



Contribution made by a mobile solution to patient care.

Using the MCA (Mobile Clinical Assistant) in Nursing Care at the Hospital Comarcal de Inca. Majorca

July 30, 2009 | Reference | v3



© ATOS ORIGIN SA Spanish listed company 2009. This document has been created by and is the property of ATOS ORIGIN Sae for exclusive use by [Name of client]. Confidential only for authorized use by Atos ORIGIN Sae.

© ATOS and ATOS ORIGIN are registered trademarks.

LIST OF VERSIONS

Version	Revised by	Date
V0	Miguel Corral	July 6, 2009
V1	Miguel Corral	July 8, 2009
V2	Enrique Palau / Alfredo Martin	July 22, 2009
V3	Enrique Palau / Miguel Corral	July 30, 2009
V4	Alfredo Martin/Miguel Corral	August 28, 2009
V5	Enrique Palau	September 7, 2009

Index

1	Introduction: Use of mobile technologies at the Hospital Comarcal de Inca.....	4
1.1	Executive Summary.....	4
1.1.1	Hospital Comarcal de INCA	5
2	Methodology.....	6
2.1	Description of the methodology applied.....	6
2.1.1	Description of the workflow before using the MCA	7
2.1.2	Description of the workflow using the MCA	9
3	Results	10
3.1	Time measurements of the processes carried out following conventional procedures.	10
3.2	Time measurements of the processes carried out using the MCA.	10
3.3	Comparison of the timeframe for both procedures.	11
4	Value delivered by the MCA at the Hospital Comarcal de Inca.....	13
4.1	Quality of care.....	13
4.2	Patient safety.....	13
4.3	Productivity	14
4.4	Enhancing clinician satisfaction.....	14
5	Opportunities for improvement stemming from the use of the MCA at the HCI	15
6	References.....	16

1 Introduction: Use of mobile technologies at the Hospital Comarcal de Inca.

1.1 Executive Summary.

The Hospital Comarcal de Inca (HCI) is a prominent example of a “Paperless Hospital”¹ in Spain. Thanks to its leadership position in ICTs, it is also playing a pioneering role in the introduction of a mobile healthcare platform. The use of a MCA (Mobile Clinical Assistant) at the patient’s bedside has enabled the Nursing Service to enhance workflows in the day-to-day clinical care delivered to hospitalized patients.

The case study outlined below shows a multitude of benefits in terms of clinician productivity, patient safety and quality of care, as the time spent with patients (treatment, checking vital signs and clinical records) is increased.

The procedure for delivering nursing care for hospitalized patients at Medical Nursing Unit and the Maternity-Pediatric Nursing Unit comprises a range of activities implemented with patients by the team of healthcare professionals. In conventional procedure point of care data is noted down on paper or by using a Tablet PC in some units, which is shared by several clinicians and located in the corridor or at the nurses’ station, with the attendant security and confidentiality issues.

In this case study, two members of the nursing staff, one from the Medical Nursing Unit 1 and the other from the Maternity-Pediatric Nursing Unit, were equipped with a Panasonic Toughbook CF-H1, based on Intel’s MCA platform, providing real-time access to clinical records, as well as incorporating an interface specially designed to streamline the standard processes employed by clinicians. The combination of the CF-H1, a purpose-built device for healthcare environments, and the interface, which enables direct access to vital data, creates a synergy that enhances the day-to-day activity of nursing staff.

Utilizing the MCA platform in this environment maximizes the clinical care process. More specifically, the case study shows improvements to clinical care procedures,

¹ Hospital in which all the day-to-day clinical and administrative tasks are carried out using ICT support, without using conventional resources such as paper.

better adherence to medication administration protocols and decreased latency in recording patient information. The main impacts include enhanced quality of care and patient safety, combined with productivity gains and higher levels of clinician satisfaction.

The study shows that the use of mobile platforms improves day-to-day clinical activity with hospitalized patients and indicates that this is the way forward in modernizing current healthcare systems as it enhances the services delivered in terms of quality, efficiency and safety.

1.1.1 The Hospital Comarcal de INCA

The Fundació Hospital Comarcal de Inca is a public institution (Public Healthcare Foundation), attached to the Balearic Islands Health Service (Servei de Salut de les Illes Balears), whose mission is to oversee the management and provision of health care at the Hospital Comarcal de Inca.

This center was opened in January 2007 and service provision has been gradually extended, the hospital becoming fully operational in 2008. At present, with a workforce of approximately 760 healthcare professionals, the Hospital Comarcal de Inca serves the healthcare needs of approximately 114,000 people.

The Foundation's strategic aim is to enhance the quality, productivity and efficiency of the healthcare services delivered by the various units, through the engagement of resource allocation management professionals and joint responsibility in decision-making. Engagement and satisfaction in the workplace, standardization of medical practice, accurate information on diagnostic and therapeutic procedures for patients, are all key to the smooth running of the hospital. This is where information technologies can play a critical role by enabling access to quality clinical and administrative data at the time and place they are needed.

2 Methodology.

Paper is used to record information flows, together with the Tablet PC in some units, in the conventional work procedures at the Hospital de Inca. As an alternative, the HCI has considered the need of assessing the benefits of using purpose-built healthcare mobile technologies, via a MCA solution that enables access to clinical systems in real time at the point of care, seeking to enhance productivity and safety as regards data handling.

However, in order to justify such outlay, managers need objective data and evaluations supporting the measurable benefits of implementing these technologies.

Seeking to help healthcare professionals ascertain the value that investment in information technology delivers to healthcare organizations, Intel has developed the Intel Healthcare IT value model, specifically adapted to this working environment, and which includes a section on the study of the use of MCAs. Intel's model aims to measure this value in specific "categories of benefits" or values that comprise the strategic benefits expected from targeted investment in ICTs. The model emphasizes and prioritizes the quantifiable benefits, together with the economic impact. However, in order to gain a full understanding of the benefits of IT investment in the healthcare environment, it is necessary to take into account a range of intangible benefits arising from usage.

The objective of this case study is to reckon the value delivered by the MCA in improving nursing care procedures for patients on the wards of the Fundación Hospital Comarcal de Inca.

2.1 Description of the methodology applied.

The value delivered by utilizing a MCA has been assessed through observation and measurement of the time spent carrying out nursing care procedures for patients on the wards at the Hospital Units selected. Moreover, feedback sessions have been held with the professionals using this technological solution who have also given their views on the MCA by filling out "ad hoc" surveys.

For the purposes of the study, two nurses in charge of patient care on the wards were equipped with two Panasonic Toughbook CF-H1s, based on the MCA platform, developed by the Digital Health Group of Intel Corporation, purpose-built to meet the needs of clinical work as they are light weight, durable, resilient to drips and spills and can be wiped cleaned with disinfectant.

Through the MCA platform, healthcare professionals can access the hospital's information system (HP-HCIS), as well as the interface developed for access to frequently consulted information, that is to say, they have access to the patient's clinical records, which is similar to the data stored on the PC at the Nursing Station but specially enhanced for mobile work.

The MCA was used in day-to-day care for a group of hospitalized patients at the Medical Nursing Unit 1 and the Maternity-Pediatric Nursing Unit. The workflows for this sample were observed and measured repeatedly over two consecutive days.

Prior to this, in order to establish a point of comparison with the initial situation, observation and measurements of the nursing care provided employing conventional procedures were carried out by the same staff on a patient group with similar conditions to the above. In this instance, the clinical updates were performed by taking notes by the patient's bedside on paper or in some cases with a Tablet PC, which were then fed into the Hospital's information systems at the corresponding clinical workstation.

2.1.1 Description of the workflow before using the MCA

Before starting patient care, the nursing station compiles all the clinical data needed (care plan, medication, treatment, results of tests requested previously, e.g. blood tests, reports, etc.), and available (on paper) for each patient. In addition, this information is noted down in a table created by the nurses, summarizing the key data on each patient.

ADULTACIONES	NOMBRE	DIA ANTECEDENTES	CTES	VIGAS INVASIVAS ASAS2 Fecha de implementación	CURAS Tipo de cura Fecha próxima cura	PRELIMBARRACIONES Fecha próxima
7A		DIABETES	T: TA: FC: SAT: BMT:	VPS BMT DE CO CE 24H	JG De: 190	TYO CON METADONA (en nervios)
1B		REAG EPIC	TA: TA: FC: SAT: BMT:	VPS GN 24 SP + STP	Hemos si FIEBRE De: 1329 SG	CTES TURNO CONTROL DIURESIS BIPAP NOCTURNA CON 02 2LX 17:00 GSA, CULTIVO ESPUTOS 1:00 PLEURAL A-2, 2, 2, 2
2A		COLENGOCPIA	T: TA: FC: SAT:	VPS	DIARRIAS PONER VIA EN BRAZO DERECHO SG	12:00 COLENGOCPIA 11:00 ECO ABDOMINAL 15:00 Tac abdominal 18:00 HSE L A LAS 11H XA ECOENGDOSCOPIA (amb solicitudes)
2B		ITU AP. ALZHEIMER AVANZADO	T: TA: FC: SAT:	VPS GN 24 SP + STP	COLCHON ANTIESCARAS ASPIRAR SP	SEDESACION SI TOLERA 00:00 T dopo melitos 11:00 A/S 13:00 FIEBRE-HEMOS-URINO-RX ABDOMEN Y TORAX-A/S
2A		BRONCOPNEUMONIA	T: TA: FC: SAT: BMT:	VPS GN 24 BMT DE CO CE 24H	HEMOS SI FIEBRE JG De: 160	CTES X TURNO PTES 2 ESPUTOS 14:00 A/S 15:00 A/S + GSA 18:00 RX TORAX

At the patient's bedside the nurse consults the information needed in the table on the sheet of paper, supported, where necessary, by additional physical reports carried in folders, a process which takes some time in each case. Data on several patients are often consulted at the same time; clinicians memorize them and perform their tasks based on this information, with the attendant limitations and risks. During this consultation only the results of the tests carried out to date are available (they have not been updated). If the clinician wants to find out the latest results, it is necessary to leave the patient's room, go to a work station that is connected to the hospital's information system (nursing stations, offices etc.) and consult the relevant data or, at very least, go out to the corridor and find the Tablet PC for shared use, if there is one.

Updates on the patient's condition are noted down in the table, which shows the medication that the patient has been prescribed at that time, and which can be used to make notes over several days. On occasions, this report is not updated as information can vary at any time or in an emergency. In addition, manual transcription leads to problems associated with understanding the clinician's handwriting.

The medication to be dispensed to the patients during the procedure is obtained from a computerized store called Pyxis. The patient's data need to be entered as well as the medication required. In order to enter these data the nursing staff print out a paper sheet with the data needed to be entered in the Pyxis; these data sometimes contain errors because the patient's condition has not been updated.

Once the round has been completed, large part of the information noted down, the medical instructions, prescriptions and requests for further tests, need to be entered in the appropriate information systems (HIS, Nursing care, Pharmacy, Laboratory, etc.) using the PC at the nursing station. This procedure takes too long and, as observed, is highly likely to be subject to interruptions and transcription errors as the information needs to be transcribed manually and then transferred to the digital systems to set in motion the automatized circuits in the pharmacy, laboratory or dietary services.

2.1.2 Description of the workflow using the MCA

The day-to-day care utilizing the MCA is the same, although in this case it is not necessary to compile the printed documentation beforehand nor enter the information afterwards in the information systems, which takes a high proportion of the nursing staff's time. Moreover, there are significant differences regarding accessing information and updating it:

- Consultation of reports and test results is performed at the patient's bedside. This enables clinicians to access fully updated information in real time.
- The existence of an access interface to the most frequently consulted data facilitates access and streamlines processes.
- Consultation of the medication to be dispensed to each patient is performed directly by the MCA, which provides fully updated information in order to obtain the medication needed from the Pyxis.
- Consultation of further tests is carried out in real time and taking into account the latest information, avoiding unnecessary repetition or time loss by having to phone other clinicians for updates.
- The treatment and medication that the patient receives is fully updated at all times as the clinician can access the pharmacy system in real time.
- The clinician can consult diagnostic images (mainly ulcers) in situ, which means that results can be viewed without having to carry round a dossier of images.

3 Results

3.1 Time measurements of the processes carried out following conventional procedure.

The measurements performed on the nursing care provided before using the MCA are as follows:

Activity	Duration*
Preparation	13 minutes
Vital signs	17 minutes
Medication	19 minutes
Nurses' notes	24 minutes
Diet	9 minutes
Water balance	6 minutes
Contacting other services	6 minutes

3.2 Time measurements of the processes carried out using the MCA.

The measurements carried out during the nursing care procedure using the MCA are as follows:

Activity	Duration*
Preparation	0 minutes
Vital signs	17 minutes
Medication	10 minutes
Nurses' notes	11 minutes
Diet	9 minutes
Water balance	4 minutes
Contacting other professionals	4 minutes

3.3 Comparison of time spent on both procedures.

Activity	Time without MCA	Time with MCA	Improvement
Preparation of activities	13 min	0 min	100 %
Vital signs	17 min	17 min	-
Medication	19 min	10 min	47 %
Treatment	11 min	11 min	-
Nurses' notes	24 min	11 min	54 %
Diet	9 min	9 min	-
Water balance	6 min	4 min	33 %
Contacting other services	5 min	4 min	-
TOTAL	93 min	55 min	~ 40 %

The time differences estimated are very significant overall, particularly as regards preparation time and entering nurses' notes.

4 Value delivered by the MCA at the Hospital Comarcal de Inca

In this case study, it can be observed that the use of the MCA in patient healthcare procedures optimizes the various different workflows, which, ultimately enhances the quality and safety of care, delivers productivity gains, improves levels of clinician satisfaction, and, although an appropriate evaluation methodology on the data obtained has not been applied to date for this purpose, indirectly has a readily deducible economic impact. The main benefit obtained from the use of these solutions is that the nursing staff can spend more time with patients, thereby increasing the time spent on basic nursing tasks: care, evaluation, safety, support, etc.

The case study has shown that the use of the MCA provides **benefits** in the following areas:

4.1 Quality of care

If the clinician lacks accurate information, optimal patient care cannot be provided, leading to repetitions or unnecessary actions and, very occasionally, to errors in clinical practice.

Mobile, real-time access to information has a positive impact on the quality of clinical decision-making and care, removing the need to leave the patient's room to recover results from reports at a desktop PC or Tablet PC.

This enables the clinician to pay more attention to identifying and assessing the patient's condition and spending more time with each patient. As the MCA enables access to clinical records, the risks of errors in communications between the nursing staff and other departments are reduced. Moreover, there are no intermediaries as regards sending and receiving information.

Real-time access to patient data, combined with availability of the appropriate clinical tools, also means that all decisions taken will be better informed, more appropriate and agile, as well as based on quality data, thereby reducing any time wasted or delays and increasing the time spent with patients.

4.2 Patient safety

The use of the MCA offers healthcare professionals the chance to access results in real time, enabling them to take decisions based on the latest information. It also enables secure dispensing and consultations on changes to medication in real time, free of transcription errors or

misunderstandings. In short, the need to “share” handwritten notes is removed, as are the corresponding risks for the patient.

4.3 Productivity

Having accurate information available at the right time and place means that healthcare professionals can deliver care more efficiently. Nursing staff can carry out the full care procedure without interruptions, the time spent during a shift on low value activities such as calls to other professionals to confirm availability of information is diminished significantly. The MCA reduces the use of paper and streamlines the work procedures of several employees as regards transferring records, instructions etc. within the Hospital.

4.4 Enhancing clinician satisfaction

The nursing staff that took part in the case study agreed that the ability to access clinical data in real time improves and facilitates the work they do. Furthermore, it promotes confidence in the idea that the clinical decisions taken are the right ones. Healthcare professionals have more useful time to communicate, collaborate and transmit knowledge, as well as increasing the time they spend with patients. Communication lines between departments improve, that is to say, between nursing staff and other healthcare professionals (physicians, nursing assistants, etc...) creating a more satisfactory working atmosphere for the team.

In general, users stated that the clinical information entered is of higher quality, more standardized and better formatted, thereby assisting consultation thereafter. Furthermore, they maintain that the MCA platform adapts perfectly, thanks to its hardware characteristics, to mobile working practices on nursing wards.

5 Opportunities for improvement stemming from the use of the MCA at the HCI

The case study shows that the use of a MCA optimizes day-to-day care procedures and associated workflows at the HCI. The time measurements performed show, directly or indirectly, the benefits reaped, including enhancing clinician productivity, improving quality of care and patient safety.

As the use of mobile technologies spreads, the full range of clinical services and areas of hospitalization provided at the HCI can reap these benefits. Moreover, new functionalities will be introduced in the specially built interface in order to enhance functionality.

Importantly, further to these benefits, usage could lead to the redesign of healthcare professionals' work processes. This would increase the value delivered through the work performed and avoid time wasted on repetitive and low value tasks, thus improving the working conditions of clinicians and enhancing patient care.

As mobility is a basic requirement for nurses as regards patient care and treatment, the use of platforms and information systems that support mobility needs to grow. However, widespread deployment of mobile solutions in healthcare institutions at an initial stage requires strong institutional support and leadership from the management team and clinical staff.

Wide-scale use of these technological solutions depends more heavily on the commitment shown by users and managers at the centers by streamlining the processes they are used for and providing adequate training, than on the technical capabilities of the devices themselves, for Panasonic's CF-H1 more than meets the needs of healthcare professionals at the present and in the near future in terms of data access and recording and associated clinical activities.

6 References

www.intel.com/healthcare/ps/mca

<http://www.intel.com/it/pdf/measuring-it-success-at-the-bottom-line.pdf>

http://www.intel.com/intelpress/sum_bvm.htm

http://www.intel.com/healthcare/hit/providers/hit_value_model_whitepaper.pdf

BORRADOR