

# *Indian Health Service Electronic Health Record*

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Information Systems Advisory Council  
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HOME

ABOUT IHS

SITE MAP

HELP



# IHS · EHR Electronic Health Record



EHR Home

Clinical  
view

Technical  
view

Walk Through

Preparing for EHR

EHR Training  
sessions

Current Status

EHR Program  
facts

Health Information  
Management System  
(HIMS) Application

Presentations

FAQ

Feedback  
only

Access  
for New  
Users  
Late User  
Registration  
Improve User

Listserv

## EHR Presentations

This page contains links to presentations that have been made recently about the IHS Electronic Health Record. They are shared for your interest and information.

**Please note that information in these presentations was current as of the date they were presented. Some information may no longer be current, as the software development and testing process is fluid, and some issues change over time. Presentations will be removed from this site if their content is no longer relevant.**

- This presentation was offered in workshops at the 2005 Annual IHS Combined Councils Conference in San Diego. It includes some early metrics from EHR sites as well as discussion of suggested preparation activities.  
[NCCD 022805](#) [PPT-2.2MB]
- The following presentation was made in August 2004 to the IHS Technical Conference held in Scottsdale. The emphasis was on facility preparation for EHR. The open forum including presentations by Drs. Byron and Rudd on the Crow and Warm Springs experience is not captured in this show.  
[IHS EHR Tech Conf 042504](#) [PPT-1.1KB]
- This presentation was offered by Dr. Miles Rudd at the IHS Technical Conference, in August 2004. It describes the EHR implementation experience at Warm Springs Health Center.  
[EHR Business Process Improvements](#) [PPT-292KB]
- This presentation was prepared for a site manager's conference in August 2004. It describes the EHR preparation process from the Warm Springs perspective.  
[Preparing for EHR](#) [PPT-647KB]
- The following presentation was made in April 2004 to the joint Health Information Management and Business Office conference held in Reno NV. The emphasis in this presentation is on the impact of EHR on medical records, data entry, coding and billing staff.  
[IHS EHR HIM-BO Mtg 042204](#) [PPT-272KB]

[www.ihs.gov/cio/ehr](http://www.ihs.gov/cio/ehr)

**Demo Patient**  
 1 20-Mar-1947 (57) F

**GENERAL 22-Feb-2005 13:48**  
 LAMER, CHRISTOPHER CLAYTON

Primary Care Team Unassigned

Postings  
**CAD**

**Alerts**

No Alerts Found


**Reminders**

No Reminders Found


**Appointments/Visits**

Appointment/Visit	Date	Status
Payne	12-Apr-2005 14...	
Payne	29-Mar-2005 1...	CANCELLED BY PATIENT
FARRELL FP-15	16-Mar-2005 1...	
Payne	01-Mar-2005 1...	
ULTRASOUND-2	25-Feb-2005 0...	CANCELLED BY PATIENT
PT student	22-Feb-2005 1...	CANCELLED BY CLINIC
CONTINUITY O...	22-Feb-2005 1...	AMBULATORY
HYDE-G SAME ...	22-Feb-2005 1...	
<PHYSICAL TH...	22-Feb-2005 0...	AMBULATORY
<PHYSICAL TH...	22-Feb-2005 0...	AMBULATORY
HYDE-G SAME ...	18-Feb-2005 1...	CANCELLED BY CLINIC
HYDE-G SAME ...	18-Feb-2005 1...	CANCELLED BY CLINIC
PT student	18-Feb-2005 1...	CANCELLED BY CLINIC
<PHYSICAL TH...	18-Feb-2005 1...	AMBULATORY

**Crisis Alerts**

Crisis Alert	Date
ADVANCE DIRECTIVE	25-Jan-2005 13:47
CRISIS NOTE	06-Jul-2004 11:12

**Problem List**

Error Retrieving Problem List...


**Lab Orders**

Lab Order	Status	Date
HGB BLOOD S...	COMPLETE	02-Feb-2005 10:52
URINE DIPSTIC...	COMPLETE	14-Feb-2005 12:39

**Adverse Reactions**

Agent	Reaction
ALLERGIC TO FLIES	WEIGHT GAIN
ASPIRIN	
BEE STINGS	HIVES, ANXIETY
EASY OPEN CAPS	EASY OPEN CAPS
EGGS	RASH
FLIES	
IODINE	ANAPHYLAXIS
METOCLOPRAMIDE	DROWSINESS
PEANUTS	HIVES
PHENYLEPHRINE/PRO...	muscle irritability
POLLEN EXTRACTS FRE...	CHILLS
POVIDONE IODINE	RASH
SILVER NITRATE	DERMATITIS, CONTAC...



# *The EHR Challenge for IHS*

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- Produce or acquire an Electronic Health Record system that:
  - Meets clinical and business needs of both Tribally and Federally operated facilities
  - Is scalable to the needs of facilities ranging from small rural clinics to medium-sized hospitals
  - Is affordable to facilities with no resource cushion or ability to borrow
  - Is sustainable into the future



# *RPMS – Elements of an EMR*

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## *for up to 20 Years*

### **Existing elements**

- Registration
- Scheduling
- Pharmacy app
- Radiology app
- Laboratory app
- Immunizations
- Reminders (passive)
- Problem List
- Health Summary
- Other PCC functions
- Billing
- More . . .

### **Lacking elements**

- Provider order entry
- Note authoring
- Point of care data entry
- GUI usability
- Active reminders & notifications



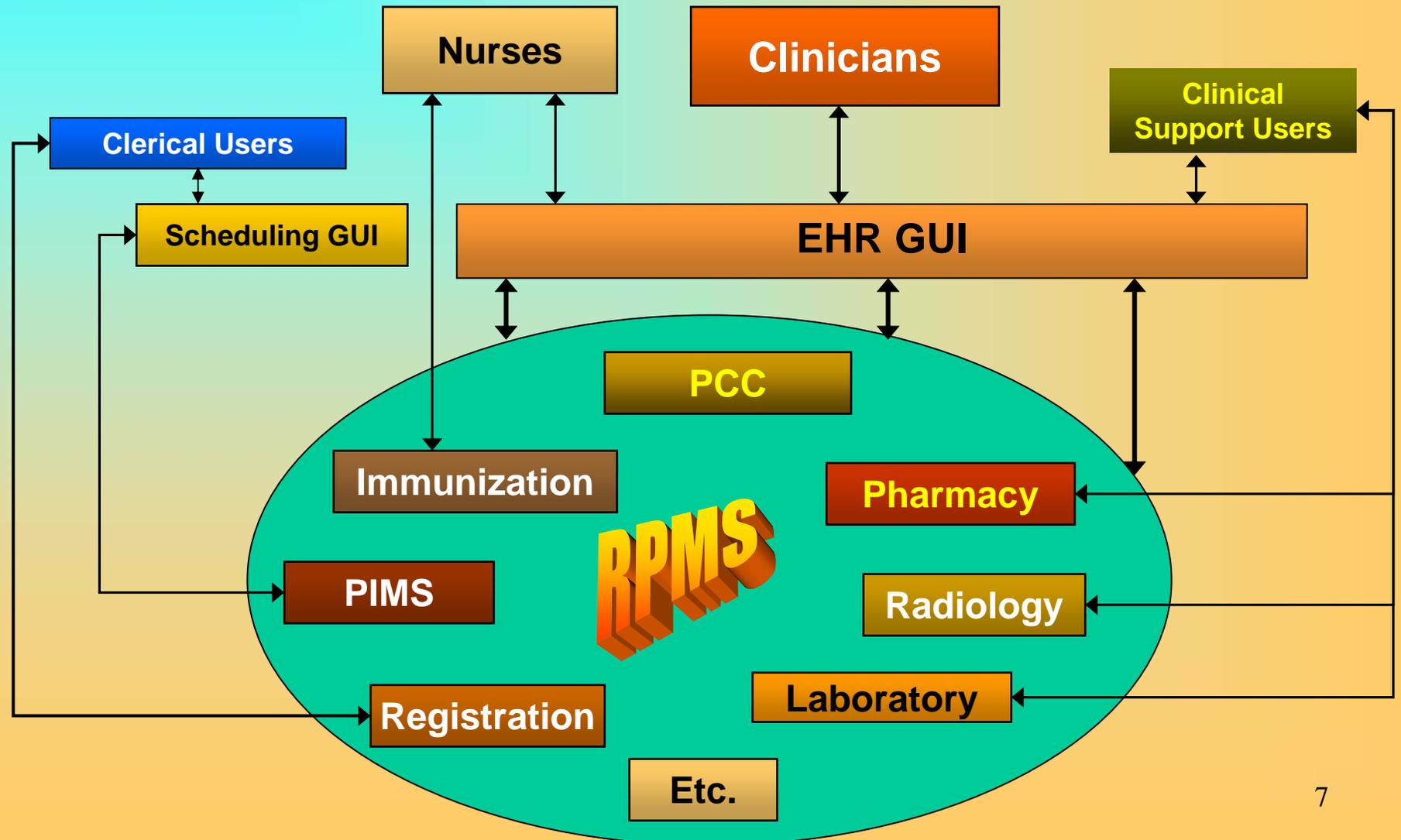
# *What is IHS EHR?*

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- Integrated RPMS database
  - Applications adapted from VHA or developed by IHS
- Graphical User Interface
  - User-friendly and intuitive access to RPMS database for clinicians and other staff
  - Components derived from VHA (CPRS) or developed internally for I/T/U needs
  - Proprietary “framework” for presentation of various GUI components
    - Licensed from Clinical Informatics Associates<sub>6</sub>



# *EHR/RPMS/User Relationships*





# *Advantages of IHS EHR*

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- Retains existing RPMS database
  - Users have access to all prior RPMS data
- Same data from EHR and non-EHR sites
  - No interfacing or reformatting of data for national exports
- Extensive customizability at local level
- Full integration of RPMS applications
- Very low cost, no license fees
- Future growth/development guaranteed
  - Ongoing partnership with VHA, other developers

**Doe, Jane**  
3 31-Dec-1957 (47) F

**CHEROKEE DIABETES PRINCIPLE** 02  
LAMER, CHRISTOPHER CLAYTON

Primary Care Team Unassigned

Postings WA

- Cover Sheet**
- Overview
- Triage**
- Visit Vitals
- Vitals
- Screening
- Health Promotion**
- Patient Education
- Immunizations
- Visit Codes**
- Problem List
- Diagnosis/POV
- Procedures
- EM Calculator
- Ordered Items**
- Lab Results
- Medication List
- Orders

**Diagnosis/POV**

**ICD Pick-Lists:** Display:  Freq. Rank  Code  Description Cols: 4

<input type="checkbox"/> 001: Acne	<input type="checkbox"/> 005: Tinea Versicolor	<input type="checkbox"/> 009: Rosacea	<input type="checkbox"/> 013: Dermatofibroma
<input type="checkbox"/> 002: Atopic Dermatitis	<input type="checkbox"/> 006: Seborrhea	<input type="checkbox"/> 010: Impetigo	<input type="checkbox"/> 014: Psoriasis
<input type="checkbox"/> 003: Seborrheic Keratosis	<input type="checkbox"/> 007: Benign Nevus	<input type="checkbox"/> 011: Actinic Keratosis	<input type="checkbox"/> 015: Onychomycosis
<input type="checkbox"/> 004: Contact Dermatitis, Unspecified	<input type="checkbox"/> 008: Warts	<input type="checkbox"/> 012: Molluscum Contagiosum	<input type="checkbox"/> 016: Intertrigo

Show All

**Historical Diagnosis** Add to PL Set as POV

Visit Date	POV Narrative	ICD	ICD Name	Facility
05/27/2005	Atrial Fibrillation	427.31	Atrial Fibrillation	Ciha Hospital
05/27/2005	Atrial Fibrillation	427.31	Atrial Fibrillation	Ciha Hospital
05/27/2005	Acute myocardial infarction, unspecified site, initial episode of care	410.91	Ami Nos,init Care	Ciha Hospital
05/27/2005	Family History of Diabetes Mellitus	V18.0	Fam Hx-diabetes Mellitus	Ciha Hospital
05/27/2005	Asthma, unspecified type, with status asthmaticus	493.91	Asthma W Status Asthmat	Ciha Hospital

**Visit Diagnosis:** Add Edit Delete

Provider Narrative	ICD	ICD Name	Priority	Cause	Injury Date	Injury Cause	Injury Place	Modifier	Onset Date	Stage
Acute myocardial infarction, unspecified site, initial episode of care	410.91	AMI NOS,INIT CARE	Primary							



# *EHR Milestones and Status*

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- IHS EHR was certified January 2005
- 7 test sites participated in 2004
- Presently 26 facilities use EHR
- Several more have software and will implement soon
- Goal for all Federal sites to be using EHR by end of 2008
- Tribal sites encouraged to use EHR as well



# *Thank You Test Sites!!*

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- Wind River (WY)
- Crow (MT)
- Warm Springs (OR)
- Cherokee (NC)
- WW Hastings (OK)
- Fort Defiance (AZ)
- Gila River (AZ)



# *Why “Certified” vs “Released”?*

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- Pharmacy 5/7 and EHR GUI are “Certified” but not “Released”
- “Released” implies software files are available to any site for download / installation
- Pharmacy and EHR GUI files are released in controlled fashion to sites who meet specific software and site preparation prerequisites





# *Current Deployment*

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- [http://www.ihs.gov/CIO/EHR/index.cfm?module=gui\\_facilities](http://www.ihs.gov/CIO/EHR/index.cfm?module=gui_facilities)



# *Additional Area-Identified Sites*

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- Winnebago
- Pine Ridge
- Fort Totten
- Flandreau
- Fort Thompson
- SEARHC
- Kodiak
- Taos
- Cass Lake
- Yakama
- Colville
- Micmac
- Poarch Creek
- Kayenta
- Claremore
- Fort Duchesne
- Fort Yuma
- Parker
- Salt River
- Fort Hall
- Neah Bay
- Westside Clinic



# *Current Development*

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- [http://www.ihs.gov/CIO/EHR/index.cfm?module=enhancement\\_development](http://www.ihs.gov/CIO/EHR/index.cfm?module=enhancement_development)

**Demo Patient**  
 1 20-Mar-1947 (57) F

**GENERAL 22-Feb-2005 13:48**  
 LAMER, CHRISTOPHER CLAYTON

Primary Care Team Unassigned

Postings  
**CAD**

**Medications**

View Action

Action	Outpatient Medications	Expires	Status	Last Filled	Refills Rem...
	AMOXICILLIN= 250MG CAP Qty: 1 for 1 days Sig: TAKE TWO CAPSULES BY MOUTH ONCE FOR INFECTION TREATMENT; TAKE UNTIL FINISHED	Feb 04,06	Active	Feb 03,05	2
	METFORMIN= 500MG (PLAIN) TABS Qty: 60 for 30 days Sig: TAKE ONE TABLET BY MOUTH TWICE A DAY TAKE WITH FOOD FOR DIABETES TREATMENT	Nov 13,05	Active	Nov 14,04	11
	CARBAMAZEPINE= 200MG TAB Qty: 60 for 30 days Sig: TAKE ONE TABLET BY MOUTH TWICE A DAY	Aug 21,05	Active	Jan 24,05	0
	ASPIRIN= 325MG TAB,E.C. Qty: 30 for 30 days Sig: TAKE ONE TABLET BY MOUTH DAILY - DO NOT CHEW	Mar 19,05	Active	Feb 17,05	0
	AEROCHAMBER SPACER WITH MASK (MEDIUM) Qty: 1 for 30 days Sig: USE AEROCHAMBER WITH INHALER AS DIRECTED	Mar 19,05	Active	Feb 17,05	0
	AEROCHAMBER SPACER WITH MASK (LARGE) Qty: 1 for 30 days Sig: USE AEROCHAMBER WITH INHALER AS DIRECTED	Mar 19,05	Active	Feb 17,05	0
	AEROCHAMBER DEVICE WITH MASK (SMALL) Qty: 1 for 30 days Sig: USE AEROCHAMBER WITH INHALER AS DIRECTED	Mar 19,05	Active	Feb 17,05	0
	COAL TAR SHAMPOO 5% (PENTRAX) Qty: 236 for 30 days Sig: SHAMPOO TO AFFECTED AREA DAILY (MASSAGE INTO WET HAIR/SCALP. RINSE)	Mar 19,05	Active	Feb 17,05	0
	SPACER (TUBE) Qty: 1 for 30 days Sig: 1 ADAPTER WITH INHALER AS DIRECTED	Mar 18,05	Active	Feb 16,05	0
	BENADRYL-MAALOX:XYLOCAINE 1:1:1 Qty: 30 for 30 days Sig: TAKE 5 ML (1 TSP) BY MOUTH AS DIRECTED	Mar 18,05	Active	Feb 16,05	0
	BUTALBITAL,APAP, CAFFEINE TABS Qty: 1 for 1 days Sig: TAKE 1 TABLET BY MOUTH EVERY 4 HOURS IF NEEDED	Mar 17,05	Active	Feb 15,05	0
	SODIUM CHLORIDE SOL., NASAL SPRAY (45ML) Qty: 45 for 30 days Sig: SPRAY 1 SPRAY INTO EACH NOSTRIL TWICE A DAY	Mar 17,05	Active	Feb 15,05	0
	IPRATROPIUM/ALBUT MDI <14.7GM> Qty: 14.7 for 30 days Sig: INHALE 1 PUFF BY MOUTH EVERY 6 HOURS SHAKE WELL BEFORE USING	Mar 15,05	Active	Feb 13,05	0

Action	Inpatient Medications	Stop Date	Status
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# *Preparation for EHR*

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- Software infrastructure
  - Cache
  - Fileman & Kernel patches
  - PIMS
  - Radiology 5.0
  - Laboratory 5.2 (current patches)
  - Ensure all applications are patched up to current levels



# *Preparation for EHR (cont'd)*

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- Pharmacy drug file preparation
- Pharmacy staff training
- Scheduled installation of EHR v1.0
  - Numerous VA applications required for EHR
  - Order Entry / Results Reporting application
  - Pharmacy 5/7 applications
  - EHR GUI files
- Use Pharmacy apps for at least 3-6 mos



# *Preparation for EHR (cont'd)*

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- EHR Overview & Lessons Learned course
- Multidisciplinary EHR team meeting regularly
- Basic CAC/Implementation team training
- On-site EHR setup visit
- On-site super end-user training
- On-site EHR go-live visit
- EHR team continues to meet
- Site metrics – data collection

Doe, Jane  
21-Dec-1957

PHARMACY 21-Dec-2004 09:  
LAWER CHRISTOPHER CLAYTON

Contraceptive

- ORAL CONTRACEPTIVES
- Brevicon 28
- Levlen
- Loestrin FE 1/20
- Loestrin FE 1.5/30
- Norinyl 1/35
- Ortho Novum 7/7/7
- TriLevlen

Medication Order

ETHINYL ESTRADIOL/NORETH

Display Restrictions/Guidelin

Dosage	Complex
1 TABLET LOESTRIN 1/20 FE (2	
1 TABLET NORINYL 1/35 (28)	
1 TABLET ORTHO-NOVUM 1/35	
1 TABLET BREVICON-28	
1 TABLET ORTHO NOVUM 7/7/	
1 TABLET LOESTRIN 1/20 FE (2	
1 TABLET LOESTRIN 1/20 (21)	
2 TABLETS LOESTRIN 1/20 (21)	
1 TABLET NORETHI...	

Comments:

Days Supply	Quantity
28	28

LOESTRIN 1/20 FE (28)  
TAKE ONE TABLET BY MOUTH  
Quantity: 28 Refills: 11

SHAKE  
Quant  
LINEZ  
TAKE ONE TABLET BY MOUTH DAILY  
Quantity: 90 Refills: 0

\*FERRIC NA GLUCONATE INJ.SOLN  
12.5MG/ML  
INJECT 125MG INTRAVENOUSLY  
WEEKLY  
Quantity: 1 Refills: 4  
BISMUTH SUBSALICYLATE

Restrictions/Guidelines

Oral Contraceptive Comparison Chart

Product	Estrogen	Progestin	Androgen
-----			
Monophasic			
Ortho-Cept	++	++++	+
*Levlen	++	++	++
Nordette	++	++	++
Nordette	++	++	++
Lo Ovral	++	++	++
*Demulen 1/35	+	++++	++
*Demulen 1/50	++	++++	++
*Loestrin 1/20	+	+++	+++
*Loestrin 1.5/30	+	++++	+++
Brevicon	++++	+	+
Modicon	++++	+	+
Ovcon 35	++++	+	+
*Norinyl 1/35	+++	+++	++
*Norinyl 1/50	+++	+++	++
Ortho Novum 1/35	+++	+++	++
Ortho-Cyclen	+++	+	+
Ortho Cept	++	++++	+
Desogen	++	++++	+
Ovcon-50	++++	+++	++
*Ovral	++++	++++	+++
Ortho Novum 1/50	+++	+++	++
Biphasic			
Jenest-28	+++	++	++
Ortho Novum 10/11	++++	++	++
Triphasic			
*Ortho Novum 7/7/7	++++	++	++
Ortho Tri Cyclen	+++	+	++
Tri-Norinyl	++++	++	++
*Tri-Levlen	++	+	++
Triphasil	++	+	++
Progestin only			
*Micronor	None	+	+
Ovrette	None	+	+
-----			
-			
<b>Estrogen Excess</b>			
dys/hypermenhorrea, bloating, edema, headache, migraine, weight gain, irritability, leg cramps, nasuea/vomitting, visual changes			
-----			
<b>Estrogen Deficiency</b>			
absence of withdrawal bleeding, early/midcycle bleeding, continuous bleeding			



# *Costs of EHR*

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- Server upgrade with redundancy
  - ~\$60,000 - \$120,000
- LAN upgrades if necessary
  - Cost variable depending on size of site
- User hardware/workstations
  - ~\$600 - \$2000 per user
- Clinical Application Coordinator, additional IT staff
  - ~\$80,000 each, annually
- Training costs
  - ~\$5000 - \$15,000



# *Other Cost-Related Factors*

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- OIT covers installation costs
- No licensing fees or support costs
- Setup and some training are brought onsite at no cost to facility
- Transient learning curve/productivity loss
- Staff time managing error reports
- Improvements in documentation and service capture → revenue



# *Diabetes Program \$\$ for IT (2004)*

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- \$2.36M distributed to 12 Areas
- 18 sites directly funded, 2 Areas retained funds
  - 10 have implemented EHR
  - 2 will shortly
  - 6 have not
- >2/3 of funds used for hardware
  - Remainder for staffing, training



# *Diabetes Program \$\$ for IT (2005)*

<b>2005 Overall Summary</b>			
<b>Allocated:</b>		<b>\$2,412,000</b>	
<b>Categories</b>	<b>Amounts</b>	<b>Categories</b>	<b>Amounts</b>
Site Hardware	\$1,769,827	Area Hardware	\$167,063
Site Staffing	\$425,951	Area Staffing	\$270,000
Site Training	\$183,100	Area Training	\$33,000
Site Unspecified	\$405,200	Area Unspecified	\$0
<b>Total Planned</b>	<b>\$3,254,141</b>	<b>Local/Area Cost</b>	<b>\$842,141</b>

**Demo Patient**  
 1 20-Mar-1947 (57) F  
**GENERAL 22-Feb-2005 13:48**  
 LAMER, CHRISTOPHER CLAYTON

Primary Care Team Unassigned  
 Postings **CAD**

**Education:** Show Standard

Visit Date	Education Topic	Comprehension	Status	Objectives	Comment	Provider	Length	Type
02/16/2005	DM DIET	POOR	GOAL SET	Y				
02/03/2005	ABD-COMPLICATIONS	GOOD	GOAL SET					
01/27/2005	MEDICATION DISPENSATION PROXY	GOOD						
01/20/2005	MEDICATION DISPENSATION PROXY	FA						
08/20/2004	M-MEDICATION DISPENSE TO PROXY	GO						
08/16/2004	HTH-DISEASE PROCESS	GO						
06/16/2004	DM DIET							

**Add Patient Education Event**

Education Topic: ASM-DISEASE F (Asthma)

Type of Training:  Individual

Comprehension Level: GOOD

Length: 5 (min)

Comment:

Provided By: LAMER,CHRIST

Status/Outcome  
 Goal Set  Goal Met

**ASM-DISEASE PROCESS**

**OUTCOME:**  
 The patient will understand the etiology and pathophysiology of a

**STANDARD:**

1. Review the anatomy and physiology of the respiratory system.
2. Discuss common triggers of asthma attacks (smoke, animal dander, air, exercise, etc.)
3. Explain that asthma is a chronic inflammatory disease and must on a long-term ongoing basis.
4. Explain the various aspects of an asthma attack, including airw

Font Size: 9

Print... Close

**Health Factors:** Add

Visit Date	Health Factor
02/18/2005	CURRENT SMOKER
10/21/2004	CURRENT SMOKER
08/16/2004	CURRENT SMOKER
08/18/2004	SMOKE FREE HOME
02/03/2005	CESSATION-SMOKELESS
06/25/2003	ALCOHOL USE
10/21/2004	CAGE 4/4

**Reproductive History:**

G: 1 P: 1 LC: 1 SA: 0 TA: 0 LMP: 12/15/2002

Family Planning Method: Barrier Methods Date FP Began: 7/17/1991

Pregnant Est. Delivery: 7/4/2001 Determined By: Sonogram

**Immunization Forecast:** HEP B ADLT past due

**Contraindications:**

**Immunization History:** Print Record Due Letter Add Edit Delete

Vaccine	Visit Date	Age@Visit	Location	Reaction	Volume	Inj. Site	Lc
DTP	08/02/1987	40 yrs	Undesig Locs				
DTP	12/04/1987	40 yrs	Ciha Hospital	Rash or Itching			
DT-PEDS	02/12/1988	40 yrs	Seattle Ind Hlth Brd				
DT-PEDS	03/04/1988	40 yrs	Ciha Hospital	Rash or Itching			



# *What Can ISAC Do?*

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- Barriers to EHR implementation
  - Basic software infrastructure
    - Significant divergence in application and patch updates across RPMS sites
    - Need to get sites up to current levels and keep them there
    - Required not only for EHR but for eventual transition to VHA architecture
    - Possible return to automated patch update system
  - Hardware infrastructure
    - Highest cost aspect of EHR
    - Diabetes funds will only go so far
    - Consultative expertise and facilitated acquisition would be nice



# IHS · EHR Electronic Health Record



## Welcome to the IHS Electronic Health Record Website

These pages will introduce you to the Indian Health Service's latest medical software application, the IHS Electronic Health Record (EHR). The site is designed primarily for IHS, Tribal, and Urban (I/T/U) Indian health care facilities that are actively involved in implementation of IHS-EHR, or are contemplating doing so in the near future. It provides a variety of information about the EHR product, as well as links to a number of helpful documents.

The Indian Health Service has long been a pioneer in using computer technology to capture clinical and public health data. The IHS clinical information system is called the Resource and Patient Management System (RPMS). Its development began nearly 30 years ago, and many facilities have access to decades of personal health information and epidemiological data on local populations. The primary clinical component of RPMS, Patient Care Component (PCC), was launched in 1984. IHS-EHR represents the next phase of clinical software development for the IHS.



# www.ihs.gov/cio/ehr

On this site we invite you to explore the following areas:

- » **EHR Clinical Overview** - Learn the key capabilities of EHR as seen by the user in clinical practice.
- » **EHR Technical Overview** - Learn how EHR relates to the rest of RPMS, and the technical and hardware specifications required to operate it.
- » **EHR Walk Through** - View the EHR application either through an animated Flash demonstration (with sound) or still pictures and text.
- » **Preparing for EHR** - Learn what facilities can do to begin the process of preparation for this new clinical technology.

# *Discussion*

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