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Hospital Services Limited

How Video Is Proving Its Value in Healthcare



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A White Paper from HSL Telehealth

Synopsis

This paper addresses why video is a valuable component in delivering healthcare, a potential that is already being realised. It covers the challenges facing the health authorities and establishments whether financial, resource-based or demand-based and shows how video, properly implemented, can contribute in providing more efficient and effective solutions, finishing with a number of examples where it has proved this assertion.

Much of the research for this paper was undertaken before the full impact of the COVID pandemic has become apparent, but this can only exacerbate the situation faced by the healthcare industry.

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Introduction

The financial and operational pressures on the NHS are driving the development of new methods of delivering medical care and treatment under the generic title of Telehealth. This paper addresses the role video can have in delivering this. It can make a serious and long-lasting contribution to solving problems faced by the NHS, not just as a means of connecting clinician and patient, but also in provisioning medical services.

Video in healthcare is not new; it has for some time supported administrative functions by providing facilities for remote meetings. However, as more reliable, secure, and user-friendly video systems and services, and ICT and medical technology developments become available, more widespread deployment in healthcare applications has become possible.

Video can now be a vital weapon in the NHS armoury. It has the capability to replicate the traditional face-to-face, interactive consultation between a clinician or clinicians, and a patient or patients and their family/carer, but without any or all of the participants having to travel; and, crucially, is fully supported by the incorporation of relevant clinical data into the session.

It is important to understand that embracing video solutions is not about eliminating all physical, face-to-face contact; some, though, can be eliminated without detriment to the medical process. Video is about making better use of scarce resources by, for example, more timely interventions and better utilisation of staff time. Each scenario must be clinically led and only clinicians can deem what is acceptable for the patient based on their own expertise and the needs and confidence of the patient. Judging these will result from pilots and on-boarding. It is an evolution not a revolution – the uptake and use of teleconsultation, telediagnosis and telemedicine will evolve over several decades in line with the evolution of ICT technology, services, and medical practice.

It is more than just gathering data and information, important though these are; and it is definitely not for offering paid-for cures over the internet.



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A Developing Trend

With the exception of administrative support, video has already been used in a number of specialist medical applications, with most of these being internally deployed within the NHS.

One of the first departments to adopt video were cancer networks. This included Multi-Disciplinary Teams (MDTs) consisting of diverse groups of clinical and social care staff from oncologists, pathologists and radiologists through to post-discharge support, palliative care and bereavement support all of whom benefited from the use of video.

However, participants still have to congregate in meeting rooms to view the relevant patient information, such as x-rays and scans, accessed from separate systems in the individual clinics or hospitals.

Advances in cloud-based communications allow for easier collaboration and access to real-time patient information. The latest iteration, therefore, deploys a video network from which all the features, facilities and applications held by the network can be accessed by and from any compliant device - a medical professional's or medical . This means no more large meeting rooms with associated equipment as everything can be viewed by authorised individuals from their PC, laptop, tablet or mobile at the required quality for medical images.

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Demanding Times

The potential value of video can be deduced by the fact that hardly a day goes by without another report detailing the pressures and constraints faced by the NHS, the most important being:



Demographic Changes



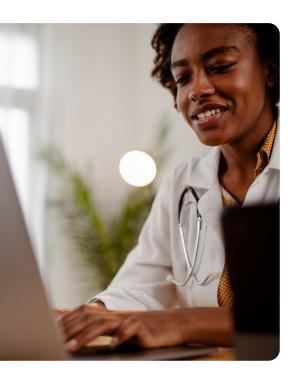
Emerging Medical Conditions



Funding

This is a trend being driven by the Coronavirus pandemic which is dominating existing resources to the detriment of ongoing patient care and treatment. The statistics quoted in this paper do not reflect the situation created by the pandemic, but many of these challenges to the NHS are likely to continue post-pandemic, creating a need for the continued use of Telehealth.









The King's Fund analysis of data over 13 years from 2003 reveals that hospital admissions have increased from 810,000 to 1.5 million representing an annual increase of 4.3%.

Over the same period the outpatient category rose by 62% to 5.8 million.



Of these, subsequent attendances (i.e. follow-ups) grew by 34.8%, a figure that could be considerably reduced by employing video sessions. Pexip's seamlessley interated offering is both platform agnostic and highly secure, instead of face-toface contact.



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At the Doctor's

The pressure is similar in GP surgeries. According to the BMA, 18m patients in the UK are estimated to suffer from a chronic condition, the majority of whom are managed in the community by GPs. Around 53% of all patients in England claim to have long-standing health conditions, many of whom will see a GP at some stage.



By 2014 the BMA estimated there were 340m GP consultations per year, up by 40m from 2008, and the average member of the public sees a GP six times per year, double the number of visits from the previous decade.



It is a UK-wide problem. In Scotland according to National Services Scotland, the number of patients registered with GP practices increased by 5% in the ten years to 2019 to 5,370m.

In Wales in 2018/19 there were over 1m 'Finished Consultant Episodes', 26.7% were day cases: how many of those could have been by video?

Why has demand increased?



An obvious explanation is the UK's ageing population with complex medical conditions. Over the period 2003-2014, the number of people over 85 increased by nearly 40%: yet that does not necessarily explain the total rise in demand. The overall population has increased, but more importantly the NHS has seen the emergence and growth in medical conditions that were not especially noticeable until recently.

Diabetes is an example where demand has grown. According to Diabetes UK, the number of people suffering from the condition increased by nearly 60% in the ten years from 2004, with more younger people affected by it. By 2016 the NHS was spending £25,000 every minute on treating it.

Other factors are also impacting on healthcare in this country. New drugs and treatment emerge regularly, evidenced by the announcement of greater usage of the thrombectomy procedure for stroke suffers, a decision one newspaper called a 'gamechanger'. There can be no criticism of such developments, but they place extra burdens on the NHS finances.



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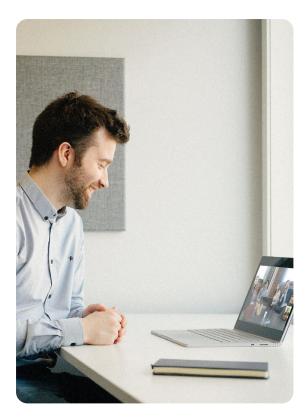




Counting the Cost

Meeting all these demands entails an enormous budget - £120.151bn by 2019/2020 in England alone. Despite this, the NHS still incurs deficits - £1.851bn in 2015/16. Squaring this situation has to involve new approaches to delivering care and treatment. Telehealth's major contribution is to reduce the number of visits to medical establishments. As the King's Fund states: "A high priority for many STPs (Sustainability and Transformation Plans) is to redesign services in the community to moderate demand for hospital care."

The experience to date with HSL's Pexip-powered Telehealth offering has already shown that it can be a major contributor to achieving this objective without affecting the clinical quality. Indeed by benefitting clinicians and patients, it can be argued that Telehealth actually enhances quality. Clinicians' time and skills are better deployed on more serious cases rather than routine ones while the full range of medical staff can be better utilised.



The patient enjoys the peace-of-mind of being in regular contact with medical help and advice with the knowledge that emergencies can be handled quickly and professionally. They also avoid the time, cost and inconvenience involved in travel to and from a hospital or surgery. In Northern Ireland's Western Health and Social Care Trust, 30% of all outpatient visits are expected to move to virtual appointments in the next year.

Video Implementation

The building blocks for the successful implementation of telehealth are already in place. Hardware including videoconferencing systems, PCs laptops, smartphones and tablets are available and affordable while industry protocols such as WebRTC, H323, Teams and SIP offer the connectivity to link these together.

At its core could be a cloud-based conferencing and collaboration service encompassing all that is available in relevant software, hardware communications and medical technology. By presenting a simple, customised set of services and applications to the user it would enable, facilitate and support a wide range of clinical disciplines.



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The architecture of the service is such that it inherently supports customisation, policy definition and application on a user by user, team by team and organisation by organisation basis. It is this architecture that makes the application of the technology ready for use in healthcare as well as the criminal justice system and other knowledge based industries.

These are the four layers in its development. The software can be deployed into many instances, so a medical establishment could procure the software and deploy the service as an internal facility. More importantly, as a cloud service, the software enables multi-tenancy use of shared resource to deliver unique, customised video and collaboration enabled applications to many hundreds of thousands of organisations and subscribers.Each instance of the software should be able to support many different types of organisation.



Policy servers ensure isolation between each organisation so that sessions between organisations can only be established when approved by both organisations. Similarly, within an organisation, policies and processes can be applied to different teams, groups and even individuals. The result is a platform that can be customised and personalised to the extent that each user has the ability to schedule, create, manage and run all of their conferencing and collaboration applications from any suitable device with intranet/internet connectivity.

Services and applications that can be run on such a platform are almost limitless. The support of international standards as well as leading industry protocols can integrate communications and collaboration services from all devices and embed these within customised applications.

The following interfaces are supported on the service and available for use within applications:

- WebRTC support for all major browsers
- 🗸 Microsoft Teams

✓ H.323✓ Pexip Meetings

Cisco Spark

SIP

🗸 Zoom

Polycom RealPresence

The support for WebRTC is the most important aspect as in itself it can provide universal, ubiquitous integration with applications running in all operating systems and devices.



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Healthcare Drivers

One of the benefits of the applications and underlying service is to enable the expansion and scaling of telehealth initiatives that invariably start as localised pilots and projects and to make these national and ultimately international services. Key aspects of this include:



A focus on patient-centred care underpinned by collaboration-based clinical care teams.



A transformation in the way care and wellness is made accessible to the public; on-demand care delivered and enabled by technology, compared to the traditional appointment or emergency driven demand that exists today in the UK and many other countries.



Reaching patients at home, in community locations and even at their place of work.

A fundamental shift from treating the sick to supporting and promoting

Extending the scope for people to

locations, e.g. having an account with

"Positive Mind Works" in New Zealand

access healthcare from remote

for a UK based patient/client.

wellness.



Ability to cope with sudden, unplanned demand such as COVID.

Remote access to specialist

empowered by technology.

distributed teams, enabled and

The demand for these applications in the UK's health service is maturing and the summary of applications supported on this platform shows the opportunity to engage now and scale the use of these nationally and then internationally.





Significantly improved the timeliness and ease of connecting with patients.





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Existing Applications Deliverable on Such a Service Include:

- Paediatric Cardiology, hospital and home
 Cancer care, hospital and community
 Neurological care, hospital and home
 Tele-education, hospital and community
 Tissue viability, home and community
 Teleswallowing, home to consultant
 Mental health
- Diabetes care in the home from the hospital (according to Diabetes UK there are an estimated 4.7 million people living with diabetes across the country)
- Stroke care in the hospital, in the home and in the community
- Neo-natal intensive care either between hospitals or between home and hospital
- Teleradiology, hospital and home
- 🗸 Renal care, hospital and home
- Speech & Language Therapy, home & clinic
- Coronary care consultations at home

This means that many possible permutations for delivering telemedicine are available between hospitals, health centres, care homes, GP practices, specialist centres and patients' homes.

Crucial to the adoption of telehealth is integration with the health services' existing Patient Administration Systems (PAS); with Electronic Patient Records (PR) and telehealth-enabled medical devices. This will mean that the workflow for virtual consultations is identical to that of in-hospital or GP-based consultations, and that the technology it delivers is invisible to both clinicians and patients. Data emanating from the session is uploaded to the patient and hospital databases during the consultation.

Further advances in telehealth could be made by the combination of Artificial Intelligence (AI), and smartphones and tablets. Common enough in many homes, these items could be used via a range of clinically-approved API's to record clinical data, this would then be transmitted via the domestic wi-fi to a secure network for onward transmission to a medical establishment.

This would provide accurate and up-to-date triage information to be integrated into the patient's EPR and the hospital's PAS and to allow consultants or other medical practitioners to make informed decisions about the urgency of each case. Potential applications could include blood pressure readings, and remote monitoring of cardiovascular and respiratory conditions.

Video In Action The deployment of video in healthcare grows apace and the second part of this White Paper describes applications where it is being used successfully to improve outcomes for both clinicians and patients.



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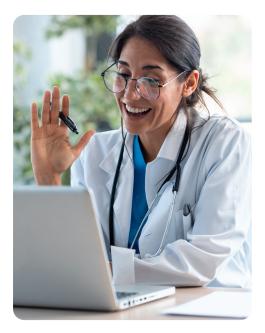


The Fundamentals

There are two types of video usage in healthcare, namely scheduled events and ad hoc events. A scheduled event is managed by the regular administrative staff in the hospital. They will make a regular appointment using the existing hospital booking system; this information is then passed to the service which then creates a secure, one-time use, scheduled Pexip-powered session/event that enables the patient and only the patient to connect to their consultation with clinical and support staff. When the appointment is due, the application alerts the patient, who can then connect into the telehealth session by clicking a confirmation button. In some instances the session will auto start with no intervention required by the patient.

An unscheduled or ad hoc event is when a patient feels that they need to be seen or examined immediately. To activate this, the patient selects a button in the application and depending on the patient group or specific needs of the individual patient; a series of activities is instigated by the Platform. For example, the healthcare provider could offer a video enabled triage service and the patient could automatically connect to this. More likely, the patient will need to be seen by the clinicians who are directly responsible for their care. In this case a series of specific alerts are programmed into the Platform to inform the clinicians that a patient is waiting to be seen. The patient will then be seen by the first available suitable clinician

These processes are customised on a patient by patient basis or standardised for a particular patient group.



On-boarding

For most patient groups there should an "on-boarding" activity. This deals with both the technical and legislative aspects of video usage. The technical involves getting the application loaded onto the patient's computer/ phone/tablet and tested, with the user being assisted through their first telehealth session. The legislative deals with patient consent, risk awareness and management, pseudonymisation of patient information to allow connections from the public network, and agreeing the administrative process with the patient.

Once this is complete the clinicians and patients can consult and provide care as needed by the individual patient.



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Case 1 Diabetes Care

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Case 1 – Diabetes Care

Diabetes is one of the major challenges facing the NHS in the UK and other health services across Europe. This application enables a telehealth session between patients from their homes and clinical staff in Altnagelvin Hospital and the South West Acute Hospital, both in Northern Ireland, who are responsible for the care programme for the patients.

The diabetes service in the Western Trust is being overseen by Diabetes UK who will evaluate and endorse the application and methodology for national roll out to other NHS Trusts.



The Western Health and Social Care Trust's Gestational Diabetes Pathway at Altnagelvin Area Hospital in Derry Londonderry has pioneered the organisation of remote consultations via Pexip for pregnant women suffering from Gestational Diabetes. The team redesigned their diabetes antenatal service through the roll-out of a simplified video communications system based on the video network implemented by HSL Telehealth.

Led internally by Dr Athinyaa Thiraviaraj, Consultant Physician in Diabetes & Endocrinology, the team have been named as recipients of a prestigious British Medical Journal Award in the category of Innovation in Quality Improvement, being commended for their display of adaptability and innovative thinking to preserve a high level of patient care at a worry-filled time for expectant mothers. Pregnant women with gestational diabetes can expect to attend up to 13 extra appointments during their pregnancy.

The Trust's team, which includes specialists in diabetes and obstetrics as well as specialist diabetes nurses and dieticians, needs to interact closely with their patients to ensure accurate and comprehensive diagnostics and treatment. The partnership between HSL and the Western Trust has seen Pexip's state-of-the-art video appointment solution embedded into HSL's network to enable the team to deliver daily patient care, helping to maintain and improve patient contact despite limited access due to Covid-19.

By using standard technology and integrating with the hospital's existing PAS and EPR systems, the service becomes part of existing healthcare workflow. Updated in real-time the PAS contains full details of all patient appointments for the current day and for the future. This is no different from established ways of working; just two additional icons appear on clinicians' screens.



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Case 1 - Diabetes Care

These will show what form the appointment will take whether face-to-face, by phone, or by video. Patients are notified by SMS or e-mail alerts and then the clinician, by clicking on the video icon, initiates the remote and secure outpatient consultations using a normal webcam, while patients access the sessions via a smartphone, tablet, laptop or PC.

The call is generated by the software in HSL's network which offers a complete, secure communications platform for healthcare establishments, providing virtual meeting rooms, gateway services, and web applications. Full, constant monitoring and support is guaranteed and the HSL solution is compliant with the network security standards adopted by the NHS and the UK government. On completion of the consultation, the clinician closes the video window, completes an associated outcome form, or writes up the notes in the relevant EPR before moving to the next patient.

Using the system the clinicians at the Western Trust have carried out over 1,000 consultations (as of Nov 2020) via the integrated interface in order to better meet patient needs and gain a more holistic view of the patient's overall condition whilst also keeping patient communications open during a period of time which has seen reduced opportunities for in-person appointments. As a result there have been 31% fewer diabetes and 23% fewer obstetric hospital appointments.

Commenting on the success of the telehealth solution for answering patients' needs, Dr Athinyaa Thiraviaraj said, "Working in partnership with women who attend our service, we have been able to develop, test, and standardise video-consultations. This has helped our service to continue with minimal interruptions through both the first and second surge of the pandemic.

This innovative model of care has made it possible for us to continue our commitment to support expectant mothers at a time of anxiety and concern."



"The video calls have enabled us to maintain a high level of patient care," Dr Thiraviaraj added. "I can't see our service defaulting to phone clinics. It's just not the same when you are engaging in complex conversations like a healthcare consultation."

15,811 miles of travel saved

Apart from the healthcare benefits the project has seen a significant impact on the environment, saving about 15,811 miles of travel so far: this equates to 4.37 tonnes of CO2.



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Case 2 Next Generation Telehealth Solution for Stroke Care

Case 2 – Next Generation Telehealth Solution for Stroke Care

Two of Northern Ireland's leading consultants responsible for the diagnosis and care of patients presenting at the Region's A&E Departments with suspected stroke reviewed a concept that Hospital Services Limited (HSL) had developed that could transform the diagnosis of this condition. Both of the consultants, Dr Enda Kerr and Dr Michael McCormick of the Belfast Health and Social Care Trust, Royal Victoria Hospital, were enthusiastic and positive stating: "This technology would build on existing processes and has the potential to make a significant contribution to improved patient outcomes after a stroke, especially during late evening and overnight periods.



The solution could transform the diagnosis of this condition and would enable stroke consultants to support their clinical colleagues immediately after a patient presented at A&E, and give them the facilities they needed to undertake a riskfree diagnosis of the extent and nature of the stroke and to provide timely, life-saving interventions."

Once the A&E clinicians have made the initial tests and diagnosis they can make an almost instant referral to the specialist consultant via a specially-designed medical cart with an integral videoconferencing system and connected to the hospital's existing ICT infrastructure. The cart is accessed from an application on a consultant's device with the power and intelligence needed to securely connect the consultant to the patient embedded in HSL's network. Thanks to the flexibility offered by Pexip, the consultants can be either on-site or off-site and be reached via their laptops, tablets or smartphones.

The quality of the video allows them to make accurate diagnoses of the patients based on factors such as speech, behaviour and appearance. To help with this the consultants can take control of the camera in the cart directly from their smartphone or tablet.

Following the review HSL undertook a demonstration in a real working environment; a proof of concept and clinical trials were agreed and work began to convert the concept into a medical grade working and supportable solution to deliver more immediate care for patients across Northern Ireland. As a result, by June 2020, the first installations of the solution had been implemented and embedded within the infrastructure that runs all of the conferencing and collaboration technology for the Health Service in NI and, once proven in Belfast, plans are in place to install the system in all hospitals across Northern Ireland.





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Case 2 – Continued

The innovation in this is the intelligence in the network enables the remote consultants to intervene from a tablet/smartphone or a laptop embedded within the core ICT infrastructure in Health and Social Care Northern Ireland (HSCNI) and presents to the consultant through a simple-to-use app that includes the features and facilities they need to undertake the initial diagnosis of the patient. This assures security, an easy -to- use workflow and the ability to include the results in the patient's electronic care record. Previous solutions ran on external systems, had no integration and relied on dedicated devices and network services to work.



Dr Enda Kerr adds

We were impressed by the simplicity and elegance of the solution. It showed a real understanding of the challenges we faced with remote diagnosis using existing, legacy telestroke solutions. Being able to intervene, support my colleagues and conduct the remote consultation with the patient from my tablet or phone has changed how we work and speeds up diagnosis and time critical treatments.

"Time is of the essence when treating someone who has had a stroke," Dr Kerr stresses. "A staggering 1.9 million neurones are lost every minute during a stroke so literally every minute counts and that can be reversible if the patient can get treatment within the first three to four hours. This technological solution provided by HSL will contribute to better outcomes for many patients as it becomes an integral part of the service we deliver across all of HSCNI".

Dr Enda Kerr



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Case 3 Paediatric Cardiology and Neo-Natal Intensive Care

Case 3 – Paediatric Cardiology and Neo-Natal Intensive Care

This service/application has been developed in conjunction with the Clark Clinic which operates a national service in Northern Ireland from the Belfast Health & Social Care Trust. The programme to develop this form of telehealth has been led by the consultant paediatrician for Northern Ireland, Mr Frank Casey.

Patients in this group are diagnosed during their 22 week foetal scan, a scan which is conducted on the HSL network between Belfast Children's hospital and all other hospitals across Northern Ireland. If a heart condition is seen to be present then a care programme is developed in advance of the birth of the child. Open heart surgery is conducted after the child is born and they spend their first few months in the Intensive Care Unit at Clark Clinic. During this period a telemedicine terminal is installed into the patient's home in preparation for their discharge from the hospital. The terminal is able to show and share vital signs from the baby and daily telehealth sessions are scheduled between the staff in Clark Clinic and the parents and child from their home. The home based terminals remain in situ for up to three years, as long as is deemed necessary by the clinical staff. Staff in Clark Clinic use a dedicated telelink suite for telehealth sessions, and for gathering and recording information from the patients.

Telelinks are scheduled as needed by each patient; however, if a parent detects any adverse change in the child's health they can alert the clinic and establish a telelink within minutes.



The service enables very sick children to spend more time at home with their families, frees up beds in the clinic and importantly avoids unnecessary re-admissions using blue light services thus saving the healthcare provider time, money and resource. In Northern Ireland the service will be extended to other paediatric patients with acute conditions; this will increase the number of service users significantly.

The same group of clinicians in the Belfast Trust also use the service to interconnect Neo-Natal Intensive Care Units, NICU's, across Northern Ireland. In this scenario the Platform handles scheduled and unscheduled events and enables the sharing of medical information from a range of external systems. This enables the experts in Belfast to assist with the diagnosis and care of babies that are born at risk in the District General Hospitals across Northern Ireland, their intervention and support directly impacts the delivery of positive outcomes and prognoses for this at risk patient group.



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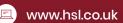


Conclusion

It is an imperative that whichever technology is adopted by a healthcare team, it must integrate seamlessly with existing systems and processes in order to become highly effective, intuitively used by care providers, if the solution is to gain widespread acceptance and be scalable across the whole spectrum of patients.

The highly flexible, secure and platform-agnostic video solution powered by Pexip and offered by HSL provides the highest levels of protection and protocols to ensure full patient confidentiality for remote monitoring and consultation enhanced by access to relevant real-time information and images.

Video properly implemented, contributes to more efficiency whilst still providing the best in patient care.







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About HSL

This White Paper has been prepared by HSL Telehealth who provides a marketleading, future-proofed conferencing and collaboration solution and a range of telemedicine devices and service provided by experienced staff and backed by the wider HSL resources.

They have established a UK-wide cloud-based network to allow healthcare establishments to offer secure remote consultations for a full suite of telehealth applications including patient reviews, remote diagnostics and continuing patient monitoring.

The Telehealth business unit is part of HSL who for over 50 years has been a specialist distributor of medical, surgical and imaging equipment, and bespoke healthcare IT solutions to health establishments, at the same time providing on-going technical and clinical support to its customers.

About Pexip

Pexip simplifies complex video conferencing to empower teams and organisations to meet and collaborate face-to-face, regardless of location or technology.

Pexip's scalable platform, with enterprise-grade security, enables high-quality video meetings, interoperability with Microsoft and Google solutions, and video system device registration. Customers can deploy Pexip on their own privately hosted servers, in their own cloud subscription of choice (Azure, Google Cloud or AWS), as a hybrid, or as a service. With a diverse set of APIs, Pexip can be customized to fit customers' unique needs and existing infrastructure.

This makes Pexip the leading provider for large enterprises and public sector organizations. The solution is sold through 300 channel partners in 75 countries and used in more than 190 countries. Pexip was listed on the Oslo Stock Exchange in May 2020.

Further Information from: HSL Telehealth, 81 Market Street, Draycott DE72 3NB







