LEWIS AND CLARK
INFORMATION EXCHANGE

Population Health Problem Solving Scenario

Population Health – The Opportunity

- A solution is needed that will allow multiple clinics and hospitals to share detailed information on patients that have had or at risk of having a Heart Attack or Stroke.

- One in four Kansans dies from heart disease or stroke, and rural communities have the highest mortality rates. The goal of the initiative is to reduce deaths from Heart Attack and Stroke while at the same time reducing overall healthcare costs in the rural areas being served.

The Solution Must Be/ Provide:

- **Scalable:** While the initial emphasis is on heart attacks and strokes additional disease process could be included such as Sepsis or Respiratory Disease

- **Data Capture**: Must be able to capture data in both discrete and non-discrete fields to ensure holistic data capture regardless of how the provider documents on a frequent basis.

- **Data Movement:** Must be able to move data from participants EMR to an endpoint that allows aggregation of the data

- **Vendor Agnostic:** Must be able to connect with numerous unique EMRs

The Solution Must Be/ Provide:

•   **Analytics:** Solution must be able to provide analytics on more than 170 data elements that can be in accessible in both "canned" and "on the fly" reporting of the identified population. Analytics must be able to show results at the individual provider, practice and collaborative level.

•   **Secure:** Organizations had to have full control over their data, only allowing specific data elements they had given permission for to be shared, no "data dumps" or sharing with unauthorized entities

•   **Affordable:** Rural family practice clinics have limited financial resources

Barriers Encountered

- Many organizations have no on site IT professional, IT work is outsourced

- EMR providers wanted to charge for additional connection

- Executive leadership embraced the opportunity to share data, this enthusiasm was not always communicated with the individuals tasked to make the connection(s) happen

- Multiple EMRs that ranged from very high quality to low quality

- Multitenant technology platforms where not all of the organizations on a server were participating in the Collaborative

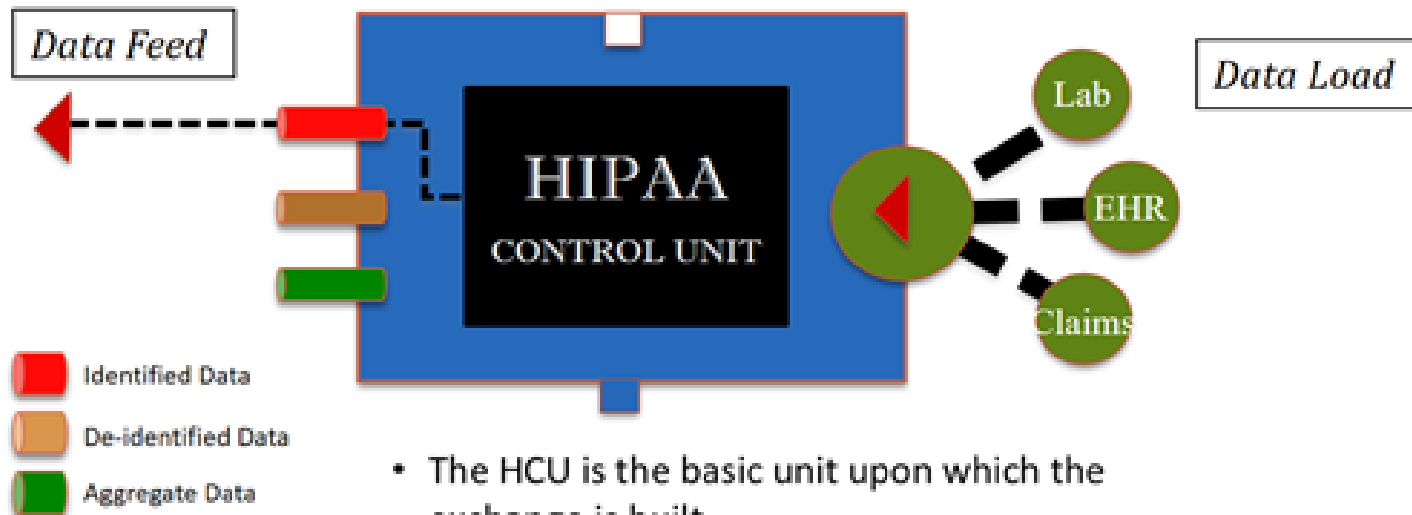# Solutions

Data Pull Versus Data Push

Instead of attempting to try and bring "pushed" data through the traditional Health Information Organization a new data "pull" model was implemented through a Private Exchange.

A project manager, who was previously a hospital CIO, was placed in charge of the communication and facilitation of the initiative with formal weekly meetings with the Private Exchange. Helped to ensure buy-in and engagement of key stakeholders. A project manager was also dedicated from the Private Exchange.

Connection

- A virtual machine is connected to the EMR database through a Virtual Privacy Network that allowed the data tables to be mapped and permissioned data to be extracted

- This required a read only access to the data base which most of the organizations had, even if the data was remote hosted

- The capability also existed to extract data through a front end method which has a clinic visit summary sent through a virtual printer. The data is then harvested from the machine readable content within the report.

HIPAA Control Unit

Data Feed

Data Load

Lab

EHR

Claims

HIPAA CONTROL UNIT

Identified Data
De-identified Data
Aggregate Data

- The HCU is the basic unit upon which the exchange is built.
  - Implemented as a virtual machine.
  - Provides data normalization and quality assessment services on behalf of the legal owner of the data managed.
  - Maintains a refreshed Concepts Catalog of certified elements that are available. The catalog is extensible by the user.
  - Manages access for applications authorized to access information from the Concepts Catalog. Maintains audit logs used for accreditation.

Heart and Stroke Virtual Data Center

Clinic Virtual Data Center

Critical Access Hospital Virtual Data Center

HCU

HCU

HCU

H&S-approved data movements occur between HCUs using secure point-to-point communications
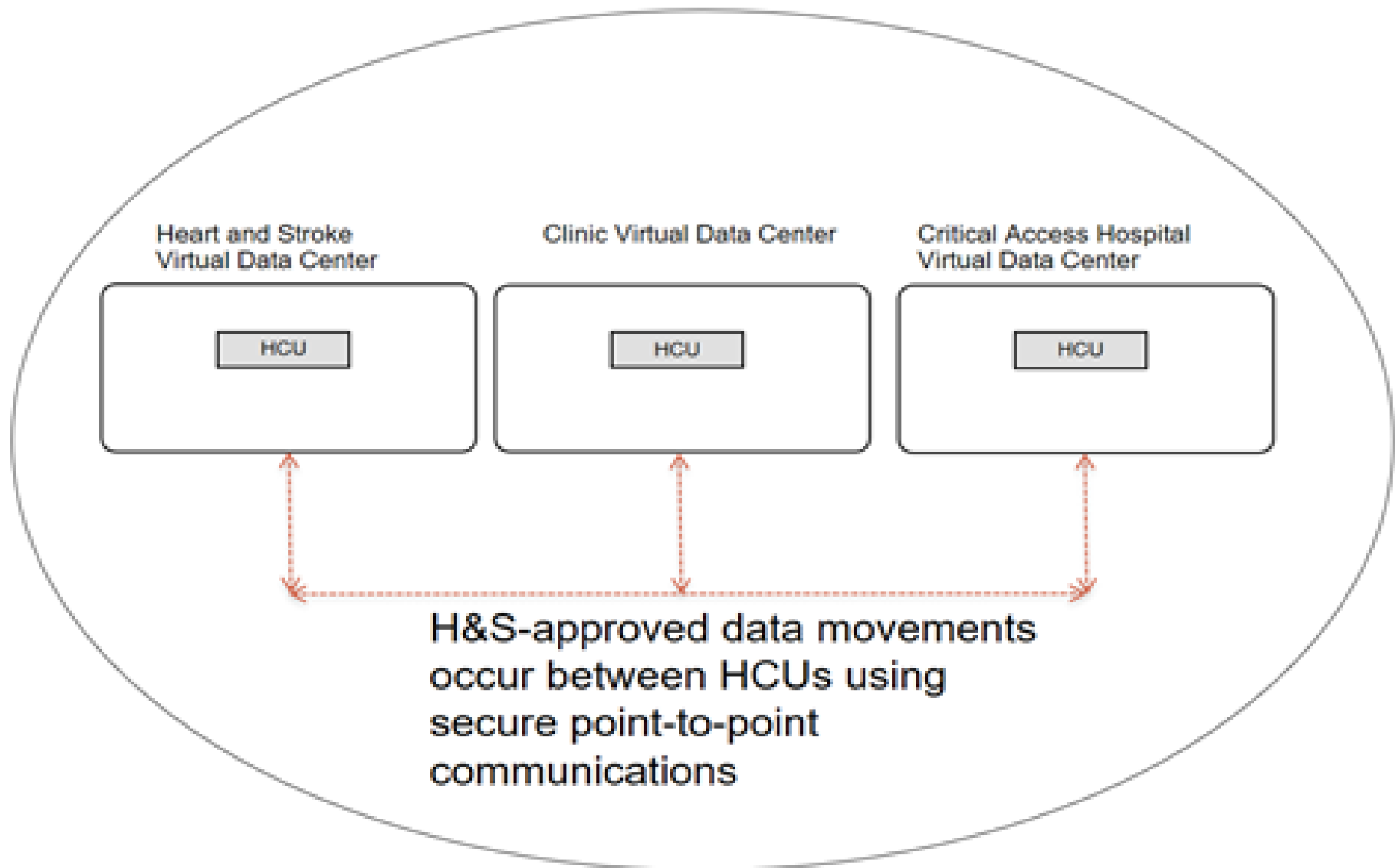
HMS Cloud Structure

Overcoming Barriers

- Using VPN to make connection from EMR Database to HCU does not expose the solution to the internet.

- Data is stored in Amazon Web Services HIPAA Compliant Cloud

- Connecting directly to the EMR database where the participant has read only access does not require the EMR vendor be engaged in most scenarios.

- More than 20 different EMRs have been connected to date through the above process. Have been able to gain knowledge of tables within several EMRs and leverage that knowledge with future connections.

Overcoming Barriers Cont.

- Data is updated on a weekly basis, can be more or less frequent

- Solution provided was approximately 1/10th of the next lowest bid to provide the services that did not include data extraction. Data would need to be pulled and sent to an analytical engine in other proposals.

- Connecting directly to the EMR database where the participant has read only access does not require the EMR vendor be engaged in most scenarios.

- Analytics can be identified, de-identified at the individual provider or practice level or at the Collaborative level. Example of analytics follow:

Example of Performance Results (Provider/ Clinic or Collaborative Level)

HME   Metric Dashboard

40th percentile
50th percentile
60th percentile
70th percentile
✓ 80th percentile
90th percentile

oard   :   :   :   Export to Excel   Export All to Excel

Metric	80th percentile			
(ACO 12) Medication Reconciliation: Reconciliation After Discharge from an Inpatient Facility	80%	-	-	-
(ACO 13) Falls: Screening for Future Fall Risk	52%	19%	0%	0%
(ACO 14) Preventive Care and Screening: Influenza Immunization	97%	47%	43%	40%
(ACO 15) Preventive Care and Screening: Pneumonia Vaccination for Patients 65 Years and Older	97%	35%	43%	25%
(ACO 16) Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up	99%	4%	0%	0%
(ACO 17) Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	80%	0%	0%	0%
(ACO 18) Preventive Care and Screening: Screening for Clinical Depression and Follow-Up Plan	40%	0%	0%	0%
(ACO 19) Preventive Care and Screening: Colorectal Cancer Screening	95%	33%	66%	19%
(ACO 20) Preventive Care and Screening: Screening Mammography	88%	45%	19%	40%
(ACO 21) Preventive Care and Screening: Screening for High Blood Pressure	80%	74%	54%	88%
(ACO 22) Diabetes Composite (All or Nothing Scoring): Diabetes Mellitus: Hemoglobin A1c Control (< 8%)	31%	87%	92%	84%
(ACO 23) Diabetes Composite (All or Nothing Scoring): Diabetes Mellitus: Low Density Lipoprotein (LDL-C) Control in Diabetes Mellitus	31%	74%	82%	67%
(ACO 24) Diabetes Composite (All or Nothing Scoring): Diabetes Mellitus: High Blood Pressure Control in Diabetes Mellitus	31%	74%	81%	69%
(ACO 25) Diabetes Composite (All or Nothing Scoring): Diabetes Mellitus: Tobacco Non Use	31%	65%	100%	21%
(ACO 26) Diabetes Composite (All or Nothing Scoring): Diabetes Mellitus: Daily Aspirin Use for Patients with Diabetes and Ischemic Vascular Disease	31%	36%	50%	77%
(ACO 27) Diabetes Mellitus: Hemoglobin A1c Poor Control in Diabetes Mellitus	20%	6%	5%	7%
(ACO 28) Hypertension (HTN): Controlling High Blood Pressure	74%	71%	74%	68%
(ACO 29) Ischemic Vascular Disease (IVD): Complete Lipid Profile and Low Density Lipoprotein (LDL-C) Control	67%	77%	89%	74%
(ACO 30) Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic	91%	39%	78%	76%
(ACO 31) Heart Failure: Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD)	80%	20%	23%	19%
(ACO 32) Coronary Artery Disease (CAD): Lipid Control	76%	87%	86%	88%
(ACO 33) Coronary Artery Disease (CAD): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Patients with CAD and Diabetes and/or Left Ventricular Systolic Dysfunction (LVSD)	76%	49%	43%	60%

Various Vital Signs and Lab Results

DM Confirmed	HbA1C Value	HbA1C Date	LDL Value	LDL Date	BP Value	BP Date	Systolic BP	Diastolic BP	Aspirin Use	Beta Blocker (Current Rx)	Statin Current Use	LVEF < 40%	ACE/ARB (Current Rx)	
N	5.2	06/18/2013	115	06/18/2013	118/70	01/27/2014	118	70	-	-	-	Y	-	
N	6.0	10/14/2013	62	10/14/2013	118/68	02/25/2014	118	68	-	06/06/2013	-	Y	-	
Y	7.6	07/01/2013	80	07/01/2013	116/64	11/19/2013	116	64	-	-	-	Y	-	
N	5.6	02/21/2014	52	02/21/2014	132/80	02/21/2014	132	80	02/21/2014	-	02/21/2014	Y	-	
N	5.6	02/10/2014	129	02/10/2014	138/88	02/10/2014	138	88	-	-	-	Y	-	
Y	7.1	12/11/2013	56	05/08/2013	116/72	12/11/2013	116	72	-	-	-	Y	-	
N	-	-	105	04/12/2013	148/94	03/13/2014	148	94	-	-	-	Y	-	
Y	7.2	01/08/2014	21	10/11/2013	134/84	03/26/2014	134	84	-	-	-	Y	-	
N	5.6	08/28/2013	70	08/28/2013	136/76	02/26/2014	136	76	-	-	-	Y	-	
N	5.8	03/03/2014	140	03/03/2014	130/84	03/03/2014	130	84	-	-	-	Y	-	
N	-	-	-	-	126/68	11/21/2013	126	68	-	-	-	Y	04/10/2013	
Y	7.1	03/06/2014	67	03/06/2014	124/78	03/06/2014	124	78	03/20/2014	03/06/2014	03/25/2014	Y	03/25/2014	
N	-	-	89	06/17/2013	128/88	06/17/2013	128	88	-	-	-	Y	-	

Various Lab and Medication Results

DM Confirmed	HbA1C Value	HbA1C Date	LDL Value	LDL Date	BP Value	BP Date	Systolic BP	Diastolic BP	Aspirin Use	Beta Blocker (Current Rx)	Statin Current Use	LVEF < 40%	ACE/ARB (Current Rx)	Anti-Hypertensive (Current Rx)	HTN Confirmed
N	6.1	01/30/2013	115	01/30/2013	128/76	01/17/2014	128	76	-	-	01/30/2013	Y	-	-	N
N	-	-	-	-	100/70	03/26/2014	100	70	03/12/2014	07/20/2012	07/20/2012	Y	06/14/2013	06/14/2013	Y
N	6.1	03/10/2014	76	07/12/2013	130/80	03/04/2014	130	80	-	-	-	Y	02/24/2014	02/24/2014	Y
Y	-	-	46	08/14/2013	120/60	12/11/2013	120	60	02/07/2006	-	12/30/2013	Y	03/03/2014	08/14/2013	Y
N	-	-	-	-	110/60	08/14/2013	110	60	-	-	01/17/2013	Y	05/11/2009	-	Y
N	6.4	12/18/2013	157	12/18/2013	130/60	11/14/2013	130	60	12/30/2008	-	05/01/2013	Y	08/09/2013	05/14/2013	Y
N	-	-	86	01/15/2013	100/60	07/22/2013	100	60	-	-	03/18/2013	Y	-	-	Y
N	-	-	98	06/18/2012	150/70	01/28/2014	150	70	05/19/2008	-	09/10/2013	Y	01/28/2014	-	Y
N	5.6	12/28/2012	95	12/28/2012	125/75	08/27/2013	125	75	-	-	09/27/2010	Y	-	-	Y
Y	7.1	11/27/2013	51	07/05/2012	108/72	11/21/2013	108	72	07/16/2012	01/10/2013	08/16/2013	Y	-	-	Y
N	5.6	01/10/2014	37	02/10/2014	130/80	03/28/2014	130	80	-	07/12/2011	01/27/2014	Y	01/27/2014	01/27/2014	Y
Y	7.6	01/14/2013	96	01/14/2013	120/75	03/26/2014	120	75	-	03/12/2009	04/17/2013	Y	11/06/2013	-	Y
Y	6.9	05/24/2012	78	12/12/2013	130/75	01/20/2014	130	75	-	-	12/06/2013	Y	05/06/2013	12/15/2009	Y
N	6.5	04/26/2013	-	-	120/80	04/25/2013	120	80	-	-	11/05/2013	Y	11/05/2013	11/05/2013	Y
N	-	-	153	03/15/2013	110/60	09/26/2013	110	60	-	02/01/2013	02/18/2014	Y	02/18/2014	02/18/2014	Y
N	-	-	51	11/05/2013	120/70	03/11/2014	120	70	02/19/2013	02/19/2013	02/19/2013	Y	-	-	Y

Medication Data to the Sig Level

HTN Confirmed	HTN DX Date	Anti-Hypertensive (Current Rx)	HTN Sig	BP	BP Date	Systolic BP	Diastolic BP
Y	03/27/2014	03/27/2014	lisinopril-hydrochlorothiazide oral tablet 10-12.5 mg	122/76	03/27/2014	122	76
Y	03/27/2014	03/27/2014	hydrochlorothiazide oral tablet 25 mg	130/68	03/27/2014	130	68
Y	03/26/2014	03/26/2014	atenolol oral tablet 25 mg	126/60	03/26/2014	126	60
Y	03/06/2014	03/25/2014	amlodipine oral tablet 5 mg	124/78	03/06/2014	124	78
Y	03/22/2014	03/21/2014	hydrochlorothiazide oral tablet 12.5 mg	130/82	03/21/2014	130	82
Y	03/14/2014	03/14/2014	losartan-hydrochlorothiazide oral tablet 50-12.5 mg	128/60	03/14/2014	128	60
Y	03/12/2014	03/12/2014	amlodipine Oral tablet 10 mg	134/70	03/12/2014	134	70
Y	03/12/2014	03/12/2014	amlodipine oral tablet 5 mg	132/68	03/21/2014	132	68

Care Management – Identifying Trends, Gaps in Care

	Patient Summary	MRN	Patient Name	Sex	Age	Initial LDL Value	Initial LDL Date	Change in LDL (Initial to Followup)	Follow-Up LDL Value	Follow-Up LDL Date	Change in LDL (Initial to Most Recent)	Most Recent LDL Value	Most Recent LDL Date	Care Manager
☐	Patient Summary			F	64	146.0	06/04/2013	-39.0	107.0	01/20/2014	-41.0	105.0	05/08/2014	-
☐	Patient Summary			M	58	136.0	11/14/2011	9.0	145.0	11/19/2012	7.0	143.0	05/15/2013	-
☐	Patient Summary			F	68	91.0	01/09/2013	-18.0	73.0	05/07/2013	18.0	109.0	02/07/2014	-
☐	Patient Summary			M	85	93.0	01/10/2013	-12.0	81.0	04/18/2013	-10.0	83.0	10/14/2013	-
☐	Patient Summary			M	68	94.0	02/25/2013	27.0	121.0	10/14/2013	-3.0	91.0	03/20/2014	-
☐	Patient Summary			M	47	150.0	01/09/2013	-	-	-	.0	150.0	01/09/2013	-
☐	Patient Summary			M	35	103.0	02/07/2013	-32.0	71.0	08/23/2013	-30.0	73.0	12/03/2013	-
☐	Patient Summary			F	68	96.0	03/05/2013	-44.0	52.0	09/24/2013	-35.0	61.0	04/15/2014	-
☐	Patient Summary			F	54	97.0	04/01/2013	-38.0	59.0	01/03/2014	-38.0	59.0	01/03/2014	-
☐	Patient Summary			F	56	53.0	08/07/2013	43.0	96.0	03/04/2014	43.0	96.0	03/04/2014	-
☐	Patient Summary			F	50	130.0	04/05/2013	3.0	133.0	08/06/2013	3.0	133.0	08/06/2013	-
☐	Patient Summary			F	81	104.0	12/06/2010	25.0	129.0	05/07/2013	-20.0	84.0	08/20/2013	-
☐	Patient Summary			F	56	62.0	06/13/2013	-	-	-	.0	62.0	06/13/2013	-
☐	Patient Summary			F	77	203.0	06/03/2013	-111.0	92.0	09/03/2013	-104.0	99.0	04/07/2014	-

Thank You