

# Building the Environment for Successful Computer-Based Decision Support: A Feasibility Study with Family Physicians



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# COMPETE --The Study

- ◆ Computerization Of Medical Practices for the Enhancement of Therapeutic Effectiveness
  - A three year project to study appropriateness of prescribing in three areas: GI, CVS and MSK
  - To be conducted in a research network of 40 community-based Family Practitioners who use an electronic medical record to capture drug use data
  - to conduct a controlled trial of academic detailing vs computer-based patient-specific audit and feedback
  - Investigate impact on efficiency, satisfaction and quality of care, especially influence on prescribing



# COMPETE --The Study

- ◆ Who is conducting the study?

The Centre for Evaluation of Medicines (CEM)

- An Independent Academic Research Institute

- international reputation for evidence-based therapeutics

- The Principal Investigator is Dr. Anne Holbrook

- Co-investigators include

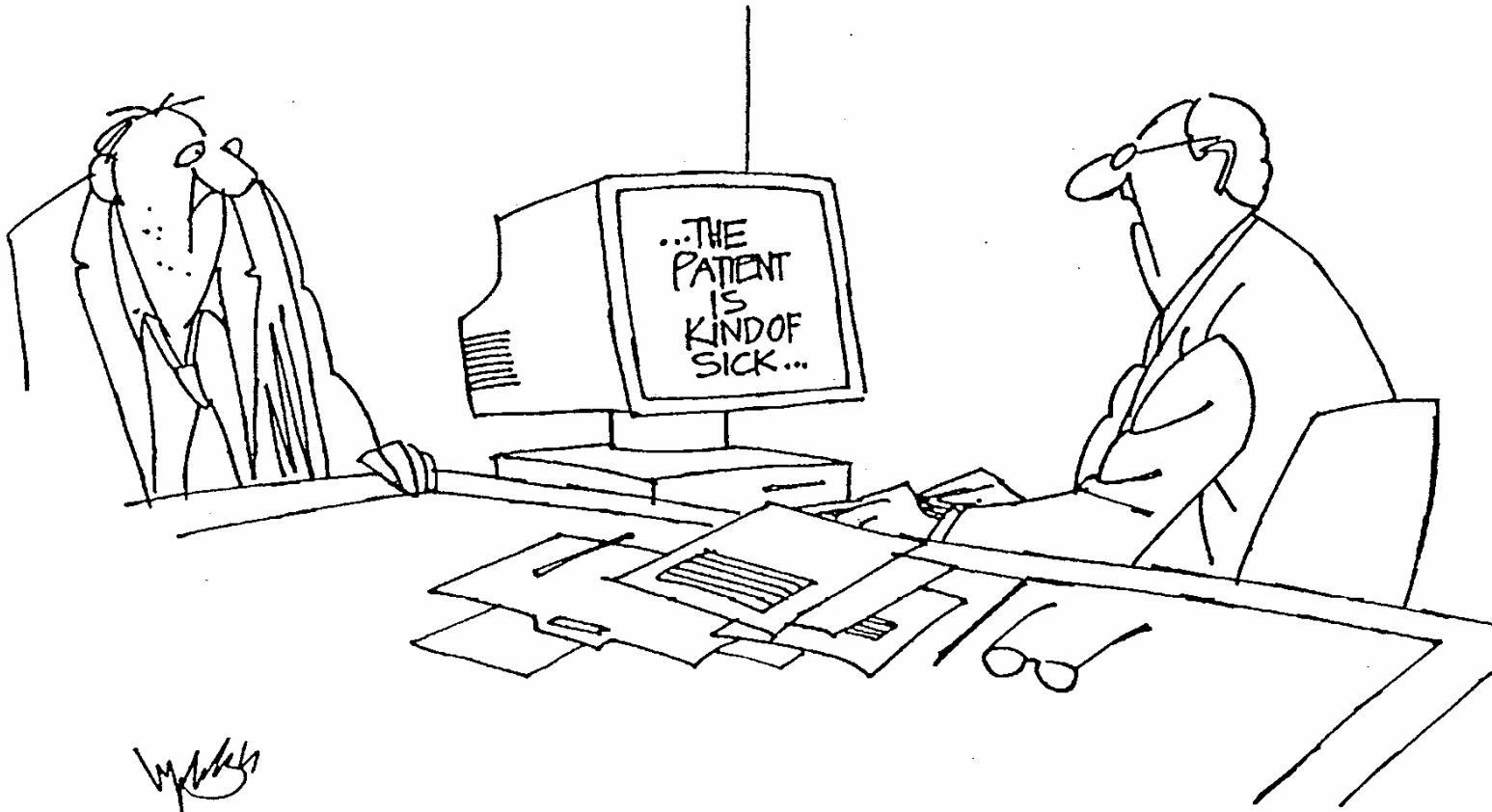
- Dr. Stuart MacLeod
- Dr Mitchell Levine
- Dr. Rolf Sebaldt
- Dr. Charlie Goldsmith
- Dr. Don Willison
- Dr. Karim Keshavjee



# AGENDA

- ◆ COMPETE databases
  - Characteristics and type of data
- ◆ Principles of an enabling environment for clinical decision support in family practice
- ◆ Analysis of COMPETE data
  - How well do family physicians compare to the ‘ideal’

File Edit Special



*W. P. Kelly*

*"I've ordered more sophisticated diagnostic software."*

# COMPETE Database

<b>Table 1</b>	<b>Scheduling</b>	<b>Invoices</b>	<b>EMR</b>
<b># Encounters</b>	<b>245,333</b>	<b>285,159</b>	<b>179,693</b>
<b># of Patients</b>	<b>47,317</b>	<b>57,444</b>	<b>31,634</b>
<b># of Diagnoses</b>	<b>N/A</b>	<b>285,159</b>	<b>282,119</b>
<b>% Male/Female</b>	<b>42/58</b>	<b>N/D</b>	<b>39/61</b>
<b>% &gt;65 yrs</b>	<b>15</b>	<b>N/D</b>	<b>17</b>
<b>% 18-64 yrs</b>	<b>60</b>	<b>N/D</b>	<b>61</b>
<b>% &lt;18 yrs</b>	<b>25</b>	<b>N/D</b>	<b>22</b>

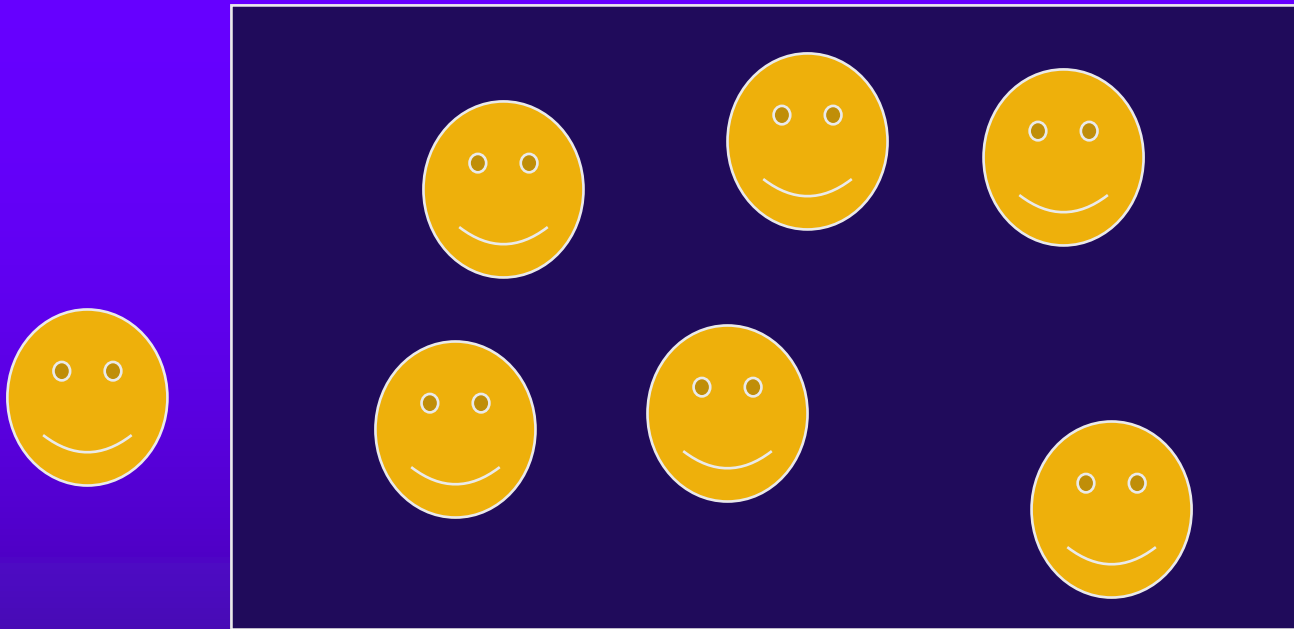




# Factors that Enable Clinical Decision Support – 6 ‘C’s

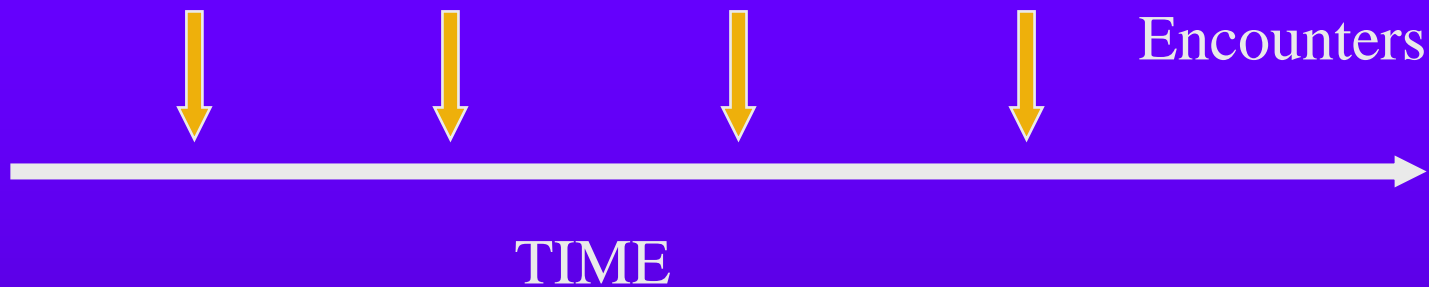
- ◆ Majority of patients should be entered into the EMR: **COVERAGE**
- ◆ Information should be entered in real-time: **CONCURRENCY**
- ◆ Most of a patient’s information should be entered: **COMPLETENESS**
- ◆ Information entered should be accurate: **CORRECTNESS**
- ◆ Information should be in structured format: **CODED**
- ◆ Information should correlate with other data on the patient: **CONSISTENCY**

# COVERAGE



- ◆ Modern population health management ideas require that all patients enrolled with a plan have their information in electronic format

# CONCURRENCY



- ◆ Patient encounters occur in short, infrequent segments
  - The opportunity to intervene and make a better decision is NOW
- ◆ Decision-support needs to be in real-time, at the point of service

# COVERAGE & CONCURRENCY

<b>Table 2</b>	<b>Patients 'Seen'</b>	<b>EMR Notes</b>	<b>% Patients Charted in EMR</b>
<b># Encounters – all</b>	<b>259,401</b>	<b>165,966</b>	<b>64%</b>
<b># Encounters – 'real-time'</b>	<b>259,401</b>	<b>122,849</b>	<b>47%</b>

- ◆ 'Real-time' = chart was signed on the same day as the encounter

# COMPLETENESS

Diagnoses in Invoice File for Patients with an EMR Note			Diagnoses in Invoice File for Patients without an EMR note		
<i>Disease</i>	<i>Dx Code</i>	<i>Total</i>	<i>Disease</i>	<i>Dx Code</i>	<i>Total</i>
Hypertension	401	8762	Anxiety Neurosis	300	4944
Anxiety Neurosis	300	7581	Non-specific Abn	796	3717
Bronchitis --Acute	466	4428	Pharyngitis	460	2929
Adult Annual Health	917	4317	Hypertension	401	2858
Osteoarthritis	715	3781	Diabetes Mellitus	250	2418
Diabetes Mellitus	250	3528	Well Baby Care	916	2391
Pharyngitis	460	3286	Bronchitis --Acute	466	2334
Leg Cramps	781	2734	Senile Dementia	290	2163
Lumbar Strain	724	2557	Dyspepsia	787	2115
Dyspepsia	787	2405	Lumbar Strain	724	2006





# COMPLETENESS

- ◆ Data in the COMPETE databases still have quite a few gaps
  - Still in the process of characterizing the gaps
- ◆ Need to find the clinician benefit to entering particular data –that’s the only way it will be entered consistently
  - The benefit may be actual implementation of a Computerized Decision-Support System

# CODED

<b>Table 4</b>	<b>Number</b>	<b>% Structured</b>
<b>Age</b>	<b>180835</b>	<b>100</b>
<b>Gender –Female</b>	<b>110042</b>	<b>100</b>
<b>Gender –Male</b>	<b>70793</b>	<b>100</b>
<b>Marital Status</b>	<b>7310</b>	<b>23.1</b>
<b>Postal Code</b>	<b>174776</b>	<b>97</b>
<b>Diagnosis codes (ICD 9-CM)*</b>	<b>234,740</b>	<b>92</b>
<b>Medications</b>	<b>218,980</b>	
<b>MediSpan GPI</b>	<b>210,220</b>	<b>96</b>
<b>Drug Information Number (DIN)</b>	<b>163,214</b>	<b>75</b>
<b>Number of Medications Stopped</b>	<b>16,416</b>	<b>6</b>
<b>Reasons for Stopping Meds</b>	<b>980</b>	<b>6</b>



# CODED

- ◆ For basic clinical concepts, such as diagnosis and medications, data is well-coded
- ◆ For more detailed concepts, there is less complete coding of information
  - Reason for stopping a medication or
  - Differentiating between provisional diagnoses vs. established diagnoses

# CONSISTENCY

Diagnosis	Invoice	EMR	Both	% Matching (95% CI)
<b>Diabetes</b>	<b>5194</b>	<b>3580</b>	<b>1860</b>	<b>52 (10.4)</b>
<b>Musculo skeletal</b>	<b>21001</b>	<b>6330</b>	<b>2194</b>	<b>35 (8.2)</b>
<b>Cardio vascular</b>	<b>16054</b>	<b>16033</b>	<b>5654</b>	<b>35 (7.3)</b>
<b>All Diagnoses</b>	<b>285,159</b>	<b>234,740</b>	<b>46976</b>	<b>20 (3.1)</b>





# CONSISTENCY

- ◆ Different databases, even in the same physician practice, have widely differing data
- ◆ Systems need to be built to increase consistency between databases and reduce an important source of error: multiple entry



# CONCLUSION

- ◆ There are many deficiencies in data collected in the COMPETE study
  - Barriers to better data collection include:
    - Poor EMR user interface
    - Lack of physician keyboarding skills
    - Incomplete training of physicians
    - Poor underlying data models and data integration
- ◆ Physician practices and EMRs have a long way to go before CDSS will become feasible in family practice