Realizing *Opportunities.*
Promoting *Patient Safety.*

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Realizing Opportunities.
Promoting Patient Safety.

Patient Safety and EMRs…

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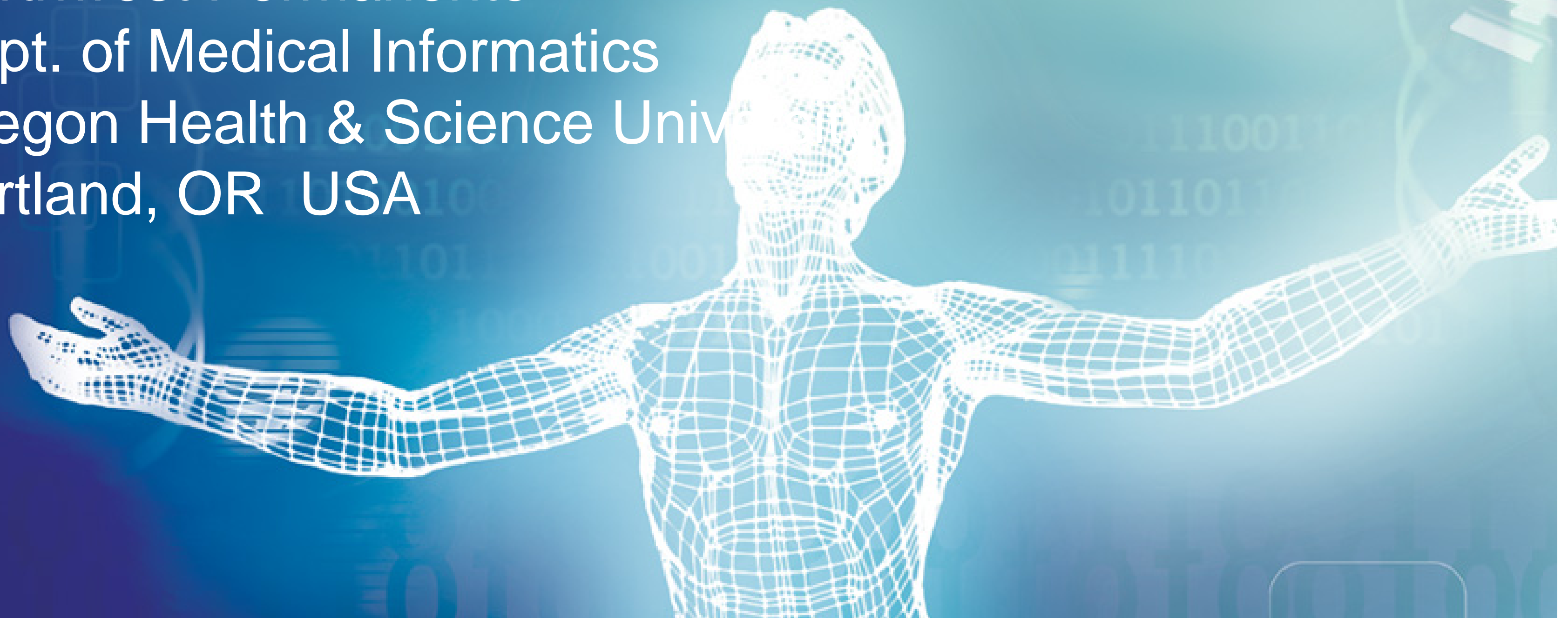
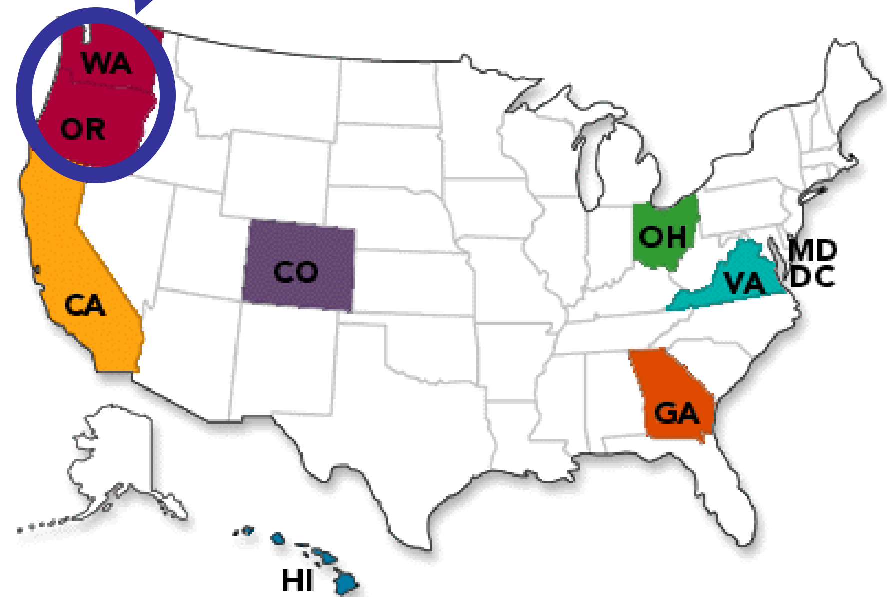


Kaiser Permanente:

The Largest Not-For-Profit Health Plan in the USA



- Integrated healthcare delivery system
- 8 regions serving 9 states and D.C.
- 8.5 million members
- 11,000 physicians
- 130,000 employees
- 29 hospitals and medical centers
- 423 medical offices
- $22 Billion annual revenue

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KPNW's EMR History

1993: Results Reporting System (RRS)
"Skunk works" ==> roll out

1994 - 1997: EpicCare Pilot and Rollout – Davies Award Winner

1999: Document Imaging for residual paper
Remote access enabled
KPOnline (member portal)

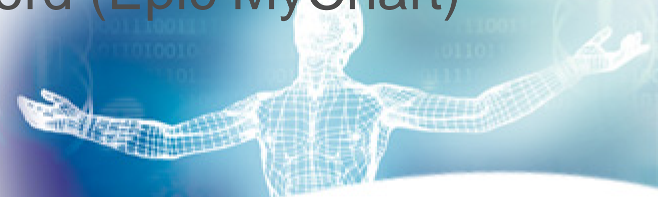
2000: New Data warehouse implemented

2001: Access to Alliance Hospital systems

2002: Pilot member access to medical record (Epic MyChart)

2003: Epic Home Health System
PACS for CT, MR, US

2006: Begin in-patient EMR implementation



Dosing in renal dysfunction

- Methods
  - 239 primary care providers at 15 primary care clinics
  - 9910 patients taking warfarin.

- Interventions were:
  - Alerts for the co-prescription of warfarin and:
    - acetaminophen, nonsteroidal anti-inflammatory medications, fluconazole, metronidazole, and sulfamethoxazole

Feldstein et al. Arch Intern Med. 166(9):1009-15; 2006.

Dosing in renal dysfunction

- Results
  - Baseline, 1/3 of patients had an interacting prescription.
  - Following alerts:
    - reduction in the warfarin-interacting medication prescription rate
      - from 3294.0 to 2804.2 per 10,000 users.
      - 14.9% relative reduction at 12 months.

Feldstein et al. Arch Intern Med. 166(9):1009-15; 2006.

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Safety Alerts for Elderly Persons

- Methods
  - 39-month period of a natural experiment,
  - used interrupted time series analysis
  - Intervention: alerts cautioning against using certain medications
  - main outcome measure was dispensing per 10,000 members per month.

Smith et al. Arch Intern Med. 166(10):1098-104; 2006.

Safety Alerts for Elderly Persons

- Results
  - Following implementation of the drug specific alerts,
  - Reduction of 5.1 prescriptions per 10,000, *P*=.004
  - 22% relative decrease
  - No evidence of a decrease in use of non-preferred agents for non-elderly patients
  - Reduction primarily due to decreases in dispensing for tertiary tricyclic agents.

Smith et al. Arch Intern Med. 2006;166: 1098-1104.

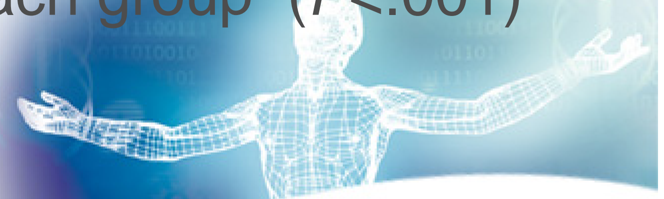
Improving laboratory monitoring of medication therapy

- Methods
  - Compared 3 interventions to usual care for 10 medications in 15 primary care clinics in an HMO
  - Patients had not received recommended laboratory monitoring within 5 days after dispensing of medication.
- Interventions were:
  - EMR reminder to the prescribing health care professional
  - Automated voice message to the patient
  - Pharmacy team outreach to the patient

Feldstein et al. Arch Intern Med. 2006 Sep 25;166(17):1848-54.

Improving laboratory monitoring of medication therapy

- Results
  - 961 patients participated in the study
  - After 25 days:
    - 22.4% in the usual care group had completed all recommended baseline laboratory monitoring
    - 48.5% of patients in the EMR reminder group (*P*<.001)
    - 66.3% in the automated voice message group (*P*<.001)
    - 82.0% in the pharmacy team outreach group (*P*<.001)



Feldstein et al. Arch Intern Med. 2006 Sep 25;166(17):1848-54.

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e-Iatrogenesis

- Patient harm caused at least in-part by the application of health information technology.
- May fall into technical, human-machine interface or organizational domains.
- We must all work to understand, measure and mitigate these issues.

Weiner et al. J Am Med Inform Assoc. 2007 Feb 28;

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CIS-related Safety Hazards

1. Hardware and Software Failures
2. Failure in data input, storage, and retrieval
3. Human-computer interface
4. Temporal synchronization of teamwork
5. Changes to organizational safety net

The Human-Computer Interaction Space

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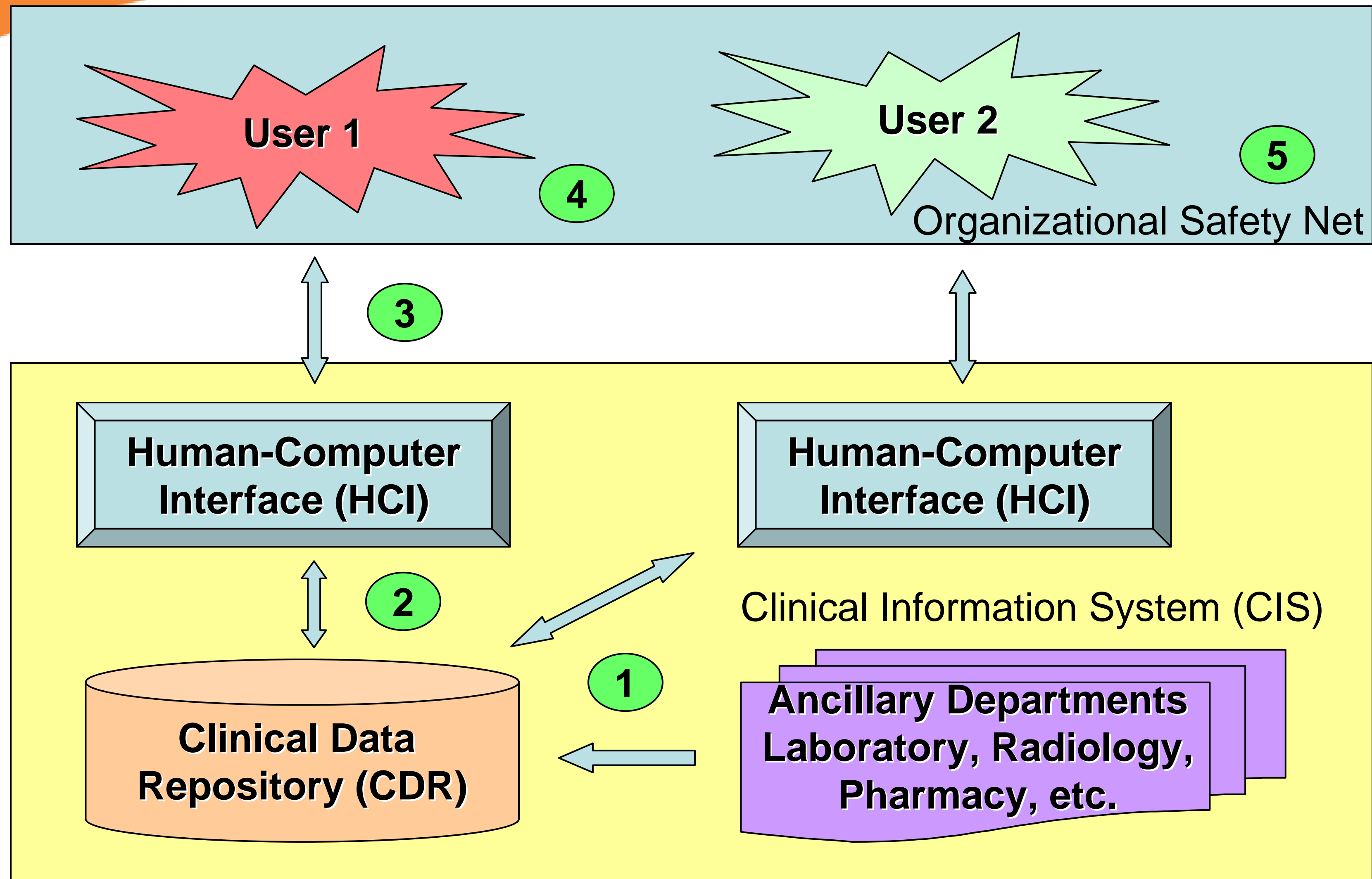
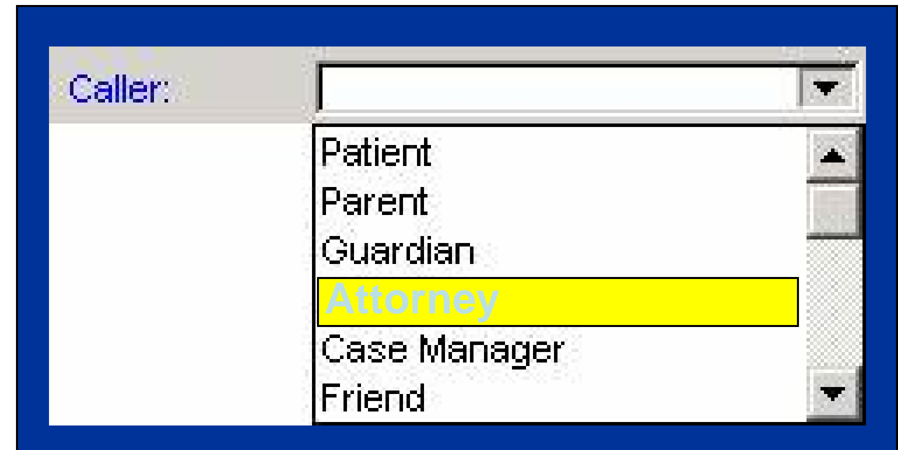


Juxtaposition errors

"I ordered the test that was right next to the one I thought I ordered, you know, right below it. My little thingie had come down and I clicked and I'm lookin' at this one but in fact I clicked on the thing before. By that time I turned my head and I'm hitting return and typing my signature and not seeing it"



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Accessing Chart Review reports for non-medication orders

Problem:

Encounter summary report does not give order details for injections, i.e., amount injected.
Clinicians may order an injection based on what she sees in Chart Review.
Other Orders report offers more details -- including the "Dose," "Frequency" and "Route"

Reason:

Medication Injection orders are controlled by National
Displayed name is based on the industry standard billing code called HCPC.
e.g., clindaymcin injection code is S0077A.
Billing is based on the HCPC standard of PER 300 MG.
Regardless of the amount injected code shows:
CLINDAMYCIN PHOSPH 300 MG
Clinicians are supposed to change the Quantity to match what is injected.
i.e., for a 900 MG injection of clindaymcin, the Quantity is 3.

Solution:

A temporary fix will be put into production on Wednesday, May 2, 2007

LEUPROLIDE ACETATE, DEPOT SUSPENSION, 7.5 MG, FOR INJECTION(Order#107448490) on 4/3/07 - Click for

DIFFERENTIAL, MANUAL(Order#107448488) on 4/3/07 - Click for Details

TSH W REFLEX TO FT4(Order#107448486) on 4/3/07 - Click for Details