Public Health – ETHOS
Electronic Tool for Health Open Source

Presentation for the:
Colorado Clinical & Translational Sciences Institute
January 21st, 2010

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Health & Human Services Division
Larimer County, Colorado
Outline

- Discrete Application Design
- Project Objectives
- Development Methodology (Scrum)
- Scheduling Module
- Next Release
Discrete Application Design

Advantages:
- Discrete applications allow for very comprehensive solutions to their specific domains
- Usually very efficient for their specific needs

Disadvantages:
- Health departments need to acquire many different application systems and have support and maintenance for all of them
- 64% of the application’s features are rarely or never used

1. 2002, APHA, Local Health Department Information Technology Assessment
2. The Standish Group, 2002 CHAOS Report
Discrete application design allows for good penetration from many local health departments to the states and federal needs.

Rarely do these applications share business workflows or data the system collects with other applications.
By designing a local health department (Environmental Health, Community Health, and Public Health Reporting) application we lose depth of detail, but gain efficiencies in data collaboration and business process integration.
Objectives

- Build a comprehensive public health department management system
- Create good data extraction routines for collaboration with other systems
- Publish the application as a Microsoft .Net open source solution
Objectives

- Build a comprehensive public health department management system
  - By focusing our efforts on the highest priority items we leave out the 40-50% of the application features we don’t use
  - Gather requirements from many health departments, not just Larimer County
  - A single system to allow for consistent design which reduces training, support and maintenance costs to the department
Objectives

Create good data extraction routines for collaboration with other systems

By creating an open database design we can share information with other open source and proprietary systems more easily

Allow the system to publish to state registries like Colorado Immunization Information System (CIIS)
Objectives

- Publish the application as a Microsoft .Net open source solution
- Open source releases the application to the community and allows for everyone to build-on and enhance the system.
- Open source is rapidly growing as an option for robust application design and support models.  
- Also by building the application with Microsoft .Net C# and using SQL Server as the database, most health departments already have the infrastructure in place.
Agile Methodology
(Scrum)

- Project Core Team (Product Owners) create user stories and determines business value.
- Development Team estimates the effort of the stories and how much can be created each development cycle (Sprint).
- Project Core Team decides what needs to be included in each release of the system and development team lays out the sprint.
- End Result: Completed application code is released earlier for the product owners to use and decide future directions.
ETHOS Project

- Fixed 18 month development with 39 sprints
- Three teams
  - Core team of subject matter experts (SMEs)
  - Development team (C# Programmers and SQL DBA)
  - Business analysts for quality assurance, process improvement and assistance to the core and development teams
- Project modules in three priority groups
- We have just completed our fourth sprint cycle and have now moved onto building the next module - cashiering
Public Health ETHOS
Core System
----
Customer Information
Data Integration Services

Scheduling
Cashiering Sales/Billing
Inventory & Pharmacy Management
Client Services
Family Planning, STD, Immunizations
Future Growth & Enhancements
Test Results Management
Data Extraction & Reporting
Electronic Medical Records
First Module
Client Scheduler

Core features
- Manage nurse and doctor schedules
- Manage clients
- Manage appointment types
- Manage locations
- Manage client appointments
- Notify clients of appointments

Application demonstration

Screen shots
User Options

Set User Options

Default Location: Loveland

Default Search Range (0-60 days): 10

Save
Today’s Appointments

Public Health - ETHOS

Today’s Client Appointment List for Loveland

Wednesday, January 06, 2010

Total Listed: 0

Select Location: Loveland

No records to display.
# User Maintenance

## Public Health - ETHOS

### User Maintenance

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Middle Name</th>
<th>Username</th>
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<th>Last Login</th>
<th>Action</th>
</tr>
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<td>Hurd</td>
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<td>G</td>
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## Appointment Types

### Public Health - ETHOS

<table>
<thead>
<tr>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Annual English Delayed</td>
</tr>
<tr>
<td>Annual English New</td>
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<tr>
<td>Annual English Repeat</td>
</tr>
<tr>
<td>Annual Exam Delayed</td>
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<tr>
<td>Annual Exam New</td>
</tr>
<tr>
<td>Annual Exam Repeat</td>
</tr>
<tr>
<td>Annual Spanish Delayed</td>
</tr>
<tr>
<td>Annual Spanish New</td>
</tr>
<tr>
<td>Annual Spanish Repeat</td>
</tr>
<tr>
<td>Birth Control Method Change</td>
</tr>
<tr>
<td>Blood Draw</td>
</tr>
<tr>
<td>Breast Check</td>
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<tr>
<td>Colposcopy Referral</td>
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<tr>
<td>Deferred Exam</td>
</tr>
<tr>
<td>Delayed One Time Visit</td>
</tr>
<tr>
<td>Depo Shot</td>
</tr>
<tr>
<td>Diaphragm Fitting</td>
</tr>
<tr>
<td>Doctor Visit</td>
</tr>
<tr>
<td>Emergency Contraception</td>
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</table>
Client Finder
Day Register

Public Health - ETHOS

Day Register for Loveland

Thursday, January 07, 2010

- 8:40 AM: HPV Treatment
- 9:20 AM: Annual English Repeat
- 10:00 AM: Birth Control Method Change
- 10:20 AM: Annual English Repeat
- 11:00 AM: Annual English Delayed
### Location Maintenance

#### Public Health - ETHOS

**Location:** Loveland

**Appointment Types**

<table>
<thead>
<tr>
<th>Location</th>
<th>Appointment Description</th>
<th>Visit Length (min)</th>
<th>Lead Time (min)</th>
<th>Intl Travel</th>
<th>Addl Person (min)</th>
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<tr>
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<td>30</td>
<td>15</td>
<td>False</td>
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<tr>
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<td>Annual Spanish New</td>
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<td>20</td>
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</tr>
<tr>
<td>Loveland</td>
<td>Annual Spanish Repeat</td>
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<td>False</td>
<td>0</td>
</tr>
<tr>
<td>Loveland</td>
<td>Birth Control Method Change</td>
<td>30</td>
<td>20</td>
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<td>0</td>
</tr>
<tr>
<td>Loveland</td>
<td>Blood Draw</td>
<td>20</td>
<td>5</td>
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<td>0</td>
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<tr>
<td>Loveland</td>
<td>Breast Check</td>
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<td>5</td>
<td>False</td>
<td>0</td>
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<tr>
<td>Loveland</td>
<td>Colposcopy Referral</td>
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<tr>
<td>Loveland</td>
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<td>20</td>
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<tr>
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**Location Closure**
Location Closures
# Provider Maintenance

## Select Provider
- Doctor
- FP RN
- International Travel Nurse

## Assigned Appointment Types
- Annual English Delayed
- Annual English New
- Annual English Repeat
- Annual Exam
- Annual Exam Delayed
- Annual Exam New
- Annual Exam Repeat
- Annual Spanish Delayed
- Annual Spanish New
- Annual Spanish Repeat
- Birth Control Method Change
- Blood Draw
- Breast Check

## Unassigned Appointment Types
- Doctor Visit
- International Travel
- International Travel Brief
- IUC Insertion
- Problem Visit RN
- West Nile Virus Complication
## Resource Maintenance

### Public Health - ETHOS

#### Resource Maintenance

<table>
<thead>
<tr>
<th>Resource Name</th>
<th>Location Name</th>
<th>Provider Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellen</td>
<td>Fort Collins</td>
<td>NP</td>
</tr>
<tr>
<td>Ellie</td>
<td>Fort Collins</td>
<td>FP RN</td>
</tr>
<tr>
<td>Ellie</td>
<td>Loveland</td>
<td>FP RN</td>
</tr>
<tr>
<td>Howell</td>
<td>Loveland</td>
<td>Doctor</td>
</tr>
<tr>
<td>IT</td>
<td>Fort Collins</td>
<td>International Travel Nurse</td>
</tr>
<tr>
<td>IT Nurse</td>
<td>Loveland</td>
<td>International Travel Nurse</td>
</tr>
<tr>
<td>IT2</td>
<td>Fort Collins</td>
<td>International Travel Nurse</td>
</tr>
<tr>
<td>IT3</td>
<td>Fort Collins</td>
<td>International Travel Nurse</td>
</tr>
<tr>
<td>Julia</td>
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<td>FP RN</td>
</tr>
<tr>
<td>Julia</td>
<td>Loveland</td>
<td>FP RN</td>
</tr>
<tr>
<td>Sarah</td>
<td>Fort Collins</td>
<td>FP RN</td>
</tr>
<tr>
<td>Terri</td>
<td>Loveland</td>
<td>NPI</td>
</tr>
<tr>
<td>Terri Double Book</td>
<td>Loveland</td>
<td>NPI</td>
</tr>
<tr>
<td>Terrie</td>
<td>Fort Collins</td>
<td>NPI</td>
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<tr>
<td>Terrie</td>
<td>Estes Park</td>
<td>NPI</td>
</tr>
<tr>
<td>Valerie</td>
<td>Fort Collins</td>
<td>NPI</td>
</tr>
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</table>
Role Maintenance

Public Health - ETHOS

Role Maintenance

Clerk
Access to Client Maintenance, Medical Data and Scheduler

Select Roles
- Cashier
- Clerk
- Clinician
- System Administrator

Assigned Permissions
- Adm_UserOptPge
- Mod_ScheduleTile
- Rpt_AddlRptsPge
- Rpt_AddlRptsPcp
- Rpt_ApprRptsPcp
- Rpt_ReportRnu
- Sch_AdminRnu
- Sch_ApprEditPcp
- Sch_ApprResultsPcp
- Sch_ApprRptsPge
- Sch_ApprTypeRnu
- Sch_ApprTypePge

Unassigned Permissions
- Adm_AdministrationPge
- Adm_HomeMnu
- Adm_RolePge
- Adm_RolePop
- Adm_SecRolesMnu
- Adm_SecurityMnu
- Adm_SecUsersMnu
- Adm_UserEditPge
- Adm_UserPge
- Adm_UsersRnu
- Adm_UsersMnu
- Adm_UserOptMnu
- Mod_AdminRtreTile
# Provider Template Maintenance

## Template Maintenance

**Public Health - ETHOS**

### Select Location

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estes Park</td>
</tr>
<tr>
<td>Fort Collins</td>
</tr>
<tr>
<td>Loveland</td>
</tr>
</tbody>
</table>

### Select Resource

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Ellie</td>
</tr>
<tr>
<td>Howell</td>
</tr>
<tr>
<td>IT Nurse</td>
</tr>
<tr>
<td>Julia</td>
</tr>
<tr>
<td>Terri</td>
</tr>
<tr>
<td>Terri Double Book</td>
</tr>
</tbody>
</table>

### Template Maintenance Details

<table>
<thead>
<tr>
<th>Monday</th>
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<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<td>Office Hours</td>
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<td>8:50 AM</td>
<td>7:50 AM</td>
<td>8:50 AM</td>
<td>8:50 AM</td>
</tr>
<tr>
<td>11:45 AM</td>
<td>11:45 AM</td>
<td>11:45 AM</td>
<td>11:45 AM</td>
<td>5:30 PM</td>
</tr>
<tr>
<td>1:00 PM</td>
<td>1:00 PM</td>
<td>1:00 PM</td>
<td>1:00 PM</td>
<td>2:00 PM</td>
</tr>
</tbody>
</table>

**Effective Start Date:** 01/01/2010  **Effective End Date:** 01/01/2010
Appt. Wizard
Step 1
Appt. Wizard
Step 3
# Appt. Wizard

## Step 4

**Currently Selected Client**

| Last Name | First Name | Middle Name | DOB (mm/dd/yyyy) | Age   | Contact Phone
|-----------|------------|-------------|-------------------|-------|---------------
| test      | test       |             | 10/22/1959       | 50 yrs | 2 mos |

**Appointment Scheduler**

<table>
<thead>
<tr>
<th>Set Appointment Time</th>
<th>Appointment Time</th>
<th>Appointment Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 AM</td>
<td>9:30 AM</td>
<td>1/14/2010</td>
</tr>
</tbody>
</table>

**Appointment Type**

- Annual English Delayed

**Provider**

NP

**Location**

Loveland

**Appointment Comment**

- Additional People and Travel Section
  - # of People: 0
  - Departure Date:  
  - Country of Destination:  

**Appointment Navigator**

- 9:30 AM: Annual English Delayed
  - Visit Length: 30 min
  - Lead Time: 15 min

**Save**

**Clear Changes**
Appt. Wizard
Step 5
Appointment Report
Second Module
Cashiering

Core features
- Handle client flow for many different organizations
- Sell services to clients and patients
- Manage items sold
- Manage direct entry of services by computer
- Manage client and patient demographics

Application demonstration

Screen shots
Public Health - ETHOS

Main Menu
Update

Check In
- Patient
- Scheduled Patient

Cashiering Sales/Billing

Administration Module
Scheduler Module
- Schedule Appointment
- Find Client
- Appointment Report

Cashiering Module
### Check In Patient

#### Customer Finder

#### Customer Search Criteria

- **Last Name**: au
- **First Name**: 
- **Middle Name**: 
- **DOB (mm/dd/yyyy)**: / / 
- **Contact Phone**: ( ) __-__

**Client Type**
- Client
- Patient

**# of Results**
- 50

#### Search Results

<table>
<thead>
<tr>
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<th>First Name</th>
<th>Middle Name</th>
<th>DOB</th>
<th>Age</th>
<th>Home Phone</th>
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<td>Austin</td>
<td>Bennie</td>
<td>06/21/1921</td>
<td>88 yrs / 7 mos</td>
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<tr>
<td><strong>Select</strong></td>
<td>Austin</td>
<td>Emma</td>
<td>11/03/1900</td>
<td>109 yrs / 2 mos</td>
<td>() -</td>
</tr>
<tr>
<td><strong>Select</strong></td>
<td>Austin</td>
<td>Jessica</td>
<td></td>
<td></td>
<td>() -</td>
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<tr>
<td><strong>Select</strong></td>
<td>Austin</td>
<td>Matthew</td>
<td>A</td>
<td></td>
<td>() -</td>
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<tr>
<td><strong>Select</strong></td>
<td>Austin</td>
<td>Nannie</td>
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[Create New Customer]
## Hold List - Fort Collins

**Thursday, January 21, 2010**

<table>
<thead>
<tr>
<th>Invoice Number</th>
<th>Name</th>
<th>Type</th>
<th>Invoice Status</th>
<th>Locked</th>
<th>Time In</th>
<th>Time Out</th>
</tr>
</thead>
</table>

### Add to: FTC-20100105-0003

- **Item Code:** Select An Item
- **Qty:** 1
- **Add**
This Invoice is currently locked by: Cory Hudson (HudsonCR)

Invoice # FTC-20100105-0002 - Bennie Austin

Invoice Number: FTC-20100105-0002
Transaction Date: 1/13/2010
Invoice Status: HOLD
Location: Fort Collins

Check In Staff: Lisa Puckett
Attending Provider:
Attending Physician: Adrienne LeBailly
Cashier:

Invoice Note:

---

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Quantity</th>
<th>Description</th>
<th>Full Price</th>
<th>Actual Price</th>
<th>Extended Price</th>
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<td></td>
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<td>SubTotal Amount: $0.00</td>
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Unlock Record

Cancel
Invoice # FTC-20100105-0003 - Emma Austin

Invoice Number: FTC-20100105-0003
Transaction Date: 1/13/2010
Invoice Status: HOLD
Location: Fort Collins

Check In Staff: Lisa Puckett
Attending Provider: Adrienne LeBalil
Attending Physician: 
Cashier: 

Invoice Note:

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SubTotal Amount: $0.00
### Demographics

<table>
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<tr>
<th>Program Type</th>
<th>Last Name</th>
<th>First Name</th>
<th>Middle Name</th>
<th>Alias</th>
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</thead>
<tbody>
<tr>
<td>Undefined</td>
<td>Austin</td>
<td>Emma</td>
<td>Undefined</td>
<td>Undefined</td>
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#### General

- **Mailing Address**: [OK To Use?](#)  
  - City:  
  - State:  
  - Zip Code:  
  - County:  

- **Home Phone**: [OK To Use?](#)  
- **Work Phone**: [OK To Use?](#)  
- **Cell Phone**: [OK To Use?](#)  
- **Email Address**: [OK To Use?](#)  
- **Moved/Gone Elsewhere?**
- **Gender**:  
- **Date Of Birth**:  
- **Age**:  
- **Has SSN?**...Yes [No](#)
- **Married?**  
- **Ethnicity**: Undefined

- **Race 1**: Undefined
- **Race 2**: Undefined
- **Race 3**: Undefined
- **Race 4**: Undefined
- **Race 5**: Undefined

- **Migrant?**:  
- **Citizen?**:  
- **Primary Language**: English

- **Preferred Language for Letter?**: English

- **Limited English Proficiency?**:  
- **OK to Identify Organization Calling?**:  
- **HIPAA Notice of Privacy Practice Given?**:  

[Save](#)  
[Cancel](#)
Demographics

Medical

Program Type: Undefined
Last Name: Austin
First Name: Emma
Middle Name: Undefined
Alias: Undefined

Income

Insurance

Medical

Primary Care Physician
School

Last Visit
Next Annual Exam
Vaccine for Children Eligibility: Undefined

Contraceptive
Gyno
Diagnosis
Alerts

Current Method of Birth Control: Undefined
Quantity Allowed: 0
Quantity Left: 0
Prescription Expire Date
Previous Method of Birth Control: Undefined

Nursing Notes
### Appointment_Results

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<th>Lookup Text</th>
<th>Value</th>
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Development Tools

- Microsoft C# .NET
- GIT Repositories (Source Control)
- LiquiBase (Database Change Control)
- Cucumber (Automated Testing)
- ScrumWorks (Story and Sprint Management)
- BaseCamp (Project Management)
www.larimer.org/depts/health

www.phethos.org (Project Website)
- General news and updates
- Application available for download and review soon

Microsoft Open Source
http://www.microsoft.com/opensource/

The Total Growth of Open Source

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