REDUCING CLINICAL BURDEN THRU KNOWLEDGE ENGINEERING
CURATING CLINICAL KNOWLEDGE

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If I had only one hour to save the world, I would spend fifty-five minutes defining the problem, and only five minutes finding the solution.

— Albert Einstein —

When it comes to reducing clinical burdens, have we spent our 55 minutes yet?
CLINICAL WORKFLOWS $\neq$ EHR WORKFLOWS

Care is a journey.

Care is a transaction.
WHY KNOWLEDGE ENGINEERING:
SURGICAL CARE HAS CHANGED
OVER THE YEARS
TRANSACTIONAL SURGICAL CARE

Now, in 2020, EVERYTHING is different.
Surgical care is highly specialized.
From Prehab to OR to Rehab.

Yet it lives in silos of Un-orchestrated complexity.
Prone to mishaps, complications and preventable harms.
Data about an individual is growing relentlessly

Schematic contrasting human cognitive capacity (e.g., the number of sets of facts the brain can correlate in a decision) with the explosion of new biomedical data types. SNP indicates single nucleotide polymorphism. The authors adapted this figure with permission from Stead.⁵

**Source**
Biomedical Informatics: Changing What Physicians Need to Know and How They Learn


William Stead, et al
MODERN CARE NEEDS
SYSTEMS ENGINEERING AND ALIGNMENT

- Care Model
- Resources
- Quality Program
- Shared Knowledge
- Business Model
- Compensation
WHY:
ORCHESTRATING COMPLEXITY MEANS CURATING KNOWLEDGE INTO VALUE

• Care Model
  • Define a patient’s care journeys are lengthy, complex continuums
  • Surgeon as the maestro orchestrating team-based care
  • Aggregate the disaggregation across sites (Office, ASCs, Complex facilities, SNF, Rehab, HH)

• Resource Model
  • Staffing, Available technologies and devices, digital science in EHRs and clouds

• Quality Model
  • Structure, Process, Outcomes, Appropriateness, Patient Experience

• Knowledge Model
  • Data & Dashboards
  • Conformance with guidelines (CPG)
  • CDS

• Business Model
  • Revenues, Move to Alternative Payment models with Value (Bundles, Episodes and ACOs)

• Clinical Compensation Model
  • Once self employed, volume drove compensation; now value to the patient & team drives compensation
GOVERNMENT IS NO LONGER JUST A PURCHASER & PAYOR

- HHS
- CMS
- ONC
- CDC
- AHRQ
- FDA
- NIH
- NCI

Each agency has contributions to healthcare. More and more they are entering into clinical medicine and clinical workflows. Knowledge management and engineering are of increasing importance.

Quality Outcomes
Price Transparency
Value Transparency
Patient Reported Outcomes
• Providing in **workflow solutions** as a digital services for patients and surgeons within the modern surgical team.
  • This means leveraging digital services in platforms which interface with the surgical team in their workflows.
  • What are the **digital workflows of importance?**

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**EHR Workflows**
- Information gathering and review
- Analytics
- Patient Assessment
- Documentation
- Care plans and treatment

**Additional Workflows**
- Clinical Decision Support
- Clinical Practice Guidelines
- Predictive analytics
- Conformance to care journey mapping
- Calculations & Assessments
- Shared knowledge to clinicians, patients, govt agencies, payors
Knowledge Engineering to be reliable, valid and current is so much more than an EHR-directed activity!

**KNOWLEDGE ENGINEERING BEGINS WITH CLINICAL SUBJECT MATTER EXPERTS!**

**INTEROPERABILITY IS "A" MAJOR PILLAR FOR KNOWLEDGE ENGINEERING.**

**EHRS WILL NOT SOLVE INTEROPERABILITY.**

**INTEROPERABILITY WILL NOT BE SOLVED WITHOUT EHR COOPERATION.**
Patients exist in more than one EHR
What are these patient services?

Individualized patient digital services (APIs) are generated for a cloud holding a common data model pulled from EHRs, HIEs, Registries, etc.

These are use cases designed by govt agencies, clinicians, patients and others & then, placed into the cloud in areas such as workflows to assist in optimal care.
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Patient specific longitudinal care

Use Case Repository

Wellness, Prevention Screening
Cardiac Risk Assessment
GI screening
Osteoarthritis Therapy
Cancer Care Staging and Surveillance
PCORI Research
FDA Medical Device Tracking
CMS Performance Measurement Reporting
Specialty Registry Feeds
Clinical Decision Support
Technology is Enabling!
BPM+ HEALTH

- Decision Model & Notation
- Case Management Model & Notation
- Business Process Model & Notation
ACS Digital Services for Cancer Care

• Seek to provide a digital framework for information sharing to all stakeholders in cancer care.

• Knowledge artifacts will support efforts:
  • 1. Modern staging (inclusions beyond TNM, such as genomics)
  • 2. Structured Data Capture of surgical Op reports and anatomic pathology reports
  • 3. Dynamically fit known therapies to the stage in clinical workflows, (e.g. NCCN)
  • 4. Inform Tumor Boards for care design
  • 5. Track care and its appropriateness
  • 6. Track completeness of care delivery
  • 7. Track outcomes
  • 8. Performance long-term surveillance and survival
Gathering the knowledge artifacts from multiple sources – EHRs, HIEs, registries, patient inputs, etc.

Standardizing the inputs for developing shared knowledge allows for informed Decisions and informed care.
Care can move beyond the “walls” and Silos of single institutions.

Care can be fashioned to meet patient needs and optimize value.
WE ARE JUST AT THE START OF THE BEGINNING

• As modern healthcare evolves –
• We must address the volume of knowledge artifacts and our manageable capacity limits
• We need to leverage digital services in creating shared knowledge across the care continuum and all the sites included in the care model.
• In workflow solutions must be trusted, reliable, valid and current.
• Digital services will need to meet govt standards (CMS, ONC, CDC, FDA, etc)
• Specialties serve as an ideal resource for SME content engineering to join with the technology sector