

Dedicated to Excellence in Dermatology

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CENTRE



With the new system and self-registration kiosks, patients can get their queue number almost instantaneously by just scanning their IC or appointment card.

Gone were the days when long queues and stacks of papers were a common sight. NSC prides itself as the first medical institution in Singapore to go paperless.

The new Electronic Medical Record System, which took three years to complete, was rolled out on 20th March this year to provide a seamless and paperless patient workflow system.

Medical case records are now a thing of the past in NSC. All such handwritten patient records had

## EMR in NSC – First Integrated Electronic Medical Record System in Singapore

been scanned and digitised. Doctors now key in details of consultation electronically. Information of the patients' skin conditions are captured and stored in the system. There is no printed or written prescription. Prescriptions are sent real-time online via the system to the pharmacy.

Patients' information is also stored in the doctor's computer. In times when the system server breaks down, the doctors will still have access to basic information about the patient whom he will be attending to.

Patients can now book, change and cancel appointment online, in real-time. Two days before the appointment, a reminder in the form of a short SMS will be sent to the patients' mobile phones as a value-added service.

Besides reducing waiting time, the system is also capable of alerting the doctors if they have accidentally prescribed a drug that the patient is allergic to. In three to five years time, it will also be able to track which medication works best for each individual patient.



Scriptless dispensing in the pharmacy with EMR.

See insert for more details.

## NSC 15th Anniversary

NSC celebrated its 15th Anniversary on 15th April 2004 with a loud bang at NSC auditorium and lobby, literally!

The celebration started with A/Prof Chan giving his first address as the new Medical Director of NSC to the staff. He thanked the staff for their hard work and contributions and looked forward to working together towards the NSC vision.



A/Prof Roy Chan, Medical Director, leading the staff in the singing of birthday song



Staff enjoyed themselves at the NSC 15th Anniversary Celebration.

A/Prof Chan's speech was followed by song and dance performances by Absolut Encounter starring NSC Pharmacy Technician Mr Eric Guansing. Just before the cake cutting ceremony, an unexpected balloon burst aptly brought the event to an even higher note.

In spite of the rain, the high spirits of all NSC staff were not a bit dampened. A portable spit was brought to the car porch and all staff proceeded to the lobby for food and drinks. Happy Birthday NSC!

Do you know

Need an appointment with NSC?

Our patients can now make, change or cancel appointments real-time online. Log on to [www.nsc.gov.sg](http://www.nsc.gov.sg) to find out more!

This is in addition to:

Telephone : 63506666

Fax (overseas) : +65-62533225

Fax (local) : 63506682

Email : [appointment@nsc.gov.sg](mailto:appointment@nsc.gov.sg)

## NSC Implements First Fully Integrated Electronic Medical Record System in Singapore

Prof Goh Chee Leok / Loo Swee Cheng

NSC rolled out Electronic Medical Record system – the first fully integrated system in Singapore - on 20th March this year, to provide a seamless and paperless patient care in NSC. Truly a state-of-the-art software system, it has helped to improve productivity and has a high potential to reduce medical errors.

Over the last 3 years, all 250,000 case records consisting of 2 million pages of records were digitised/scanned. Patient transactions are now done electronically, including on-line patient appointment system, self-registration kiosks, electronic medical recordings, order entries for laboratory tests, and prescriptions. The system also allows management to monitor patient load,

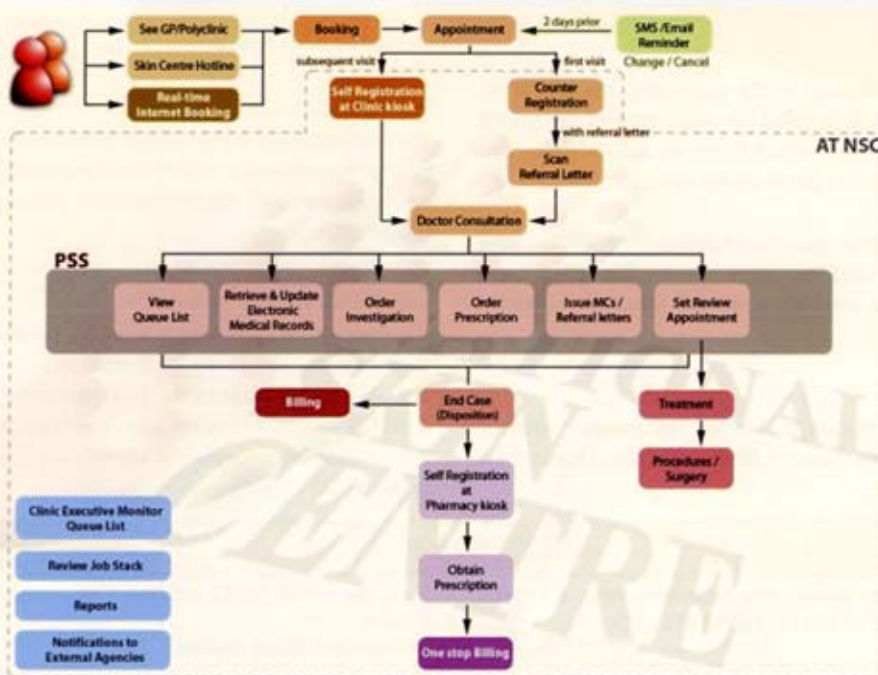


Medical Records used to be shelved in the Medical Records Room



Medical records are all now in the server

waiting time in real time and has a job stack module for our doctors. All these modules are integrated with its administration modules including inventories, purchase orders and acquisition, and financial system.



NSC - Vesalius System Overall Workflow Diagram

### How does the system work ?

#### Online internet appointment system:

Through the new system, patients now can log on to the NSC website at [www.nsc.gov.sg](http://www.nsc.gov.sg) 24 hours a day to book, change or cancel an appointment.

#### On the day of consultation visit:

2 days prior to the appointment, the system sends a reminder via SMS, email or telephone. The patient can then confirm, change or cancel the appointment.

#### Registration :

On the day of the appointment, patient registration waiting time is reduced significantly through the use of the self-registration kiosks where patients

scan their NRIC or outpatient card. A queue slip will be issued, with instructions on where to go and what to do next.

Assistance over the counter is available for first-visit patients or patients with referral letters. Referral letters will be scanned immediately into patients' electronic records.

#### Consultation Queue:

In the consultation room, a queue list of registered patients enables our doctors to select patients according to appointment time. The system can also identify patients with special needs, monitor their arrival and waiting times. The queue list will also alert the doctor of any patient left unattended for too long.

**Patient Support Electronic Medical Record System (EMR):**

Before calling up the patient, the doctor can retrieve the patient's digitised past medical records from the EMR system.



New self-registration kiosk



Doctors now key in diagnosis and prescription online.

During consultation, the doctors can perform the following functions:

- 1) Update patient records,
- 2) Order investigations and procedures electronically,
- 3) Order prescriptions on-line. The drug allergy and medical alert system will warn the doctors of any cross reaction between the drug he prescribes and those that patients are allergic to.
- 4) Enter ICD diagnosis codes, issue medical certificates, referral letters, referral to our MSW and request for follow-up appointments.

Pictures of patients' skin conditions are captured using digital camera and stored in the EMR folder for instant visual comparison of before and after treatment condition.

If treatment or procedure is to be done on the day itself, all the information will be routed electronically to the next station with the doctor's comments and instructions.

The prescription is sent electronically to the pharmacy. The electronic prescription allows the pharmacy to prepare the medication as the patient proceeds to the pharmacy. Patients without follow up appointments can proceed directly from the clinics to the pharmacy for one stop payment.

The system captures all prescription patterns of doctors in NSC. The data collated can subsequently be used to create an artificial intelligence system that will prompt for the most cost-effective treatment option of various diseases.

**The clinic monitoring system:**

The Clinic Executive uses the system to monitor and manage patients' waiting time in various consultation rooms. Patients who waited too long are re-assigned to other rooms.

**Job Stacks:**

This module captures all follow-up actions required by the doctor. Previously, tasks like reviewing abnormal laboratory reports, medical report writing, GP referral replies, statutory disease notification etc were time consuming to track, but the NSC system now allows our doctors to clear their administrative work at day end. Letters can be dictated using its digitised voice activation system.

**Other modules:**

The fully integrated system includes backroom functions like medical records coding, referral replies and a full purchase and inventory system. Purchase requisitions are now raised and approved on line for conversion to purchase orders, while departmental requisitions for supplies have also gone paperless.

**Down Time EMR:**

A down time EMR module is available, where patients' medical transactions and records are downloaded into the doctors' PC every night. Should the system server break down, the doctors will still have access to basic information.



User friendly graphic interface for the doctors to key in their diagnosis.



Nursing orders are also done through the system.

**Reports and Surveys:**

The new electronic system allows customisation of reports including waiting time for appointments, waiting time for consultation, lab tests, prescriptions, etc. Integration with our SPSS statistic software allows our staff to mine all relevant data.

**Conclusion**

NSC management has always made it a top priority to harness IT to improve staff productivity and enhance patient care. This paperless electronic system has impressed many patients. The user-friendly design has won over all the staff. The 100% participation among our doctors is evidence that the system has successfully engaged the variable and complex nature of medical care within NSC.

What people say ...	
I have enjoyed using the computer system very much as my notes are neater now and the IT team members are cheerful, helpful and dedicated. <b>Dr Lawrence Khoo, Consultant.</b>	I am impressed. [NSC] initiated a new computerised system before the other hospitals. <b>Mr Lim Keok Meng, Patient</b>
Convenience at its best. I can check prices, send prescriptions online and access my patients' medical case notes at the click of the mouse. <b>Dr Audrey Tan, Associate Consultant</b>	The new scanning machine is excellent. Saves a lot of time in the distribution of queue numbers. <b>Ms Han, Patient</b>
The LIS (Laboratory Information System), which connects our machines to the Versalius System, has shortened the turnaround time for immediate test requests tremendously. <b>Mr Lee Sau Chuen, Laboratory Manager</b>	I got my medication from the pharmacy without much wait. The new system is definitely faster. <b>Mr Daniel Chan, Patient</b>
Waiting time can now be easily tracked with the new system. This way we can ensure that the patient would not be kept waiting. <b>Sister Kong, Clinic Executive</b>	I can now collect medications at the pharmacy the moment I come down from the clinics without a prescription chit. Excellent. <b>Ms Geng, Patient</b>
Patients' e-prescriptions are sent ahead of their arrival in the pharmacy, so that we can prepare them in advance. We love to see the look of amazement on some of our patients' faces when their numbers are flashed even before they sit down! <b>Ms Valerie Chan, Senior Pharmacy Technician</b>	Everything seems faster since the computerisation of the Centre. <b>Mdm Jessie Chai Ah Moy, Patient</b>
	I was surprised that I no longer need to get a prescription slip from the doctor to get my medication in the pharmacy. <b>Ms Valerie Chin, Patient</b>

