PEERS Participants should feel safe enough to share their experiences, actions and reactions in open forum, their attendance and participation is never mandated, Participants are never compelled or required to share before they are ready.

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A QUALITATIVE EVALUATION OF A 1 YEAR PILOT STUDY OF YOUNG PEOPLE AND PARENTS ACCESSING A MENTAL HEALTH DROP-IN CENTRE IN A PAEDIATRIC HOSPITAL SETTING

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Background Children and young people with long term physical health conditions (LTC) are known to have higher levels of co-morbid mental health problems than medically healthy children. Evidence-based treatments for mental health problems are effective in children who also have an LTC. A drop-in centre in a paediatric hospital, delivering a range of interventions including onward referral, signposting and guided self-help, may be one way to complement existing mental health services as part of a stepped-care approach. The aim of this study was to understand patients' perspectives of the centre.

Methods 128 patients attending a drop-in centre at Great Ormond Street Hospital were invited to participate. Overall, 35 participated in semi-structured interviews (either in person or by phone) exploring their experience of the drop-in centre. Interviews were audio-recorded, transcribed, and analysed using Framework analysis.

Results Overall, participants found the drop-in centre highly acceptable and reported a positive experience. Reasons for this varied, but broadly focused around four areas: (1) Choice in how to access the intervention and feeling empowered afterwards; (2) Having someone to talk to who could provide them with practical support; (3) Integration and parity of physical and mental health care; (4) The intervention being sufficient to meet their needs and quick to access.

Discussion Participants found the intervention feasible and acceptable. A drop-in centre in a paediatric hospital appears to be a positive and valued adjunct to supplement existing mental health services at GOSH.

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FHIR-ENABLED HOLOGRAPHIC MODELS FROM IMAGING STUDIES: HOLOREPOSITORY 2020

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Introduction Advancements in Augmented Reality technologies allow for the generation of three-dimensional (3D) models of anatomical structures from MRI or CT scans. We present the HoloRepository 2020 Proof of Concept as an open source FHIR-enabled research demonstrator using openly available imaging data.

Method We used the latest Machine Learning (ML) algorithms in the field for organ segmentation with a supporting

structure for future ML algorithm revisions. The Cancer Imaging Archive was used for testing and integration, providing over 30 million radiology images for over 70 different anatomical structures. With this, a model training process that will allow hospitals and clinical groups to build out organ segmentation models on their own DICOM sets is anticipated.

Results This new version has 3 main editions: the Cloud HoloRepository 2020 (CH20), Intel NUC optimized HoloRepository 2020 (NH20), and HoloRepository 2020 Viewer (H20V). These facilitate new components such as an organ segmentation library, enhanced augmented reality experiences through cameras and multi-monitor displays, and a synthetic medical imaging data platform. CT and MRI DICOM scans of the brain, lungs, chest, abdomen and kidneys are rendered as a 3D view using a pre-trained model and the latest techniques for organ segmentation. A step-by-step guide on how to carry out the implementation procedure from research to deployment is laid out, enabling easy integration of newly available segmentation algorithms and methods. HoloRegistration enables simplified over-the-body tracking of the holographic views, achieving an Augmented Reality clinical education experience.

Conclusion The viewer and Intel NUC application allows for HoloRepository to be run on a local laptop or workstation, providing easier and faster access. Optimisations from this study have reduced generation times from 30 seconds to 3 seconds and cloud hosting costs by 66%. Future research into volumetric measurements and 2D cross-sectional tracking may aid diagnostics and assist navigation during surgery.

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AUGMENTED REALITY CLIPBOARD: A SMART, SECURE AND INTERACTIVE ALTERNATIVE FOR PATIENT OBSERVATION CHARTING

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Introduction In a hospital, a patient may traditionally have observations and personal data displayed on a paper clipboard next to their bed. Not only does this raise privacy concerns, as data can be viewed by anyone approaching the bed, but it also needs to be manually updated when there is a change. A handheld mobile Augmented Reality (AR) application allows the clinician to view data as superimposed on a real-life clipboard, fetching and updating this information in real time. The AR application draws the clinician away from the screen and back into the 'real world', human interaction with the patient, providing a seamless, unobtrusive way for them to interact with patient data.

Method As part of a collaboration between GOSH and UCL computer science through the industry exchange network (IXN), we developed a prototype mobile AR application for viewing patient data on an AR clipboard. The application was developed using Unity game engine and the AR foundation package for cross platform development with iOS and Android. The application pulled synthetic patient data for display, in the FHIR standard format, from the FHIR API.

Results The mobile AR application responds to a trigger image on a clipboard and displays patient information in real time, tracking the clipboard in space, so the information appears superimposed onto the object. The application offers the option to search and display patient data by patient ID

number. Further search functions are proposed, such as searching and displaying by name or hospital number.

Conclusion A proof of principle system for an AR patient data clipboard was developed to connect with the FHIR database and fetch patient information for use by clinicians in a hospital environment. Further work on this system could enable the application to connect with IoT medical devices to pull patient observations in real time.

43 CONSULTING VIRTUALLY WITH EASE: FHIR-ENABLED COMMUNICATIONS CHANNELS

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Introduction The COVID-19 pandemic has accelerated the uptake and adoption of virtual consultations by healthcare professionals, seeking to provide care at a distance. Standards are needed to promote a common understanding of systems, tailor-made and integrated to clinical workflows. To solve this, Health Level Seven International (HL7) have created Fast Healthcare Interoperability Resources (FHIR), a standard data exchange framework that is structured, standardised and human-readable aiming towards universal interoperability. Here, we present FHIR-enabled communication channels between patients and healthcare professionals. This Proof of Principle prototype was developed as part of a Hackathon between UCL Computer Science and Great Ormond Street DRIVE centre.

Methods Building in Python and using a synthetically generated database of patient details, we created an Application Programming Interface (API) that uses patient identifiable details in FHIR to generate unique links to Skype, then connected to the client side using Django; a Python web framework. This was developed with the capability for group calls, anticipating its application for multidisciplinary meetings and group therapy sessions for patients.

Results The resulting web application was successfully demonstrated in a testing environment with up to 500 mock patients through the FHIR API. It intends to streamline the process for initiating virtual consultations, enabling healthcare professionals to filter and select patient lists, and commence a group call over a virtual platform like Skype or Teams with a click of a button.

Conclusion The lack of interoperability between virtual platforms and the existing electronic health records (EHRs) is one challenge presented by new ways of working. Similar studies have shown that time spent logging into systems can be reduced by 75% introducing a single-system login. Likewise, we believe that FHIR-based web applications can facilitate group therapy sessions and team-based meetings in a remote and safe environment, whilst retaining a centralised health record.

44 INTERNET OF HEALTHCARE THINGS (IOHT) HANDHELD DEVICE FOR SECURE PATIENT DATA RETRIEVAL

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10.1136/archdischild-2020-gosh.44

Introduction Fast Healthcare Interoperability Resources (FHIR), is a common tool to make it easier to read, write, and transfer medical data. Internet of healthcare things, IoHT, is a system of interrelated computing devices which are commonly used to record data about a patient, such as an ingestible sensor, which is then transmitted using FHIR over the internet. Traditionally such data is viewed as a patient care record on a computer. Here a device was developed to allow this data to be viewed in real time with a small handheld device as a faster and more convenient alternative.

Method To be faster than a digital clinical system the device uses radio-frequency identification (RFID) where each patient is provided with a small tag containing their patient number, such as a bracelet. This allows the device to only need to be near a patient to identify them. FHIR-Parser is a library to simplify the development of Python applications using FHIR, it was developed in parallel with the device to allow anyone to start building on FHIR data using familiar object-oriented programming techniques. The device was built using standard off the-shelf components and the Arduino computing platform.

Results A prototype of the device was built using an Arduino Mega, RFID-RC522, LCD Keypad Shield (2 × 16 character display with 5 inputs), and a 50 mm by 100 mm 3D printed box. It connected over serial to a python application connected to a FHIR endpoint, successfully retrieving patient information from an id encoded RFID tag.

Conclusion Devices, such as the one demonstrated, can be miniaturised and used to display timely key care record information paperless, without the delays of a clinical information system, from an array of IoHT devices. Showing information at opportune times ensures information remains private and relevant allowing patients to receive better and more personalised care.

45 PREDICTING LONG LENGTH OF STAY IN A PAEDIATRIC INTENSIVE CARE UNIT USING MACHINE LEARNING

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Introduction Length of stay (LOS) prediction modelling in intensive care units is a valuable capacity planning tool as hospitals attempt to clear the backlog of surgical patients resulting from the COVID-19 pandemic. Recent work in adults has demonstrated the benefits of using machine learning over statistical methods for LOS prediction, however machine learning approaches have not been applied to paediatric populations.

Objectives The study set out to develop machine learning models to predict long LOS in the paediatric intensive care unit at Great Ormond Street Hospital using electronic patient records.

Methods Paediatric intensive care patients between 1st May 2019 and 30th April 2020 were extracted from electronic patient records. Random forest, XGBoost, and multilayer perceptron models were built to predict LOS greater than three or seven days. The dataset contained demographics, ventilation data, and summary statistics of physiological time-series data, taken from the first twelve hours of admission. The