Clinical Decision Support
(With an Emphasis on Medication)

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Objectives

- Describe magnitude and sources of medication errors
- Define clinical decision support (CDS)
- List CDS intervention types
- Define synchronous vs. asynchronous CDS
- Define alert fatigue and potential solutions
- Discuss examples of CDS in the literature
IOM (Institute of Medicine)  
Preventing Medication Errors

- Estimated very conservatively, medications harm at least 1.5 million people per year in the US
- In hospitals there are at least 400,000 preventable adverse drug events (ADEs) per year
- Approximately one medication error per patient per hospital day

Taxonomy of ADEs, ADRs, and Medication Errors

Distribution of *PREVENTABLE* Adverse Drug Events According to the Stage of the Error in the Medication Process

What is “Clinical Decision Support?”

“The provision to clinicians or patients of clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times to enhance patient care.”

Improving outcomes with CDS: An implementer’s guide. Osheroff, Pifer, Sittig, Jenders, Teich. HIMSS Press 2005
CDS Intervention Types

- Documentation templates (*adm note, pt hx*)
- Relevant data presentation (*pertinent lab results*)
- Order creation tools (*pre-defined order sets*)
- Protocol support (*multi-step care plans*)
- Reference information (*context sensitive*)
- Reactive alerts (*unsolicited warnings*)
Medication Decision Support

**BASIC**
- Basic dosing guidance
- Drug-allergy checking
- Drug-Drug interactions
- Duplicate therapy
- Formulary decision support

**ADVANCED**
- Advanced dosing guidance
- Drug-disease interactions & contraindications
- Medication-associated lab monitoring
- Drug-pregnancy checking

Asynchronous Alerting Strategy

Database → Web page and/or Fax alert → Pharmacist → Physician

*RPh academic detailing*
Improvement in Dosing Errors Using Measurement and Feedback

Alert Rate

- 0%
- 2%
- 4%
- 6%
- 8%
- 10%
- 12%
- 14%
- 16%

Years:
- 1994
- 1995
- 1996
- 1997
- 1998
PharmADE™ screens for potentially contraindicated drug combinations and for excessive duration of specific drugs.

PharmADE example: Cisapride with anazole or macrolide

Mean duration of combinations declined from 4.1 to 1.6 days
Observed 30.5 Order entry hours with 7 different pharmacists
- ~1500 alerts
- Only 1 alert recommendation accepted during all that time
- All others were over-ridden
The Problem and a Solution

- Commercial rule bases in their unmodified form produce an excessive number of clinically insignificant alerts.
- Nuisance alerts lead to alert fatigue & complacency.
- “Home-grown” rules are difficult & resource intensive to develop and maintain.
- Strategies for customizing commercial dosing rules can be implemented to help mitigate this problem.
Impact on Alert Rate

- None: 7.3%
- Freq multiplier: 7.2%
- Wt tolerance: 7.1%
- Calc tolerance: 7.0%
- CrCl tolerance: 6.6%
- Duplicate suppression: 6.6%
- Dose multiplier: 1.7%
- All combined: 1.2%
Summary – Max Single Dose Alerts

- The unmodified monthly alert rate of 7.3% resulted in nearly 11,000 alerts.
- With all strategies implemented, the alert rate was reduced to 1.2% (< 2000 alerts)
- The dose multiplier strategy had the greatest impact on the alert rate reducing it from 7.3% to 1.7%
Drug Interaction Strategies

- Active/Inactive flag for each drug pair
  - Knowledge vendors’ “severity level” often does not match clinicians’
- Suppress same drug-drug combination for same patient for x days
- Drug-drug-lab interactions
- Alert Delivery Priority
  - Not all need immediate (in your face) alerting

## Active Rules by Drug Interaction Severity

<table>
<thead>
<tr>
<th>Interaction Severity</th>
<th>Vendor Rules</th>
<th>Active Rules by Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1 - minor</td>
<td>8,246</td>
<td>16</td>
</tr>
<tr>
<td>2 - moderate</td>
<td>60,833</td>
<td>79</td>
</tr>
<tr>
<td>3 - major</td>
<td>7,902</td>
<td>3,173</td>
</tr>
<tr>
<td>Total</td>
<td>76,981</td>
<td>3,268</td>
</tr>
</tbody>
</table>

- **CPOE Test at Hospital “A”**
  - (2375 alerts/wk)

- **PharmADE**
  - (19 alerts/wk)
Drug-Drug-Lab Interactions

- Interaction increasing Warfarin effect and INR > 3.5
- Interaction decreasing Warfarin effect and INR < 1.5
- Warfarin interaction and absence of INR in past x days

Warfarin Interactions

Alerts for 100 selected interactions at one hospital

Added INR parameter
Summary

- Customizations to a commercial rule base allowed screening a large number of drugs for dosing problems, and allowed filtering of drug interactions to only the most significant.
- Customizations should allow flexibility at both the facility and drug level.
- Customizations should be easily implemented and maintained, even through monthly updates.
- Lessons learned can be used to inform CPOE implementation.
Clinical Decision Support

From AMIA 2008-9 Informatics Year in Review (Dan Masys, Vanderbilt)

http://dbmichair.mc.vanderbilt.edu/amia2009/
Clinical Decision Support for Providers

- Reference

- Title
  - Effect of an electronic medication reconciliation application and process redesign on potential adverse drug events: a cluster-randomized trial.

- Aim
  - To measure the impact of an information technology-based medication reconciliation intervention on medication discrepancies with potential for harm (potential adverse drug events [PADEs])

- Methods
  - Controlled trial, randomized by medical team, on general medical inpatient units at 2 academic hospitals from May to June 2006.
  - 322 patients admitted to 14 medical teams, for whom a medication history could be obtained before discharge.
  - Intervention was a computerized medication reconciliation tool and process redesign involving physicians, nurses, and pharmacists.
Clinical Decision Support for Providers

- Reference

- Methods, cont’d
  - The main outcome was unintentional discrepancies between preadmission medications and admission or discharge medications that had potential for harm (PADEs).

- Results
  - Among 160 control patients, there were 230 PADEs (1.44 per patient), while among 162 intervention patients there were 170 PADEs (1.05 per patient) (adjusted relative risk [ARR], 0.72; 95% confidence interval [CI], 0.52-0.99).
  - A significant benefit was found at hospital 1 (ARR, 0.60; 95% CI, 0.38-0.97) but not at hospital 2 (ARR, 0.87; 95% CI, 0.57-1.32) (P = .32 for test of effect modification).
  - Hospitals differed in the extent of integration of the medication reconciliation tool into computerized provider order entry applications at discharge.
Clinical Decision Support for Providers

- Reference
  - Schnipper JL et. al.. Arch Intern Med. 2009 Apr 27;169(8):771-80.

- Conclusions
  - A computerized medication reconciliation tool and process redesign were associated with a decrease in unintentional medication discrepancies with potential for patient harm.
  - Software integration issues are important for successful implementation of computerized medication reconciliation tools.

- Importance
  - Contributes to literature on ‘people, process and technology’ that confirms Reed Gardner’s classic observation that technology is only (10-15-20) percent of success, the rest is sociology.
Clinical Decision Support for Providers

- **Reference**

- **Title**
  - Computerized decision support to reduce potentially inappropriate prescribing to older emergency department patients: a randomized, controlled trial.

- **Aim**
  - To evaluate the effectiveness of computer-assisted decision support in reducing potentially inappropriate prescribing to older adults.

- **Setting:**
  - Academic emergency department where computerized physician order entry was used to write all medication prescriptions
Clinical Decision Support for Providers

- Reference

- Methods
  - 63 emergency physicians randomized to the intervention (32 physicians) or control (31 physicians) group.
  - Decision support advised against use of nine potentially inappropriate medications and recommended safer substitute therapies.
  - Primary outcome was the proportion of ED visits by seniors that resulted in one or more prescriptions for an inappropriate medication.
  - Secondary outcomes were the proportions of medications prescribed that were inappropriate and intervention physicians' reasons for rejecting the decision support.
Clinical Decision Support for Providers

- Reference

- Results
  - Average age of the patients = 74, two-thirds were female, and just over half were African American.
  - Decision support was provided 114 times to intervention physicians, who accepted 49 (43%) of the recommendations.
  - Intervention physicians prescribed one or more inappropriate medications during 2.6% of ED visits by seniors, compared with 3.9% of visits managed by control physicians (P=.02).
  - The proportion of all prescribed medications that were inappropriate significantly decreased from 5.4% to 3.4%.
  - The most common reason for rejecting decision support was that the patient had no prior problems with the medication.
Clinical Decision Support for Providers

- Reference

- Conclusions
  - Computerized physician order entry with decision support significantly reduced prescribing of potentially inappropriate medications for seniors.
  - Approach might be used in other efforts to improve ED care.

- Importance
  - Overrides of clinical decision support guidance occur because of data not captured in the EMR but elicited by providers
  - An installed CPOE system with CDSS is an essential infrastructure for such interventions
Clinical Decision Support for Providers

- Reference

- Title
  - Improving laboratory monitoring of medications: an economic analysis alongside a clinical trial.

- Aim
  - To test the efficiency and cost-effectiveness of interventions aimed at enhancing laboratory monitoring of medication.

- Methods:
  - A cost-effectiveness analysis.
  - Patients of a not-for-profit, group-model HMO were randomized to 1 of 4 interventions: an electronic medical record reminder to the clinician, an automated voice message to patients, pharmacy-led outreach, or usual care.
Clinical Decision Support for Providers

- **Reference**

- **Methods, cont’d:**
  - Patients followed for 25 days to determine completion of all recommended baseline laboratory monitoring tests.
  - Measured the rate of laboratory test completion and the cost-effectiveness of each intervention.
  - Direct medical care costs to the HMO (repeated testing, extra visits, and intervention costs) were determined using trial data and a mix of other data sources.

- **Results**
  - Average cost of patient contact was $5.45 in the pharmacy-led intervention, $7.00 in the electronic reminder intervention, and $4.64 in the automated voice message reminder intervention.
Clinical Decision Support for Providers

Reference

Results, cont’d
- The electronic medical record intervention was more costly and less effective than other methods.
- The automated voice message intervention had an incremental cost-effectiveness ratio (ICER) of $47 per additional completed case, and the pharmacy intervention had an ICER of $64 per additional completed case.

Conclusions:
- Using the data available to compare strategies to enhance baseline monitoring, direct clinician messaging was not an efficient use of resources.
Clinical Decision Support for Providers

Reference

Conclusions, cont’d:
- Depending on a decision maker's willingness to pay, automated voice messaging and pharmacy-led efforts can be efficient choices to prompt therapeutic baseline monitoring.
- Direct clinician messaging is a less efficient use of resources.

Importance
- Adds to a growing literature that when implementing clinical decision support, members of the care team other than physicians appear to be better targets for automated alerts and reminders.
Clinical Decision Support for Providers

- **Reference**

- **Title**

- **Aim**
  - To assess impact of intervention design to improve the documentation and treatment of tobacco use in primary care.

- **Methods**
  - Developed and implemented a 3-part electronic health record enhancement: (1) smoking status icons, (2) tobacco treatment reminders, and (3) a Tobacco Smart Form that facilitated the ordering of medication and fax and e-mail counseling referrals.
Figure 1. Screen shot of the Tobacco Smart Form with smoking icon.
Reference

Methods, cont’d
- Primary outcome was the proportion of documented smokers who made contact with a smoking cessation counselor.
- Secondary outcomes included coded smoking status documentation and medication prescribing.

Results
- During the 9-month study period, 132,630 patients made 315,962 visits to study practices.
Clinical Decision Support for Providers

Reference

Results, cont’d
- Coded documentation of smoking status increased from 37% of patients to 54% (+17%) in intervention practices and from 35% of patients to 46% (+11%) in control practices (P < .001 for the difference in differences).
- Among the 9589 patients who were documented smokers at the start of the study, more patients in the intervention practices were recorded as nonsmokers by the end of the study (5.3% vs 1.9% in control practices; P < .001).
- Among 12,207 documented smokers, more patients in the intervention practices made contact with a cessation counselor (3.9% vs 0.3% in control practices; P < .001).
Clinical Decision Support for Providers

Reference

Results, cont’d
- Smokers in the intervention practices were no more likely to be prescribed smoking cessation medication (2% vs 2% in control practices; P = .40).

Conclusions
- The EHR-based intervention improved smoking status documentation and increased counseling assistance to smokers but not the prescription of cessation medication.

Importance
- CDSS literature on smoking has shown it to be a remarkably difficult condition to modify through interventions. Gratifying positive results.
Clinical Decision Support for Providers

- **Reference**

- **Title**
  - Effect of a computerized body mass index prompt on diagnosis and treatment of adult obesity.

- **Aim**
  - To determine whether a computerized body mass index (BMI) chart prompt would increase the likelihood that patients of family physicians would be diagnosed with obesity and referred for obesity treatment.

- **Methods**
  - A total of 846 obese patients of 37 family physicians were randomly assigned to either have a patient's BMI chart prompt placed in their electronic medical record (intervention group) or not have a BMI prompt (comparison group) placed in the record.
Clinical Decision Support for Providers

- Reference

- Methods, cont’d
  - Patient medical records examined for evidence of an obesity diagnosis and referral for specific obesity treatments.
  - Also measured whether the presence of comorbidities in obese patients influenced the likelihood of diagnoses and treatments by the physicians.

- Results
  - Obese patients of physicians who had a BMI chart prompt in their medical records were significantly more likely than obese patients of physicians who did not receive a BMI chart prompt to receive a diagnosis of obesity (16.6% versus 10.7%; P=.016).
Clinical Decision Support for Providers

Reference

Results
- Patients of physicians who were provided with a BMI chart prompt were also more likely than patients of physicians who did not get a chart prompt to receive a referral for diet treatment (14.0% versus 7.3%, P=.002) and exercise (12.1% versus 7.1%, P=.016).
- Of the obesity comorbidities, only obstructive sleep apnea (OSA) was a predictor of a patient being diagnosed with obesity (P=.014).

Conclusion:
- Inclusion of a computerized BMI chart prompt increased the likelihood that physicians would diagnose obesity in obese patients and refer them for treatment.
Clinical Decision Support for Providers

- **Reference**

- **Importance**
  - Consistent with well established literature on physician alerts and prompts that shows both a modest increase in compliance with best practices and disappointing overall effect on care processes.
Clinical Decision Support for Providers

- Reference

- Title
  - Computer-assisted screening for intimate partner violence and control: a randomized trial.

- Aim
  - To assess whether computer-assisted screening can improve detection of women at risk for intimate partner violence and control (IPVC) in a family practice setting.

- Setting:
  - An urban, academic, hospital-affiliated family practice clinic in Toronto.
Clinical Decision Support for Providers

Reference

Methods
- 293 adult women in a current or recent relationship randomized to computer-based multi-risk assessment report attached to the medical chart.
- The report was generated from information provided by participants before the physician visit (n = 144).
- Control participants received standard medical care (n = 149).
- Measured frequency of initiation of discussion about risk for IPVC (discussion opportunity) and detection of women at risk based on review of audiotaped medical visits.
Clinical Decision Support for Providers

- **Reference**

- **Results**
  - The overall prevalence of any type of violence or control was 22% (95% CI, 17% to 27%).
  - In adjusted analyses based on complete cases (n = 282), the intervention increased opportunities to discuss IPVC (adjusted relative risk, 1.4 [CI, 1.1 to 1.9]) and increased detection of IPVC (adjusted relative risk, 2.0 [CI, 0.9 to 4.1]).
  - Participants recognized the benefits of computer screening but had some concerns about privacy and interference with physician interactions.

- **Conclusion**
  - Computer screening effectively detected IPVC in a busy family medicine practice, and it was acceptable to patients.
Clinical Decision Support for Providers

Reference

Importance
- Extends literature on patients’ willingness to use computerized interviewing methods to report sensitive and potentially stigmatizing conditions.
- Additional evidence that tailored reports inserted into outpatient setting can reduce barriers to initiation of difficult conversations between providers and patients.
Clinical Decision Support for Providers and Patients

- Reference
  - Holbrook A. et al. CMAJ. 2009 Jul 7;181(1-2):37-44. [McMaster University, Hamilton ON]

- Title
  - Individualized electronic decision support and reminders to improve diabetes care in the community: COMPETE II randomized trial.

- Aim
  - To determine whether electronic decision support, providing information that is shared by both patient and physician, encourages timely interventions and improves the management of this chronic disease.

- Methods
  - Randomly assigned adult primary care patients with type 2 diabetes to receive the intervention or usual care.
Clinical Decision Support for Providers and Patients

- **Reference**
  - Holbrook A. et al. CMAJ. 2009 Jul 7;181(1-2):37-44. [McMaster University, Hamilton ON]

- **Methods**
  - Intervention involved shared access by the primary care provider and the patient to a Web-based, color-coded diabetes tracker.
  - Intervention provided sequential monitoring values for 13 diabetes risk factors, their respective targets, and brief, prioritized messages of advice.
  - Primary outcome measure was a process composite score.
  - Secondary outcomes included clinical composite scores, quality of life, continuity of care and usability.
  - Outcome assessors were blinded to each patient's intervention status.
# Diabetes tracker: Physician view

## Top 3 Diabetes related risk factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Status</th>
<th>Target</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td>Previous 120/55, Most Recent 120/55</td>
<td>Frequency 90, Value Less than 130/80 mmHg</td>
<td>BP should be monitored every 3 mo. Encourage patient to be monitored more frequently.</td>
</tr>
<tr>
<td>Meds (ACEi)</td>
<td>N/A, Not on ACEi</td>
<td>Frequency 180, Value on ACEi</td>
<td>Records indicate patient is not on an ACE inhibitor and is not allergic to it. Consider adding an ACE inhibitor.</td>
</tr>
<tr>
<td>Lipids</td>
<td>N/A, N/A</td>
<td>Frequency 360, Value LDL &lt; 2.6</td>
<td>LDL measurement is not available in our records. LDL should be monitored and recorded every 6 months until in target range (&lt;2.6) and then annually thereafter.</td>
</tr>
</tbody>
</table>

## Legend

- Patient Calendar
- TOP 3
- Details
- Patient Profile
- Print

- Home
- Details
- Population
- Resources
- Logout
Diabetes tracker: Patient view

### Diabetes related risk factors

<table>
<thead>
<tr>
<th>My Action Item</th>
<th>My Status</th>
<th>Check Every (No. of days)</th>
<th>My Goal</th>
<th>Value</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Checkup</td>
<td>Oct-01-2002</td>
<td>Jan-20-2003</td>
<td>90</td>
<td>Every 3 months</td>
<td>Your BP is too high. Adjusting your medication could help. We need to measure your BP. Your BP needs to be measured every 3 months. Please make an appointment with your doctor.</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>140/85</td>
<td>140/85</td>
<td>90</td>
<td>Less than 130/80 mmHg</td>
<td>Your HgA1c test indicates your blood sugars are not under good control. Please check with your doctor for advice about better blood sugar control.</td>
</tr>
<tr>
<td>HbA1c</td>
<td>NA</td>
<td>0.075</td>
<td>180</td>
<td>Less than 0.07</td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>NA</td>
<td>5.6</td>
<td>1</td>
<td>As required</td>
<td>Excellent, you are a non-smoker.</td>
</tr>
<tr>
<td>Smoking</td>
<td>NA</td>
<td>Not smoker</td>
<td>90</td>
<td>Not smoking</td>
<td>Well done, you are keeping active. We suggest at least 30 minutes 3 times weekly.</td>
</tr>
<tr>
<td>Exercise</td>
<td>&lt; 1.5 km/wk</td>
<td>&gt; 1.5 km/wk</td>
<td>60</td>
<td>1.5 hour-week</td>
<td></td>
</tr>
<tr>
<td>Weight (BMI)</td>
<td>78 Kg (24.47)</td>
<td>NA</td>
<td>90</td>
<td>Less than 27</td>
<td>Your doctor needs to know your weight. Please contact your doctor.</td>
</tr>
<tr>
<td>Meds (ACEI)</td>
<td>Not on ACEI</td>
<td>Not on ACEI</td>
<td>180</td>
<td>on ACEI</td>
<td>Most people with diabetes need ACE inhibitor medications to protect kidneys and heart. Contact your doctor about considering this type of medication for you.</td>
</tr>
<tr>
<td>Meds (ASA)</td>
<td>On ASA</td>
<td>On ASA</td>
<td>100</td>
<td>on low dose ASA</td>
<td>Fantastic, your medications is on target!</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>2.05</td>
<td>2.05</td>
<td>360</td>
<td>LDL &lt; 2.6</td>
<td>Fantastic, your cholesterol is on target!</td>
</tr>
<tr>
<td>Protein in urine</td>
<td>NA</td>
<td>NA</td>
<td>360</td>
<td>F-2.8 M-2.0</td>
<td>You need to have a urine test (microalbumin). It is important to have a urine test every year. Your kidneys could be damaged by diabetes.</td>
</tr>
<tr>
<td>Foot Check</td>
<td>NA</td>
<td>No ulcer or nerve damage</td>
<td>180</td>
<td>No foot ulcers nor nerve damage</td>
<td>Your feet need examining by your doctor. It's important to get your feet checked every 6 months. People with diabetes can develop foot ulcers.</td>
</tr>
<tr>
<td>Eye Check</td>
<td>NA</td>
<td>No eye damage</td>
<td>360</td>
<td>No eye damage</td>
<td>You need to see an eye specialist. Your diabetes could be damaging your eyes. It is important that you have your eyes checked every 6 - 12 months. Complications of diabetes can cause blindness. Eye check-ups can help prevent this</td>
</tr>
<tr>
<td>Flu shot</td>
<td>NA</td>
<td>Not up-to-date</td>
<td>360</td>
<td>Yearly</td>
<td>Your doctor needs to know if you have had a flu shot. Flu infections may be worse for a diabetic. Contact your doctor for an annual flu shot.</td>
</tr>
</tbody>
</table>

**Recommendations are based on the latest information provided by your doctor.**

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**Legend**

- Green: Doing well
- Red: Action needed

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[Print Information sheet (PDF)]

[Green: Doing well]
Clinical Decision Support for Providers and Patients

- Reference
  - Holbrook A. et al. CMAJ. 2009 Jul 7;181(1-2):37-44. [McMaster University, Hamilton ON]

- Results, cont’d
  - Recruited 46 primary care providers and 511 of their patients, mean age 60.7.
  - Mean follow-up was 5.9 months.
  - Process composite score was significantly better for patients in the intervention group than for control patients (difference 1.27, p < 0.001);
  - 61.7% (156/253) of patients in the intervention group, compared with 42.6% (110/258) of control patients, showed improvement (difference 19.1%, p < 0.001).
Results, cont’d

- The clinical composite score also had significantly more variables with improvement for the intervention group (0.59, 95% CI 0.09-1.10, p = 0.02), including significantly greater declines in blood pressure (-3.95 mm Hg systolic and -2.38 mm Hg diastolic) and glycated hemoglobin (-0.2%).
- Patients in the intervention group reported greater satisfaction with their diabetes care.

Conclusions

- A shared electronic decision-support system improved the process of care and some clinical markers of the quality of diabetes care.

Importance

- New models of shared decision support are succeeding
Clinical Decision Support for Providers and Patients

- Reference

- Title
  - Patient and physician reminders to promote colorectal cancer screening: a randomized controlled trial.

- Aim
  - To determine whether systematic reminders to patients and physicians could increase cancer screening rates.

- Methods
  - A randomized controlled trial in 11 ambulatory health care centers.
  - Participants included 21,860 patients aged 50 to 80 years who were overdue for colorectal cancer screening and 110 primary care physicians.
  - Patients were randomly assigned to receive mailings containing an educational pamphlet, fecal occult blood test kit, and instructions for direct scheduling of flexible sigmoidoscopy or colonoscopy.
  - Physicians were randomly assigned to receive electronic reminders during office visits with patients overdue for screening.
Clinical Decision Support for Providers and Patients

Reference

Methods, cont’d
– Primary outcome was receipt of fecal occult blood testing, flexible sigmoidoscopy, or colonoscopy over 15 months
– Secondary outcome was detection of colorectal adenomas.

Results
– Screening rates were higher for patients who received mailings compared with those who did not (44.0% vs 38.1%; \( P < .001 \)).
– Effect increased with age: +3.7% for ages 50 to 59 years; +7.3% for ages 60 to 69 years; and +10.1% for ages 70 to 80 years \( (P = .01 \) for trend).
– Screening rates were similar among patients of physicians receiving electronic reminders and the control group (41.9% vs 40.2%; \( P = .47 \)).
– However, electronic reminders tended to increase screening rates among patients with 3 or more primary care visits (59.5% vs 52.7%; \( P = .07 \)).
– Detection of adenomas tended to increase with patient mailings (5.7% vs 5.2%; \( P = .10 \)) and physician reminders (6.0% vs 4.9%; \( P = .09 \)).
Clinical Decision Support for Providers and Patients

- Reference

- Conclusions
  - Mailed reminders to patients are an effective tool to promote colorectal cancer screening
  - Electronic reminders to physicians may increase screening among adults who have more frequent primary care visits.

- Importance
  - Adds to CDSS literature that shows larger effect size when best practice guidance sent to patients compared to same message sent to physicians
Clinical Decision Support for Patients

- Reference
  - Volandes AE et al. BMJ. 2009 May 28;338:b2159. doi: 10.1136/bmj.b2159. [Massachusetts General Hospital, Boston, MA]

- Title
  - Video decision support tool for advance care planning in dementia: randomised controlled trial.

- Aim
  - To evaluate the effect of a video decision support tool on the preferences for future medical care in older people if they develop advanced dementia, and the stability of those preferences after six weeks.

- Setting
  - Four primary care clinics (two geriatric and two adult medicine) affiliated with three academic medical centers in Boston.
Clinical Decision Support for Patients

Reference
- Volandes AE et al. BMJ. 2009 May 28;338:b2159. doi: 10.1136/bmj.b2159. [Massachusetts General Hospital, Boston, MA]

Methods.
- Convenience sample of 200 older people (>or=65 years) living in the community with previously scheduled appointments at one of the clinics. Mean age was 75 and 58% were women.
- Intervention was verbal narrative alone (n=106) or with a video decision support tool (n=94).
- Main outcome measure was preferred goal of care: life prolonging care (cardiopulmonary resuscitation, mechanical ventilation), limited care (admission to hospital, antibiotics, but not cardiopulmonary resuscitation), or comfort care (treatment only to relieve symptoms). Checked again six weeks later.
- Analyzed difference in proportions of participants in each group who preferred comfort care.
Clinical Decision Support for Patients

- Reference
  - Volandes AE et al. BMJ. 2009 May 28;338:b2159. doi: 10.1136/bmj.b2159. [Massachusetts General Hospital, Boston, MA]

- Results.
  - Among participants receiving the verbal narrative alone, 68 (64%) chose comfort care, 20 (19%) chose limited care, 15 (14%) chose life prolonging care, and three (3%) were uncertain.
  - In the video group, 81 (86%) chose comfort care, eight (9%) chose limited care, four (4%) chose life prolonging care, and one (1%) was uncertain (P=0.003).
  - Among all participants the factors associated with a greater likelihood of opting for comfort care were being a college graduate or higher, good or better health status, greater health literacy, white race, and randomization to the video arm.
Clinical Decision Support for Patients

Reference
- Volandes AE et al. BMJ. 2009 May 28;338:b2159. doi: 10.1136/bmj.b2159. [Massachusetts General Hospital, Boston, MA]

Results
- Participants were re-interviewed after six weeks. Among the 94/106 (89%) participants re-interviewed in the verbal group, 27 (29%) changed their preferences (kappa=0.35).
- Among the 84/94 (89%) participants re-interviewed in the video group, five (6%) changed their preferences (kappa=0.79) (P<0.001 for difference).

Conclusions
- Older people who view a video depiction of a patient with advanced dementia after hearing a verbal description of the condition are more likely to opt for comfort as their goal of care compared with those who solely listen to a verbal description.
- They also have more stable preferences over time.
Clinical Decision Support for Patients

Reference
- Volandes AE et al. BMJ. 2009 May 28;338:b2159. doi: 10.1136/bmj.b2159. [Massachusetts General Hospital, Boston, MA]

Importance
- Multimedia technologies can assist patients in understanding future health states.
- To understand dementia, a movie is worth a thousand words…


10 New CDSS RCTs showing no difference for intervention vs. control, cont’d


10 New CDSS RCTs showing no difference for intervention vs. control, cont’d
