Images from outside institutions on CD/DVDs can now be uploaded into a Web-based program, lifeIMAGE, for storage and sharing. These images may also be saved on the MGH PACS for patients with an MGH medical record number. Physicians can request that an MGH radiologist interpret the scans and dictate a report if the examination is <6 months old. By sharing and storing the images, duplicate imaging will be reduced and patient care will improve.

Table 1. Volume of Examinations Uploaded via lifeIMAGE to MGH PACS from January to March, 2012*

<table>
<thead>
<tr>
<th>Modality</th>
<th>Total Volume</th>
<th>% On-Site Radiology Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>5,124</td>
<td>20%</td>
</tr>
<tr>
<td>MR</td>
<td>5,862</td>
<td>6%</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>250</td>
<td>7</td>
</tr>
<tr>
<td>PET</td>
<td>451</td>
<td>14</td>
</tr>
<tr>
<td>X-Ray</td>
<td>4,079</td>
<td>7</td>
</tr>
<tr>
<td>Breast Imaging</td>
<td>2,017</td>
<td>N/A</td>
</tr>
<tr>
<td>Fluoroscopy</td>
<td>366</td>
<td>N/A</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>1,277</td>
<td>N/A</td>
</tr>
<tr>
<td>Total # examinations uploaded into PACS</td>
<td>19,426</td>
<td></td>
</tr>
</tbody>
</table>

*In the same time period, the total number of examinations uploaded into lifeIMAGE was 26,699 from 12,838 CD/DVDs.

Each year, doctors at the MGH receive between 50,000 and 100,000 CDs/DVDs containing patient images. These CD/DVDs are a storage and management problem. They also have a wide variety of image viewers with varying capabilities that are frustrating to use as the navigational interface varies for each viewer and the images may not reliably load. Until recently, there was no practical way of sharing those images or keeping them on file for reference purposes.

The American Board of Radiology has determined that duplication of imaging studies is one of the major causes of overutilization in radiology. The extent of this problem was demonstrated by a Commonwealth Fund survey that reported that 20% of all patients claimed to have received duplicate medical tests in the USA. The importation of outside images into a picture archiving and communication systems (PACS) can lower the rate of duplicate imaging. This has been demonstrated for patients who are transferred to emergency departments as well as patients who come for specialized treatment. For example, successful importation of images from CDs reduced the mean rate of all subsequent imaging in patients transferred to an emergency department by 17% (p < .001) compared to the failed-import group. In another study of patients who underwent transarterial chemoembolization, 52% of patients whose outside images were not imported into PACS received duplicate imaging, compared to 11% of those whose images were imported into PACS (p < 0.001). Such duplicate imaging wastes resources, results in needless radiation exposure for many patients, and delays treatment.

Importing Images into PACS

Until recently there was no standard for image sharing and storage. Different vendors were each using their own proprietary system. This problem was addressed by an Integrating Healthcare Enterprise (IHE) initiative, which has introduced new standards for image sharing and patient information exchange. Now, when images are burned onto a CD/DVD from one hospital or imaging center’s PACS in an IHE compatible format, the CD/DVD can be taken to another institution, where it can be uploaded into that institution’s PACS.
Mass General Imaging has recently implemented a web-based sharing solution, lifeIMAGE (Newton, MA), which allows viewing, sharing, and storage of radiology images and reports. Physicians, or their assistants, can load images on CD/DVDs from other institutions into the lifeIMAGE program. These images can then be viewed using a common lifeIMAGE interface. The images can be stored in a lifeIMAGE personal library, where they can be shared with others. If the outside report has been saved along with the images, it can also be viewed. If the patient has an MGH medical record number (MRN), the images can also be uploaded into the MGH PACS, from which they can be readily accessed by all those who care for a patient. Table 1 shows the volume of examinations uploaded into the MGH PACS in the first three months of 2012.

Uploading Images

The lifeIMAGE program is accessible via the radiology order entry (ROE) homepage on the Intranet and then clicking on Upload Images in the menu bar. From there (Figure 1), it is possible to access the lifeIMAGE program (Figure 2) and a video tutorial on uploading images.

When a physician or an assistant loads a patient’s CD/DVD into their computer, lifeIMAGE automatically detects the disc, prompts the user to log on, and provides an opportunity to view and validate the patient’s images together with the patient’s name and date of birth, in a standardized interface (Figure 3) that is not dependent on the viewer installed on the CD/DVD. If present, the radiology report may also appear. For this to work, the images must be provided in the standard DICOM format used for medical imaging. It is anticipated that in the future, the program will be able to convert other formats, such as jpeg, so that they can be viewed and stored.

Physicians or their assistants can choose which images they would like to upload into their personal lifeIMAGE library, which only requires the patient’s name and date of birth. These personal library images can be shared with others.
If the patient has an MGH medical record number (MRN), the images can be uploaded into the MGH PACS by clicking on the button, “Upload into PACS.” The program recognizes the imaging modality but the user must specify the appropriate body part in a drop-down menu. The user may also request that an MGH radiologist interpret the images, provided that the images are less than 6-months old and they are not fluoroscopic, ultrasound, or interventional images. The reasons for the request must be provided, via a ROE-like interface. The Radiology Department recommends that interpretations of recent outside studies be performed for all patients currently undergoing care at MGH.

MGH radiologists would prefer to have the outside report available for all interpretations, but it is seldom provided and is not a requirement, except for mammography, where interpretations are not done without a prior report. There is a professional charge for this service, but not a technical charge. Most Massachusetts insurance carriers will pay this charge and it is very unlikely that a Massachusetts patient will have to pay for this service directly.

Uploading images into lifeIMAGE takes 1-2 minutes for an x-ray and 3-5 minutes for a 200-300 image CT or MRI multi-planar study. Once the images are in the PACs, the images may be accessed throughout the Partners’ system for patient care, as are all PACS images.

Images and patient information can be transferred more rapidly if outside institutions and receiving MGH departments both subscribe to lifeIMAGE’s Drop-Box program. In this program, an outside institution uploads images into a lifeIMAGE Drop-Box file in the cloud, which can be downloaded directly into the MGH PACS. This option is particularly useful for trauma patients who are being transferred to the Emergency Department because the images can arrive before the patient.

**Further Information**

For more information about uploading images into PACS, please contact Daniel I. Rosenthal, MD, Vice Chairman and Director of Radiology Operations, Department of Radiology, Mass General Hospital, at 617-726-7661.

We would like to thank Dr. Rosenthal and Stephanie Bogdan, Imaging Informatics, Mass General Hospital, for their assistance and advice for this issue.
References


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