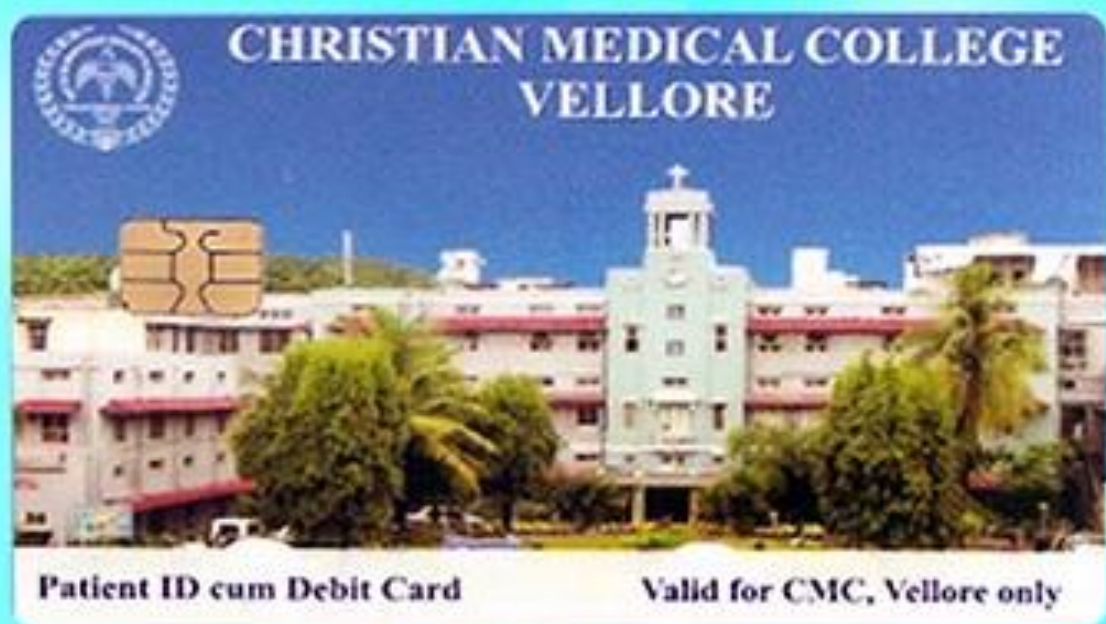


CHRIS CARD

CMC's innovative in-house debit card



Christian Medical College
Vellore

PART I

AWARD APPLIED BY:

PRIVATE SECTOR ORGANIZATION

PART II

INTRODUCTORY INFORMATION

PROJECT NAME: “CHRIS CARD” – CMC’s innovative in-house debit card

INSTITUTE: Christian Medical College, Vellore

AWARD CATEGORY APPLIED FOR: SKOCH DIGITAL INCLUSION AWARD - Health

ADDRESS:

Christian Medical College,

Ida Scudder Road,

Vellore, Tamil Nadu – 632004

India

Telephone: 0416-2282010

Email: director@cmcvellore.ac.in

PROJECT COMMENCEMENT DATE: August 2006

PROJECT COMPLETION DATE: November 2006

DETAILS OF RESPONDENT:

Dr. Sunil Chandy,

Director,

Christian Medical College,

Vellore, Tamil Nadu – 632004

India

Telephone: 0416-2282010

Email: director@cmcvellore.ac.in

CHRIS CARD – Christian Medical College’s innovative in-house debit card

Overview of the project

The Christian Medical College, Vellore (CMC) is an unaided, Christian minority health care institution with a special mandate to offer world class health care to all sections of the society, using cost effective, caring technology.

One of the fundamental problems faced by patients and their relatives in accessing health care, is the unavailability of ready cash to book appointments and pay for investigations, medications and in-hospital care. ATMs place a limit on the amount of money that can be withdrawn per day; many patients do not have credit or debit cards; and while carrying around large sums of money, patients fall prey to pickpockets, touts and other antisocial elements. From an organizational point of view, patients counting large sums of money at cash counter cause delays, and introduce an element of inefficiency which is detrimental to the smooth functioning of a large health care institution. Recognizing this, the CMC’s Department of Computerized Hospital Information Processing Services (CHIPS), came up with an in-house innovation - the CMC debit card, dubbed the ‘CHRIS’ card, which helps patients pay for their appointments, investigations, medications, and inpatient bills. The CHRIS card is issued to patients who do not want to carry hard cash in hand and has a microchip which can store information and cash similar to any debit card. Each CHRIS card is patient ID specific with a protected password, has lifetime validity, and no service charges.

Challenges faced before deployment of the project

Any new project is first accepted with a lot of reluctance. In this case, cashiers were afraid of losing their job and were hesitant to promote the product.

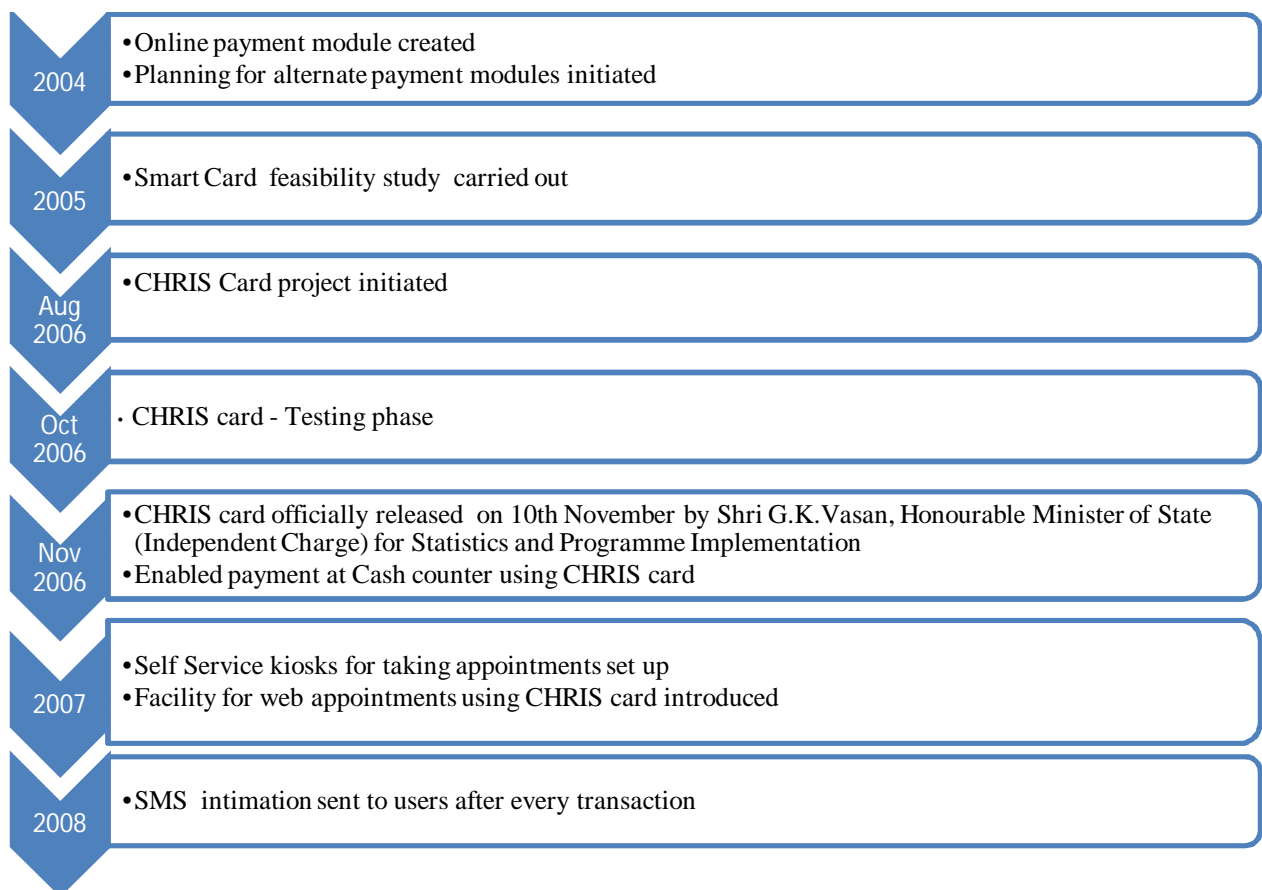
Objective of the project

The objective of this project was to improve the patient's hospital experience by allowing him to move around without the fear of being robbed, and avail special privileges such as the use of a separate counter for quick transactions.

Description of the implemented project

The CHRIS card project began in August 2006, and by November 2006 was ready to be rolled out. Figure 1 describes the various steps in the development process.

Figure 1: Timeline showing the evolution of the CHRIS card concept



The CHRIS Cards are pre-manufactured from a vendor with default security code and stocked in the Medical Records Department. Depending on the demand, approximately 200 cards/ day are

activated. At the time of issue, each card is customized for that particular patient by generating a new security code along with a random pin number, with the patient's ID number printed on the card. Since every CHRIS Card is assigned a unique patient ID, all transactions through a card can be done for that patient only.

The cards that are activated are sent to OP Services along with sealed envelopes containing the password and instructions for use. The cashier prints the hospital number and loads money in the CHRIS card for those patients who opt for this service. Thereafter, the patient can use the activated card at any cash counter to pay for his / her transactions. Each time a patient uses his CHRIS card, an SMS is sent to the mobile number linked to the card showing transaction details and balance.

The minimum deposit to avail a CHRIS Card is INR 5000, but there is no upper limit to the amount of cash that can be loaded. Once a patient's treatment is completed, the balance amount is refunded and the card returned back to the patient for use at the next visit. Alternatively, the patient can keep the card with the balance amount, use it till zero balance, and refill again. The patient can keep the card with cash loaded in it for as long as he wishes, as the card has life time validity.

In order to encourage usage by patients, the CHRIS card is widely publicized at cash counters and Out-patient services throughout CMC; CHRIS card machines are deployed in the Outpatient Services at all new registration counters, CHRIS card readers are installed at all cash counters and select Out-patient services for easy patient access, and counters have been set up to cater exclusively to patients with CHRIS cards.

HOW TO USE CHRIS CARD FOR TRANSACTIONS

GO TO A CHRIS CARD KIOSK



INSERT YOUR CHRIS CARD

 General InFormation	<p>CASHLESS SERVICE For REPEAT REGISTRATIONS & ALL PAYMENTS</p> <p>USE "CHRIS CARD" (CMC Smart Card)</p>  <p>Please Insert Your Smart Card</p> <p>Contact Cash Counters for Purchasing CHRIS Card</p> <p>Christian Medical College, Vellore.</p>
 Appointments	
 Pay InPatient Bill	
 Check Your Balance	
 Change Your Password	
View Appointments	
 Help	

ENTER PIN NUMBER

General InFormation

Appointments

Pay InPatient Bill

Check Your Balance

Change Your Password

View Appointments

Help

Welcome TESTING RECORD

Enter your PIN Number

0	1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	!	#	\$	%
			^	&	*				

VIEW AVAILABLE APPOINTMENTS

View Next Appointment

Clinic code CARDIOLOGY 1

Private Consultant
 General Doctors

CLOSE

S.No	Doctor Name	OPD Days
0	All Doctors	
1	GEORGE JOSEPH	TUE, FRI,
2	OOMMEN K GEORGE	TUE, FRI,
3	SUNIL THOMAS CHANDY	TUE, WED, FRI,

New Appointment


S...	Doctor Name	Appointment	Availa...
1	GEORGE JOSEPH	27/03/2007	12
2	OOMMEN K GEORGE	27/03/2007	76
3	SUNIL THOMAS CHANDY	27/03/2007	145
4	VIJI SAMUEL THOMSON	27/03/2007	20
5	SUNIL THOMAS CHANDY	28/03/2007	89
6	GEORGE JOSEPH	30/03/2007	18
7	OOMMEN K GEORGE	30/03/2007	82
8	SUNIL THOMAS CHANDY	30/03/2007	149
9	VIJI SAMUEL THOMSON	30/03/2007	21


Repeat Appointment


S...	Doctor Name	Appointment	Availa...
1	GEORGE JOSEPH	27/03/2007	1
2	OOMMEN K GEORGE	27/03/2007	75
3	SUNIL THOMAS CHANDY	27/03/2007	63
4	VIJI SAMUEL THOMSON	27/03/2007	16
5	SUNIL THOMAS CHANDY	28/03/2007	90
6	GEORGE JOSEPH	30/03/2007	21
7	OOMMEN K GEORGE	30/03/2007	88
8	SUNIL THOMAS CHANDY	30/03/2007	77
9	VIJI SAMUEL THOMSON	30/03/2007	19


Designed and Maintained by CHIPS
Version 1.0.2


BOOK REPEAT APPOINTMENTS

 **General InFormation**


 **Appointments**

 **Pay InPatient Bill**

 **Check Your Balance**

 **Change Your Password**

View Appointments

 **Help**

PUSHPA EAPEN




This Unit functions only on Monday,Wednesday,Friday

April					2007	
Mon	Tue	Wed	Thu	Fri	Sat	Sun
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						


26/03/2007 ◀ ▶ 23/04/2007


◀ Previous Date
Next date ▶


◀ Previous Month
Next Month ▶


 *Cancel*
 *Finalize*
 *Back*


MAKE PAYMENTS

 **General InFormation**


 **Appointments**

 **Pay InPatient Bill**

 **Check Your Balance**


 **Change Your Password**

View Appointments

 **Help**

Amount To Pay

Rs. Three Hundred Eighty Five only

 *Make Payment*
 *Cancel*

Description of hardware and software products, technologies and solutions deployed in the project

Software: Oracle and VB

Hardware: Smart cards, Universal Smart Card Reader

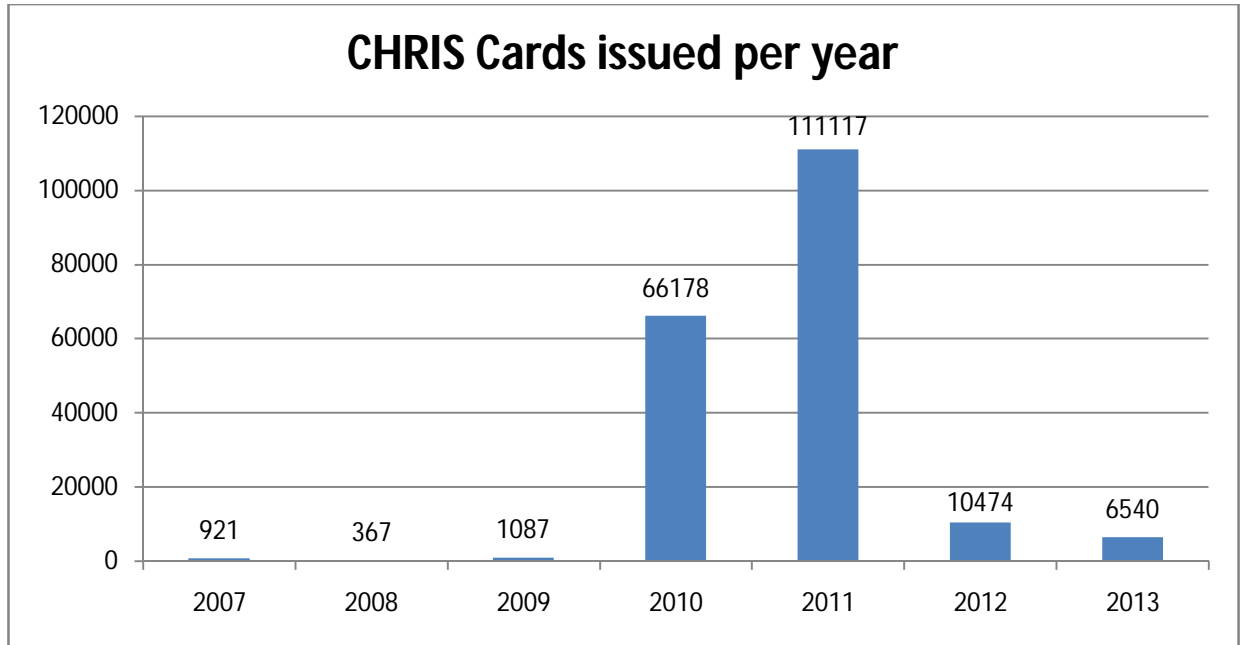
The CHRIS Card is fashioned from a PVC medium complying with ISO 7816-1 standards for its geometry. A silicon chip is implanted on one of its faces at a predetermined location as per ISO 7816-2 and is capable of processing, storing, and safeguarding thousands of bytes of data. Data reading and writing is possible only through the Card Operating System or DLL's supplied by the reader manufacturer. We use a Universal Smart Card Reader which is designed with a microcontroller to read and write information onto chip cards by means of an ISO 7816 compliant card plug and interface electronics. The reader receives all the commands to write data, read data and status read from the host serial port. The commands that are received on the reader port are processed and executed by writing or reading through the Smart Card Interface.

The reading and writing on chip is by means of I2C2 wire communication. The Reader works with the power drawn from the serial port of the PC. This is integrated with the payment module which runs on Oracle and VB.

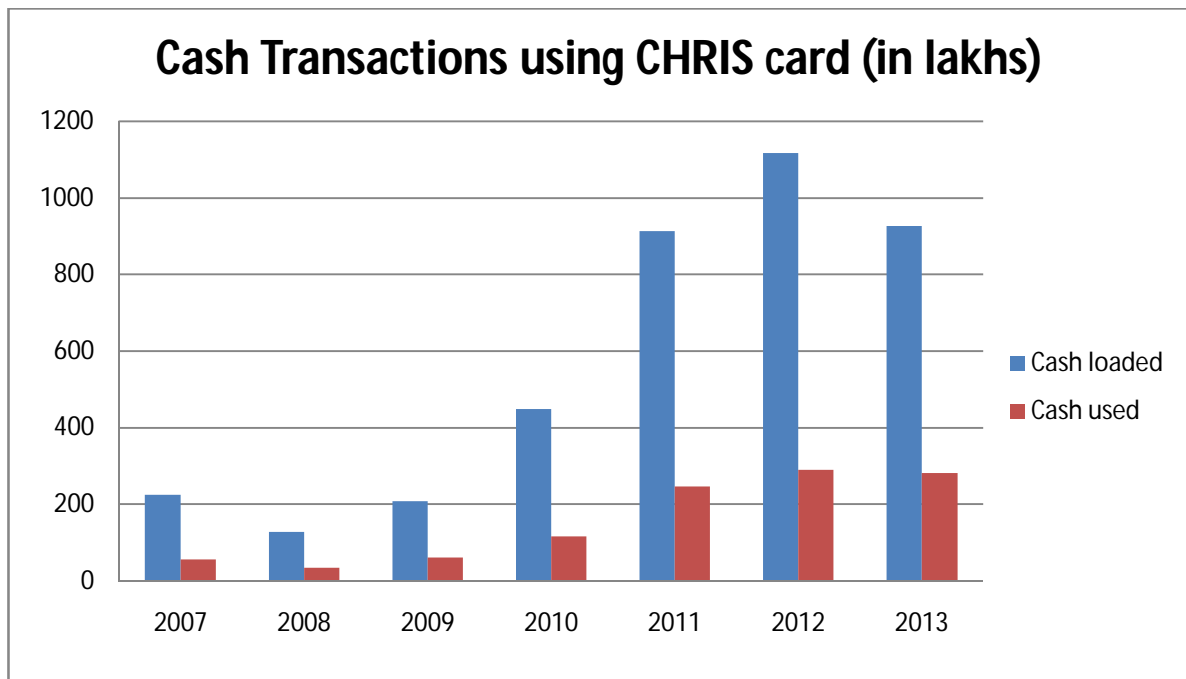
Details of coverage of the targeted population

Every year, Christian Medical College, Vellore serves 16.72 lakh outpatients in the main hospital and 4.7 lakh outpatients in its peripheral centers. We have 3049 beds (including peripherals) which cater to 1.3 lakh in-patients per year.

The graphs given below display the number of CHRIS cards issued per year and the volume of money transactions using CHRIS cards, since their introduction.



*Please note: During the year 2011 and 2012, a CHRIS card awareness drive was conducted and the administration decided to provide CHRIS card to every new private patient who registered in CMC. However, project evaluation showed that patients used the CHRIS card mainly as a patient ID, and hence it was decided to revert back to the policy of issuing CHRIS cards only on demand.



A total of 2, 95, 650 CHRIS cards have been issued to patients since the launch of this service. CMC currently deploys 12 CHRIS card machines and 48 CHRIS card readers to ensure easy money transactions throughout the hospital.

Comparison of pre-deployment scenario and post deployment benefits

Prior to the implementation of CHRIS Card, all transactions were paid for in cash through cash counters. Patients had to walk around with large sums of money for various payments, risking theft and loss. Patients reported a high degree of satisfaction with the introduction of the CHRIS card, because it allowed secure, hassle-free money transactions. Patients now use the CHRIS card to pre-book doctor's appointments via the internet, leading to an appreciable decline in incidents of exploitation by touts and middlemen.

Cost-effectiveness of the project

The CHRIS card is a smart card which acts as a debit card and patient ID card. Unlike other debit and credit cards, the CHRIS card does not levy any service charge as it has been customized with no cost on the purchase of software, maintenance and alteration costs. As opposed to this, the commercial solution would have cost CMC INR 2/- per transaction besides the initial payment and maintenance. Improved patient experience is a value addition to the project which is not measurable.

Details on extent of integration with other e-governance projects

The CHRIS card can be produced at cash counters all over CMC, to pay for investigations, medications and to settle in-patient bills. Apart from this, the CHRIS card can be used to book and confirm repeat appointments through the CMC website and the CMC Call center.

Details of cyber security measures in the project

A security code of three bytes is used to ensure cyber security. Each card has a unique security code, which is maintained internally and compared with supplied verification data in order to get write access. An error counter of three bit is also involved to avoid unauthorized tampering. In addition to the security code, each card is assigned a pin number which is patient specific, and can be changed by the patient. This offers an additional layer of security.

Future road map on coverage, up gradation and integration

CMC plans to issue similar smart cards to credit (company and insurance reimbursed) patients. We also plan to deploy CHRIS card machines in all out-patient clinics to facilitate easy cash payments throughout the hospital. As part of the up gradation plan, high-end self service kiosks will be deployed, where patients bearing CHRIS cards can pay for repeat appointments, investigations, medications and in-patient bills.

The CHRIS card development team

EBINEZER SUNDARRAJ	Sr. Systems Manager	B.Sc., M.C.A., M.Phil
ANITHA SHEBA RACHEL A	Systems Manager	B.TECH, M.S.
ANISHA R MACADEN	Systems Manager	B.Sc, M.C.A
LAKSHMIKANTHAN S	Sr. Programmer	B.Sc, M.C.A
VASANTHI S	Sr. Programmer	B.Sc, M.C.A

CURRICULUM VITAE

Ebinezar Sundarraj

Department of Computerized Hospital Information Processing Service (CHIPS)
Medical Informatics
Christian Medical College Hospital
Vellore - 632 004 (Tamil Nadu), India.

email: ebby@cmcvellore.ac.in
esundararaj@gmail.com

Date Of Birth: 14th April 1968

Gender: Male

Educational Qualifications:

Year	Qualification
2003	M.Phil. Manonmaniam Sundarnar University
1998	MCA Madurai Kamaraj University
1989	Post Graduate Diploma in Computer Applications(Rank Institute Madras)
1989	B.Sc.(Maths), Voorhees College, Madras University

Joined Christian Medical College, Hospital in the year 1990 and in 1991 started the first Clinical Network in the Department of Neurological Sciences., extending the IT services to Operation theatre, ICU's, Wards, Consultants room and Neuro Labs. In the year 2001 was promoted as EDP Manager of the Christian Medical College, started the New Hospital Information System (HIS), Today CMC is an institution with more than 3000 beds and 6000 outpatients on a given day with 8400 employess, The IT needs of this 112 Years institution is fully taken care by the In-House team. All the five campuses are connected through Optical Fibre and through Wireless connections

Nature of Job: Project Architect and Database Administrator (Oracle)

WORK EXPERIENCE

Year	Post Held
2014-	General superintendent for CMC hospital
2013-	Head of department- (CHIPS)
2012-	Sr.Systems Manager
2010-2012	Systems Manager
2001-2010	EDP Manager
1995-2001	Programmer-Sr.Programmer

Worked as Senior Developer & Site Manager at NORMAH, Kuching Malaysia
Eutech Cybernetics Ltd, Malaysia (Health Care Division) for 3 months March – May 2000

Worked as HIS Consultant, for Bosco Institute of Information Technology (BIIT), Yelagiri
November 2010 – February 2011

Project Details in Brief:

HIS(Hospital Information System):

Introduced RDBMS (Oracle) in CMC. Storage of the patient's life-time clinical record was planned and the migration of existing data from Fox to Oracle spearheaded. CHIPS now provides 24/7 services with no downtime for backups and 99.2% service uptime. Planned and implemented the integration of various function in different sections of the hospital – Laboratories, Medical Records Department (MRD), Pharmacy, Dietary, in-patient (IP) and out-patient (OP) areas, New practices for the Admission-Discharge-Transfer process were introduced and Online Bed Availability Status viewing was enabled. The Human Resource Management module was started and categories (staff, dependants, students, etc) commanding medical benefits were streamlined. The Theater billing processes, tariffs, and clinical data entry were streamlined. This not only resulted in financial profit, but also provided ready clinical data for surgeons. IP & OP billing processes were redefined and all existing computer modules were integrated with the billing module so that all billing information was available online.

Finance:

Planned and implemented all the finance software like Payment cashbook, Ledger, Receipt Cash books, Trail balance and salary and salary related modules that is currently running CMC. Planned and Migrated the old finance data from the Fox to the new System. **Contactless security cards** for authentication was introduced for all rule based financial transactions.

Networks:

A new networking infrastructure was introduced - a CISCO network with Virtual Private Networks and security walls was put in place which enabled CHIPS to extend Clinical services to the entire CMC residential campus through broadband. Currently the number of active nodes at a any given point of time is around 3000. Planned the implementation of MAN (metro area network) covering 5 campuses on fiber with RF as redundancy. Planned the implementation of WAN to get connected to internet and Telemedicine . Planned the implementation of LAN on traditional Ethernet to interconnect 3000 and odd computers to access HIS, intranet and internet. Optical fiber LAN has been implemented on residential quarters to access Intranet, PACS and HIS at residence to attend on emergencies.

Extension to Peripherals:

All peripheral hospitals were connected to the main hospital network through optic fibre. All existing software modules were extended to Schell Hospital, LCECU, Rehabilitation Institute and MHC, CHAD and RUHSA

CHRIS Card and Net Banking:

A customized cost-effective smart card solution with full security features was introduced. E-account holders of banks like Punjab National Bank and IOB can now make web payments and appointments online through a module provided by CHIPS. Credit card holders of any bank can make payments through the payment gateway of ICICI Bank.

SMS and Paging:

Introduced, planned and implemented the Customized SMS Gateway, web paging, multi-line telephonic paging and CART (Cardiac Arrest Resuscitation Team) paging for priority paging.

Purchase and Material Management Module:

Planned and set the work flow for the Purchase and Material management module for the process of procurement, receiving and distribution of all the items in CMC which is linked to the finance module.

Implementation of RAC & Oracle Database administrator:

Deployed Oracle RDBMS and been the Database administrator for oracle databases since it was started in 2000. Migrated to the current setup consisting of RAC (Real Application Cluster) 3 Node environment with a two node RAC for business continuity (Disaster Recovery) and a separate data mining server. Planned the migration from Oracle Database 11g, Enterprise Edition with Real Application Clusters and implement Oracle Enterprise Manager to achieve 99.999% availability and eliminate system downtime during scheduled maintenance. The upgrade also improved system performance by approximately 50%.

Senior Training Fellowship Award

Visited various Health Care Centers in USA between September 2000 – December 2000 for studying Clinical Information Systems

EDGE Award – 2011 for the Hospital Information Systems

Other Administrative work

Member, IT Policy Committee

Member, Salary Revision(2008) Committee

Member, Salary Anomaly Consideration Committee

Member, Information Technology Advisory Committee

Member, Computer Sub committee

Member, Employees Grievances Redressal Committee (Class 1 Employees)

Member, Hospital Billing & Tariff Committee

Christian Medical College

Ida Scudder Road,
Vellore, Tamil Nadu - 632004
India

Telephone : 0416-2282010
Email: director@cmcvellore.ac.in