Using electronic health record data for population health and practice based research

2014 North American primary care research group Practice Based Research Network Conference

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EHR as a Backbone to Analytics

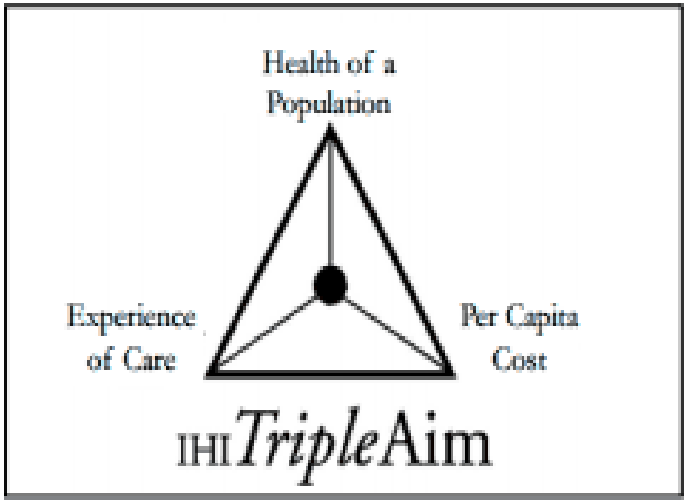
As the adoption rate of electronic health records (EHRs) in primary care increases, so too does the potential for EHRs to be viable tools for quality improvement and research

- Broadly defined, EHRs store clinical information for use in patient care and are intended to:
  - allow efficient, secure, accurate data sharing
  - offer decision support for patient care
  - improve management of medical information
  - reduce health disparities among safety-net clinics
  - improve patient care at reduced cost
  - act as valuable tools for quality improvement, practice redesign, research, and analytics

Overlay of Analytics and Triple Aim

Key objective of health analytics

- To gain insight for making informed healthcare decisions
  - Improve the quality of patient care
  - Reduce healthcare costs
  - Improve the health of the patient population



Raghupathi, 2013

PERSPECTIVE

- Health analytics is generally equated with specialized software, run only by those with specialized skillsets
    - Often referred to when talking about “big data” and “data warehouses”
- While important, the focus on software can overshadow other essential considerations
    - Knowledge, skill, and ability to work with data (transcends specific EHRs)
        - Applying data on a local level (state → region → clinic → provider)
    - “Data maturity” (Turning data into information, and information into action)

Confusion versus Information

We need just the right balance

- As information increases, confusion decreases – but only to a point

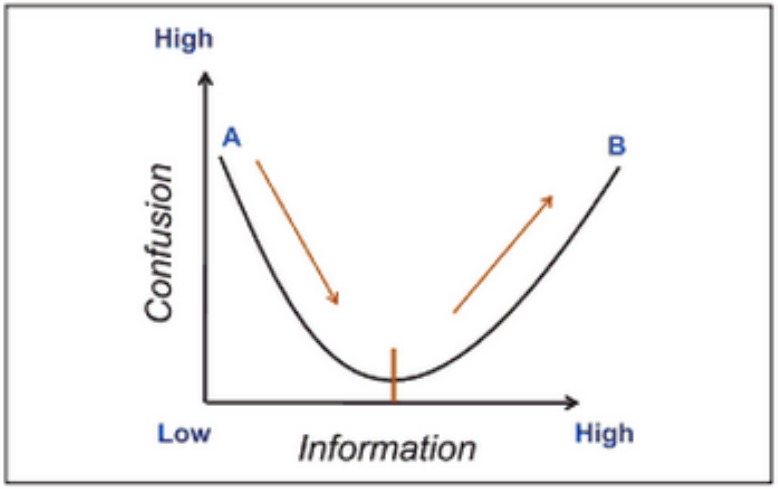


Figure 1. Confusion versus Information

Health Systems Must Strive for Data Maturity

Rocco J. Perla, EdD[1]

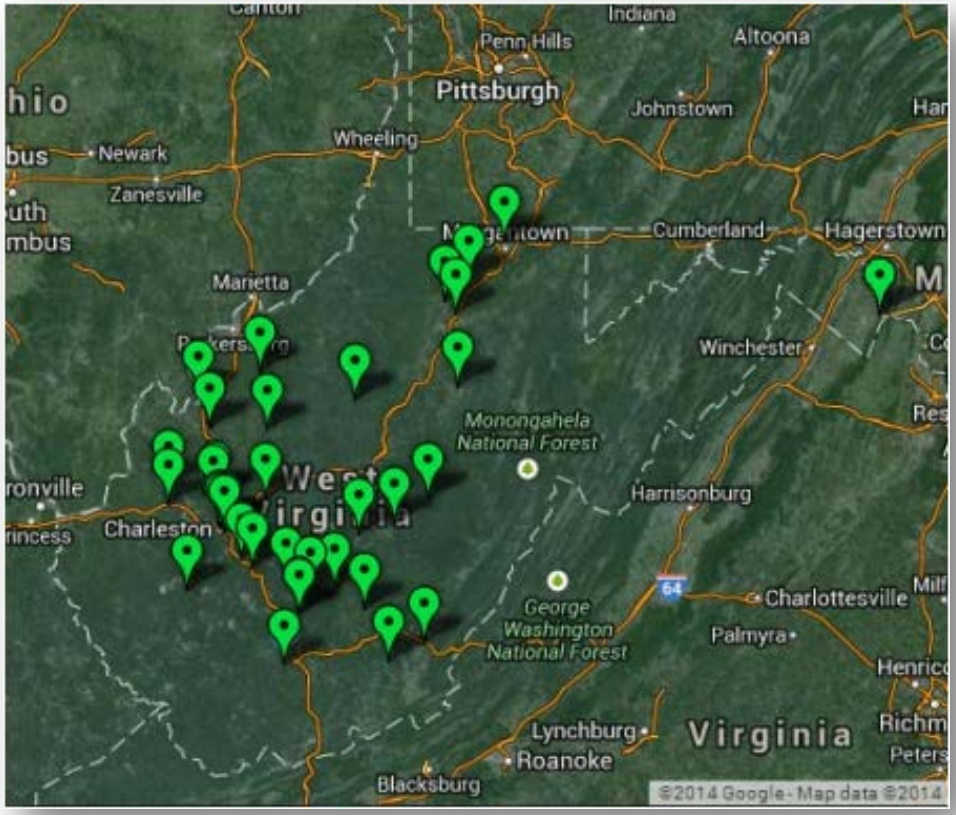
Data Maturity

5 concepts in being "data mature" (Perla, 2012)

1. Data are seen as an investment and resource
    - Good reports take time and care
2. Projects have lifecycles
    - Old measures evolve or are replaced
3. All measures are operationally defined
    - Clear, understood definitions
    - Knowing from where the data come
4. Improvement metrics are linked to attempts at change
    - Acting on data -- Improvement depends on measurement
5. Data are visualized
    - Graphical representations
    - Maps

WV Practice Based Research Network

- Mission -- To improve the health of West Virginians by collaborating with primary care practices to conduct translational practice based research



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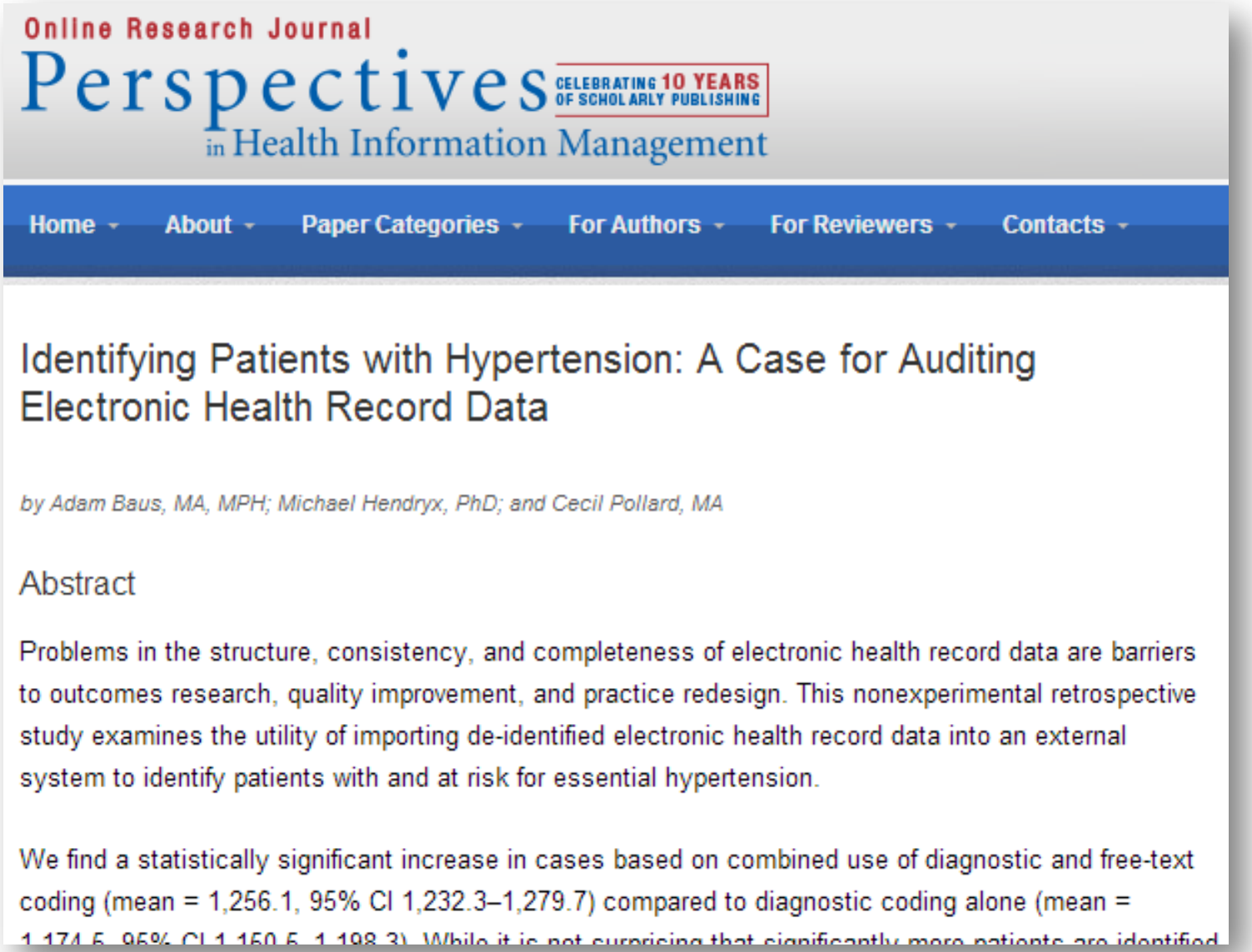
Value Added from Free Text EHR Data



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Identifying Patients with Hypertension: A Case for Auditing Electronic Health Record Data

by Adam Baus, MA, MPH; Michael Hendryx, PhD; and Cecil Pollard, MA

Abstract

Problems in the structure, consistency, and completeness of electronic health record data are barriers to outcomes research, quality improvement, and practice redesign. This nonexperimental retrospective study examines the utility of importing de-identified electronic health record data into an external system to identify patients with and at risk for essential hypertension.

We find a statistically significant increase in cases based on combined use of diagnostic and free-text coding (mean = 1,256.1, 95% CI 1,232.3–1,279.7) compared to diagnostic coding alone (mean = 1,174.5, 95% CI 1,150.5–1,198.3). While it is not surprising that significantly more patients are identified

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Increase in Count of Patients with Essential Hypertension, by Search Criteria and Primary Care Center

Primary Care Center	A: Patients with Hypertension: ICD-9-CM Coding	B: Patients with Hypertension: ICD-9-CM Coding Plus Free Text	C: Patients with Hypertension: ICD-9-CM Coding Plus Free Text Plus Last 2+ Blood Pressure Readings ≥140/90 mm Hg	Percent Missed Based on ICD-9-CM Coding Only (100% − A/C)
A	5,124	5,270	5,535	7.4%
B	1,605	1,868	1,945	17.5%
C	476	505	596	20.1%
D	658	660	724	9.1%
E	852	859	884	3.6%
F	313	313	325	3.7%
G	228	418	438	47.9%
H	396	407	446	11.2%
I	666	714	749	11.1%
J	1,143	1,217	1,526	25.1%
K	1,458	1,586	1,725	15.5%
Sum	12,919	13,817	14,893	13.3%
Mean	1,174.45	1,256.09	1,353.91	
Standard Deviation	1,386.60	1,424.08	1,492.58	
95% CI, Lower	1,150.49	1,232.26	1,329.93	
95% CI, Upper	1,198.31	1,279.74	1,377.87	

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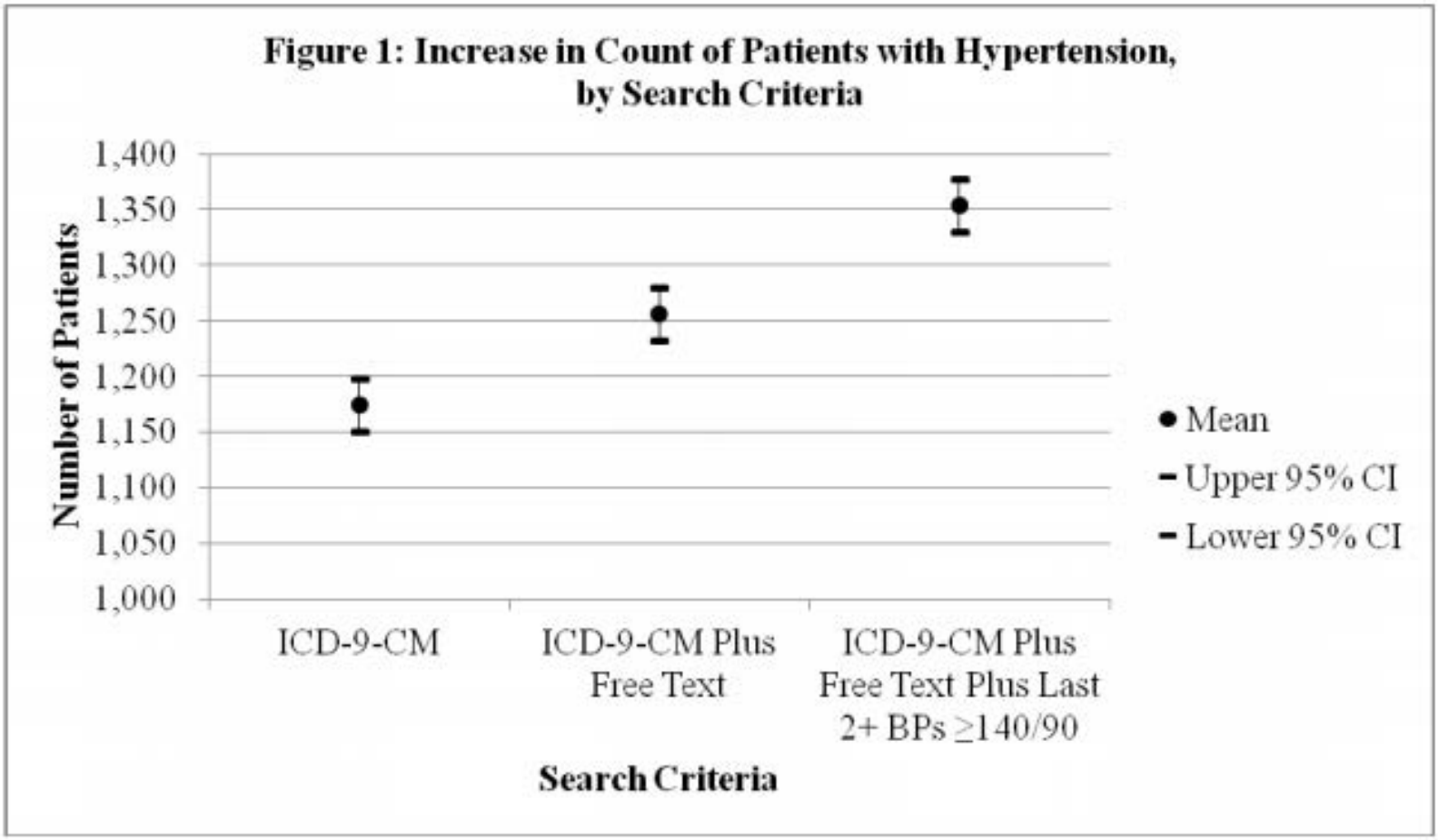
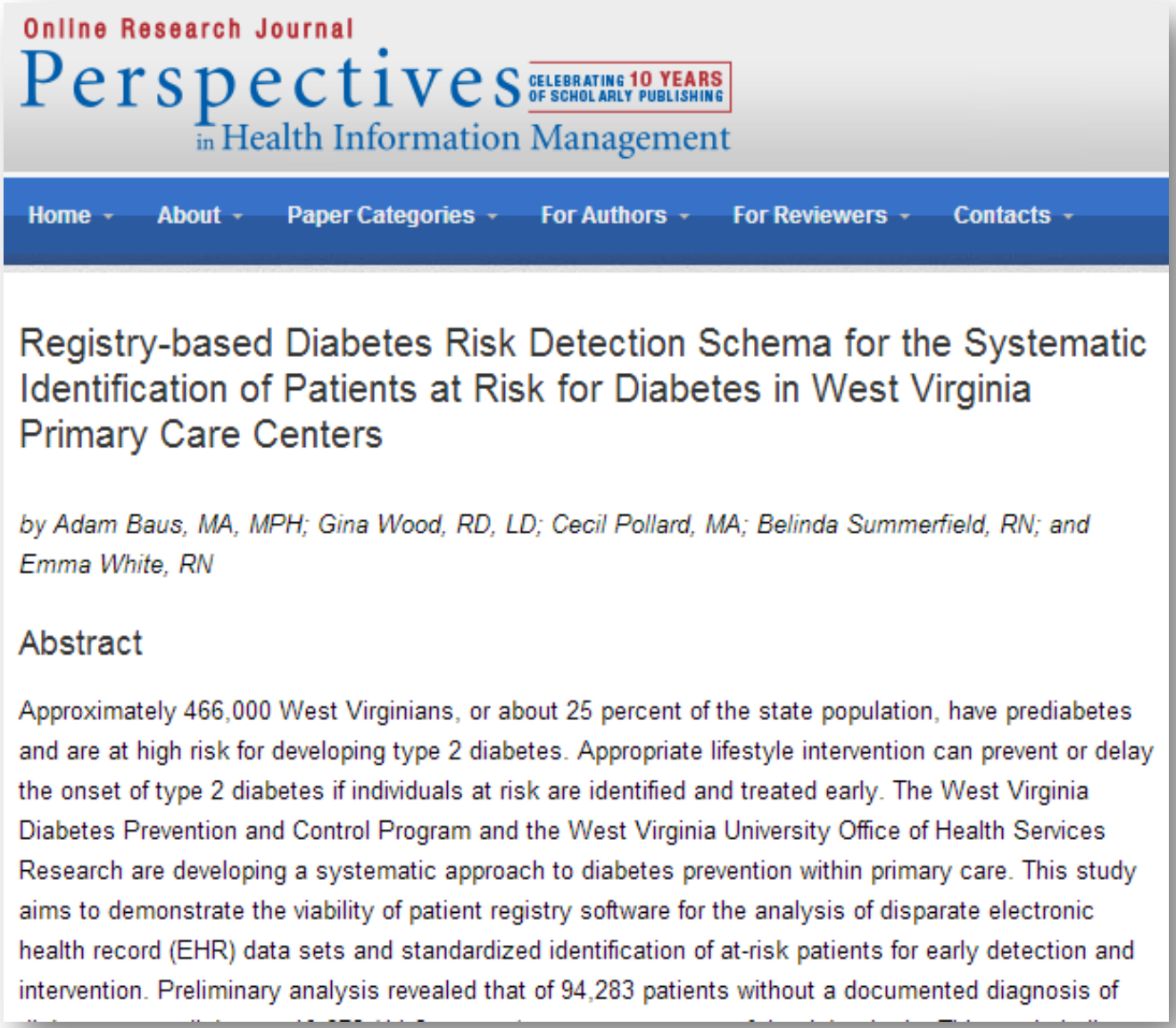


Note: Figure shows statistically significant increases in identification of essential hypertension cases using three search criteria methods.

Identifying Patients At-Risk for Diabetes



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Registry-based Diabetes Risk Detection Schema for the Systematic Identification of Patients at Risk for Diabetes in West Virginia Primary Care Centers

by Adam Baus, MA, MPH; Gina Wood, RD, LD; Cecil Pollard, MA; Belinda Summerfield, RN; and Emma White, RN

Abstract

Approximately 466,000 West Virginians, or about 25 percent of the state population, have prediabetes and are at high risk for developing type 2 diabetes. Appropriate lifestyle intervention can prevent or delay the onset of type 2 diabetes if individuals at risk are identified and treated early. The West Virginia Diabetes Prevention and Control Program and the West Virginia University Office of Health Services Research are developing a systematic approach to diabetes prevention within primary care. This study aims to demonstrate the viability of patient registry software for the analysis of disparate electronic health record (EHR) data sets and standardized identification of at-risk patients for early detection and intervention. Preliminary analysis revealed that of 94,283 patients without a documented diagnosis of

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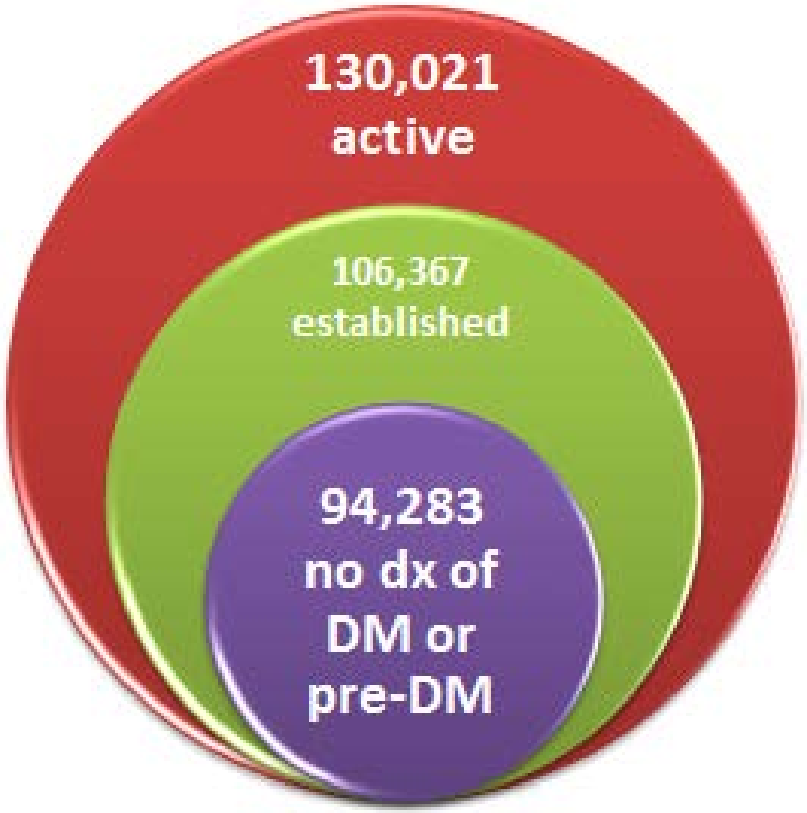
- Across 14 WV primary care centers, we find:
  - 130,021 active patients
  - Among those, 106,367 (81.8%) are established (receiving care for 12 months or more)
  - Among those, **94,283** (88.6%) do not have a diagnosis of diabetes or pre-diabetes



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Primary Care Center	Patients w/out Dx of DM or pre-DM	Patients age ≥45 with last BMI >25	Patients age <45 w/ BMI >25 w/ HTN, hyperlipidemia, gestational DM, family hx of DM, CVD	Patients with last FBG 100-125	# and % of patients identified as at-risk for pre-DM
A	1546	112	18	1	131 (8.5%)
B	1682	334	40	4	378 (22.5%)
C	2068	308	49	1	358 (17.3%)
D	1050	54	7	70	131 (12.5%)
E	1110	15	3	0	18 (1.6%)
F	1849	62	15	2	79 (4.3%)
G	2068	284	35	11	330 (16.0%)
H	5517	235	26	21	282 (5.1%)
I	8407	669	70	0	739 (8.8%)
J	17792	2467	288	1627	4382 (24.6%)
K	10026	557	52	504	1113 (11.1%)
L	9185	627	91	3	721 (7.8%)
M	19038	1054	90	2	1146 (6.0%)
N	12945	794	69	2	865 (6.7%)
Sum	94283	7572	853	2248	**10673 (11.3%)**
Mean	6734.5	540.8	60.9	160.6	
SD	6307.2	635.2	71.4	442.5	

FROM PERLA, 2012

“In the end, we need to keep data in its place and maximize its ability to serve us humans with all our limitations—not the reverse.”

SELECT READINGS ON THE BENEFITS AND CHALLENGES OF EHR DATA

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Thank You & Contact Information

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