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Community Health Access Network (CHAN)

Data Warehouse Project

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July 22, 2010

Who we are and what we do

- **CHAN** is a Health Center Controlled Network of Community Health Centers (CHC)
- CHCs provide multiple services including primary care, dental care, counseling services, women's health, health promotion and education, and case management – regardless of patient's ability to pay
- Each Full member agency has a seat on **CHAN's** Board of Directors
- Currently, 45% of funding comes from member dues and system fees, the balance from various federal, State and foundation sources

CHAN's HCCN Members

6 Full NH members – Federally Qualified Health Centers:

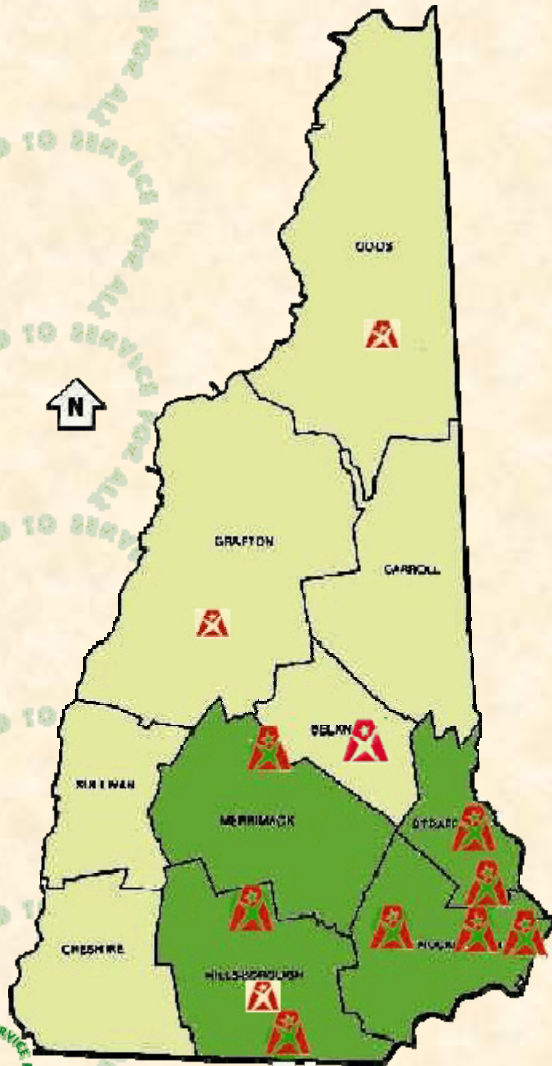
- Avis Goodwin CHC (Dover, Rochester)
- Families First Health and Support Center (Portsmouth plus Healthcare for the Homeless Program van)
- Health First Family Care Center (Franklin, Laconia)
- Lamprey Health Care, Inc. (Raymond, Newmarket, Nashua)
- Manchester CHC (Manchester)

1 Full Federally Qualified Health Center member in Texas:

- Shackelford County Community Resource Center – 4 sites

4 Affiliate FQHC members

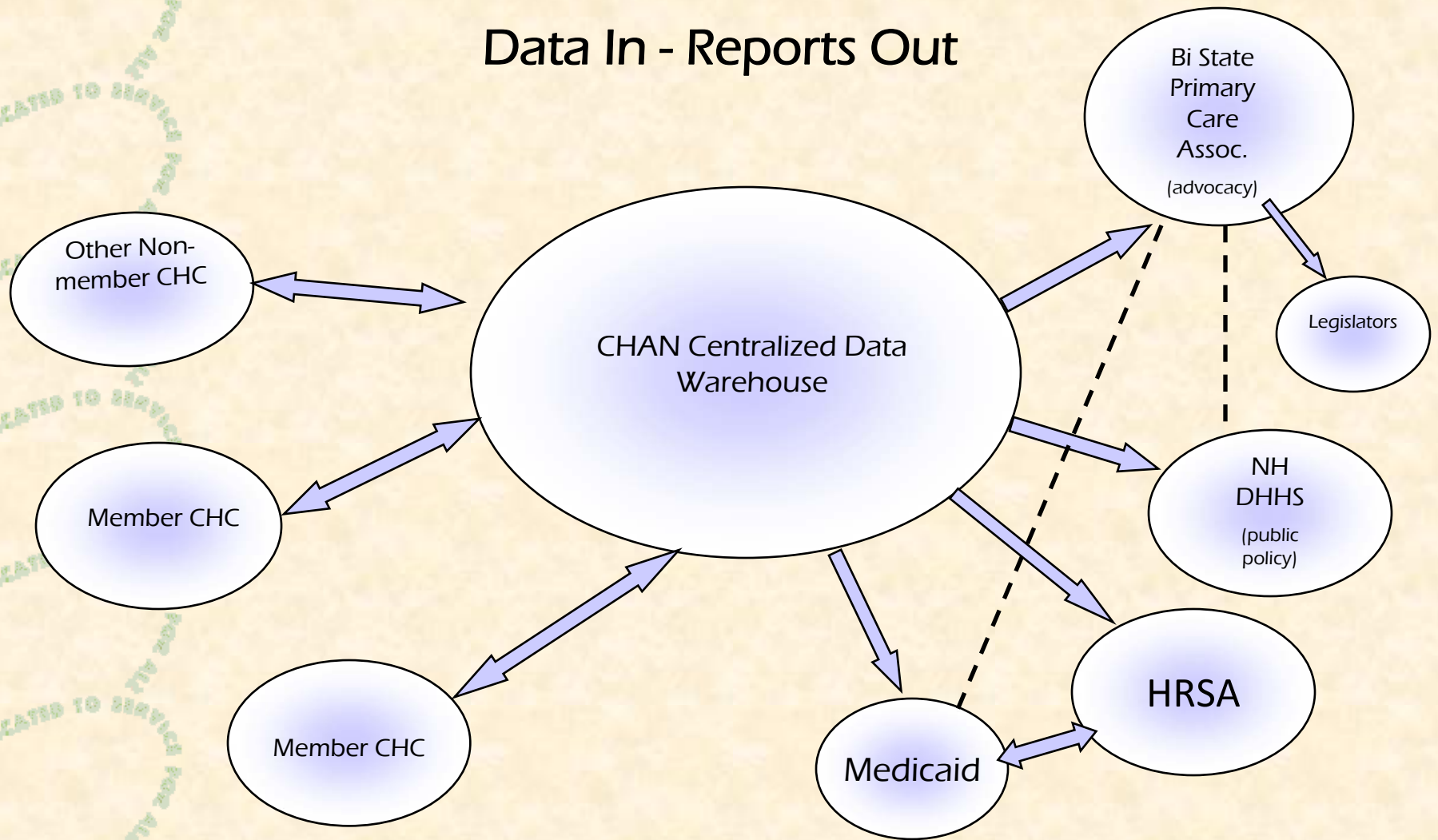
- Coos County Family Health Services (Berlin, Gorham)
- Ammonoosuc Community Health Services, Inc. (Littleton, Woodsville, Whitefield, Franconia, Warren)
- Healthcare for the Homeless Program (Manchester)
- Harbor Care Clinic, Healthcare for the Homeless Program (Nashua)



How we got here

- Using grant funding, **CHAN** began implementing Electronic Medical Records in 2000
- Much customization of data input screens was done to accommodate various programs
- Screens are designed to collect discrete data elements to enable us to show our funders how we make a difference for our patients
- **EVERYONE** who supports us wants a **REPORT!!!**

Data In - Reports Out



goal: to identify, collect and combine STANDARDIZED data from multiple systems

goal: utilize this standardized data to guide Public Health policy, increase CHC reimbursement rates and improve clinical outcomes

Reporting Evolution

Previous Processes

1. Reported on production data

Issues:

- slowed down application users
- limited our ability to create complex reports because we would void our vendor agreement by creating views, etc.

2. Extracted data from EMR and PM applications into separate databases on a SQL server

Issues:

- still difficult to combine data from EMR and billing sources
- required advanced programming skills
- hardware quickly became overloaded and retrieval was extremely slow

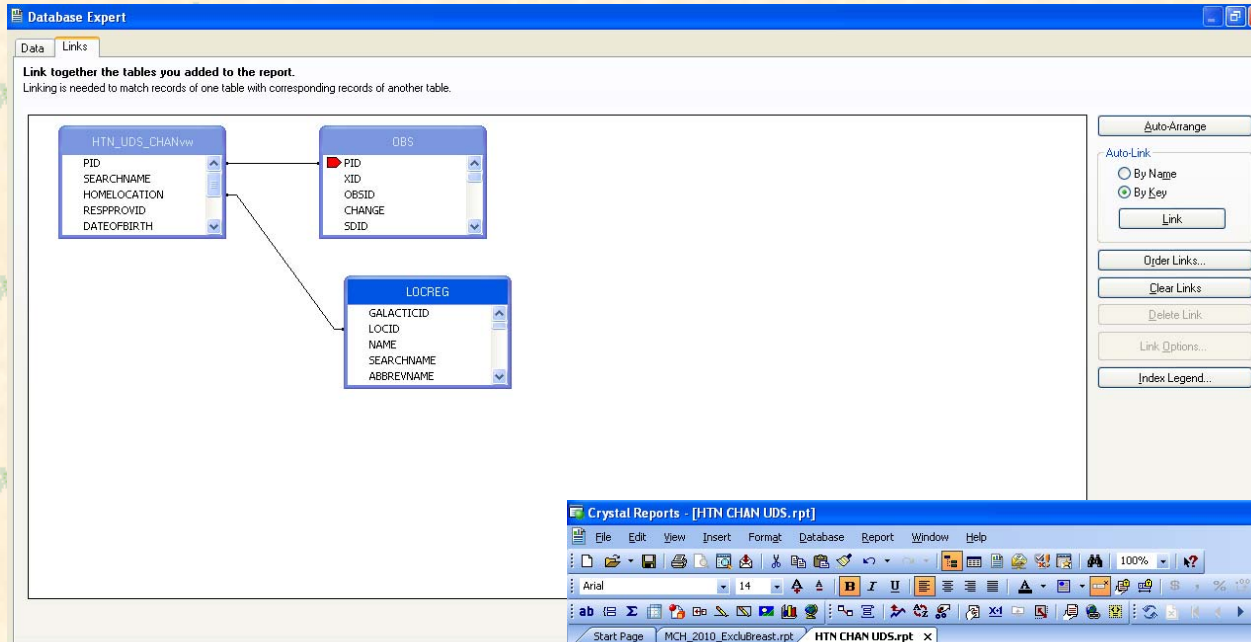
Prior to the creation of the Data Warehouse we used Microsoft SQL views to write a script to select the patients:

The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows a list of database objects, including views like 'dbo.Female18to65W1VisPastYrVw' and 'dbo.HTN_UDS_CHANvw'. The main window shows the definition of the view 'SQLTABLE.EMR..._UDS_CHANvw*'. The view is defined as a SELECT DISTINCT query that joins the PERSON, OBS, and PROBLEM tables. The query filters for patients with HDID = 1020, born between 1965 and 2008, with a problem change date within the last 365 days, and a problem code starting with 'ICD-401%'. The query groups by patient ID and search name, and filters for patients with more than one observation (COUNT(dbo.OBS.HDID) > 1).

Column	Alias	Table	Output	Sort Type	Sort Order	Group By	Filter	Or...	Or...	Or...
PID		PERSON	<input checked="" type="checkbox"/>			Group By				
SEARCHNAME		PERSON	<input checked="" type="checkbox"/>			Group By				

```
SELECT DISTINCT
  dbo.PERSON.PID, dbo.PERSON.SEARCHNAME, dbo.PERSON.HOMELocation, dbo.PERSON.RESPPROVID, dbo.PERSON.DATEOFBIRTH,
  dbo.PERSON.EMAIL, dbo.PERSON.EXTERNALID, dbo.PERSON.RACE, COUNT(dbo.OBS.HDID) AS VISITS
FROM
  dbo.PERSON INNER JOIN
  dbo.OBS ON dbo.PERSON.PID = dbo.OBS.PID INNER JOIN
  dbo.PROBLEM ON dbo.PERSON.PID = dbo.PROBLEM.PID
WHERE
  (dbo.OBS.HDID = 1020) AND (dbo.PERSON.DATEOFBIRTH < GETDATE() - 6570) AND (dbo.OBS.OBSDATE > GETDATE() - 365) AND
  (dbo.PROBLEM.CHANGE = 2.00) AND (dbo.PROBLEM.QUALIFIER = 'Dx of') AND (dbo.PROBLEM.STOPDATE > GETDATE()) AND
  (dbo.PROBLEM.CODE LIKE 'ICD-401%')
GROUP BY dbo.PERSON.PID, dbo.PERSON.SEARCHNAME, dbo.PERSON.HOMELocation, dbo.PERSON.RESPPROVID, dbo.PERSON.DATEOFBIRTH,
  dbo.PERSON.EMAIL, dbo.PERSON.EXTERNALID, dbo.PERSON.RACE
HAVING
  (COUNT(dbo.OBS.HDID) > 1)
```

Then using Crystal Reports join the patient population with the clinical data needed:



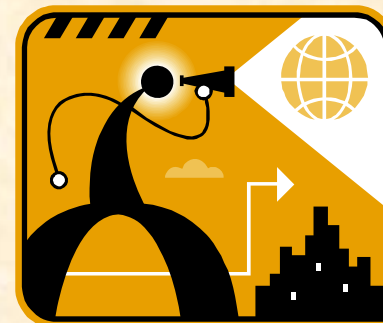
The screenshot shows the Crystal Reports interface for a report named 'HTN CHAN UDS.rpt'. The report is titled 'Hypertension By Race' and 'Table 7 - Section B UDS Health Outcomes and Disparities 2008'. The criteria are: 'Pts grouped by Site and Race with Active Dx of HTN (401*) aged 18+ w/2 or more HPI during 2008 and diagnosed w/HTN prior to 6/30/08'. The report is dated 11/25/2009.

	Total HTN Pts at this site:	186
Race: Black	Total HTN Pts of this Race:	1
	# patients with controlled blood pressure: <i>(most recent 2008 BP <140/90)</i>	0
Race: Hispanic	Total HTN Pts of this Race:	3
	# patients with controlled blood pressure: <i>(most recent 2008 BP <140/90)</i>	1
Race: Native American	Total HTN Pts of this Race:	1
	# patients with controlled blood pressure: <i>(most recent 2008 BP <140/90)</i>	0

This is an example of the report after hours of vetting data and formatting:



What was our VISION for an enhanced Data Warehouse?



To build a reliable source of standardized data:

- easily and securely accessible
- allows benchmarking and reporting (federal UDS, State of NH and others) for trending clinical care
- allows member health centers to participate in Medical Home and Meaningful Use initiatives
- for Patient case management
- aid administrators to track operational measures

Requirements of a system to meet the Vision

- Flexibility to meet changing reporting needs
- Produce accurate, auditable reports that are easy to read and understand – yet maintain HIPAA standards
- User-friendly for report developers and end users
- Has ability & capacity to include data from multiple in-house sources
- Has ability & capacity to include data from outside entities
- Allows for drill down from summary report data

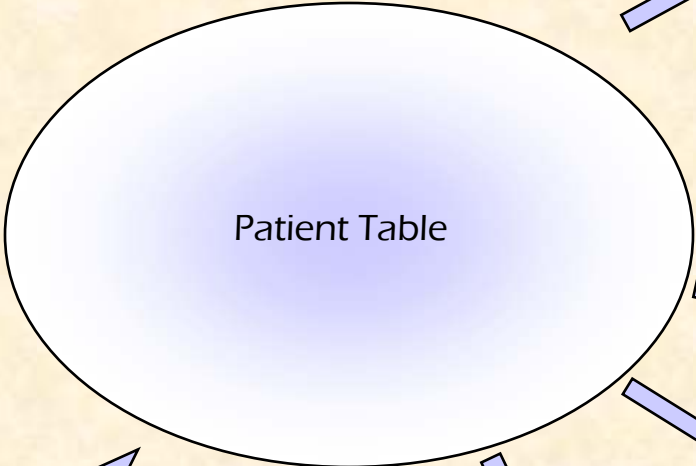
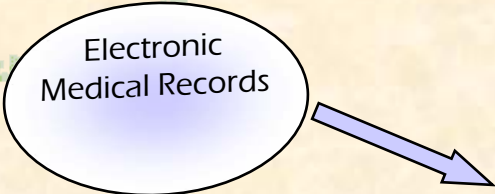
Reporting Evolution (cont)

Current Processes

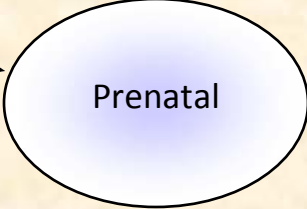
- Extracting data from EMR and PM systems to a combined data warehouse on SQL Server 2008
- Programming not needed because data fields are CHAN staff created for frequently used measures i.e., age-in-years, date-last-well-visit
- Data 'flakes' are disease specific i.e., Diabetes, Immunizations, Asthma
- All data from EMR and PM available for each patient
- Updated hardware and overnight loading of 'pre-fabricated' fields **speeds up** the report processing!!!!!!

CHAN's Data Warehouse

Data Sources:



Data Flakes:



Data is extracted from sources nightly and loaded in Data Warehouse. Patient table is populated based on definitions required by various outside agencies (i.e., HRSA defines diabetic patient as 18-75yrs with diagnosis of Diabetes and 2+ medical visits within the reporting year).

Today we can choose data based on pre-fabricated measures in a one step process:

Data Links

Link together the tables you added to the report.

Linking is needed to match records of one table with corresponding records of another table.

DM_PATIENT

- SSN
- ADDRESS01
- ADDRESS02
- CITY
- STATE
- ZIP_CODE
- MARITAL_STATUS_ID
- MARITAL_STATUS
- DEATH_DATE
- EMPLOYMENT_STATUS_ID
- EMPLOYMENT_STATUS
- PCP_ID
- PCP_NAME
- USUAL_PROVIDER_ID
- USUAL_PROVIDER_NAME
- EMAIL
- PHONE
- PREFERRED_LANGUAGE
- CHILDHOOD_IMMUNIZATION_UDS_COMPLIANT
- CHILDHOOD_IMMUNIZATION_CHD_MEASURE
- IS_DIABETIC
- IS_ASTHMATIC
- IS_HOMELESS
- IS_TAKING_FOLICACID_SUP
- IS_DEPRESSED
- IS_COPD
- IS_HTN
- IS_HTN_UDS
- FOBT_ON_EXAM_COMPLIANT

DM_PATIENT

- DATE_LAST_BMI_PERCENTILE
- LAST_BMI_PERCENTILE_VALUE
- DATE_LAST_SYSTOLIC
- LAST_SYSTOLIC_VALUE
- DATE_LAST_DIASTOLIC
- LAST_DIASTOLIC_VALUE
- DATE_LAST_LDL
- LAST_LDL_VALUE
- DATE_LAST_CHOLESTEROL
- LAST_CHOLESTEROL_VALUE
- DATE_LAST_EKG
- DATE_LAST_SMOKING_STATUS
- LAST_SMOKING_STATUS
- LAST_DRUG_USE_STATUS
- LAST_ALCOHOL_USE_STATUS
- DATE_LAST_WIC_STATUS
- WIC_STATUS
- DATE_LAST_FLU_IMMUNIZATION
- FLU_IMMUNIZATION_VALUE
- DATE_LAST_PNEUMONIA_VACCINE
- PNEUMONIA_VACCINE_VALUE
- PRENATAL_STATUS_CURRENT
- PRENATAL_EDC_CURRENT
- PRENATAL_STATUS_3YEARS
- DATE_LAST_PAP
- LAST_PAP_RESULT
- PAP_ELIGIBILITY
- MAMMO_ELIGIBILITY
- MAMMO_COMPLIANT
- DATE_LAST_MAMMO

Today we can offer users access to their own data to create WEBI reports based on the pre-fabricated measures:

The screenshot displays the 'New Web Intelligence Document' interface. The left pane shows a tree view of data measures under the 'Data' tab. The right pane shows the 'Result Objects' and 'Query Filters' sections.

Data Measures:

- Date Last Weight
- Last Weight Value
- Date Last Bmi Percent
- Last Bmi Percent Value
- Date Last Bmi Percentile
- Last Bmi Percentile Value
- Date Last Systolic
- Last Systolic Value
- Date Last Diastolic
- Last Diastolic Value
- Date Last Ldl
- Last Ldl Value
- Date Last Cholesterol
- Last Cholesterol Value
- Date Last Smoking Status
- Last Smoking Status
- Last Drug Use Status
- Last Alcohol Use Status
- Date Last Flu Immunization
- Date Last Pneumonia Vaccine
- Date Last Pap
- Date Last Mammo
- Last Mammo Result

Result Objects:

- Global Pid
- Date Last Flu Immunization
- Location Of Care Name

Query Filters:

- Is Diabetic Equal to 1
- Location Of Care Name Equal to Families First of the Greater Seacoast
- And
- Or
- Date Last Flu Immunization Is null
- Date Last Flu Immunization Less than 09/1/2009

Future Process Goals

Where we are going

- Continue to add “flakes”
- Allow users to create their own simple reports using our pre-fab fields in Business Object’s Web Intelligence application
- Using Xcelsius, develop dashboards for clinical and administrative staff
- Add other outside agency data and users

Successes

- **CHAN** has combined complex disparate data to allow for retrieval from one data source simplifying our structure and reducing maintenance of multiple databases
- Users are empowered by accessing their own agency's data securely with tags to define the derivation of each field
- Data is more transparent which adds to report reliability
- Report development time has been drastically reduced due to streamlined one-to-one relationship between patient and clinical observations
- Our enhanced reporting capability has made us an attractive partner – one agency has already signed a MOA with us