication technologies in today's healthcare landscape has not always helped clinicians do their jobs. Incompatible mechanisms and lack of secure communication remain obstacles to collaborations with a network. A coherent data exchange architecture must be reinforced by experienced data and communication professionals.

## ADVANCED ANALYTICS

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Once patient data is consolidated and accessible in a central repository, we are closer to the ideal of a data driven healthcare system. Artificial intelligence holds the promise of accurate diagnosis, health risk prediction, and prescriptive medicine such as recommendation of correct treatments.

A study of risk factors may identify diabetic patients who are more likely to be hospitalized based on age, gender, ethnicity, income group, co-existing conditions, medical adherence and past patterns of care. AI can find additional patient cohorts within a population by analyzing known conditions, medication, and personal history of existing patients. There are also clustering techniques which can be applied to EMR data to identify clinical pathways that result in the best outcome.

In the bigger picture, predictive analytics can tell if a patient is likely to miss an appointment due to a lack of transportation, or difficulties with child care. The coordinator can arrange for a pickup and find locations close to home. In a population study, the network can determine factors like high percentages of families with young children, and therefore increase the number of pediatricians or add pediatric service in the same location the parents will visit.








Telehealth also directly opens up the possibility of automated capture of clinician patient dialogues. After transcription, speeches can be parsed, analyzed with entity recognition, relation extraction, and session summarization, and converted into structured data that fit well into the EHR. A partner equipped with the state of the art Natural Language Processing (NLP) capabilities can create such dedicated solutions for any of the clinical specialties.

## CONCLUSION

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The technologies that led to the rise of telehealth also support a patient centric delivery system which optimizes the patient experience and improves clinical outcome.

There are many technical challenges in bringing about a patient 360 view in an end to end, connected patient journey. The engineering team must be highly skilled in data engineering to consolidate all types of patient data including those from EHR, clinical notes, laboratory systems, imaging repositories, claims and billing systems, pharmaceutical database, nursing home records, and personal data such as genomics, family history, social determinants, and personal preferences. The data integration effort includes consideration of data quality, data dictionary, format conversion, communication and access security, and a scalable architecture that supports both front line operation and also advanced analytics. In parallel, an experienced application development team must deliver the information to both care professionals and patients across all channels, which now includes VR headsets and wearable devices.



BigRio is a specialty consultancy which specializes in product, data engineering and AI. We have a long established practice history in the healthcare and pharmaceutical industry. Our expert engineering team successfully ramped up the operation infrastructure of a prominent telehealth client company during the high traffic demands triggered by the COVID-19 pandemic. In addition, we have delivered cloud computing and predictive analytics projects for numerous global brands across retail, automotive, food packaging, communications, and technology industries.

We are available for an exploratory call to better understand your current platform/ architecture and collaborate on how we can help assist in optimizing your product to deliver the best possible experience for your patients. Please reach out to us at [info@bigrio.io](mailto:info@bigrio.io)