

Practical Applications for Emerging Clinical Solutions

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Practical Applications for Emerging Clinical Solutions



What we'll cover

- Overview
- Types / potential
- Benefits / drawbacks
- Evaluating potential
- Implementation
- Maximizing value

Population Health

Disease State Management

Telehealth

Remote Patient
Monitoring

Block chain

Clinical Decision
Support (CDS)

AI

Barriers to practice innovation

- Many innovations / so many choices
- Innovation infancy
- Cost / determining the value
- Data security
- Reimbursement
- Applying technology to workflows





Population Health & Disease State Management

Patient Population Management

- Identify and group patients into larger populations
- Apply best practice diagnosis and interventions across the group
- Goal of improving the health of a larger population by focusing on identification and intensive care management for highest risk patients

Disease State Management

- Overarching term for a population health strategy
- Integrated system of people and tools sharing knowledge
- Engagement of a full healthcare support system
- Care team shares knowledge, responsibility, and care plan actions
- Goal of managing chronic conditions

Target Disease States

- Coronary heart disease
- Chronic obstructive pulmonary disease (COPD)
- Kidney failure
- Hypertension
- Heart failure
- Obesity
- Diabetes mellitus
- Asthma
- Cancer
- Arthritis
- Clinical depression
- Sleep apnea
- Osteoporosis

Emerging Field Precision Medicine

US babies tested at birth for up to 50 genetic diseases. Genome sequencing could test for a wider range of diseases and conditions.

Oncology is testing for genetic and genomic markers in cancer screenings for tailored treatment

Population Management Benefits

- Improve outcomes
- Engage patient – and family
- Engage providers
- Reduce costly hospital re-admissions
- Widen access to care
- Motivate care plan compliance



Population Management

Types of tools / system components

- Health data analysis
- Patient stratification
- Data capture
- Case management/coordination
- Disease management standards / CDS
- Care plan generation
- Patient advocacy / engagement
- Team sharing / engagement
- Compliance reporting
- Outcomes reporting





Remote Patient Monitoring

Remote Patient Monitoring (RPM)

Technology tools to...

- Remotely monitor patients
- Outside of conventional clinical settings
- Engage patients in taking charge of their care
- Receive and review patient data for timely interventions
- Goal to improve patient outcomes

RPM – How it works

- Providers identify patients to participate / secure consent to enroll
- Tools are provided or obtained by patient (Sensors, devices and apps)
- Patients trained on usage
- Patients engage technology to capture biometric data or self-report
- Real-time data sent via secure electronic transmission via apps
- Providers use apps to review data / receive alerts for assessment and intervention

RPM – Types

- Blood pressure (Cuff)
- Blood glucose (Glucometer)
- Pulse (Oximeter)
- Weight (Connected scale)
- Physical activity (Fitbit)
- Psychological state (Survey app)



EXAMPLE: DIABETES MANAGEMENT

Abbott's FreeStyle Libre

- Painless sensing technology built into a stick on sensor measures and transmits glucose information
- Continuously measures glucose every minute and records readings every 15 minutes without fingersticks
- Patients get real-time glucose readings on their smart phone
- Providers receive immediate alerts to intervene as needed



“Electronic transmission of blood glucose levels and other diabetes data every 2 weeks—in lieu of a clinic visit—results in a similar level of glucose control and incidence of acute diabetes complications when compared with current standard care.”

Modem Transmission of Glucose Values Reduces the Costs and Need for Clinic Visits:

<http://care.diabetesjournals.org/content/26/5/1475>

RPM – Types

Patient Tools

- Medication and test reminders
- Alerts
- Motivational communications
- Educational content
- Virtual visits / check-ins
- Patient to provider communication

Provider Tools

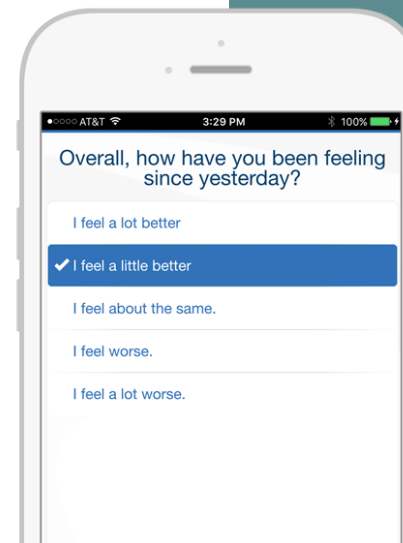
- Patient identification / consent
- Patient education / usage info
- Care plan recommendations
- Data presentation / alerts
- Provider to patient communication
- Billing resources (Timers, documentation)
- Population management reporting

EXAMPLE: PATIENT ENGAGEMENT & PROVIDER MONITORING

Vivify Pathways +Go

- MicroMD populates portal with demographic and chronic condition data
- Providers select patients and assign to care paths
- Patients enroll and use their own mobile device or computer
- Patients receive care-plan specific scheduled reminders, educational videos, medication reminders, and health tips
- Patient submitted vitals push into MicroMD EMR
- Practices review data and complete tasks in Vivify portal
- Practices intervene as needed
- Tracked task time tracked and passed to MicroMD EMR
- Practices use documented billing processes

Potential to boost CCM reimbursement as much as \$40 to \$90 per eligible patient per month



RPM – Implementation

- Create a team
- Identify opportunities
- Know billing opportunities and requirements
- Evaluate and select vendor(s)
- Iron out the workflow
 - Patient engagement/consent/enrollment
 - Orders
 - Devices and apps (Cost, access)
 - Patient training, usage, requirements, support
 - Monitoring, intervention, documentation (Which systems, how, who, when)
- Train providers and staff
- Launch with patients
- Monitor for success and improvements/expansion

Use Case	Primary measurement making RPM effective
Diabetes	Blood glucose, HA1C
Hypertension	Blood Pressure, Heart rate
Depression	Mood
Medication adherence	% of medications taken on schedule

New 2019 CMS RPM Reimbursement Codes



As of January 1, 2019 the Center for Medicare and Medicaid Services (CMS) makes remote care a separate billable service with 3 new codes for Chronic Care Remote Physiologic Monitoring (CCRPM), or Remote Patient Monitoring (RPM).

<p>CPT Code 99453 (Setup)</p>	<p>Remote monitoring of physiologic parameter(s) (eg, weight, blood pressure, pulse oximetry, respiratory flow rate), initial; set-up and patient education on use of equipment. One time setup/education of \$21 (regionally adjusted).</p>	<p>Co-pay applies (Medicare Part B 20%)</p> <p>Can be billed with CCM in same month with additive minutes</p> <p>Expands definition of who can do the work for it to be billable</p>
<p>CPT Code 99454 (Equipment & Monitoring)</p>	<p>Remote monitoring of physiologic parameter(s) (eg, weight, blood pressure, pulse oximetry, respiratory flow rate), initial; device(s) supply with daily recording(s) or programmed alert(s) transmission, each 30 days \$69 per patient/month (regionally adjusted)</p>	<p>Not a Telehealth service: No rural/underserved restriction (patient can be anywhere) and no qualified originating site restriction (can occur in the home)</p> <p>Could be combined 20 minutes of monitoring across multiple providers per patient per month (This is a separate 20 min from the time that needs to be done on CCM)</p>
<p>CPT Code 99457 (Interventions)</p>	<p>Remote physiologic monitoring treatment management services, 20 minutes or more of clinical staff/physician/other qualified healthcare professional time in a calendar month requiring interactive communication with the patient/ caregiver during the month \$54 per patient/month (regionally adjusted)</p>	<p>Doesn't pay on the billing to multiple providers who bill for the same things for the same patient in the same timeframe</p> <p>Patient entered data and FDA device submitted data qualifies</p> <p>Patient must have been seen by the provider face to face within the last 12 months</p>



Clinical Decision Support (CDS)

Clinical Decision Support (CDS)

System focused on patient data mining / information presentation to get...

- the right information
- to the right people
- at the right time to make decisions / act
- through the most efficient channels
- in the right intervention format



Clinical Decision Support (CDS)

- Many tools already in EMR are considered CDS
 - Medical history, results
 - Patient assessment templates
 - Encounter document
 - Alerts
 - Drug interaction checking
 - Drug dosing calculators
 - Order sets
 - Links to references
 - Patient education
 - Care plans
- New tools focus on **data mining** and **connecting providers with knowledge** to further improve health outcomes
- Goals are help providers with diagnosis, education, and care plans

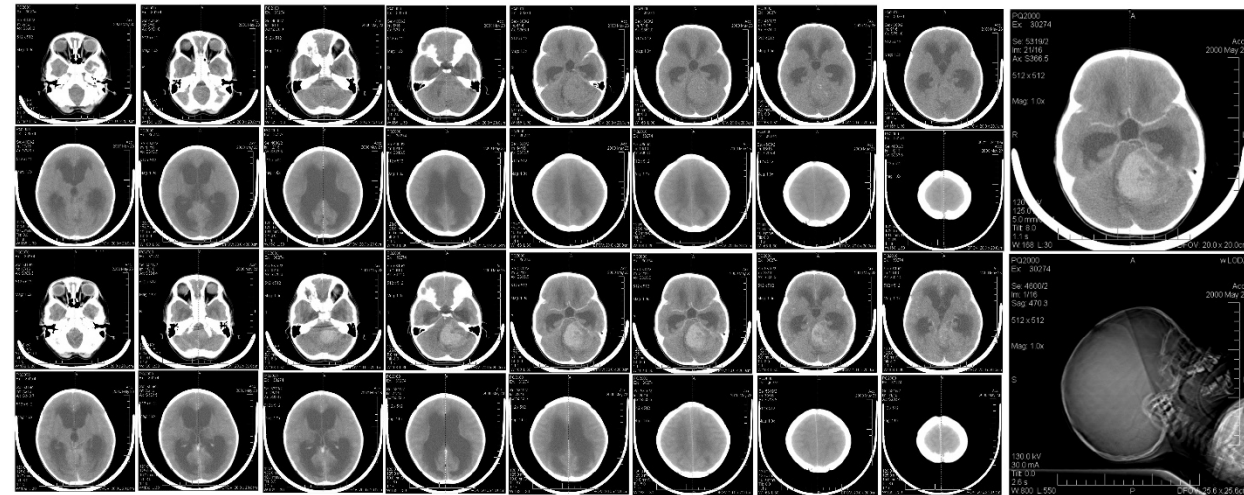
CDS – Types

- Knowledge-based
- AI / rules-based
- Machine Learning models

Advisory board
Reference information and guidance
Documentation forms/templates
Alerts and reminders
Data presentation
Facilitators of orders/prescriptions
Protocol/care plan support

EXAMPLE: RADIOLOGY CDS

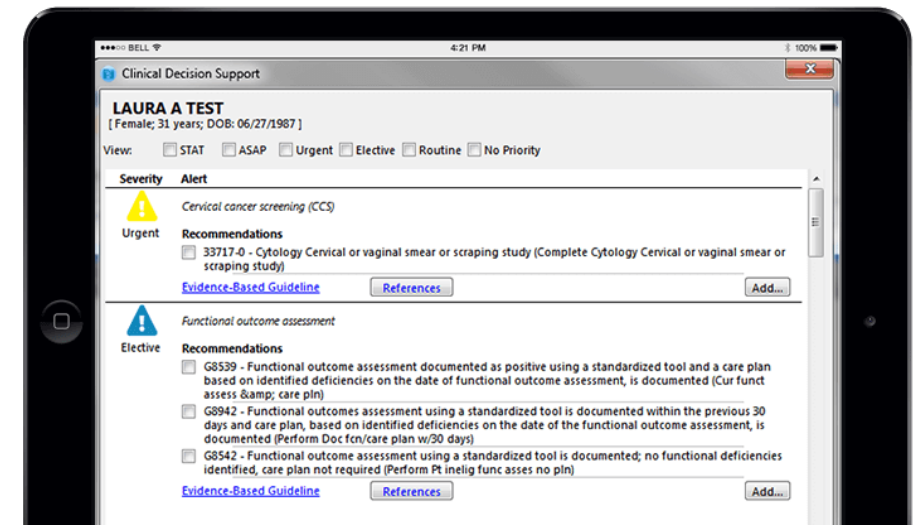
- Detects and alerts radiologists to intracranial hemorrhages and pulmonary embolisms
- Ensure nothing missed



EXAMPLE: RULES-BASED CDS

Persivia

- CDAs in MicroMD EMR sent to Persivia for next day’s scheduled patients
- Persivia Rules Engine analyzes data against catalogue of rules set up by provider
- Evidence-based alerts and guidelines returned to EMR
- Severity, guidelines, references, and recommended actions and viewable via a color-coded icon in multiple chart areas
- Users take action on labs, diagnostics, referrals, assessments, or medications, by selecting and adding an action to a patient’s plan tab and create orders within normal EMR workflow



CDS - Benefits

- Save time
- Improve accuracy
- Standardize care across multiple providers
- Reduce healthcare costs
- Centralize relevant, expert resources
- Improve outcomes



CDS - Drawbacks

- Understanding the value
 - Some providers reluctant to use
 - Getting providers engaged to use
- Alert fatigue
- Implementing access into workflows
- Determining what info to apply



CDS – Implementation

- Elect a leader to start identifying CDS resources
- Determine potential
- Pick a few things to monitor / improve
- Set some ground rules about CDS
- Get team engaged
- Select appropriate tools
- Monitor usage / track achievement of goals
- Tweak usage over time to improve
- Find ways to minimize alert fatigue





Telehealth / Telemedicine

Telehealth

- Overarching term
- Collection of methods and tools to virtually provide education and health services

Goal is to improve a patient's health outlook by allowing for real-time, two-way interaction between the patient and a provider at a remote site

Telemedicine

- Subset of telehealth
- Actual clinical diagnosis and monitoring that takes place over technology vs. in person



Telemedicine – Types

Live video / Synchronous

Live dialogue between two parties using audiovisual technology

EXAMPLES: On-site kiosks, video visits, and mobile virtual visit kits



Store-and-forward / Asynchronous

Transmitting health information through secure electronic communications to a provider to review and consult at another time

EXAMPLE: Secure text and email

RPM / Mobile health

Collection and transmission of health data from patient to provider and health education and care provided through the use of mobile devices such as cell phones and tablets

EXAMPLES: Pre-op instructions via app or tablet, app for patient to capture biometric data with reminders for medication adherence

Telemedicine – Benefits

Boost access

- Specialists
- Evenings and weekends
- Rural areas
- Home-bound patients
- Low acuity / frequent visits



Grow practice revenue

- Bill payers for services
- Charge patients for convenience
- Check eligibility and collect payments
- Offer more services
- See more patients
- Fill last minute cancellations
- Bill for care provided for free

Telemedicine – Benefits

Improve health outcomes

- Chronic Care Management
- Wellness visits
- Behavioral health consultations
- Monitor care plan adherence

Patient satisfaction and loyalty

- Convenient ways / times to access healthcare
- Compete with on-demand healthcare models
- Strengthen patient relationship with visit frequency

Balance staff / improve provider satisfaction

- Practice anytime, anywhere
- Manage patient to physician ratio, staff location, visit volume
- Reduce need for in-person appointments

Telemedicine – Evaluating Potential

- Appoint a telehealth leader and cross-functional team
- Identify areas where telehealth would provide highest benefit
- Determine billing requirements
 - Varies by payer and state
 - Verify patient coverage
 - Documentation and coding requirements
 - Stay on top of changes
- What visits can be facilitated via telemedicine?
- Confirm your patient population is a good fit? (Conditions, risk levels, internet access, comfort with tech)
- Identify your goals. What trying to achieve? How success measured?
 - Cost savings
 - Revenue generation
 - Patient satisfaction/engagement
- Understand the investment
 - Solution costs (Software, devices, training, eligibility checking, online payment processing, etc.)
 - Commitment to implementation and optimization

Telemedicine – Visit Types

Condition Management

- Treatment plan management
- Medication management
- Medicare CCM

Routine Conditions

- Allergies and sinus infections
- Colds & flu
- UTIs
- Yeast infections
- Upper respiratory

Routine Follow Ups

- Wellness exams
- Medication adjustment
- Review abnormal lab results

Counseling / Behavioral Health

- Weight loss management
- Smoking cessation
- Behavioral health services

Home Health



Telemedicine – Implementation

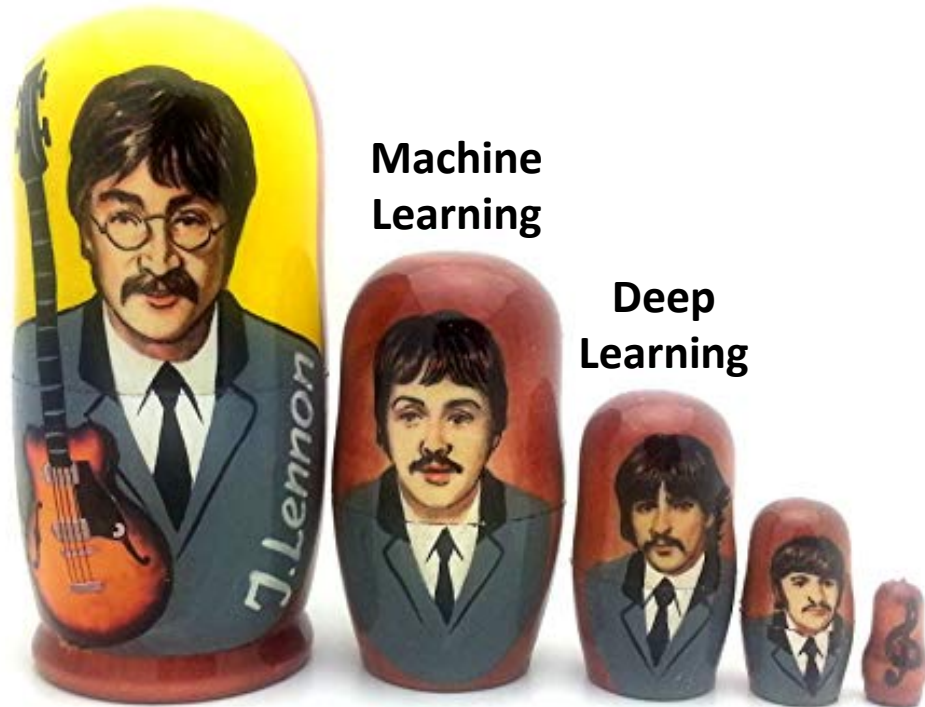
- Start small
- Identify solutions that can accommodate initial use cases and allow for expansion
- Select solutions partner
- Plan how to apply telemedicine to administrative, clinical, and billing workflows
- Plan implementation in conjunction with solutions partner
- Identify staff and responsibilities
- Create an inviting physical setting
- Market your services (Website, portal messaging, waiting room signs, email, social media, SEO)
- Leverage early adopters
- Monitor for changing payer opportunities and requirements
- Measure success
- Consider expansion over time



Artificial Intelligence (AI)

Artificial Intelligence (AI)

AI



- Umbrella term for any computer program doing something smart
- Machine Learning is a subset of AI
- Deep learning is a subset of Machine Learning

Artificial Intelligence (AI)

Capability of machines to mimic human behavior...

- Decision making
 - Visual perception
 - Speech and image recognition
 - Translation
-
- Group of if-then statements or a complex statistical model mapping raw data to symbolic categories
 - If-then statements programmed by a human hand
 - Grouped together, the if-then statements often termed rules engines

EXAMPLE:
Rules-based CDS

Machine Learning

Machine learning models created by feeding data into a learning algorithm...

- Human writes the algorithm
- Program dynamically alter itself – without human intervention – based on a systematic approach to crunching information from consistent and incremental knowledge over time
 - Algorithm trained with increasing volumes of reliable data
 - Ability to modify itself when exposed to more data
 - Over time model becomes more accurate



EXAMPLE: MACHINE LEARNING

Machine learning network monitoring and alerts to protect ePHI

- Practice has defined policies for ePHI access and usage
- Machine Learning system can be applied to a network to identify patterns of normal ePHI access and usage
- Identify and alert users to red flags outside of normal usage
- As usage continues, more data supports the definition of normal usage and can identify new red flags for non-normal usage
- Automating threat detection can help identify and alert practices to breaches faster and more accurately than a human



Deep Learning

Broader family of Machine Learning based on entire data representations vs. task-specific algorithms...

- Attempts to mimic the activity in layers of neurons in the human brain's neocortex
- System learns to recognize patterns in digital representations of sounds, images, and other data
- More accurate, using more data, math and computing power



PROMISING APPLICATIONS: DEEP LEARNING

AI beats experienced dermatologists in detecting skin cancer

- Convolutional neural network system trained to identify skin cancer using 100,000+ images of malignant melanomas and benign moles
- System fed with 300 new images
- **System identified 95% of melanomas** and 71% percent of benign moles
- Results were compared against 58 dermatologists who evaluated 100 of the cases
- **Dermatologists identified 89% of melanomas** and 76% of benign moles



AI – Benefits / Challenges

Benefits

- Offer “second opinion”
- Reduce the potential for error
- Improve speed of decision making
- Personalized care / precision medicine

Challenges

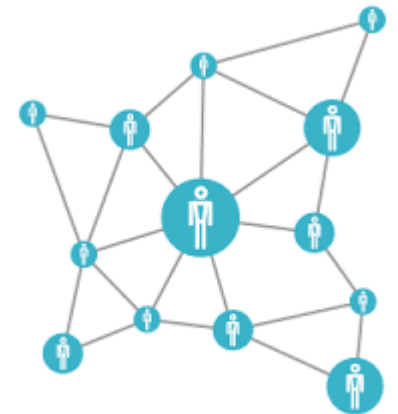
- Adoption
- Collecting enough data and processing it
- Data silos
- Applications still being visualized and developed



Blockchain

Blockchain

- Distributed network of computers working as one system
- System verifies and records immutable transactions in a digital ledger
- Series of blocks strung together in a chain
- Each transaction verified across network participants before ledger addition
- Transactions shared without preexisting trust between the parties via cryptographic private keys enabling trust between all parties in the network
- No central authority



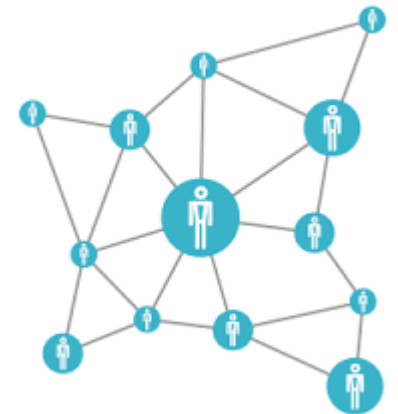
Blockchain - Benefits

- Transaction blocks are distributed across many computers
 - No centralized database to hack
 - No central authority to shut down system
- Transactions touted as immutable
- Fault tolerant and redundant
- Cost effective vs. centralized computing
- Scalable



Blockchain - Considerations

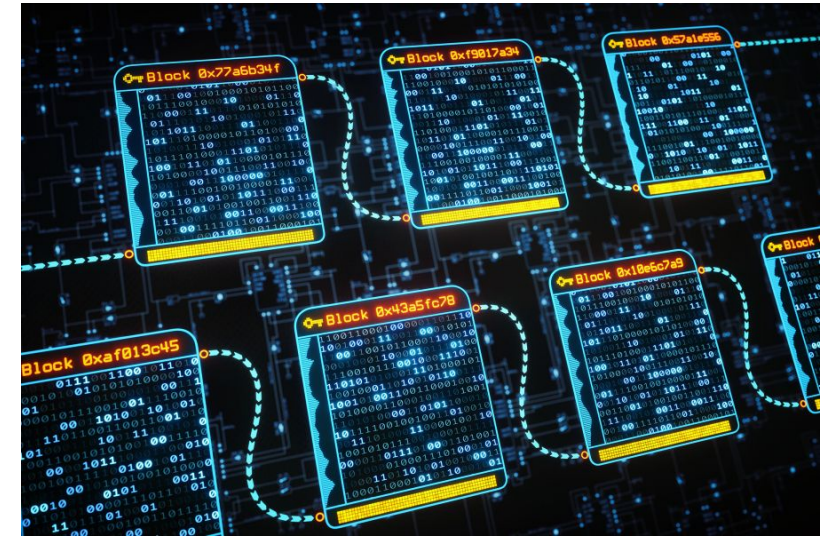
- Transaction speed
- Requires a lot of energy
- Public blockchain is open
- Security
- Limited nodes and distribution = higher potential for compromise
- Data accuracy
- Lose the crypto key, lose access
- Complexity
- Regulations may conflict
- HIPAA Concerns



PROMISING APPLICATIONS: BLOCKCHAIN

Blockchain could allow

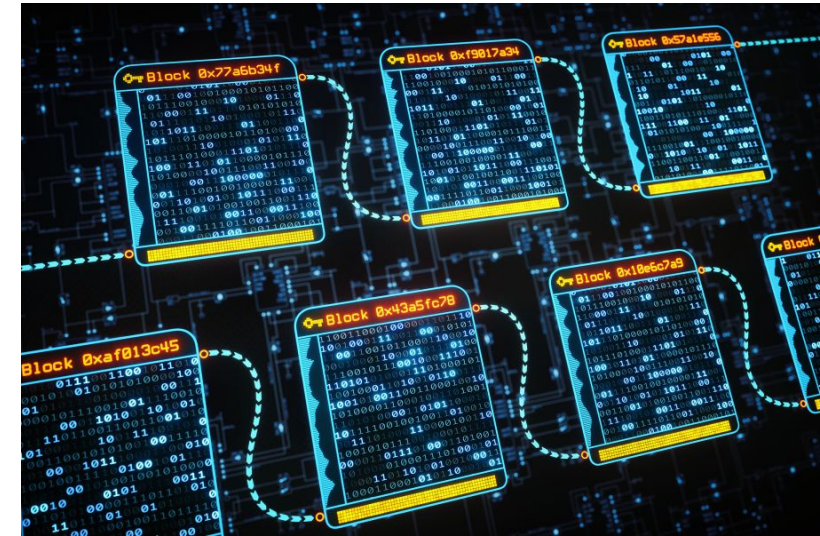
- Centralized patient data from multiple sources
- Secure records to only those allowed to access the blockchain
- Verified
- Timestamped
- Immutable



PROMISING APPLICATIONS: BLOCKCHAIN

Imagine a network that can

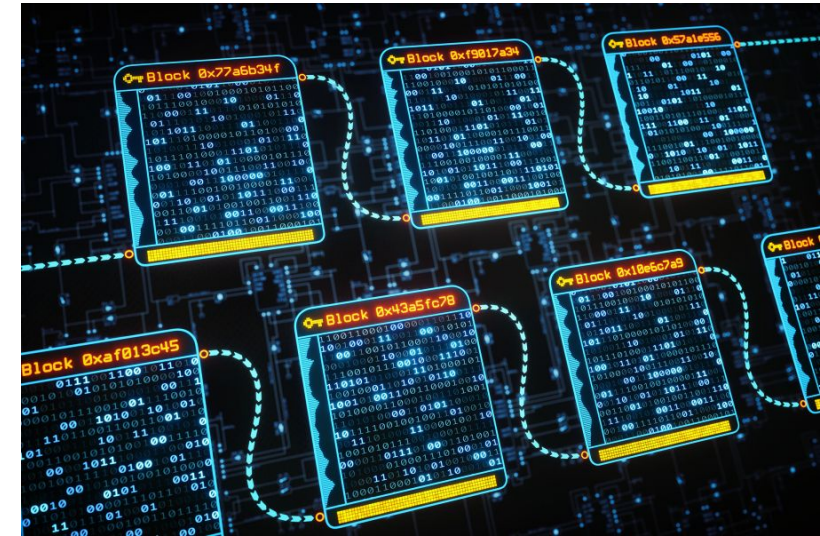
- Allow patients to aggregate and own their data from multiple sources and can choose to share it with who they want and potentially be paid for it
- Enable a single healthcare system with multiple entities to stay in sync and share data on a commonly distributed ledger
- Facilitate data aggregation for larger population health initiatives like AI and machine learning applications



PROMISING APPLICATIONS: BLOCKCHAIN

Private/permissioned blockchain

- Closed network for authorized participants
- Built and used inside organizations to securely exchange real-time information
- Transactions verified, secure, and immutable
- Companies have the right to choose among actors of the supply chain who will be acting as miner



PROMISING APPLICATIONS: BLOCKCHAIN

- **Drug Traceability:** Drug registry with manufacturing and supply chain steps registered and timestamped to verify drug authenticity
- **Drug use monitoring:** Post opioid prescription information for nationwide access
- **Single source for physician / payor data:** Prior authorizations, credentialing, etc.
- **Proof of work:** Medical liability cases in which a provider is claimed to have altered records; ledger is tamperproof trail

The “killer app” has
yet to be launched.
Stay tuned.



AIMSVARTM

Association of Independent Medical Software Value Added Resellers

Questions? Thoughts?