

One Community Health Center's Journey

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Strategies for Leveraging the EHR to Improve Population Health

Putting Things in Perspective

- Why EHRs?
- UCHS adoption of EHRs
- The ACS study and what we learned
- How we approach data, data mining, and improvement strategies
- Examples—what it looks like, how providers use the tools in the EMR (we hope)
- Lessons learned/wisdom acquired along the way

Electronic Health Records

- Revisiting why we are all converting
 - Quiz: My health center is spending thousands of dollars to purchase and implement an EHR because:
 - Meaningful Use Money is flowing from the federal government and we need to cash in!
 - Can't get paid in the future if we don't have an EHR
 - Ran out of space to store paper records

(Snapshot) Recent Literature on EHRs

- Age adjusted rates of office visits fell after 2 years of EHR use; quality measures remained unchanged or improved slightly (Kaiser)
- Colorectal cancer screening rates increased among patients with 3 or more visits when providers received reminders
- No relationship between length of time using EHRs and provider performance on quality measures
- Accumulation of data in EHRs has outpaced our capacity to use the data to improve efficiency, clinical quality, financial performance (JAMIA, 2010)
- Meta analysis of recent studies showed 92% positive results associated with EHRs overall (Health Affairs, March 2011)
- Small practices (<10 providers) serving Medicaid/uninsured showed increases in preventive services delivered (JAMIA, August 2011)

UCHS Story

- Adopted Starpanel EHR from Vanderbilt in early 2001
- Immediate impact
 - Multiple clinic sites—access to patient records
 - Greatly enhanced physician chart review for APNs
 - Opened up physical space (record room eliminated)
- Not much data mining at that time—data went in, not much came back out in aggregate

UCHS Story, Part 2

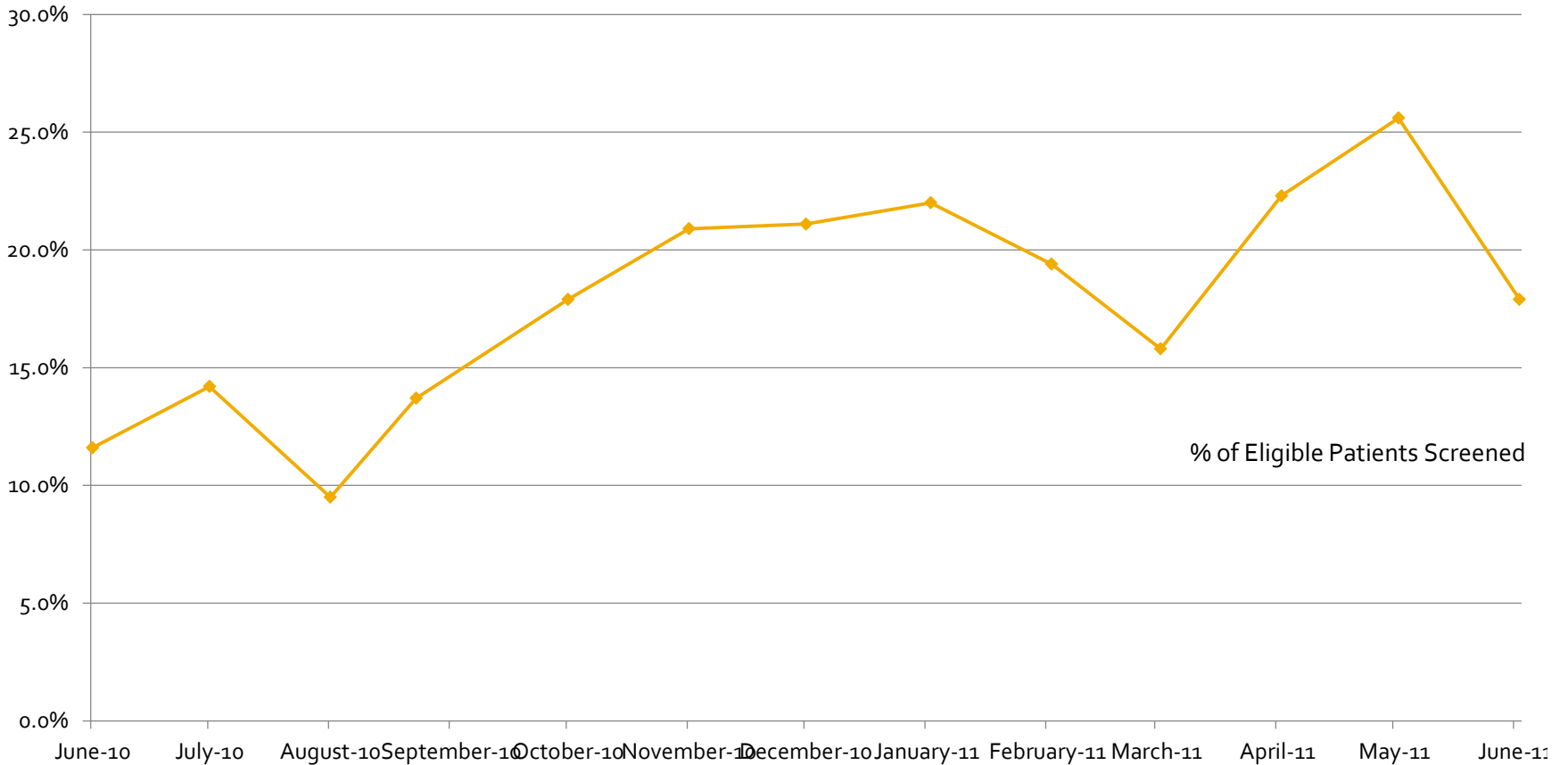
- UCHS separates legally from Vanderbilt necessitating a new record system
- Very fast selection and implementation of Allscripts in late 2007-early 2008
- Customization took place after the fact (not the recommended course of action!)
- Clinician hired to manage the IT-Provider interaction in late 2008
- 4 years' experience; continued refinement of both the software itself but also of our ability to leverage it to meet operational and fiscal goals

American Cancer Society Project

- Colorectal and breast cancer screening rates were followed for 12 months, from June 2010 (baseline month) through June 2011
- Colonoscopy (within 10 years) or annual gFOBT (take home kit) was counted
- Yearly mammography for women age 40 or older

Overall Results: Colorectal Cancer Screening

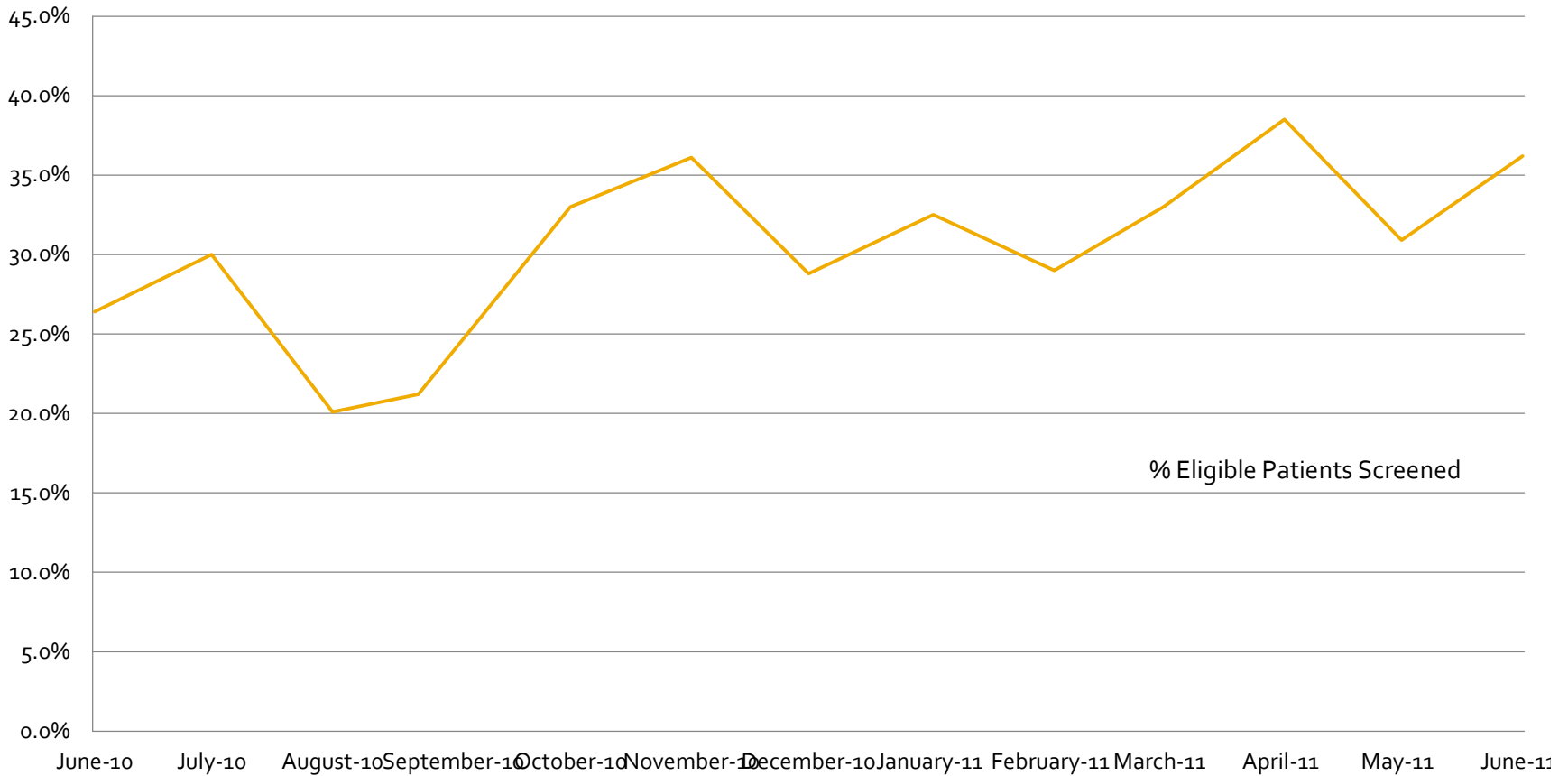
% Total Colorectal Screening



% of Eligible Patients Screened

Overall Results: Breast Cancer Screening

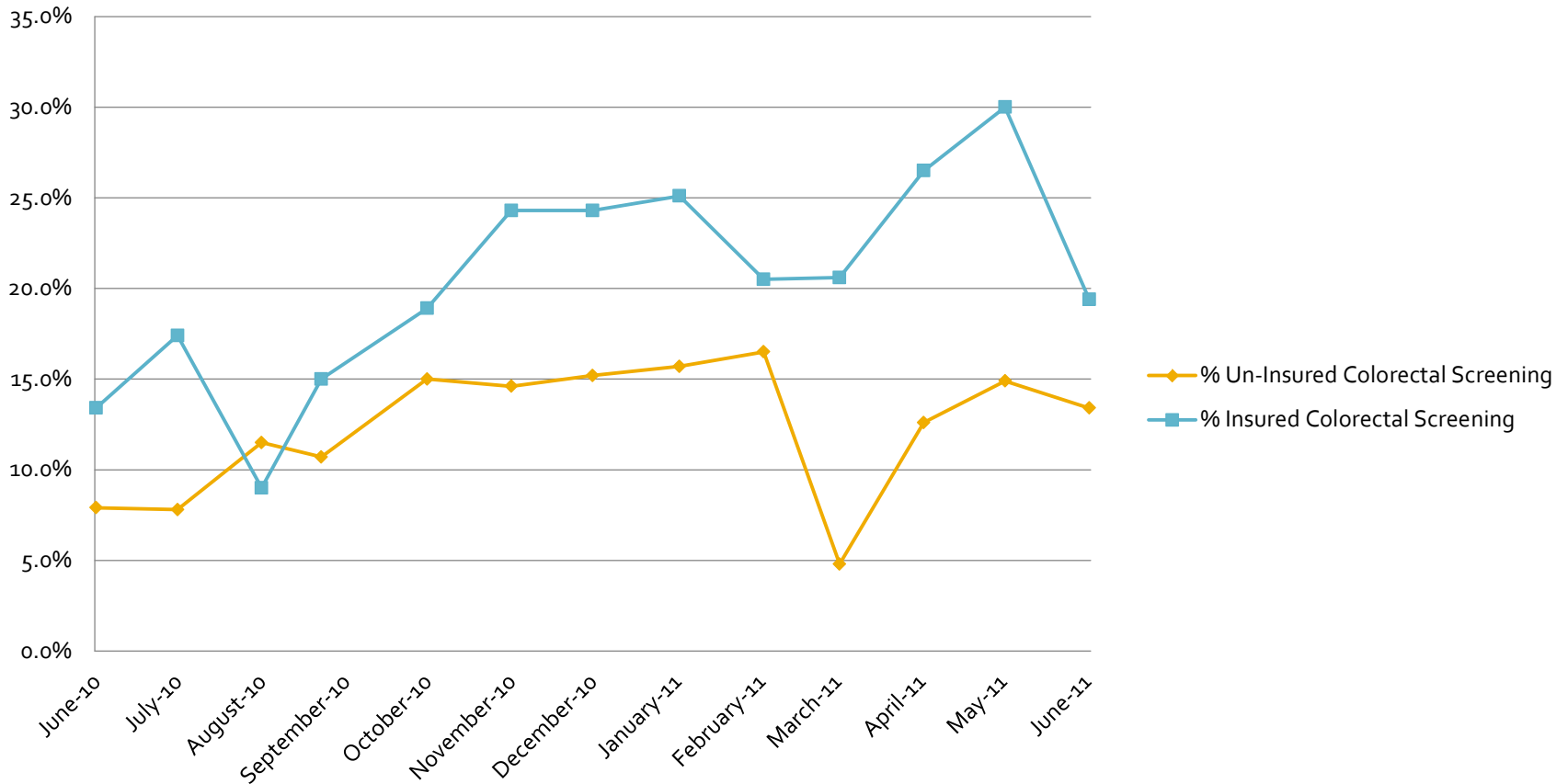
% Total Mammography Compliant



% Eligible Patients Screened

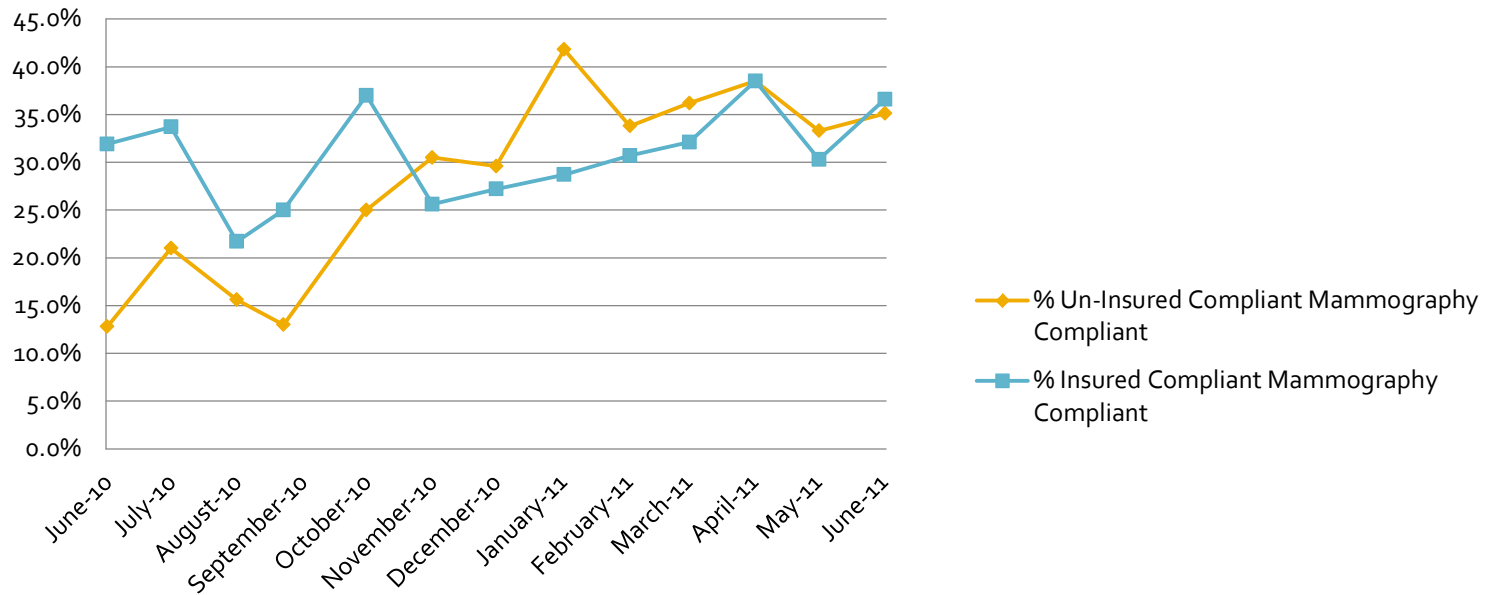
Further Data Mining: Colorectal

Insured and Uninsured Rates



Further Data Mining: Breast

Insured and Uninsured Rates



Analysis & Approach to Improvement

- Screening for both diseases improved somewhat over time (more so for breast cancer):
 - External reporting raised awareness among the QA/QI committee members
 - Drill down on insurance status showed missed opportunities for mammography in particular
 - Data mining led to focused efforts to improve the results using provider communication and EHR tools
- Colorectal cancer screening rates remained flat for uninsured patients
 - Need to explore options for patients
 - Need to educate providers on alternatives to colonoscopy

EHR Tools in Current Use

Screen shot discussion by Christian Ketel, RN, MSN, CIO

Reminders

Allscripts Professional EHR

Desktop Patient ZTEST Beck...

Reminders - Becky Ztest

Mark Complete
 Send Message...
 Pending Only
 Preview
 Close

Subject	Date/Time	Entered By	Completed By	Completed Date
Preventive care may be needed	11/1/2011 1:08 PM	Manager, System ...		
Risk assessment may be needed	11/1/2011 12:38 PM	Manager, System ...		
Preventive care may be needed	11/1/2011 12:26 PM	Ketel, Christian AC...		

Summary

Face

Patien

Demc

Remir

Flow

Immu

Medic

Chart

Lab F

Proce

Addit

Resu

Contact

Reas

Revie

Histo

Vitals

Physical Exam

Health Maintenance

7472000-C-REACT-PROT-HIGH-SENS (6-CPD) (98444) [Ordered]

Actions

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Patient: Ztest, Becky
Priority: Medium
Remind: Always
Date Completed:
Entered By: Manager, System SM
Completed By:

Subject: Preventive care may be needed

Note: For smoking cessation, brief interventions typically take between 5 and 10 minutes and may include one or more of the following:

- simple opportunistic advice to stop
- an assessment of the patient's commitment to quit
- an offer of pharmacotherapy and/or behavioural support

Reminders

Subject	!	Date/Time v	Entered By
 Preventive care may be needed		11/1/2011 1:08 PM	Manager, System ...
 Risk assessment may be needed		11/1/2011 12:38 PM	Manager, System ...
 Preventive care may be needed		11/1/2011 12:26 PM	Ketel, Christan AC...

Patient:	Ztest, Becky	Priority:	Medium
Remind:	Always	Date Completed:	
Entered By:	Manager, System SM	Completed By:	

Subject: Preventive care may be needed

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Preventive care may be needed	11/1/2011 12:26 PM	Ketel, Christian AC...		

Patient: Ztest, Becky **Priority:** Medium
Remind: Always **Date Completed:**
Entered By: Manager, System SM **Completed By:**

Subject: Risk assessment may be needed
Note: Breast cancer
 Yearly mammograms are recommended starting at age 40 and continuing for as long as a woman is in good health
 Clinical breast exam (CBE) about every 3 years for women in their 20s and 30s and every year for women 40 and over
 Women should know how their breasts normally look and feel and report any breast change promptly to their health care provider. Breast self-exam (BSE) is an option for women starting in their 20s.
 The American Cancer Society recommends that some women -- because of their family history, a genetic tendency, or certain other factors -- be screened with MRI in addition to mammograms. (The number of women who fall into this category is small: less than 2% of all the women in the US.) Talk with your doctor about your history and whether you should have additional tests at an earlier age. For more information, call the American Cancer Society and ask for our document, Breast Cancer: Early Detection </sslINK/breast-cancer-early-detection-toc>.

Reminders

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 Preventive care may be needed	11/1/2011 12:26 PM	Ketel, Christan AC...		

Patient: Ztest, Becky
Remind: Always
Entered By: Ketel, Christan ACNP

Priority: Medium
Date Completed:
Completed By:

Subject: Preventive care may be needed

Note: Colorectal cancer and polyps
 Beginning at age 50, both men and women should follow one of these testing schedules:

Tests that find polyps and cancer
 Flexible sigmoidoscopy every 5 years*, or
 Colonoscopy every 10 years, or

Double-contrast barium enema every 5 years*, or
 CT colonography (virtual colonoscopy) every 5 years*

Tests that primarily find cancer
 Yearly fecal occult blood test (gFOBT)***, or
 Yearly fecal immunochemical test (FIT) every year**, or
 Stool DNA test (sDNA), interval uncertain**

Decision Support

The screenshot displays a medical software interface for a patient named KETEL, Christian ACNP. The interface is divided into several sections:

- Summary:** Includes Face Sheet, Patient Manager, Demographics, Reminders, Flow Sheets, Immunizations, Medication Admin, Chart Attachments, Lab Results, Procedure Results, Additional Results, Result Summaries, Contact, Reason for Visit, Review of Systems, History, Vitals, Physical Exam, Assessment/Plan, and History & Physical.
- Medical History: Newest to Oldest:** Lists various medical conditions and events, including:
 - Problem List/Past Medical:
 - PREVIOUS C-SECTION (654.23)
 - SUPERVISION, OTHER NORMAL PREGNANCY (V22.1)
 - SUPERVISION OF OTHER NORMAL PREGNANCY (V22.1)
 - SUPERVISION OF OTHER NORMAL PREGNANCY (V22.1)
 - Allergy: No Known Drug Allergies [4/27/2011]
 - Immunization
 - Family: Hypertension: Mother, Diabetes Mellitus: Mother.
 - Social: Marital status: Married x 12 years to Raul Gonzalez, Culture/Language: Mexico, Spanish and some English, Highest Education Level Attained: 5th grade, No Drug Use, Non Drinker/No Alcohol Use, Non Smoker/No Tobacco Use.
 - Travel
 - Pregnancy/Birth: Gestations: 3, Abortions/Miscarriages: 0, Living Children: 2, LTCS for FTP/2000/7#6oz/girl & RCS/2002/7#10oz/girl--both in Denver, Preterm: 0, Term: 2.
 - Past Surgical
 - Diagnostic Studies
 - Health Maintenance: Pap Smear: Within Normal Limits. August 2010
 - Other Past History: Unspecified Diagnosis
- Encounters: By Type, Newest to Oldest:** Lists various encounter types, including:
 - Encounters: OB Global, [Open Encounter]
 - Messages: Patient Message
 - Chart Attachments: Appointment Communication, Labs/Procedures
 - Scanned Documents: Administrative, Radiology Report
- Medications: All, Newest to Oldest:** Lists current and administered medications, with a note that none are documented.
- Orders: Reviewed, Newest to Oldest:** Lists various orders, including:
 - Less Than a Week Ago:
 - 10/26/2011: FOLLOW UP - 1 WK-SCHEDULED [Final, Reviewed]
 - 10/26/2011: SUBSEQUENT PRENATAL CARE (0502F) [Final, Reviewed]
 - 10/26/2011: ROUTINE OBSTETRIC CARE (59400) [Final, Reviewed]
 - One Week Ago:
 - 10/19/2011: FOLLOW UP - 1 WK-SCHEDULED [Final, Reviewed]
 - 10/19/2011: SUBSEQUENT PRENATAL CARE (0502F) [Final, Reviewed]
 - 10/19/2011: ROUTINE OBSTETRIC CARE (59400) [Final, Reviewed]

The interface also features a top navigation bar with a patient ID (3271729), age (32y Female), and other patient information. A red circle highlights a specific icon in the top navigation bar. The bottom of the screen shows a Windows taskbar with the system clock indicating 4:12 PM on 11/1/2011.

Decision Support

The screenshot displays the Allscripts Professional EHR interface for a patient named KETEL, Christian ACNP. The patient's information includes a birth date of 5/21/1979, age of 32y Female, and insurance information (Cover Kids | #336390). The interface is divided into several sections:

- Medical History: Newest to Oldest:** This section contains a tree view of medical conditions and social history. A prominent warning icon (a triangle with an exclamation mark) is overlaid on this section, indicating a decision support alert. The history includes:
 - Problem List/Past Medical:
 - PREVIOUS C-SECTION (654.23)
 - SUPERVISION, OTHER NORMAL PREGNANCY (V22.1)
 - SUPERVISION OF OTHER NORMAL PREGNANCY (V22.1)
 - SUPERVISION OF OTHER NORMAL PREGNANCY (V22.1)
 - Allergy:
 - No Known Drug Allergies [4/27/2011]
 - Immunization
 - Family:
 - Hypertension: Mother.
 - Diabetes Mellitus: Mother.
 - Social:
 - Marital status: Married x 12 years to Raul Gonzalez.
 - Culture/Language: Mexico, Spanish and some English.
 - Highest Education Level Attained: 5th grade
 - No Drug Use
 - Non Drinker/No Alcohol Use
 - Non Smoker/No Tobacco Use
 - Travel
 - Pregnancy/Birth:
 - Gestations: 3.
 - Abortions/Miscarriages: 0.
 - Living Children: 2. LTCS for FTP/2000/7#6oz/girl & RCS/2002/7#10oz/girl--both in Denver
 - Preterm: 0.
 - Term: 2.
 - Past Surgical
 - Diagnostic Studies
 - Health Maintenance:
 - Pap Smear: Within Normal Limits. August 2010
 - Other Past History:
 - Unspecified Diagnosis
- Encounters: By Type, Newest to Oldest:** This section lists various medical encounters, including OB Global, Open Encounters, Messages, Patient Message, Chart Attachments, Appointment Communication, Lab/Procedures, Cancelled Documents, Administrative, and Radiology Report.
- Medications: All, Newest to Oldest:** This section shows current and administered medications, with a note that none are documented.
- Orders: Reviewed, Newest to Oldest:** This section lists several orders, including follow-up visits and prenatal care, all marked as "Final, Reviewed".

The interface also features a left-hand navigation menu with options like Face Sheet, Patient Manager, Demographics, Reminders, Flow Sheets, Immunizations, Medication Admin, Chart Attachments, Lab Results, Procedure Results, Additional Results, Result Summaries, Contact, Reason for Visit, Review of Systems, History, Vitals, Physical Exam, Assessment/Plan, and History & Physical. A right-hand sidebar contains an Actions menu with options like Menu, Send Message, Launch, Print, Queues, Appointments (95 [14]), Open Encounters (1), Result Notifications (0), Messages (1), Web Messages (0), Refill Requests (2), eRefill Requests (0), Documents (0), Action Items (1), Received Charts (2), and Report Results.

Decision Support

The screenshot displays the Allscripts Professional EHR interface for a patient. The top navigation bar includes the patient's name, date of birth (5/21/1979), gender (32y Female), and other identifiers. The main content area is titled "Face Sheet" and is divided into several sections:

- Medical History: Newest to Oldest**: A table with columns for Severity and Description. The first entry is "Calculating BMI recommended every 12 months. BMI calculation requires height and weight. (Height missing)" with a severity of "Low".
- Current Medications**: A section showing "-None documented-".
- Orders: Reviewed, Newest to Oldest**: A list of orders with dates and descriptions, such as "10/26/2011: FOLLOW UP - 1 WK-SCHEDULED [Final, Reviewed]".

The left sidebar contains various navigation options like "Face Sheet", "Patient Manager", "Demographics", "Reminders", "Flow Sheets", "Immunizations", "Medication Admin", "Chart Attachments", "Lab Results", "Procedure Results", "Additional Results", "Result Summaries", "Contact", "Reason for Visit", "Review of Systems", "History", "Vitals", "Physical Exam", "Assessment/Plan", and "History & Physical". The right sidebar shows a "Current Encounter" section and a list of "Actions" and "Queues" including "Menu", "Send Message", "Launch", "Print", "Appointments", "Open Encounters", "Result Notifications", "Messages", "Web Messages", "Refill Requests", "eRefill Requests", "Documents", "Action Items", "Received Charts", and "Report Results". The bottom taskbar shows the Windows operating system with the date and time set to 4:13 PM on 11/1/2011.

Decision Support

The screenshot displays the Allscripts Professional EHR interface. At the top, the patient information is shown: 5/21/1979 | 32y Female | Cover Kids | #336390. The user is identified as KETEL, Christian ACNP. The main window is titled "Face Sheet" and shows a "Medical History: Newest to o" section. A decision support alert is highlighted with a yellow box, showing a table with the following content:

Severity	Description	Actions
Low	Calculating BMI recommended every 12 months. BMI calculation requires height and weight. (Height missing)	[vitals] [Ignore/Exclude]

The interface also includes a sidebar on the left with navigation options like "Face Sheet", "Patient Manager", and "Demographics". On the right, there is a "Queues" panel with various task counts, such as "Appointments 95 [14]" and "Open Encounters 1". The system tray at the bottom right shows the time as 4:13 PM on 11/1/2011.

Ordering Protocols

Assessment/Plan

Patient Problem List | Patient Medications | My Short Lists | **Short Lists** | Search | Free Text Diagnosis

Include | Add to My Short Lists | Reset Short List | Collapse All | View...

- ★ UCLS - FAMILY PRACTICE
 - AT LEAST ONE PRESCRIPTION CREATED DURING THE ENCOUNTER WAS GENERATED AND TRANSMITTED ELECTRONICALLY USING A QUALIFIED ERX SYSTEM (G8553)
 - @CANCER SCREENING SHORT LIST
 - TOBACCO USE DISORDER (305.1)
 - SELF MANAGEMENT PROGRAM (PLEASE PUSH THIS PROGRAM) (v70.6)
 - Vine Hill Diagnoses (Encounter Form)
 - UCLS - In House Labs
 - Laboratory test-Send Out
 - Diagnostic Imaging
 - DM and CAD Screens:
 - Narcotic or Other Controlled Substance Restriction
 - Diagnostic Procedures/Screening
 - Correspondence
 - Common Procedures (CPT codes)
 - Injectables / Inhalants / Administration Codes
 - Immunizations / Skin Testing
 - UCLS-Oral Medication List (In progress)

Current Plans

Promote | Move | Note | Clear | Draft | Drug | ABN

Future Plans

Include

Ordering Protocols

Include Add to my Short Lists Reset Short List Collapse All View...

★ CANCER SCREENING SHORT LIST

Back to UCHS - FAMILY PRACTICE

FOR ANY OUTSIDE DIAGNOSTIC TESTS ORDERED (INCLUDING MAMMOGRAM) PLEASE CONTACT REFERRAL SPECIALIST

-----BREAST CANCER SCREENING-----

MAMMOGRAM, SCREENING (77057)

-----COLON and RECTUM CANCER SCREENING-----

In House-Hemocult (OCCULT BLOOD FECES SCREEN) (82270)

FECAL OCCULT HGB ASSAY, QUAL, 1-3 SIMULTANEOUS DETERMINATIONS SEND OUT(82274)

DIAGNOSTIC SIGMOIDOSCOPY (45330)

COLONOSCOPY (44388)

CONTRAST X-RAY EXAM OF COLON (Barium Enema) (74270)

-----CERVICAL CANCER SCREENING-----

Thin prep Pap with reflex hpv (88142)

-----PROSTATE CANCER SCREENING-----

PSA (PROSTATE SPECIFIC ANTIGEN) (84153)

PROSTATE CANCER SCREENING; DIGITAL RECTAL EXAM (G0102)

-----CANCER SCREENING ICD-9-----

⇒ SCREENING MAMMOGRAM NEC (V76.12)

⇒ SCREENING FOR MALIGNANT NEOPLASM, COLON (V76.51)

⇒ SCREENING FOR MALIGNANT NEOPLASM, PROSTATE (V76.44)

⇒ SCREENING FOR MALIGNANT NEOPLASM, CERVIX (V76.2)

★ NEW EMPLOYEE LABS/TITERS

Ordering Protocols

The screenshot displays a medical software interface with the following components:

- Navigation Bar:** Patient Problem List | Patient Medications | My Short Lists | **Short Lists** | Search | Free Text Diagnosis
- Toolbar:** Include | Add to My Short Lists | Reset Short List | Collapse All | View...
- Protocol List:**
 - UCLS - FAMILY PRACTICE
 - AT LEAST ONE PRESCRIPTION CREATED DURING THE ENCOUNTER WAS GENERATED AND TRANSMITTED ELECTRONICALLY USING A QUALIFIED ERX SYSTEM (G8553)
 - @CANCER SCREENING SHORT LIST
 - TOBACCO USE DISORDER (305.1)** (highlighted with a red oval)
 - CHANTIX STARTING MONTH PAK, 0.5 MG X 11 & 1 MG X 42 (Oral Tablet) - [Rx:Brand]
 - WELLBUTRIN SR, 150MG (Oral Tablet Extended Release 12 Hour) - [Rx:Brand]
 - TOBACCO USE TXMNT COUNSELING (4000F)
 - TOBACCO USE TXMNT, PHARMACOL (4001F)
 - SELF MANAGEMENT PROGRAM (PLEASE PUSH THIS PROGRAM) (v70.6)
 - Vine Hill Diagnoses (Encounter Form)
 - UCLS In House Labs
 - Laboratory test-send Out
 - Diagnostic Imaging
 - DM and CAD Screens:
 - Narcotic or Other Controlled Substance Restriction
 - Diagnostic Procedures/Screening
 - Correspondence

- Current Plans:** Promote | Move | Note | Clear | Draft | Drug | ABN
- Future Plans:** Include

Ordering Protocols

The screenshot displays a medical software interface with the following components:

- Navigation Bar:** Patient Problem List | Patient Medications | My Short Lists | **Short Lists** | Search | Free Text Diagnosis
- Toolbar:** Include | Add to My Short Lists | Reset Short List | Collapse All | View...
- Tree View:**
 - UHS - FAMILY PRACTICE
 - AT LEAST ONE PRESCRIPTION CREATED DURING THE ENCOUNTER WAS GENERATED AND TRANSMITTED ELECTRONICALLY USING A QUALIFIED ERX SYSTEM (G8553)
 - @CANCER SCREENING SHORT LIST
 - TOBACCO USE DISORDER (305.1)
 - SELF MANAGEMENT PROGRAM (PLEASE PUSH THIS PROGRAM) (v70.6)
 - Vine Hill Diagnoses (Encounter Form)
 - UHS - In-house Labs
 - Laboratory test-Send Out
 - Diagnostic Imaging
 - DM and CAD Screens:
 - Narcotic or Other Controlled Substance Restriction
 - Diagnostic Procedures/Screening
 - Correspondence
 - Common procedures (CPT codes)
 - Injectables / Inhalants / Administration Codes
 - Immunizations / Skin Testing
 - UHS-Oral Medication List (In progress)
- Current Plans:**
 - TOBACCO USE DISORDER (305.1)
 - Chantix Starting Month Pak 0.5 MG X 11 & 1 MG X 42. Active.
 - TOBACCO USE TXMNT COUNSELING (4000F)
 - TOBACCO USE TXMNT, PHARMACOL (4001F)
- Future Plans:** (Empty)

A red arrow points from the 'TOBACCO USE DISORDER (305.1)' entry in the tree view to the 'Move' button in the 'Current Plans' toolbar.

Ordering Protocols

Status: Active | Training Patient Ins. Plan: Undefined Marital Status: Undefined
Usual: Rosenbloom, Samuel T. MD Allergies: Penicillins, Erythromycins, Cockroaches Guarantor: Self Blood Type: (no entry)
Ref: -

CHANTIX STARTING MONTH PAK, 0.5 MG X 11 & 1 MG X 42 (Oral Tablet)

Prescription Education Patient Allergies Alternatives

Use Generic: Chantix Starting Month Pak 0.5 MG X 11 & 1 MG X 42, 1 Tablet.

Strength: **0.5 MG X 11 &, Tablet (Oral)** Status: Active

Dose...: 1 Tablet Reason: Start Date: 11/1/2011 (Today)

Frequency: Based On: Samples Given: Authorized by: Bhatt, Vivak S MD

Medically Necessary Dispense as Written

Local Prescription Mail Order Prescription

A Local Prescription has not been specified.

Days: 0 Quantity: Tablet Refills: None Refill Quantity: 0

Notes:

Interactions:

Interaction	Onset	Override Reason	Warning
No known interactions			

Exclude from CCD

Output... OK Cancel

Patient Info:
Becky Ztest
4 year, 9 month old female
-Race Undefined-
135 lb (61.23 kg) as of 2/26/2008
BSA: 1.64 m²
Allergies:
Penicillins: Rash
Erythromycins
Cockroaches: Diarrhea go

Formulary/Coverage/Copay

Lessons Learned from ACS Project

- Consistent with the literature, length of time using an EHR did not seem to be associated with higher prevention rates
- For colorectal cancer screening, being uninsured was associated with lower rates of screening
 - Should clinic standard be changed to gFOBT take home kits?
- For breast cancer this was not the case—uninsured patients often had same or higher rates of screening
- Missed opportunities by primary care providers to order free mammograms (women's health providers were much more vigilant)
 - Lack of knowledge about Tennessee Breast and Cancer Screening Program?
 - Patient did not follow up?
 - Results never received by primary care clinic?
 - Lack of assigned personnel to help patient navigate and to chase results?

Overall Lessons Learned Using the EHR

- Valuable tool when data can be easily extracted
- Data can and should be extracted from both the clinical record as well as the practice management system
- External reporting forces us to look at how well we manage our populations (ACS project, ACNM reporting, UDS, Meaningful Use reporting, Medical Home reporting)
- Having a clinical provider building/customizing EHR screens is invaluable and time saving
- Population health improvement should be the core purpose of the QA/QI committee
- Measure what is important to know and act on that information [only]
- Keep refining; never a finished product
- Listen to clinical providers—leverage the EHR to improve their workflow