Aligning Technology with Clinical Practice

(*For users and Clinical Leaders*)

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Today's Agenda

1. Introduction
2. Learning Objectives
3. Common Themes in Healthcare Technology
4. Empowering your Clinical Leadership
5. Describing the Clinical Enterprise (*To non-clinical staff*)
6. Aligning Clinical Function with Clinical Design
7. Solutions for Five (5) Common Problems
8. Discussion / Questions

Introduction

Introduction

- R. Dirk Stanley, MD MPH
- Chief Medical Information Officer, UConn Health
- Hospitalist (*ABIM*), Clinical Informaticist (*ABPM*), Informatics Blogger
- *No conflicts, nothing to disclose*.

My Goal : *To inform and empower.*

Learning Objectives

Learning Objectives

During this discussion, you will learn about :

1. **Common themes** in healthcare technology.
2. **Common solutions** to common problems with development and adoption of clinical technology.
3. **Operational interfaces** between clinical care and technology.
4. **Importance of developing clinical leadership** and **governance**.
5. **Value of solid engagement** between end-users, clinical technology leadership, and Clinical and Executive leadership.

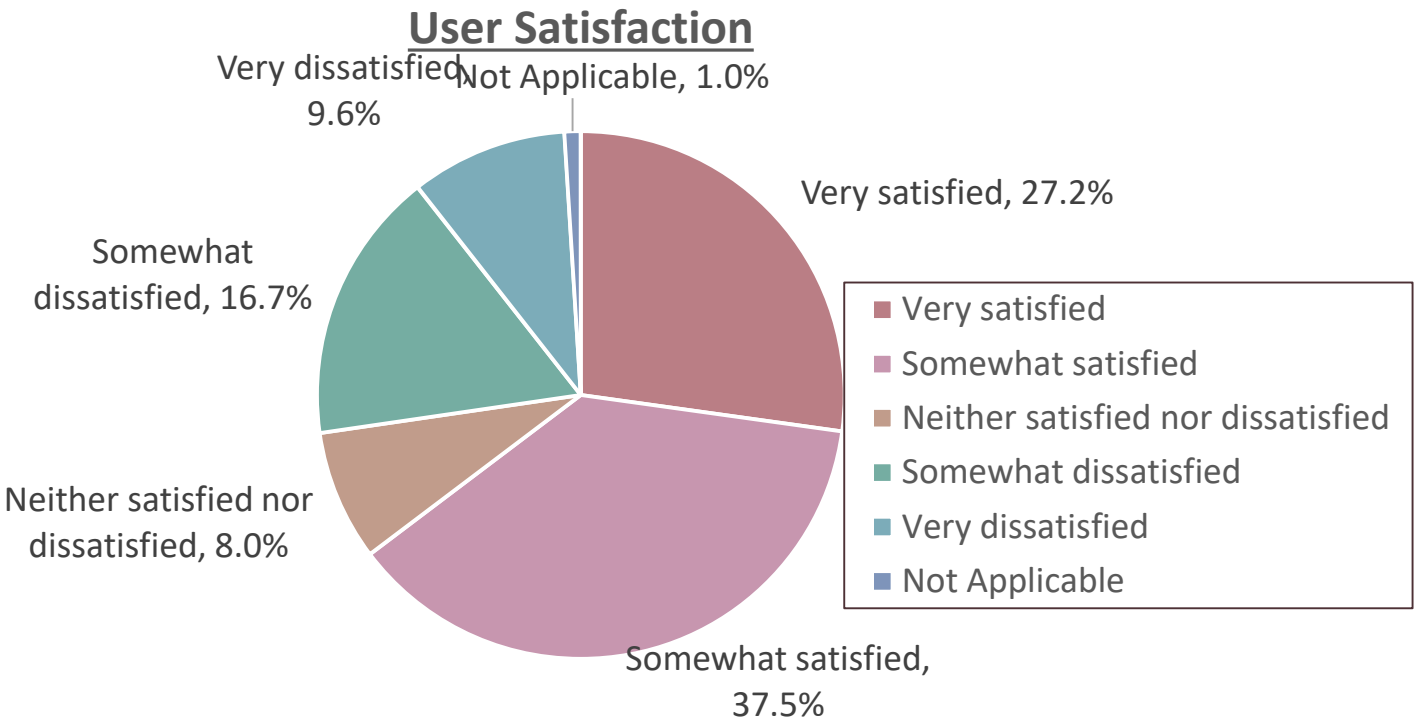
Common Themes in Modern Healthcare Technology

Common Themes in Healthcare Technology

1. **'Artificial Intelligence'** – *Is it safe? Will it solve my problems?*
2. **'Too *much* technology'** – *During uptimes*
3. **'Too *little* technology'** – *During downtimes*
4. **'Too *expensive*'** – Cost and ROI concerns
5. **'Too *complicated*'** – Lengthy deployments and delayed fixes
6. **'Technology *not doing what it should*'** – *Usability and User Experience (UX) (Includes **patient** experience*)

Common Themes in Healthcare Technology

- **Physician Satisfaction and Burnout:** A 2024 survey (*Holmgren, Hendrix, et al*) of 2,067 family physicians revealed :



Holmgren A., Hendrix, N., Maisel, N., Everson, J., Bazemore, A., Rotenstein, L., Phillips, R.,Adler-Milstein, J. Electronic Health Record Usability, Satisfaction, and Burnout. JAMA Network Open. 2024;7(8):e2426956. doi:10.1001/jamanetworkopen.2024.26956

Common Themes in Healthcare Technology

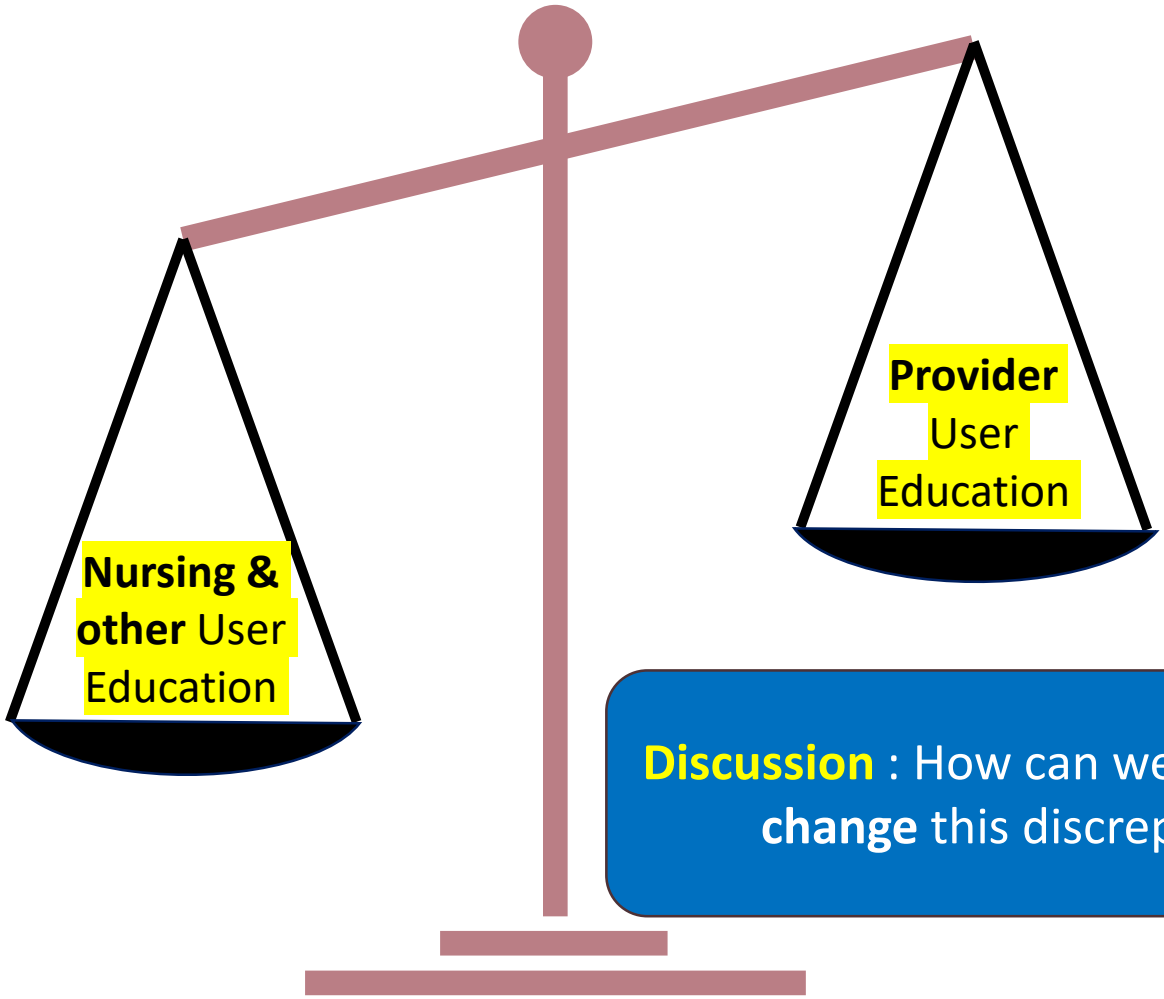
- Notably, **greater usability** across EHR functions correlated with **higher satisfaction** levels.
- However, **poor usability (*UX*)** was associated with **increased burnout** (*'moral injury'*) among physicians.
- (*2014*) CMS and ONC release **SAFER Guidelines** : https://www.healthit.gov/topic/safety/safer-guides
- **SHM Nov 2023** - new **KLAS research** shows that **highly satisfied** EHR users often had access to **effective training and support**. These users reported that their organizations implemented EHR systems well, and they **felt adequately prepared** to use them, leading to **better satisfaction** and **efficiency**.
- Indicates that **EHR usability (*UX*)** directly affects physicians' ability to deliver **high-quality patient care**.
- **Take-home** : Usability (*UX*), workflow design, ample training and support = **Improved care**, **improved satisfaction**, and **less burnout.**

Common Themes in Healthcare Technology

- **For Nurses** – In 2021, *Jaber et al* studied 170 Nurses in Outpatient Tertiary Hospital.
- Positive views on **EHR usage** ranged from 51.2% to 84.7%, with the lowest satisfaction related to writing nurse care work (*flow*) sheets.
- **EHR quality**, positive perceptions ranged from **70% to 87.6%**, with primary concerns about system problems and crashes.
- **User satisfaction** scores varied between **76.5% and 87.1%.**
- **Conclusion** : The study found significant **positive correlations** between **EHR use**, **quality**, and **user satisfaction**.

Jaber, M., Al-Bashaireh, A., Alqudah, O., Khraisat, O., Hamdan, K., Almaizy, H., Lalaithabai, D., Allaira, R. **Nurses' Views on the Use, Quality, and Satisfaction with Electronic Medical Record in the Outpatient Department at a Tertiary Hospital**. *The Open Nursing Journal*, Nov 2021. DOI: 10.2174/1874434602115010254

Common Themes in Healthcare Technology



Discussion : How can we (*culturally*) **change** this discrepancy?

Common Themes in Healthcare Technology

New Physician Onboarding

- **Basic EHR Training**
- **Advanced** (*Specialty-specific*) **Workflow Intro**
- **Advanced** (*Specialty-specific*) **EHR Training**
- **Advanced** (*Specialty-specific*) **3rd Party Systems Training**
- **Defaulting, Personalization, and Customization**
- **Policy Intro** (*e.g. codes, transfusions, high-risk procedures*)

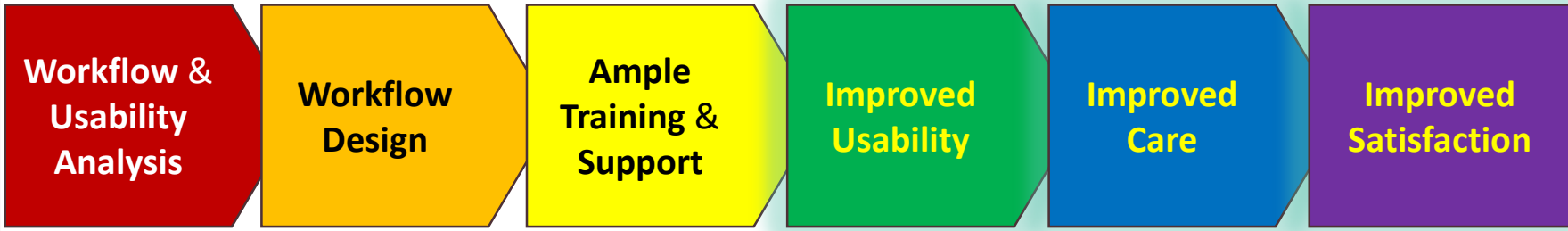
Physician Re-certification

- **Advanced** (*Specialty-specific*) **Workflow Reviews**
- **Policy Review** (*e.g. codes, transfusions, high-risk procedures*)

...

Common Themes in Healthcare Technology

Chain of Workflow and Usability Improvement



Take-home : Improving **usability**, **care**, and **satisfaction** starts with **improved workflow and usability (*UX*) analysis**.

Common Themes in Healthcare Technology

IT TICKETS (*e.g. Small items*)

1. Something that used to work no longer works, and I **can't continue working** (**STAT**)
2. Something that used to work no longer works, but I am **able to continue working** (**ROUTINE**)

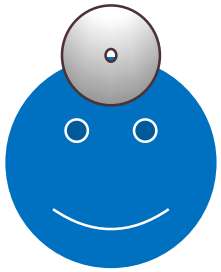
Other common examples :

- New User onboarding, training, and support
- Existing User Offboarding
- Lost Equipment
- Security or Privacy Violations
- Reporting of Safety Incidents
- Pharmacy/Formulary Updates

IT PROJECTS (*e.g New Service*)

1. **Conception** and **documentation of need**
2. **Analysis**, Scoping, Budgeting, Evaluation, Prioritization, and approval
3. **Project Team and Project Plan Development**
4. **Drafting** of Deliverables
5. **Building** of Deliverables
6. **Testing** of Deliverables
7. **Final Approvals**
8. **Communication & Education**
9. **Implementation**
10. **Monitoring & Support**

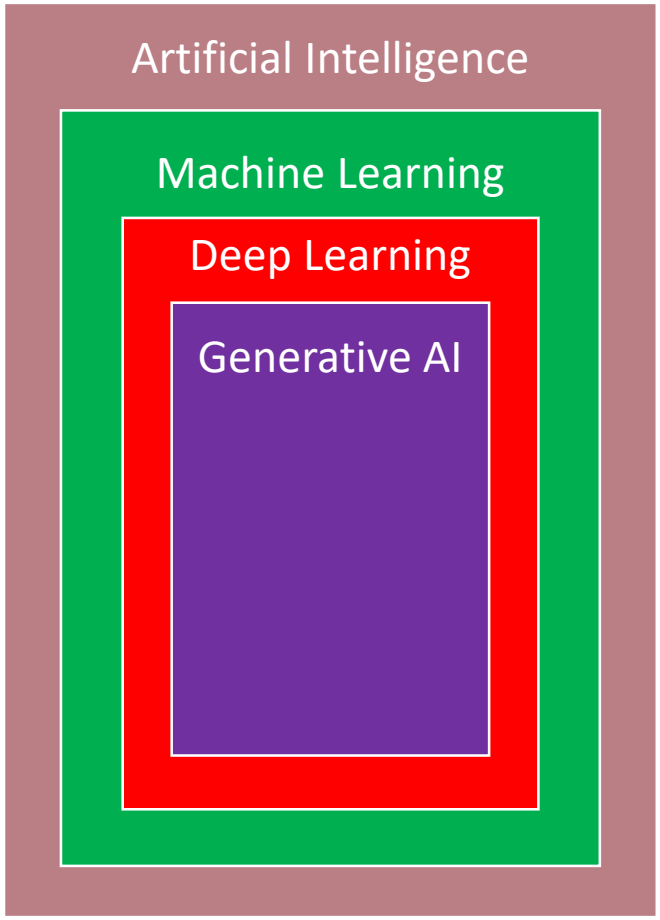
Common Themes in Healthcare Technology - AI



PROVIDER

- **Q** : "*Can **AI** automatically write my notes for me?*"
- **Q** : "*Will **AI** help me bill properly?*"
- **Q** : "*Can **AI** help me find a pulmonary embolism in this CT Scan?*"
- **Q** : "*Can **AI** help summarize this lengthy chart for me?*"
- **Q** : "Will **AI** remind my patients to get their yearly screening?"
- **Q** : "Will **AI** help identify patients who need advance care planning discussions?"
- **A** : "***Yes*** *– But only if you implement it* ***carefully***, ***safely***, *and* ***thoughtfully***."

Common Themes in Healthcare Technology



- **Artificial Intelligence** – Program and systems with the ability to learn and mimic human behavior
- **Machine Learning** – Algorithms with the ability to learn without being explicitly programmed
- **Deep Learning** – Multi-layered neural networks that adapt and learn from vast amounts of data to solve complex problems
- **Generative AI** – Form of AI designed to create new and original content in various forms

Common Themes in Healthcare Technology

WHAT AI CAN DO :

1. **Quickly assemble and analyze data –** AI can listen to discussions and summarize findings, to help improve documentation speed and quality.
2. **Cutting through the noise** - AI can help make sense of the **overwhelming amount of clinical data, medical literature, and population and utilization data** to inform decisions
3. **Providing contextual relevance** - AI can help empower healthcare providers to see expansively by **quickly interpreting billions of data points** - both text and image data - to identify contextually relevant information for individual patients
4. **Reducing errors related to human fatigue** - **Human error** is costly and human fatigue can cause errors. **AI algorithms don't suffer from fatigue, distraction, or moods.** They can process vast amounts of data with incredible speed and accuracy, all of the time.
5. **Identifying diseases more readily** - AI systems can be used to **quickly spot anomalies** in medical images (*e.g. X-rays, ultrasounds, CT Scans, and MRIs*)

Adapted from : https://www.ibm.com/topics/artificial-intelligence-medicine

Common Themes in Healthcare Technology

WHAT AI CAN'T DO :

1. **Correct for bad data collection –** Without effective data governance, incorrect or incomplete data may be stored in the medical record, leading to incorrect AI analyses.
2. **Distributional shift** - A mismatch in data due to a change of environment or circumstance can result in erroneous predictions. For example, over time, disease patterns can change, leading to a disparity between **training** and **real-world operational data**.
3. **Insensitivity to impact** - AI doesn't yet have the ability to take into account false negatives or false positives.
4. **Black box decision-making** - With AI, predictions are not open to inspection or interpretation. For example, a problem with training data could produce an inaccurate X-ray analysis that the A.I. system cannot factor in, and that clinicians cannot analyze.
5. **Unsafe failure mode** - Unlike a human doctor, an AI system can diagnose patients without having confidence in its prediction, especially when working with insufficient information.
6. **Automation complacency** - Clinicians may start to trust AI tools implicitly, assuming all predictions are correct and failing to cross-check or consider alternatives.
7. **Reinforcement of outmoded practice** - AI can't adapt when developments or changes in medical policy are implemented, as these systems are trained using historical data.

Adapted from : https://www.thomasnet.com/insights/the-challenges-and-dangers-of-ai-in-the-health-care-industry-report/

Common Themes in Healthcare Technology

WHAT AI CAN'T DO :

8. **Self-fulfilling prediction** - An AI machine trained to detect a certain illness may lean toward the outcome it is designed to detect.
9. **Reward hacking** - *Proxies for intended goals* sometimes serve as *'rewards*' for AI, and these clever machines are sometimes able to find hacks or loopholes in order to receive unearned rewards - without actually *fulfilling the* ***intended goal***.
10. **Unsafe exploration** - In order to learn *new strategies* or get the *outcome it is searching for*, an AI system may start to test boundaries in an unsafe way.
11. **Unscalable oversight** - Because AI systems are capable of carrying out countless jobs and activities, including multitasking - *monitoring* such a machine can be *extremely challenging*.
12. **Unrepresentative training data** - A dataset *lacking in sufficient demographic diversity* may lead to *unexpected, incorrect diagnoses* from an AI system.
13. **Lack of understanding of human values and emotions** - AI systems lack the complexity to both feel emotions (*e.g. empathy*) and understand intangible virtues (*e.g. honor*), which could lead to decisions that humans would consider *immoral* or *inhumane*.
14. **Lack of accountability for mistakes** - Because AI systems cannot **feel pain** and have no ability to compensate monetarily or emotionally for their decisions, there is no way to **hold them accountable** for errors. Blame is therefore redirected onto the many people related to the incident, with no one person ever truly held liable.

Adapted from : https://www.thomasnet.com/insights/the-challenges-and-dangers-of-ai-in-the-health-care-industry-report/

Common Themes in Healthcare Technology

Take-Home Messages about AI :

1. AI is **complex** and **emerging**.
2. Always **proceed with care**.
3. Best to work with **experienced professionals** who can serve as *intermediary* between **vendors** and **institutions**.

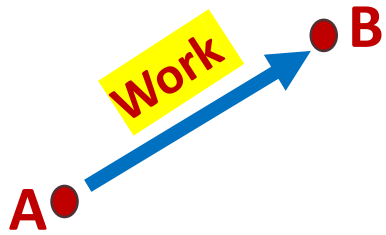
Empowering Clinical Leadership

Empowering Clinical Leadership

- **Q** : Why are **clinical governance** and **clinical leadership** so important for **healthcare technology**?
- **A** : Over half of your **user experience** will depend on :
  1. Your **onboarding**, **training**, and **personalization**.
  2. Your **local IT configuration** (*hardware, software*) – How well does it support your clinical needs?
  3. What **new projects** your Clinical and IT teams develop, and when
  4. How **prepared** you are for planned and unplanned **downtimes**
  5. How well **Finance, Coding, Billing, HIM, IT, Legal / Compliance**, (*and many other areas*) understand **your specific clinical needs.**
  6. How many FTEs you have in **Applied Clinical Informatics**.
  7. ***Many other factors…***

Empowering Clinical Leadership

- **Q** : How will we get from **here** to **there**?
- **A** : Good **leadership**, good **process**, good **analysis**, good **design**, good **documentation**, good **strategy**, good **support**, good **teamwork**, and good **planning.**

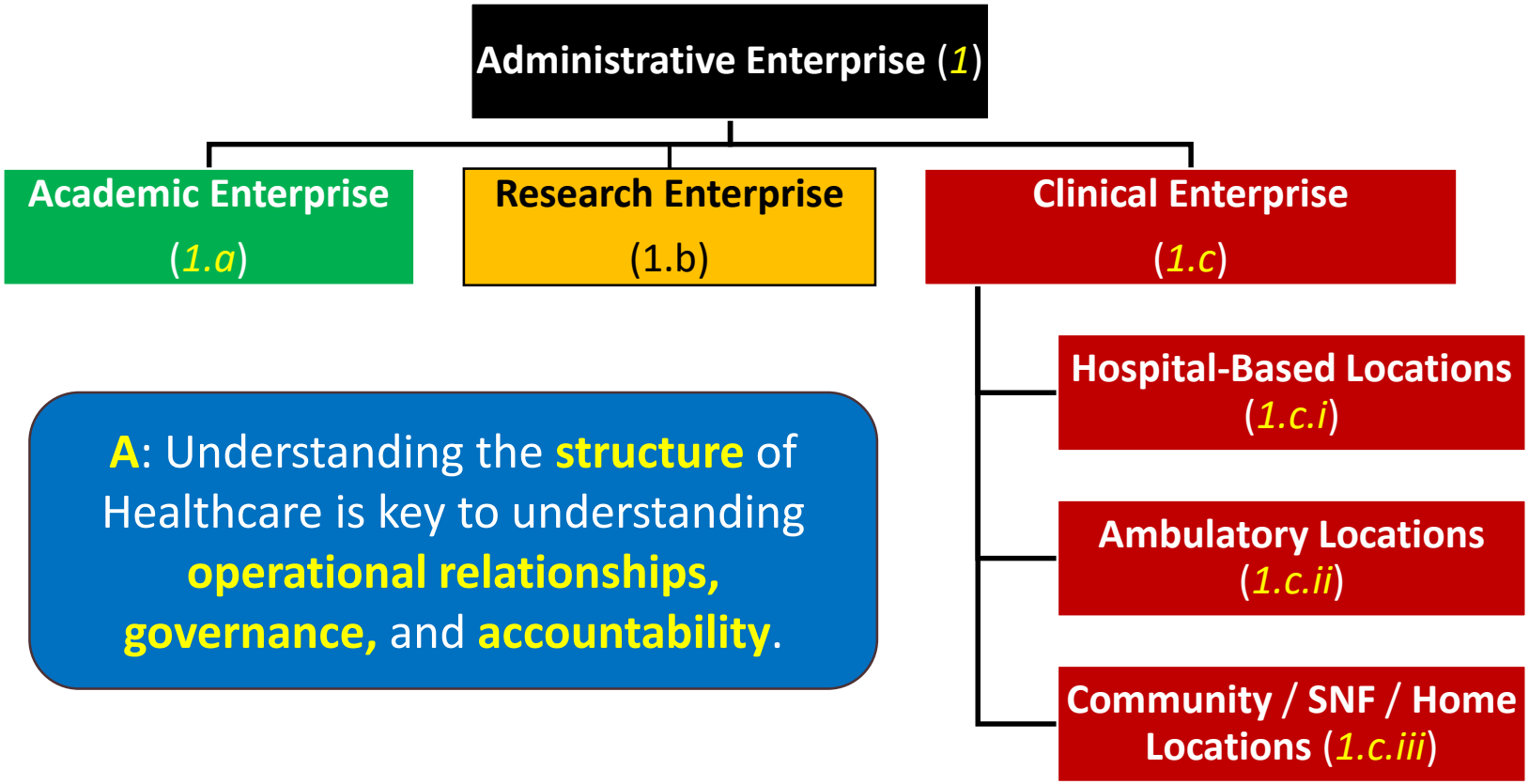


Describing the Clinical Enterprise

(*To non-clinical staff*)

Describing the Clinical Enterprise (*to non-clinical staff*)

- **Q** : How and where is your **Clinical Enterprise** described?
- **Q** : Why is this important?

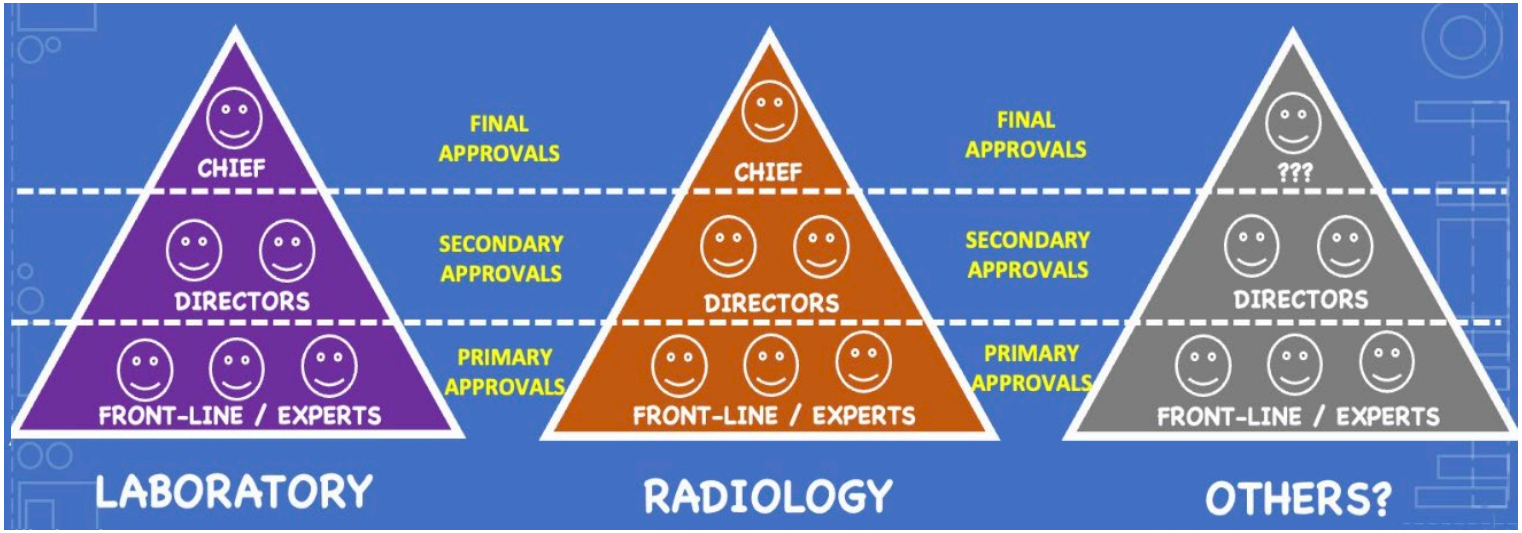


A: Understanding the **structure** of Healthcare is key to understanding **operational relationships, governance,** and **accountability**.

Source : https://www.dirkstanley.com/2021/06/welcome-to-healthcare.html

Describing the Clinical Enterprise (*to non-clinical staff*)

- Understanding **roles and responsibilities** helps facilitate **teamwork** and clear **leadership** for these enterprises - which supports **improved communication** and **operational harmony**.
- **Quasi-military reporting structure** of Healthcare often not well-described or well-understood. (*e.g. 'matrixed organization'*)



Describing the Clinical Enterprise (*to non-clinical staff*)

Failure to clearly describe the Clinical Enterprise can lead to workflow, operational, communication, and data aggregation problems (*with Finance, IT, Legal, HIM, and other 'non-clinical' areas*)

- E.g. **Specialty** vs. **Service** :
  - **SPECIALTY** = Internal Medicine, General
  - **SERVICE(S)** =
    - **[ ]** Inpatient Hospitalist?
    - **[ ]** Outpatient Adult Internal Medicine (*Primary Care*)?

Aligning Clinical Function with Clinical Design

Aligning Clinical Function with Clinical Design

- **Clinical technology** should support good, safe, legal, and cost-effective **patient care**.
- **Technology** should not define **clinical workflows** – Instead, ***clinical workflows*** should inform and define ***technology***.

- **Q** : How to take **control** of your technology?
- **A** : First, ask **who** architects/designs, builds, tests, and implements your clinical technology!

Aligning Clinical Function with Clinical Design

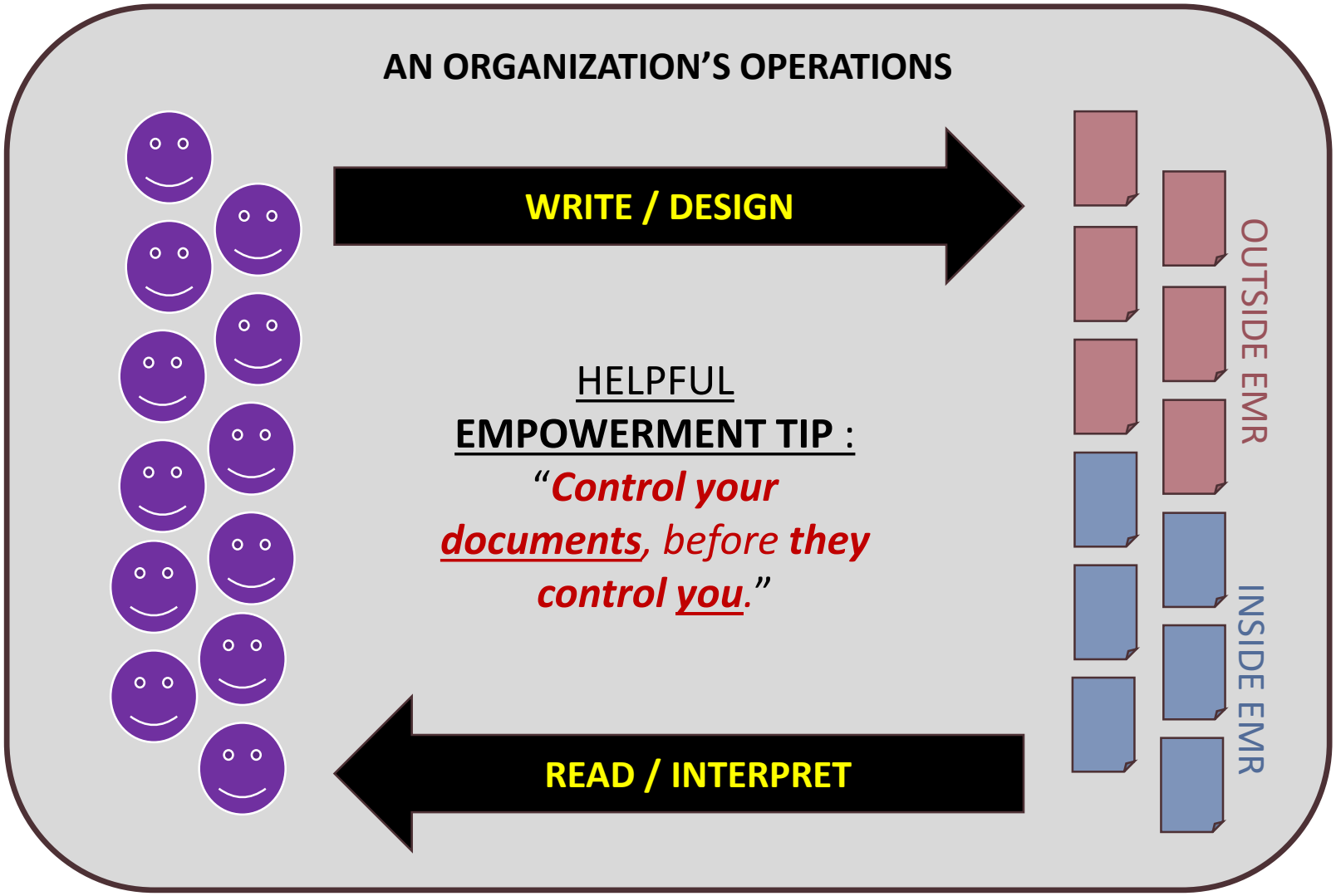
+ **Ten easy steps** to '*gourmet*' change management :

1. Documenting need for change (***end-users + clinical leadership***)
2. Analyzing, Reviewing, Prioritizing, and Approving change (***Informatics + End-users + Clinical Leadership + Finance + IT***)
3. Assigning Project Manager, developing project team and plan, assigning timelines (**PM**)
4. Drafting of workflows (***Informatics***)
5. Building/configuration of workflows (***Analysts***)
6. Testing (***Analysts*** + ***end-users + Informatics***)
7. Approving (***Analysts*** + ***end-users*** + ***clinical leadership + Informatics***)
8. Educating/communicating (***Trainers*** + **End-users + Clinical leadership + Informatics**)
9. Implementing your workflow (***Analysts + End-users + Clinical Leadership + Informatics***)
10. Monitoring/Supporting your workflow (End-users + Clinical Leadership + Informatics)

Aligning Clinical Function with Clinical Design

Deliverables OUTSIDE EMR	Deliverables INSIDE EMR
1. **Plans** (*e.g. Project, Testing, Education, Communication, Go-Live, Monitoring / Support, Maintenance, Downtime, etc.*)	1. **Clinical Documentation** (*e.g. Notes, Flowsheets, Checklists, Images,Videos, tracings, etc.*)
2. **Policies / Procedures**	2. **Registration Information**
3. **Guidelines**	3. **Labs**
4. **Protocols**	4. **Radiology / Images**
5. **Patient Consents**	5. **Orders**
6. **Interfaces**	6. **Order Sets**
7. **Staff / Patient Education**	7. **Clinical Pathways**
8. **Staff Schedules**	8. **Clinical Decision Support** (*e.g. alerts*)
9. **Committee Charters**	9. **Reports / Dashboards**
10. **Org Charts**	10. **Visit / Encounter Types / Schedules**
11. **Budgets**	11. **Charges**
12. **Job Descriptions**	12. **Security Groups / Profiles / Filters**

Aligning Clinical Function with Clinical Design



Solutions for
Five (5) Common Problems

Solutions for Five (5) Common Problems

Q1 : "*I want to change things, but I **don't know where to start***?"

A1 : Start by asking who is in charge of :

+ *your **Clinical Governance** (e.g. CNO, CMO, VP of Pharmacy, etc.)*?
+ your **Clinical IT/Technology** (*e.g. CIO, CMIO, CNIO*)?
+ your **Operations** (*e.g. COO*)
+ your **Project Management**? (*e.g. VP of PMO*)
+ your **Clinical & IT Education**? (*e.g. Director of Education, Director of EHR training*)

Solutions for Five (5) Common Problems

Q2 : "*I'm a **new clinical leader**, what do I do?*"

A2 : Medical school usually does not prepare you well for the teamwork of **Clinical Leadership**. Key things to learn :

1. How to **represent your constituents** through effective meetings and continuous communications.
2. How to charter and chair a **committee**, and basic parliament (*Robert's Rules of Order*)
3. How to read and interpret and write **bylaws**, **policies**, **budgets**, **org charts**, and **job descriptions**.
4. How to analyze, design, plan, and implement a **workflow** change.

Solutions for Five (5) Common Problems

Q3 : *"I want to implement **something new**, but don't know **where to start**?"*

A3 : Every healthcare organization needs to **procure and implement** technology and services in an *organized way*. Key things to ask :

1. Who your **Clinical Technology / Clinical Informatics champions** and leaders are.
2. Which **committees** help oversee your clinical technology.
3. Who oversees your **intake** evaluation, **budgeting**, and **procurement**.

Solutions for Five (5) Common Problems

Q4 : *"I don't feel like my technology **aligns** with my **clinical needs** - how can I fix this?"*

A4 : Every healthcare organization needs to **optimize workflows** in an organized way. Key things to know :

1. Who your **Department Chair/Chief** and other Clinical Leadership is, *to enlist their support*.
2. Who your **Quality** and **Applied Clinical Informatics** champions and leaders are, *to analyze your workflows*.
3. What **policies/procedures** outline your clinical workflows.
4. How to submit **new project requests** for optimizing workflows.

Solutions for Five (5) Common Problems

Q5 : "*This isn't really **my responsibility** - Why should I be **engaged** with my clinical technology leaders and solutions?*"

A5 : Failure to be engaged is one of the most common reasons technology. Key things to know and ask :*doesn't align with clinical needs*

1. Engagement in **training and personalization** often helps improve **usability and satisfaction**. (*What time is allotted for training?*)
   a. Airplane pilots spend many hours in **flight simulators** – Similarly, shouldn't Healthcare prepare its staff to use complex tools to care for patients?
   b. **Ask** : How much time do your leaders allocate for training?
2. **Regular team meetings** are *vital* to gather and share important information, and *solve problems*.

Discussion / Questions?

Questions?

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Thank you!