

# A knowledge management system

- ◆ *Extract and package best current knowledge*
- ◆ *Deploy into routine practice*
- ◆ *Continuously update and maintain*
- ◆ *Generate and validate new knowledge*

# Shared Baseline “Lean” protocols *(bundles)*

1. **Identify a high-priority clinical process** *(key process analysis)*
2. **Build an evidence-based best practice protocol**  
*(always imperfect: poor evidence, unreliable consensus)*
3. **Blend it into clinical workflow** *(= clinical decision support; don't rely on human memory; make "best care" the lowest energy state, default choice that happens automatically unless someone must modify)*
4. **Embed data systems to track (1) protocol variations and (2) short and long term patient results** *(intermediate and final clinical, cost, and satisfaction outcomes)*
5. **Demand that clinicians vary based on patient need**
6. **Feed those data back** *(variations, outcomes)* **in a Lean Learning Loop** - *constantly update and improve the protocol*

# Org structure: Development Teams

## ◆ **Team leader**

- *respected physician leader, in active practice*
- *functionally a knowledge expert*

## ◆ **Core work group**

- *knowledge experts*
- *build initial Care Process Model*
- *provide academic detailing, run referral clinic*
- *geographically base*

## ◆ **Front line clinicians**

- *physicians, nurses, clerks, techs, etc.*
- *first level review; keep knowledge experts grounded*
- *2-way street: fundamental knowledge up, ownership down*
- *geographic representation*

## ◆ **Staff support** - *flow charter, statistician, data manager, clinical ops administrator*

# Managing clinical knowledge

**Development Team responsibility –**

**build and maintain the Care Process Model (CPM):**

## Initial development phase

- 1. Generate initial evidence-based best practice guideline** (flowchart)
- 2. Blend the guideline into clinical workflow**  
(standing order sets, clinical flow sheets, checklists, action lists, etc.)
- 3. Design variation, outcomes tracking system** (feed patient registries)
- 4. Design patient and professional education materials**
- 5. Deploy, test, and validate in actual care delivery**

## Maintenance phase

- 6. Keep the Care Process Model current** (protocol variations + patient outcomes; core experts: new research findings; improvement suggestions)
- 7. core experts: Academic detail front-line teams** (Clinical Learning Days)
- 8. core experts: Run the referral clinic** (last step in treatment cascade)
- 9. core experts: Manage specialist care managers**

# Clinician roles

- ◆ *Really interested?* **Serve on Development Team**
  - *About 3 to 6 hours per month*
  - *We'll pay for your time* (we'll make you whole for time lost from practice)
- ◆ *Somewhat interested?* **Respond when we circulate**
  - *We really want your expertise / ownership* (but no \$\$ compensation)
- ◆ *Just too much / way too busy?* **Just practice**
  - *Every time you vary you are criticizing the guideline*

# Benefits to patients and clinicians

- ◆ **Better clinical outcomes**

- *“We count our successes in lives”*

- ◆ **Lower health care costs** - *Eliminate waste;*  
*e.g., Intermountain’s total operating costs down 13% (\$688MM)*

- ◆ **True transparency** - *as clinicians counsel with patients*

- ◆ **Higher productivity**

- *current workforce / physical plant can handle increasing demand*

- ◆ **Dramatically better knowledge generation**

- *every patient contributes to new knowledge;*

- *clinical effectiveness research fully embedded in routine practice*

# Every patient generates knowledge

- ◆ **58 longitudinal patient registries** representing about 80% of all inpatient and outpatient care delivered within Intermountain
- ◆ **about 3 petabytes** (thousand terabytes) **of storage**
- ◆ **primary use: routine clinical management**  
(justifies operational expense)

# 2015 "Type 1" learning production

- ◆ *Women & Newborn: 84 peer-reviewed articles*
- ◆ *Cardiovascular* (2103 data):
  - 64 peer-reviewed articles**
  - 67 abstracts**
  - 15 "other" - book chapters, editorials, etc.**
- ◆ *Other Clinical Development Teams also published*  
(just not as prolific as Women & Newborn and CV -- ~400 total articles)
- ◆ *Cumulative impact on cost of operations: ~\$688 million*

**Goal: 1,000 peer-reviewed Type 1 publications**  
**in a single year** (sometime before I retire)