



The “National Integrated Medical Imaging System” [NIMIS]—friend, not nimesis!

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Abstract

Introduction The “National Integrated Medical Imaging System” or NIMIS went live in 2011 and allows the movement of patient radiology imaging throughout the Irish health system. At the time of its launch, NIMIS was not only going to allow the filmless passage of patient radiology imaging but it was also envisaged that it would act as a medical image archive. The aim of this study was to assess the awareness and use of non-consultant hospital doctors and hospital consultants with regard to this medical image archive/referral function of NIMIS.

Methods A survey was carried out on 50 doctors across all specialities and grades at Tullamore Hospital looking at different aspects of the use of NIMIS.

Results Ninety-four percent of respondents use NIMIS on a daily basis and 6% use it on a weekly basis. The primary reason for using NIMIS was found to be “Viewing and Ordering Imaging” in 92% of those surveyed with 8% stating it was “Viewing imaging/reports”. Ninety-eight percent surveyed said they had never used NIMIS to send a referral form or clinical photograph and 82% were not aware of this potential function. The majority of those surveyed stated that they either agreed or strongly agreed NIMIS is user-friendly.

Conclusion NIMIS allows the safe and confidential flow of patient images and clinical information in the Irish health system. It could provide definite potential in the areas of clinical conferencing, multidisciplinary meetings and remote patient assessment along with collaborative research and education.

Keywords Clinical conferencing · Data protection · National Integrated Medical Imaging System · NIMIS

Introduction

The “National Integrated Medical Imaging System” or NIMIS went live in 2011 and allows the movement of patient radiology imaging throughout the Irish health system [1, 2]. It is comprised of a national Radiology Information System (RIS), which allows users to view and order images from their current hospital site, and a Picture Archiving and Communication System (PACS), which allows users access to imaging performed across

all NIMIS sites [3]. At the time this study was undertaken, NIMIS was compliant with current data protection laws and was designed with input from the Data Protection Commissioner with all users requiring appropriate security access [1, 4]. NIMIS is currently used in 63 hospitals across the Irish Health System with 30,000 active users, facilitates 200,000 patient updates daily and has 22 million plus imaging records [5]. At the time of its launch, NIMIS was not only going to allow the filmless passage of patient radiology imaging but it was also envisaged that it would act as a medical image archive, for example for dermatology photos, ECG’s and histology slides [2]. Following our review of the literature, there is only one publication to date that looks at “End-user experience” regarding NIMIS but none on its other potential uses [3]. The aim of this study was to assess the awareness and use of non-consultant hospital doctors and hospital consultants with regard to this medical image archive/referral function of NIMIS.

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Methods

A survey was carried out on NCHD's (non-consultant hospital doctors) and hospital consultants across all specialities at the Midland Regional Hospital Tullamore. This is a level 2

hospital that receives referrals from two level 3 hospitals and covers a catchment area of four counties with a population of approximately 292,000. The survey looked at the following aspects of NIMIS: frequency of use, primary reason of use, other uses and user friendliness (see Fig. 1).

Fig. 1 Survey

1) On average how often do you use the "NIMIS"?

Everyday

Once a week

Once a month

2) What is the primary reason you use the "NIMIS"?

Viewing images/Reports (radiographs / CT / MRI etc)

Ordering images

Viewing and ordering images

Other: please state (eg clinical conferencing) _____

3) Have you ever used the "NIMIS" to send/upload patient clinical information? (eg a referral/ an ECG)

Yes

No

4) Were you aware that you could send patient clinical information other than standard radiological imaging via the "NIMIS"?

Yes

No

5) Do you find the "NIMIS" user friendly?

Strongly agree

Agree

Neither agree or disagree

Disagree

Strongly disagree

Table 1 Frequency of speciality

Levels	Counts	% of total	Cumulative (%)
Anaesthetics	1	2.0	2.0
ENT	1	2.0	4.0
Emergency Med	2	4.0	8.0
General Surgery	9	18.0	26.0
Medicine	22	44.0	70.0
Orthopaedics	15	30.0	100.0

Results

There were a total of 50 respondents across multiple specialities and grades as shown in Tables 1 and 2. Ninety-four percent of respondents use NIMIS on a daily basis and 6% use it on a weekly basis (see Fig. 2). The primary reason for using NIMIS was found to be “Viewing and Ordering Imaging” in 92% of those surveyed with 8% stating it was “Viewing imaging/reports” (see Fig. 3). Ninety-eight percent surveyed said they had never used NIMIS to send a referral form or clinical photograph and 82% were not aware of this potential function (see Tables 3 and 4). Ninety percent of those surveyed stated that they either agreed or strongly agreed that NIMIS is user-friendly (see Fig. 4).

Discussion

We can see from our results that NIMIS is used by the majority of our respondents every day but over three quarters have never used or are unaware of the medical image archive/referral function or potential function. This is in stark contrast to what was envisaged at its inception 8 years ago and reflects a poor uptake of this telemedicine capacity. The remote assessment of patients and use of virtual clinics has been adopted by several specialities including nephrology, gastroenterology, ophthalmology and orthopaedics and has been shown to be safe, cost-effective and efficient associated with high patient satisfaction levels [6–18]. NIMIS provides a ready-made portal to facilitate this virtual assessment of patients and is user-friendly, as shown from our results.

In our institution, which was the first in Ireland to introduce a virtual fracture clinic, we recently carried

Table 2 Frequency of grade

Levels	Counts	% of total	Cumulative (%)
Consultant	12	24.0	24.0
NCHD	38	76.0	100.0

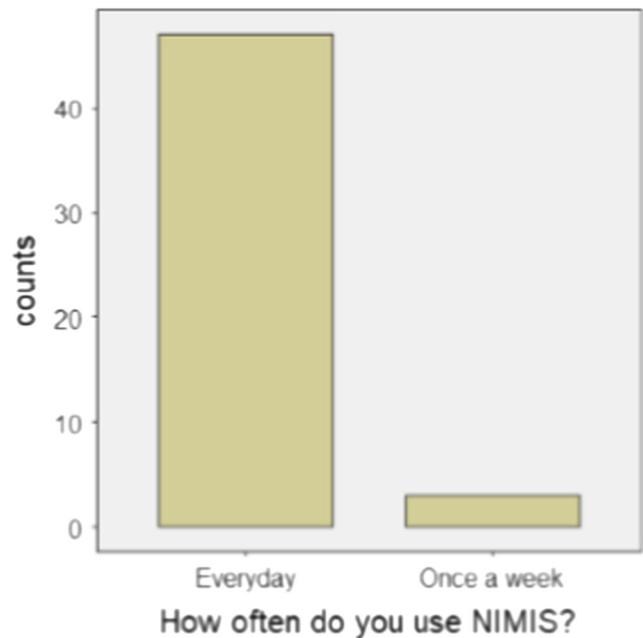


Fig. 2 Frequency of NIMIS use

out a pilot study looking at electronic referrals for our virtual fracture clinic service via NIMIS which yielded very positive and efficient results. This has subsequently led to the adoption of this electronic referral pathway by one of the peripheral level 2 hospitals. This virtual fracture clinic model along with this electronic referral method marries well with NIMIS, using up to date best clinical practice and current available technology, and could be rolled out on a national level. Another recent pilot study at our institution revealed that NIMIS can support the uploading of colour clinical photographs with adequate resolution. This not only offers potential in the area of clinical conferencing in Ireland but also for remote consults from peripheral hospitals to tertiary centres particularly for image reliant disciplines like orthopaedics,

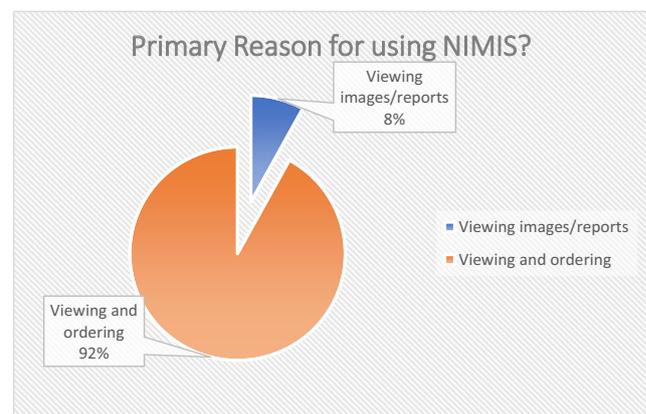


Fig. 3 Primary reason for using NIMIS

Table 3 Frequency of Have you used NIMIS to send patient clinical information eg. referral form or clinical photograph

Levels	Counts	% of total	Cumulative (%)
No	49	98.0	98.0
Yes	1	2.0	100.0

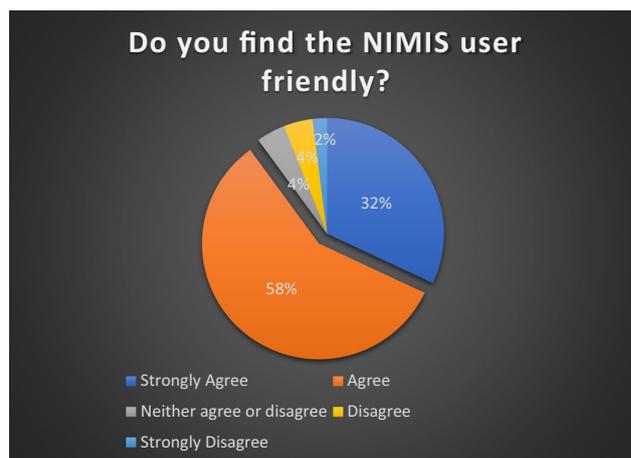
dermatology and plastic surgery. It also has the capacity to promote collaboration amongst institutions in terms of education and research and is something clinical managers should be encouraging.

In the current climate of data protection and data flow in medicine NIMIS offers a solid, established and regulated platform for the exchange of images, clinical photos and other diagnostic results between medical parties. We know from a recent study carried out at University Hospital Limerick (UHL) that all Interns surveyed use the instant messenger “WhatsApp” as a means to communicate clinical information with 97% stating that the data was sensitive in nature [19]. This activity is already potentially in breach of the 1998 and 2003 Data Protection Acts but the exchange of patient medical information in this fashion will be illegal following the enforcement of the EU General Data Protection Regulation in May 2018 [19, 20]. This is something that hospitals, clinical managers and the health service overall all need to plan for particularly when organisations can receive hefty fines when they are in breach of the regulation [20]. Also it is interesting to note that 97% of respondents in the UHL study feel that using an instant messenger leads to improved patient safety and whilst NIMIS is not the complete answer it certainly offers a large part of the solution given that it is an established, working IT platform in the health service which appears is not being used to its full capabilities. Moreover, continuing advances in software and technology development means that image processing and viewing options are always improving and would help maximise these NIMIS aptitudes if there was more awareness.

The authors recognise that one of the limitations of this study is the small sample size and are aware that it only offers a snapshot of part of the NCHD and hospital consultant experience in the Irish health system.

Table 4 Frequency of Were you aware that you could send patient clinical information other than standard radiology imaging via the NIMIS?

Levels	Counts	% of total	Cumulative (%)
No	41	82.0	82.0
Yes	9	18.0	100.0

**Fig. 4** NIMIS user-friendliness

Conclusion

NIMIS allows the safe and confidential flow of patient images and clinical information in the Irish health system. It could provide definite potential in the areas of clinical conferencing, multidisciplinary meetings and remote patient assessment along with collaborative research and education.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethics Ethical approval was not required for the study as it was an anonymised service evaluation.

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