PACS and beyond

User Report

Hospital wide image management

One solution for all medical images

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Máxima Medisch Centrum is a two location top-clinical hospital with a total of 836 beds. The common medical specialism's are represented, perinatology (NICU Level 1) and pediatrics as an hospital specialty. In 2007 a health logistics project is started to improve the efficiency of healthcare; a result of this project is a specific profile for each of the two locations. Location Eindhoven has a elective nature for short stay and standard procedures. Location Veldhoven has a acute nature with more complex procedures. Therefore the Neonatal Intensive Care Unit, Obstetrics, Adult Intensive Care Unit, Emergency Care, Cardiac Care Unit and Dialyses are stationed at location Veldhoven. Out-patient departments are stationed on both locations.

Máxima Medisch Centrum Eindhoven

Optimizing the technology environment

Hospitals are always searching for optimal solutions to support and improve their healthcare process and patient information. In the health logistics project of Máxima Medisch Centrum basic principles such as "excellent primary healthcare" and "operational excellence" are defined to support and improve the healthcare process. It is important that the implemented solutions can develop according to the healthcare needs of the present and the future. Solutions must therefore meet the following preconditions: comply to open standards, based on transparent and open sources and able to integrate with other already present solutions.

Máxima Medisch Centrum Veldhoven

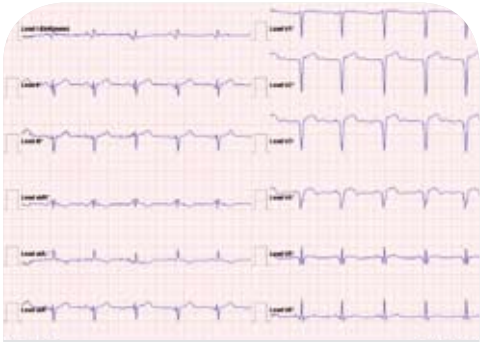
One of the developments in healthcare is the need to have different sorts of digital medical images available for multi-disciplinary diagnosis; different digital medical images should be visible for the referring physicians and for physicians from other specialism's. JiveX provides a hospital wide solution that meets the preconditions. JiveX uses a standard method of acquisition, storage and distribution and has a central solution for all medical images.

In 2003 Máxima Medisch Centrum was the first hospital in the Netherlands that bought and implemented JiveX. Martijn Schasfoort says "The flexibility of JiveX provides us with a solution that can be integrated in other available applications and comply to our demands e.g. standard software and the DICOM standard. We have the privilege of a good partnership with VISUS. In this partnership we meet on a regular base to discuss our demands and wishes and to discuss the new developments within JiveX. Our demands are implemented and our wishes are taken into consideration further developed and if so implemented in a new version. The partnership with VISUS also enables Máxima Medisch Centrum to keep up to date with the technology and knowledge surrounding JiveX, DICOM and IHE. The next challenge for us is the integration of hemodynamic waveforms "

JiveX AMG integrated on an endoscopic system

Integration of JiveX in other hospital applications

Integration in already available applications in the hospital is essential. This way the workflow of the hospital and different departments can be supported. Before implementing JiveX a workflow analysis of the department is made. "The implementation of JiveX was done in different phases. First the central system was implemented followed by the different departments based on need. Because JiveX is a modular system is easy to expand the functionality if the need of the department changes." says Schasfoort.



Integration of a ECG tool in the JiveX Review Client

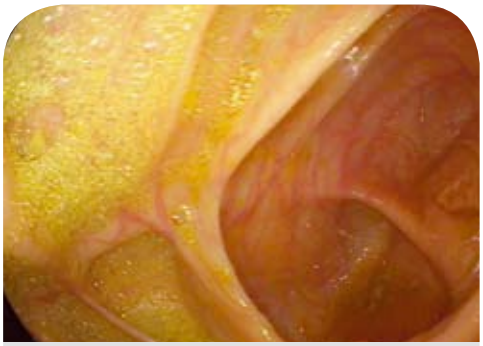
From the central hospital perspective, integration in an EHR (Electronic Health Record) and connecting to relevant information in a central planning system (HIS= Hospital Information System) is essential. JiveX generates a patient worklist per department based

on the hospital wide planning system. By using this worklist the errors in the patient information used within JiveX can be reduced. After the medical examination/procedure the acquired medical images must be directly available in the reporting application of the Hospital Information System (HIS). JiveX is integrated within the HIS by using an URL-link to the JiveX server, in this way the physician can select the patient in the HIS and then click on the URL-link to review the relevant medical images for reporting.

Some departments have the need for specific post processing tools for gathering extra information from the performed medical procedure. The cardiology department has the need for extra processing of ultrasounds and ECG's (the hospital defines an ECG as a medical images). With JiveX it is possible to integrate other processing software e.g. TomTec, Voxar and Mortara software so more medical detail is available for the physician when necessary for diagnoses. Jarno van den Bogaart says "When using this option, the raw DICOM data should be available. This also gives a new dimension to the storage of all that medical information. Due to clear instructions to the physician the total data volume per year can be reduced. The physician sees the advantage of capturing and storing only the relevant medical images/video for reporting. First analysis brought us to 6 TBytes per year. Now we store about 1,5 TBytes per year.". Although clear instructions there is a growth of data volume in medical procedures due to technology innovation.

JiveX AMG integrated on an ultrasound system

"Our vision is one PACS (Picture Archiving and Communication System) for all medical images, where the images are stored according to the DICOM standard. Due to the limitations of the installed PACS from another manufacturer we decided in 2002 to search for another PACS manufacturer. JiveX is a full-fledged PACS for radiology and non-radiology medical images." says van den Bogaart. At this moment the hospital staff is considering to take up the radiology images within the JiveX PACS. This way all medical images are available for all physicians with one "look-and-feel" and one user-interface. JiveX is used at many departments at both locations in Máxima Medisch Centrum, except the radiology department.

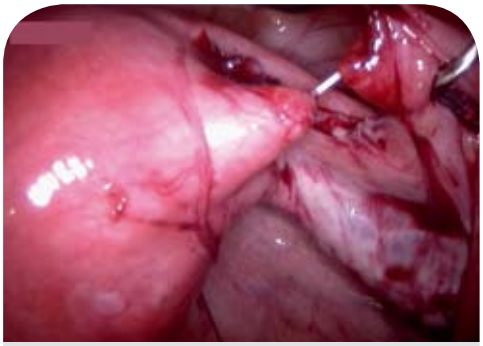


Live scene from the control panel of the JiveX AMG

Physicians demands

Every physician and department has its own need for information for diagnosis and treatment. For diagnosis and treatment the physician uses informal/raw data generated within the department (e.g. department information system) and information from other departments (e.g. laboratory). The information from the other departments is formal/reported information. Integration of information is here the key issue.

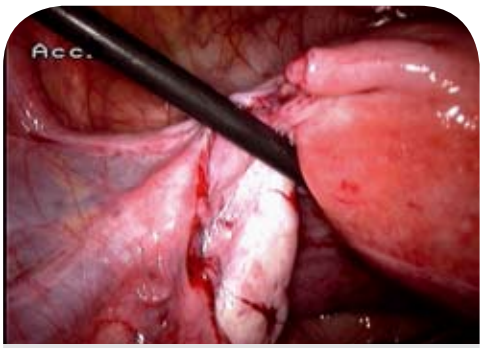
By an analysis of the needs of each department it becomes clear that most of the needs are the same (e.g. storing of digital images, being able to easily find the information, to see the relevant formal information from other departments), but that there are some specific needs (e.g. reconstruction possibilities, measurement possibility). Thilo Mohns says "All medical information, images and text, should be available for all physicians and to find the right images fast and easy. This medical information should be 100% valid and reliable. By the integration of JiveX in our EHR, the physician gets, fast & easy, what he needs for his core business: treating and curing patients." Mohns is a specialist pediatric intensive care in Máxima Medisch Centrum since 2007 and is member of the steering committee EHR in the hospital. The physician will determine if the available medical images are relevant for that moment."



Gynaecology image acquired with JiveX AMG

Communication with other hospitals

In the region of Eindhoven (South of the Netherlands) all big healthcare providers are connected to a fiberglass network. All hospitals in this region use a PACS based on a DICOM standard. By defining the regional health network as "standard" local area network, hospitals can be connected by using the DICOM-standard. The problem is that every hospital uses their own patient identification number.



Gynaecology image acquired with JiveX AMG

In 2009 all citizens in the Netherlands should have their own unique identification number. This number (in the Netherlands called BSN – meaning "citizens service number") should give healthcare providers insight of all available health information

of that patient. Information will only be available to registered authorized healthcare personnel and should reduce medical faults during treatment of the patient. Still every hospital will use their own patient identification number but the citizens service number will provide an extra verification.

It is possible to connect JiveX to other PACS's , this possibility will be further developed in 2009 when the unique patient number is available.

Maintaining the JiveX installation

Within Máxima Medisch Centrum the departments Medical Technology (MT) and Information Communication Technology (ICT) are combined in one department Medical and Information Technology (MIT) with a total of 65 employees. Martijn Schasfoort says "The trend of technology of medical devices is shifting to IT technology; medical devices incorporate the DICOM standard, HL7 protocol and other standards from the IT world. This creates the need for medical-IT employees. With the new combined department Medical and Information Technology we can give optimal support to all hospital personal using medical or IT devices."

One of the strong points of VISUS is that all information is available for maintaining the system by hospital engineers. "If extra support is needed, VISUS will provide the necessary means to keep the system up-to-date. This way we can provide a stable and reliable JiveX installation" says Schasfoort. The implementation of JiveX in Máxima Medisch Centrum is done by hospital engineers with support of VISUS engineers.

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