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Leveraging Health Information Exchange for Care Coordination

Summer Institute of Nursing Informatics 2019
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Today's Health Care Landscape

- Fragmented and Varied Patient Care
- Health Care Disparities
- Aging and Sicker Population
- Opioid Crisis
- High Costs
- Provider Burnout & Dissatisfaction

Sources: M. Battle, Population Health and Population Health Management: "What it is and What it isn't" November 2018

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Learning Objectives

1. Introduce current health care challenges
2. Discuss the key components for health information exchange
3. Describe potential technology tools for care coordination
4. Explore outcomes in using Health Information Exchange data for care coordination

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Today's Health Care - Facts

Health consumption expenditures per capita, U.S. dollars, PPP adjusted, 2017

United States	$10,224
Switzerland	$8,009
Germany	$5,728
Sweden	$5,511
Austria	$5,440
Netherlands	$5,386
Comparable Country Average	$5,280
France	$4,902
Canada	$4,826
Belgium	$4,774
Japan	$4,717
Australia	$4,543
United Kingdom	$4,246

The US value was obtained from the 2017 National Health Expenditure data

Source: KFF analysis of data from National Health Expenditure Accounts and OECD
• Get the data • PNG

Peterson-Kaiser
Health System Tracker

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Today's Healthcare Landscape and the Need for Interoperability

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Today's Health Care - Facts

Age-adjusted major causes of mortality per 100,000 population, 2015

Legend: United States, Comparable Country Average

Categories: Diseases of the circulatory system, Neoplasms, Diseases of the respiratory system, External causes of mortality, Mental and behavioural disorders, Diseases of the nervous system, Endocrine, nutritional and metabolic diseases

Note: Data for Canada are from 2013 and France are from 2014

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What's Changing?

TRADITIONAL VS VALUE-BASED CARE MODELS	
VOLUME	VALUE
Fee for Service- Per Case	Payment to Manage Populations
No Rewards for Quality	Incentives and Penalties for Quality Metrics (Outcome Drive Incomes)
Collaboration/Partnerships & Care Coordination Not Valued	Shared Accountabilities (Healthcare Providers, Health Plans, etc.)
No IT Investment Incentives	Technology is part of the Core Strategy

Movement from a model centered on care delivery, or treatment of illness → a model with inclusive of health management and wellness

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Patient's Health Data

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The Transformation

Value base delivery model

- improve health of populations
- enhance patient experience
- lower cost across continuum of care
- elevating clinicians experience

Healthcare organizations & providers

- more accountability for care coordination
- need for interoperability to share health data (HITECH 2009)
- need for providers to use HIE & PDMP
  - 136 million ED visits annually
  - 13% to 27% ED visits are potentially avoidable
  - 28% patients have reoccurring encounters in multiple facilities

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HIE- health information exchange
PDMP- prescription drug monitoring program

Patient's Health Data- Reality

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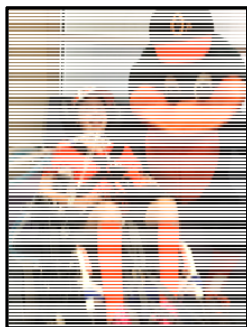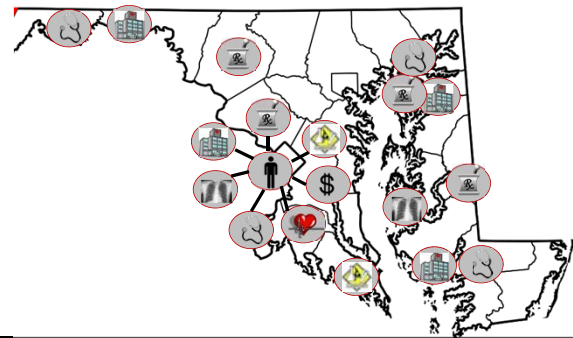
The Need for Interoperability

"Leveraged correctly, health information technology can help automate efforts, increase transparency, and reduce miscommunication between health plans, providers, and healthcare organizations."

Source: https://www.healthit.gov/topic/health-it-basics/health-information-exchange; https://journal.ahima.org/2018/09/01/the-future-of-healthcare-data-exchange

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Health Information Exchange (HIE)

- HIE allows health care providers to securely and appropriately access, and share patient information electronically from multiple entities
- Historically divided into 3 key forms:
  1. **Directed Exchange** – ability to send and receive secure information
  2. **Query-Based Exchange** – ability for providers to find or request information
  3. **Consumer Mediated Exchange** – ability for patients to control the use of their data
- Different HIE models formed based on local characteristics
  - **State-wide HIEs** closely affiliated with or run by state government
  - **Private HIEs** specifically supporting hospital systems, payers, or other provider networks
  - **Hybrid HIEs** with multiple local networks collaborating
  - **Regional/Community HIEs** working across organizations and depending on a variety of funding sources

Source: https://www.healthit.gov/topic/health-it-and-health-information-exchange-basics/what-hie

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Drivers of Health Information Exchange Promoting Interoperability

National Exchange Initiatives	CMS Proposed Rules	ONC Proposed Rules

• Widespread desire to share data across HIEs through standard use cases, agreements, and technology specifications
    • **National Networks**
    • **EHR vendors share data through proprietary frameworks**
	• Enable notifications for inpatients who are admitted, transferred, or discharged
	 • Certain payers must adopt open APIs & share pt. information with other payers when requested by the pt.
	 • Certain payers must join a trusted exchange network
		• Defines information blocking framework; outlines 7 Information blocking exceptions
		 • Outlines significant enhancements to the ONC Health IT Certification Program
		 • Defines APIs without special effort

Comments • National Networks include: Carequality; Commonwell Health Alliance; Patient-Centered Data Home • EHR to EHR (i.e., **Epic Care Everywhere)**	*Comments* • Impacts Medicare & Medicaid hospitals	*Comments* • Impacts Health IT platforms of certified products; Health Information Networks; HIEs; Providers

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Current Status

- Most geographies are covered by some form of HIE, either with a statewide or regional entity
  - 70 HIE members (https://strategichie.com/membership/member-list/)
- Core competencies vary greatly between HIEs, although most operate at least a clinical portal and push notifications
  - Other services include reporting based on administrative data, results delivery, and research
- Many HIEs have a patient consent model, either through regulation or HIE policy
  - Opt-out is in most states, and requires adequate notice to patients of their right to be excluded from searches
  - Opt-in requires patients to consent to a search before it occurs

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Drivers of Health Information Exchange Promoting Interoperability

Prescription Drug Monitoring Programs (PDMPs) Source: http://www.pdmpassist.org/pdf/PDMP_Program_Status_20180501.pdf	State Initiatives
• Programs collecting Controlled Dangerous Substances (CDS) dispenses • Mandated reporting in 49 states plus the District of Columbia, Puerto Rico, and Guam	• Maryland & CMS entered into a new initiative to improve care and reduce the growth in health care spending • Hospitals, physicians, and policymakers chose to invest in shared health technology infrastructure
Comments • Access and use are generally governed by state law	*Comments* 1. Global hospital budgets 2. All-Payer hospital rates 3. Total care cost accountability 4. Share provider incentives 5. Population health goals 6. Quality of care incentives

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Chesapeake Regional Information System for our Patients (CRISP)

- **Regional Health Information Exchange:** (HIE) serving Maryland, West Virginia, and the District of Columbia.

- **Vision:** To advance health and wellness by deploying health information technology solutions adopted through cooperation and collaboration

CRISP Services

- **Point of Care:** Clinical Query Portal & InContext Information
- **Care Coordination:** Encounter Notification Service (ENS)
- **Population Health:** CRISP Reporting Services (CRS)
- **Public Health Support**
- **Program Administration**

CRISP Service Area

Maryland is an opt-out state.

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Current State- Interoperability

Source: KLAS (2017). Interoperability 2017 First Look at Trending- Some Progress Toward a Distant Horizon

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Deep Interoperability

- Indications of one of two optimal responses in all four interoperability stages
1. often or nearly always have access to needed data through any interoperable means
2. able to easily locate specific patient records or have them automatically presented to clinicians
3. able to retrieve patient data fully integrated into the EMR's native data fields or in a separate tab or section within the EMR
4. feel retrieved patient data often or nearly always benefits patient care

26% have achieved deep interoperability—up 2% from last year

Source: KLAS (2017). Interoperability 2017 First Look at Trending- Some Progress Toward a Distant Horizon

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Promoting Interoperability
Data

- **Data** - Facts measured, collected, reported, or generated
  - Informatics role- define requirements, data validation, testing
- HIE architecture models:
  1. **Federated architecture** allows patient data to remain at the source (e.g. hospitals or practices); exchanges data on-demand
  2. **Centralized architecture** maintains all patient data in a single database
  3. **Hybrid architecture** (majority)
- Data source includes:
  - Providers- EHR (orders, notes, results)
  - Payers- Claims
  - Pharmacies, laboratory, imaging centers
  - Public Health Agencies
- Transmission of data generally includes:
  - **Admission/Discharge/Transfer** feeds with patient demographics & visit information
  - **CDAs/CCDs** containing patient problems, medications, history, etc.
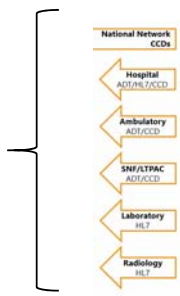 - **HL7 ORU** messages for lab results, radiology reports, transcriptions

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Informatics and Tools for Coordinated Care Delivery
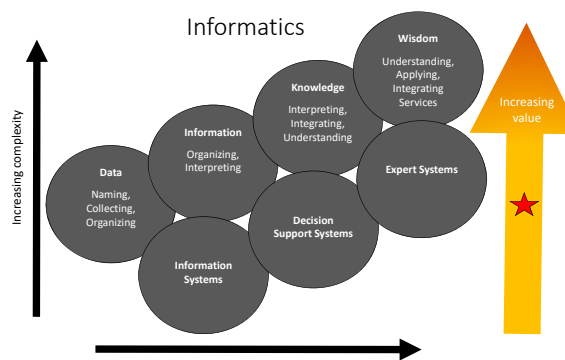
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CRISP Clinical Architecture

Patient demographics
- Patient Enterprise Master Patient Index Number
- Patient's name (last, first, middle)
- Gender
- DOB
- Address
- Contact number
- Encounter visits
- Results- lab, radiology, transcriptions
- Notes

National Network CCDs
Hospital ADT/HL7/CCD
Ambulatory ADT/CCD
SNF/LTPAC ADT/CCD
Laboratory HL7
Radiology HL7

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Informatics

Increasing complexity

Wisdom — Understanding, Applying, Integrating Services
Knowledge — Interpreting, Integrating, Understanding
Information — Organizing, Interpreting
Data — Naming, Collecting, Organizing
Expert Systems
Decision Support Systems
Information Systems

Increasing value

© modified Romano Nelson, 2013

Increasing interactions & interrelationships

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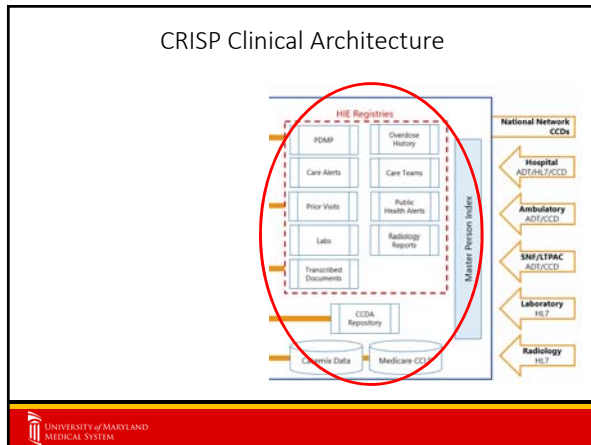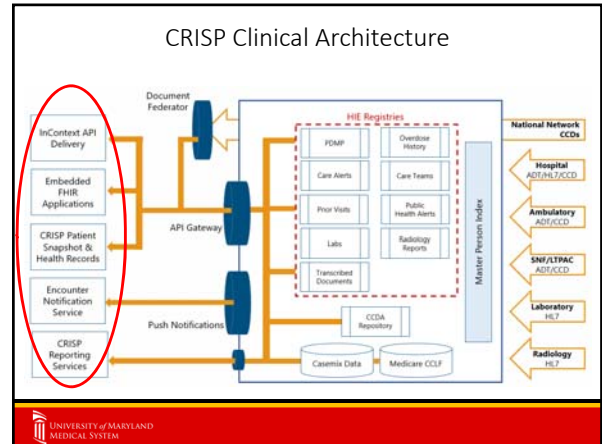## Promoting Interoperability
Information

- **Information-** Organizing, Interpreting Data
- Health Information Exchange Data allows health care professionals and patients to appropriately access and securely share a patient's medical information electronically
- To advance health and wellness by deploying health information technology solutions adopted through cooperation and collaboration
- Informatics role- design, data validation, testing, training

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Information
(Patient's Health Information)

- **United States Core Data for Interoperability**
- The USCDI establishes the minimum data set that must be consistently exchanged and replaces the existing Common Clinical Data Set (CCDS)
- Organizing and interpreting patient's health data

CRISP Clinical Architecture

CRISP Clinical Architecture

Knowledge

- Leveraging patient's health information exchange in clinical workflow
- Embedded CRISP InContext Application

Promoting Interoperability
Knowledge

- **Knowledge**- interpreting, integrating, and understanding patient data & information
- Health Information Exchange Data/Information acquired by a person through experience or education to make decisions
- Informatics role- design of workflow, usability testing, communication, support, and post implementation observation

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Knowledge
HIE- patient data per encounter in Maryland

Slide 1

Knowledge
Immunization information in HER
Bidirectional Interface with state immunization registry

Slide 2

BestPractice Advisory - Cadence, Anna

Informational (1)

Patient may have experienced a controlled substance related event on 2018-12-01 at University of MD UMMC. Discharge Diagnosis: T40.0X (Poisoning by Opium).

Order | Do Not Order | naloxone (NARCAN) nasal spray

Acknowledge Reason

Patient Refused | This is not my decision

✓ Accept | Dismiss

Slide 3

Promoting Interoperability
Wisdom

- **Wisdom**- understanding, applying, integrating services
- Using data, information, and knowledge to make insightful clinical decisions on the right patient, right place, and the right time
- Incorporate important HIE information into native workflows within an EHR
- Create opportunities to spur innovation and improvement to advance health and wellness through the use of technology Promote and enable patient
- Informatics critical role- observation, monitor key performance indicators, innovation, training, communication

Slide 4

Wisdom

- Emergency providers and staff can easily identify patients associated with Transitional Care program or who meet criteria for the program.

3 possible icons populate the TCC column:
- = meets criteria based upon automated screening
- = patient has a care coordination note but is not actively tracked by TCC
- = patient is tracked by TCC

Slide 5

Overdose Notification in the EHR

- InContext API Delivery
- Embedded FHIR Applications
- CRISP Patient Snapshot & Health Records
- Encounter Notification Service
- CRISP Reporting Services

Design displaying of right data/information to clinicians at the right place, right time in the right workflow

Slide 6

Addressing Today's Healthcare Challenges requires Leveraging HIE in Care Coordination

- Fragmented & Varied Patient Care
- Aging & Sicker Population
- Health Care Disparities
- Opioid Crisis
- High Costs
- Provider Burnout & Dissatisfaction

Slide 1

Informatics Leveraging HIE
Care Coordination

Problem: Fragmented & Varied Patient Care

Goal: Reduce Fragmentation; Reduce Variation; Promote Continuity of Care

① Who
Providers, Care Coordinators, Case Managers , Social Workers, High Risk Coordinators

② Where
Ambulatory → ED → Acute Care → Skilled Nursing Facility; Post Acute Care → Population Health Program; Payers

③ What HIE data
- Encounter visits
- Clinical notes
- Problems
- Results- lab, images, other tests
- Allergies
- Immunization
- Medication information
- Care teams
- Social determinants
- Preferred pharmacy
- Advance directives, power of attorney

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Slide 2

HIE Care Coordination Tools

Example- State HIE (CRISP) Reports

- Case Mix data and Medicare claims data to:
  - Identify high-needs patients
  - Measure performance of initiatives for QI and program reporting
  - Coordinate care
- Different levels of patient data available for hospitals based on HSCRC payment requirements & Total Cost of Care Model participation

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Slide 3

HIE Care Coordination Tools

Example- State HIE (CRISP) Unified Landing Page (ULP)

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Slide 4

Informatics Leveraging HIE
Care Coordination

Problem: Aging & Sicker Population

Goal: Identification of the Right Patient with the Right Information at the Right Time

① Who
Providers, Care Coordinators, Case Managers , Social Workers, High Risk Coordinators

② Where
Ambulatory → ED → Acute Care → Skilled Nursing Facility; Post Acute Care → Population Health Program; Payers

③ What HIE data
- Encounter visits
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- Results- lab, images, other tests
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- Social determinants
- Preferred pharmacy
- Advance directives, power of attorney

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Slide 5

HIE Care Coordination Tools

Example- State HIE (CRISP) Unified Landing Page (ULP)
Patient Snapshot Tab

- All CRISP applications in a single, secure site with one username and password
- PDMP (authorized users only per State mandate)
- Snapshot: View of critical patient data including care alerts, care teams, and prior visits with customizable widgets
- Query Portal: Labs, radiology, images, and other clinical documents

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Slide 6

HIE Care Coordination Tools

Example- State HIE (CRISP) Encounter Notification Service (ENS)

- Real-time or batch alerts to organizations and providers based on known treatment and care management relationships
- Solves a basic problem for organizations responsible for a patient's health – where is my patient? When did my patient access care?
- Notifications can be delivered via a secure folder, the ULP, EHRs, or databases
- ENS subscription information is displayed at the point of care through ULP or In-Context

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HIE Care Coordination Tools

Example- State HIE (CRISP) Encounter Notification Service (ENS)

- Notifies when your patient is hospitalized in any regional hospital
- Receive special notification about ED visits that are potential readmissions

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HIE Care Coordination Tools
Care Alerts in CRISP

Example: Care Alerts

- Care Alert: a short description of critical information for patient care generated by CRISP participants within their EHR.

"Mr. Stevens has CHF exacerbations that typically and rapidly respond to 40 mg IV furosemide in the ED with close follow up the next day in the office. Call/text Dr. FIRST at 111-333-4444 if you are considering admission."

"This patient has a MOLST. Please note: DNR, DNI, no feeding tube, no antibiotics."

"Mrs. Franklin's pain medications are managed entirely by Dr. Dolor. Securely text him prior to prescribing any controlled substances."

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HIE Care Coordination Tools

Example- State HIE (CRISP) Encounter Notification Service (ENS)

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HIE Care Coordination Tools
Care Alert in EHR

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Informatics Leveraging HIE
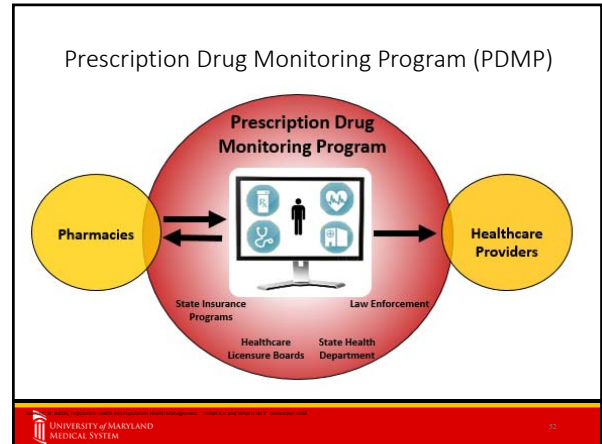## Care Coordination

Problem: Health Care Disparities

Goal: Access to Care

① Who
Providers, Care Coordinators, Case Managers , Social Workers, High Risk Coordinators

② Where
Ambulatory → ED → Acute Care → Skilled Nursing Facility; Post Acute Care → Population Health Program; Payers

③ What HIE data
- Encounter visits
- Clinical notes
- Problems
- Results- lab, images, other tests
- Allergies
- Immunization
- Medication information
- Care teams
- Social determinants of health
- Preferred pharmacy
- Advance directives, power of attorney

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HIE Care Coordination Tools
Care Alert in EHR

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Care Alerts (Pre/Post)

Percent of Members on the Panel with 1 or more Visits

Time Period	Total Number of Patients with a visit - Pre	Total Number of Patients with a visit - Post	Total Number of Patients with a visit - Pre %	Total Number of Patients with a visit - Post %	Change in Number of Patients
1 Month	876	534	82.0%	50.0%	-32.0%
3 Months	999	784	93.5%	73.4%	-20.1%
6 Months	1,037	868	97.1%	81.3%	-15.8%
12 Months	1,052	909	98.5%	85.1%	-13.4%

Prescription Drug Monitoring Program (PDMP)
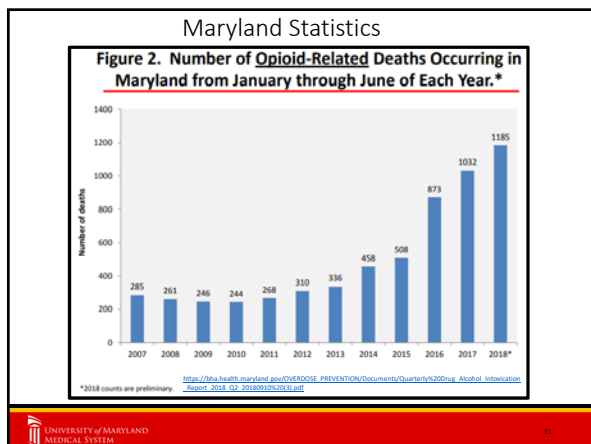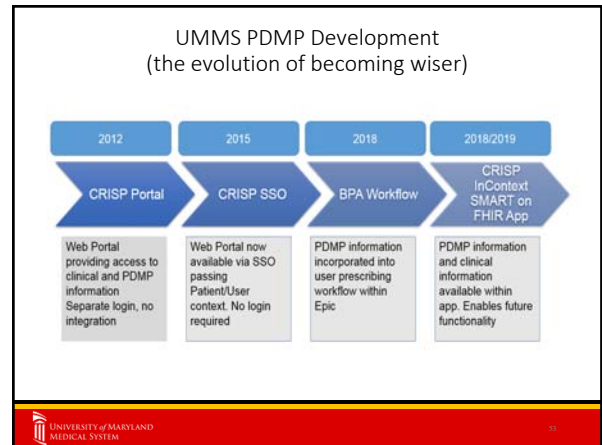

Informatics Leveraging HIE Care Coordination

- **Goal:** Reduce Opioid Use
- Prescribers must query, review & document pt.'s PDMP prior to prescribing controlled drug substances
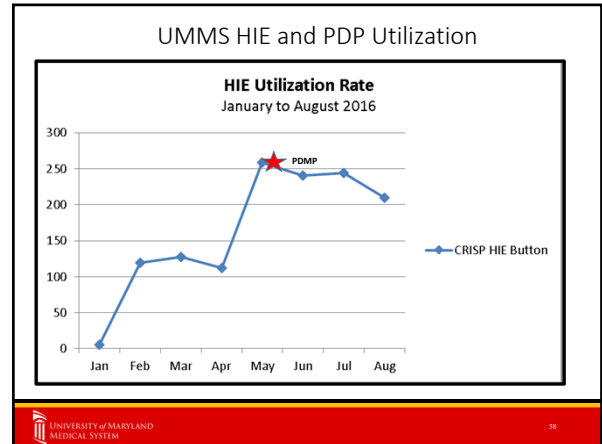- Pharmacists must review patient PDMP prior to dispensing

Problem: Opioid Crisis

① **Who** Providers, Care Coordinators, Case Managers, Social Workers, High Risk Coordinators

② **Where** Ambulatory → ED → Acute Care → Skilled Nursing Facility; Post Acute Care → Population Health Program; Payers

③ **What HIE data**
- Encounter visits
- Clinical notes
- Problems
- Results- lab, images, other tests
- Allergies
- Immunization
- Medication information
- Care teams
- Social determinants
- Preferred pharmacy
- Advance directives, power of attorney

UMMS PDMP Development
(the evolution of becoming wiser)

Maryland Statistics

Figure 2. Number of Opioid-Related Deaths Occurring in Maryland from January through June of Each Year.*

*2018 counts are preliminary. https://bha.health.maryland.gov/OVERDOSE_PREVENTION/Documents/Quarterly%20Drug_Alcohol_Intoxication_Report_2018_Q2_20180910%20(3).pdf
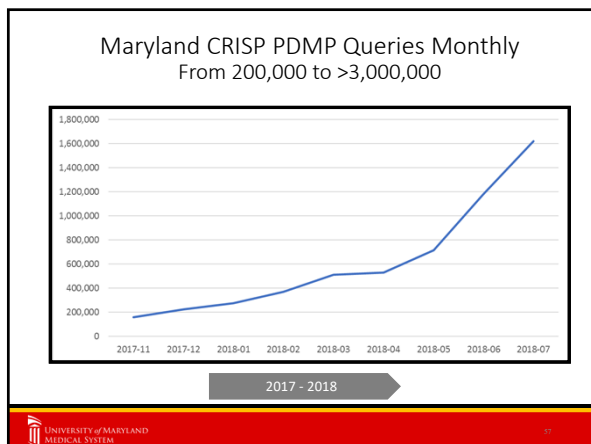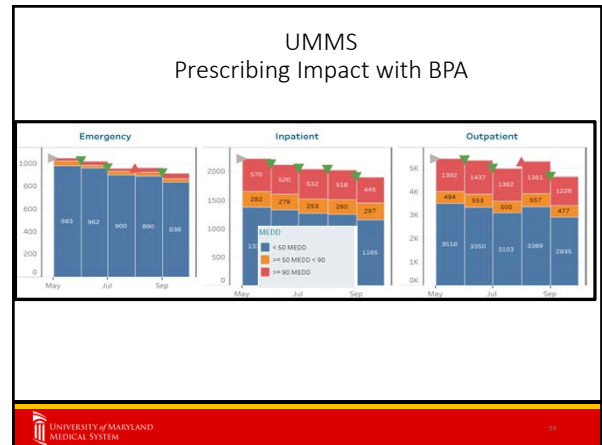

- **Design group:** Maryland Epic Users Meetings
- *Worked with all Maryland Epic facilities to explore workflow options, share interface and provider workflows, and define data utilization agreement*

- **Requirements:**
  - Nonintrusive to workflow
  - Interface and trigger query workflows
  - Integrate using NCPCP outgoing medication dispense history interface
  - Documentation required in EHR (audit history) and with CRISP
  - Documentation for repeatable implementation

Participating Organization

University of Maryland Medical System	CRISP Epic
Johns Hopkins Health System	Mercy Medical Center
Anne Arundel Medical Center	Meritus Medical Center
Peninsula Regional Medical Center	Bon Secours Hospital
Greater Baltimore Medical Center	Kaiser Permanente

PDMP information presents during the prescribing workflow when a analgesic-narcotic or benzodiazepine outpatient order is entered or signed

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UMMS HIE and PDP Utilization

HIE Utilization Rate
January to August 2016

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Documentation of provider reviewing PDMP

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UMMS
Prescribing Impact with BPA

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Maryland CRISP PDMP Queries Monthly
From 200,000 to >3,000,000

2017 - 2018

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Informatics Leveraging HIE
Care Coordination

Problem: High Costs

Goal: Reduce costs of care

① **Who**
Providers, Care Coordinators, Case Managers , Social Workers, High Risk Coordinators, Payers, Population Health Programs

② **Where**
Ambulatory → ED → Acute Care → Skilled Nursing Facility; Post Acute Care→ Population Health Program; Payers

③ **What HIE data**
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- Results- lab, images, other tests
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Patient's Results

- Patients' prior hospital records available (e.g., labs, radiology reports, etc.)
- Prevents duplicate tests ordering
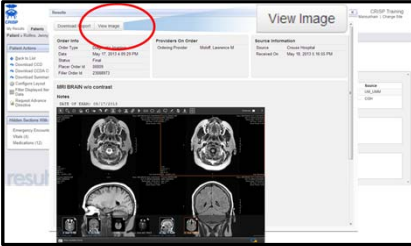
HIE Reports
Pre/Post Enrollment

- Upload patient panel with enrollment date in program
- Compare patient utilization and charges before and after

Patient's Results

- Patients' prior radiology results and now images available
- Prevents duplicate tests that are costly
- Less radiation exposure
- Alerts clinicians of important conditions or treatment information

Informatics Leveraging HIE
Care Coordination

Problem: Provider Burnout & Satisfaction

Goal: Having information to improve workflow efficiency, improve quality of care→ provider satisfaction, reduce burnout

① Who
Providers, Clinicians

② Where
Ambulatory; ED; Acute Care; Skilled Nursing Facility; Post Acute Care
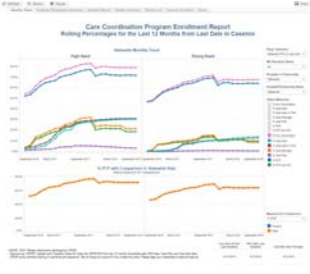
③ What HIE data
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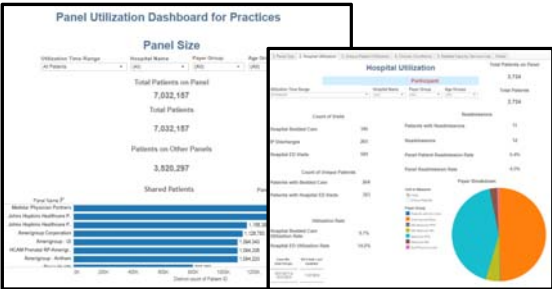- Advance directives, power of attorney

HIE Reports
Care Coordination Program Enrollment

- Reports available to track how well hospitals assign patients with Care Plans, Care Alerts, Care Managers and PCPs
- Reports available to provide detail on current month of data

HIE Reports
Panels for Practices

Summary

Promoting Interoperability
for Better Care Today & Tomorrow

People
- It takes engagement!
- Organizations must promote interoperability between systems to develop a holistic care delivery model to deliver safe and quality care
- Alignment with hospital priorities involves: Leaders, Operations, IT, State HIE, i.e., CRISP
- Beyond the hospital→ community

Process
- It takes knowledgeable resources!
- Understanding regulations, processes, and policies
  - Registration & Training
  - Opt out process for patients- state HIE, hospitals, ambulatory practices
  - Licensure for residents are different than attendings
- Beyond the hospitals→ community

Does it make a difference?

Percent of Members on the Panel with 1 or more Visits

Time Period	Total Number of Patients with a visit - Pre	Total Number of Patients with a visit - Post	Total Number of Patients with a visit - Pre %	Total Number of Patients with a visit - Post %	Change in Number of Patients
1 Month	167	67	99.4%	39.9%	-59.5%
3 Months	120	84	100.0%	70.0%	-30.0%
6 Months	67	54	100.0%	80.6%	-19.4%
12 Months	<11	<11			

Promoting Interoperability
for Better Care Today & Tomorrow

Technology
- It take time!
- Timeline- always takes longer than expected
- Patient's health care model is complex with multiple data points coming from multiple entities
  - Definition of key terms are critical
  - Mapping of data requires investment of trading partners
  - Do not overburden with too much data/information.
- Promoting interoperability requires hospital IT investment
  - Infrastructure- HW, Network (i.e., Citrix), integration, interfaces
  - Technology ever changing- CCD, SSO, InContext, API
  - **Testing**, Maintenance, Support
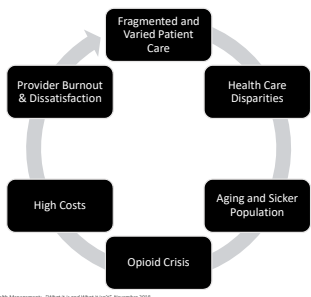 - Communication with changes, upgrades
- Beyond the hospitals→ community

Does it make a difference?

Average Charge per Member

Time Period	Total Number of Patients with at least 1 visit pre or post	Total charges - Pre	Total charges - Post	Average Charge per patient - Pre	Average Charge per patient - Post	Total Charges per Patients change
1 Month	168	$2,286,581	$420,245	$13,692	$6,272	($7,420)
3 Months	120	$2,781,970	$1,463,881	$23,183	$17,427	($5,756)
6 Months	67	$2,039,168	$1,995,088	$30,435	$36,946	$6,511
12 Months	<11	$132,054	$94,247			

Today's Health Care Landscape

- Fragmented and Varied Patient Care
- Health Care Disparities
- Aging and Sicker Population
- Opioid Crisis
- High Costs
- Provider Burnout & Dissatisfaction

Sources: M. Battle, Population Health and Population Health Management. "What it is and What it isn't" November 2018

Promoting Interoperability
for Better Care Tomorrow

Sources: M. Battle, Population Health and Population Health Management: "What it is and What it isn't" November 2018

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Questions

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Better Care Today & Tomorrow

I don't let bumps slow me down. 483 THIS GIRL CAN

The Office of the National Coordinator for Health Information Technology, 2014

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Appendix

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Key Terms

- **Application Programming Interface (API):** an interface made available from an IT system that allows external developers access to that system
- **Continuity of Care Document (CCD):** a standard document standard for EHR systems to export patient information; a type of **Clinical Document Architecture (CDA)** found within the **Consolidated CDA (C-CDA)** implementation guide
- **Electronic Health Record (EHR):** the health care IT system used by clinicians to document patient information
- **Health Information Exchange (HIE):** the ability of two or more separate IT systems to share data back and forth
- **Health Information Organization (HIO):** an intermediary acting between separate IT systems to facilitate data exchange
- **Interoperability:** the ability for two or more separate IT systems to exchange data AND effectively use that data

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