WATERLOO INSTITUTE FOR HEALTH INFORMATICS RESEARCH

Waterloo Smarter Health Seminar Series:

'why not'

Why Not Safer Health Care Right Now?

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University of Waterloo
October 24, 2007

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WATERLOO SMARTER HEALTH SEMINAR SERIES

"*Why not safer health care right now?*"

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Department of Family Medicine
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Outline

- Quality and safety in the system
- A brief history of modern patient care
- Why do adverse events happen?
- Focus on system reliability
- Practical solutions

The items highlighted in red may be opportunities for ehealth intervention

Dimensions of quality

IOM -USA

What the citizens tell us

- 2004 Commonwealth Fund International Health Policy Survey in Australia, Canada, New Zealand, the United Kingdom, and the United States
- Adults
- 1400 per country (3061 in the UK)

Schoen C, et. al. Primary care and health system performance: adults' experiences in five countries. Health Aff (Millwood). 2004 Jul-Dec;Suppl Web Exclusives:W4-487-503.

Rank 1 is best, 5 is worst

	Australia	Canada	New Zealand	UK	US
Patient Safety	2.5	4	2.5	1	5
Patient-Centeredness	2	3	1	5	4
Timeliness	2	5	1	4	3
Efficiency	1	4	2	3	5
Effectiveness	4.5	2.5	2.5	1	4.5
Equity	2	4	3	1	5

Slide from Don Berwick August 2005

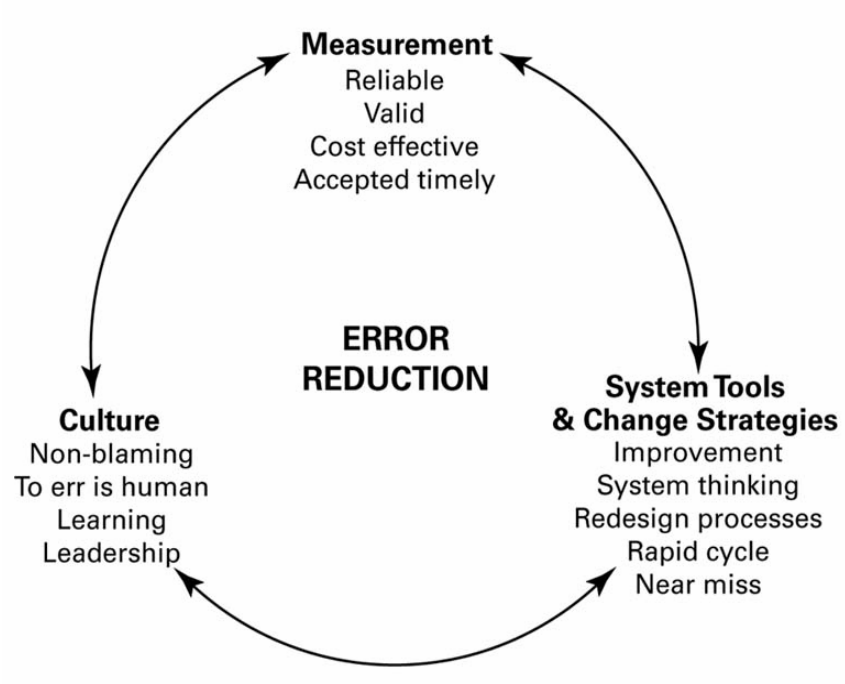
The Health Quality Council of Alberta (HQCA)

- Population bases surveys 2003, 04 and 06
- Percent who have interacted with the health care system in the past 12 months who say they themselves, or member of their immediate family, have experienced unexpected harm while receiving healthcare in Alberta

2006	12%
2004	13%
2003	14%

- In 2006
  - 9% said it caused death to a family member.
  - Inpatient hospital care was the health care setting 36%, followed by an emergency department for 16% and a family physicians office for 16%
  - 62% who reported they experienced unexpected harm, say the doctor or health professionals involved didn't tell them that unexpected harm had occurred during their own or their family members care or treatment

CAES



The Canadian Adverse Events Study: the incidence of adverse events in hospitalized patients in Canada

CAES was funded by the
Canadian Institute for Health Information
Canadian Institutes of Health Research

Canadian Institute for Health Information
Institut canadien d'information sur la santé

Project started in June 2002

Results published in CMAJ in May 2004

Terminology: What is an Adverse Event vs. a Medical Error?

Adverse Event
(bad outcome from care)

"An unintended injury or complication which results in disability, death or prolonged hospital stay and is caused by health care management."

(Wilson et al.)

Medical Error
(deficient process of care)

"The failure of a planned action to be completed as intended or use of a wrong plan to achieve an aim."

(Kohn, et al.)

Sample

- Acute care, non-specialty hospitals having a minimum of 1500 patient separations per annum
- Reviews of randomly selected charts for adult separations that occurred fiscal 2000
- Two-stage retrospective chart review, involving trained nurse & physician reviewers
  - Stage 1: using explicit criteria, nurse reviewers flagged patient records that MAY have had an adverse event
  - Stage 2: using explicit criteria, physician reviewers determined if an adverse event occurred – and using judgment assessed the degree of preventability

Triggers

Criteria for Adverse Events Phase 1 – Nurse Review	
1	Unplanned admission before index admission
2	Unplanned readmission after discharge from index admission
3	Hospital-incurred patient injury
4	Adverse drug reaction
5	Unplanned transfer from general care to intensive care
6	Unplanned transfer to another acute care hospital
7	Unplanned return to the operating room
8	Unplanned removal, injury or repair of organ during surgery
9	Other patient complications (AMI, CVA, PE etc.)
10	Development of neurological deficit not present on admission
11	Unexpected death
12	Inappropriate discharge to home
13	Cardiac/respiratory arrest
14	Injury related to abortion or delivery
15	Hospital-acquired infection/sepsis
16	Dissatisfaction with care documented in the medical record
17	Documentation or correspondence indicating litigation
18	Any other undesirable outcomes not covered above.

Key Numbers from the Canadian Adverse Events Study

- The overall AE rate found in the study was 7.5% [CI 5.7 - 9.3] – this means 1 in 13 adult hospital patients in year 2000 experienced an AE
- 2.8% of patients had one or more *preventable* AEs [CI 2.0 – 3.6] (i.e. 37.3% of AEs are preventable)
- Preventable AE rates were the same across the 3 hospital types
- An estimated total of 1.6% of people hospitalized in Canadian hospitals in 2000 had an AE and died [CI =0.9 to 2.2%] or approximately 16,000 per year [CI= 9250 to 23, 750]
- Assuming an average LOS of 3.5 days and 95% occupancy, then a 500 bed Canadian hospital would have an average of 100 preventable AEs per month

Detecting Adverse Events

Jha ***J Am Med Inf Assoc*** 1998;5:305
O'Neil ***Ann Int Med*** 1993;119:370

Method	AE/1000 admissions
1. Incident Reports	5
2. Retrospective Chart Review	30
3. Stimulated Voluntary Reports	30
4. Automated Flags	55
5. Daily chart review	85
6. Automated Flags and Daily review	130

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Why do AEs happen?

A brief history of modern patient care

The emergence of modern medicine

~1860 – 1910:

- new high standards for clinical education
- strict requirements for professional licensing
- clinical practice founded on scientific research
- new internal organization for hospitals

1912: The ‘Great Divide’

“…for the first time in human history, a random patient with a random disease consulting a doctor chosen at random stands a better than 50/50 chance of benefiting from the encounter.”

Harvard Professor L. Henderson

(Harris, Richard. A Sacred Trust. New York, NY: New American Library, 1966)

But things have changed

- Information explosion
- New and better drugs
- New and ?better? diagnostics
- Emerging diseases and disease patterns
- Increasingly complex surgery
- Shift to community based care

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Merck Manual – now and then

17th edition
1999 – 2833 pages

1st edition
1899 – 192 pages

Drug Knowledge

- 30 years ago a graduating generalist MD had to know about 60 distinct drugs
- Now the number is closed to 600
- The capacity of the human mind is about 100 to 150

New tests

- Molecular diagnostics testing (MDT) is exploding nationwide by more than 20 percent annually
- By 2009, the number of MDT in the US is projected at 67 million
- Genetic testing is reshaping both the laboratory and pathology sectors and the larger health care marketplace

http://findarticles.com/p/articles/mi_pwwi/is_200601/ai_n15989711

?Better tests?

- As the number of tests inexorably increases, we are seeing an explosion of false positive tests
- Being falsely diagnosed as having a disease can cause tremendous suffering which is not always easily set aside
- False positives place increasing burdens on overstretched resources, resources which, in the end, are wasted
- A false positive biochemical test will almost certainly result in some further action

Emerging diseases and disease patterns

- HIV
- SARS
- Diabetes epidemic
- Drug resistant TB
- Hantavirus
- ...

Complex surgery

- Coronary artery bypass
- Minimal invasive techniques
- Transplant surgery
- ...

Shift to community based care

- Mental health care
- Pneumonia
- Day surgery
- Obstetrics
- ...

So we have..

- An old system
- That has and continues to work well
- But with increasing pressure and complexity must change
- One thing will be to reduce AEs that are preventable

Why do AEs happen?

Humans make errors

“Man, a creature made at the
end of the week when God
was tired.”

Mark Twain

Who Makes Errors?

"The reality is that most errors are made by good people with good training, skills, and intentions who inadvertently commit errors despite their best efforts because of an unfortunate confluence of individual, workplace, communication, technologic, psychological, and organizational factors."

Annals of Emergency Medicine, July 2000, 59

Human Factors vs System Factors

System and process flaws are the source of many health care errors, a human dimension is cited as a contributing factor in 60 to 80 percent of all medical errors.

Shared Accountability for Safety

- Accountability depends on nature of event
  - Honest mistake, flawed system (90-95%)
  - Recurrent individual problems with protocol violations despite system efforts (~?1-5%)
  - Intentional harmful act (<1%)

James Reason's bottom line

- Fallibility is part of the human condition
- We can't change the human condition
- We can change the conditions under which people work

Systems approach acknowledges that practitioners face:

- Increased Process Complexity
- Escalating Change
- Information Overload
- Increased Expectations for Perfect Outcomes
- New Patient Vulnerabilities

Focusing on system reliability

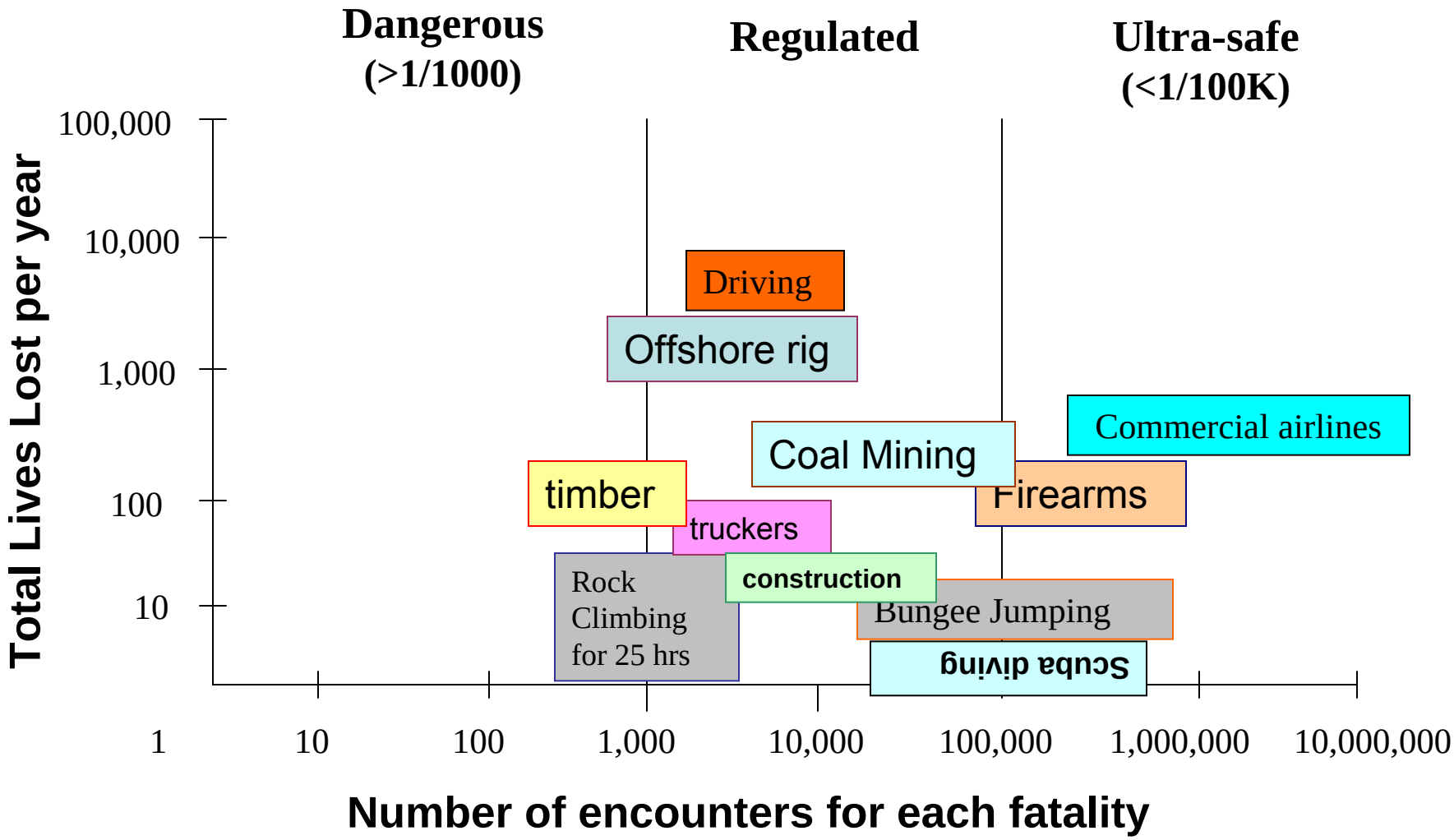
Reliability

- Reliability is defined as patients getting the intended tests, medications, information, and procedures at the appropriate time and in accordance with their values and preferences
- Reliability is measured in “defects” per ten (10^{-1}), per one hundred (10^{-2}), per one thousand (10^{-3}), etc.
- Most studies conclude that our current health care system is delivering care at the level of $10^{-1.36}$

Hospitalization

- Comparison with other un-health related activities unfair
- In part the risks of hospitalisation are due to the terrible illnesses that afflict persons and the terrible things we have to do to them to try to save them
- Relevant comparison should be persons with various conditions who *don't* come to hospital
- The risk of death from hospitalisation is small when compared with the (close to certain) risk of death with untreated bacterial meningitis or a ruptured viscus…

Risky activities (Canada)



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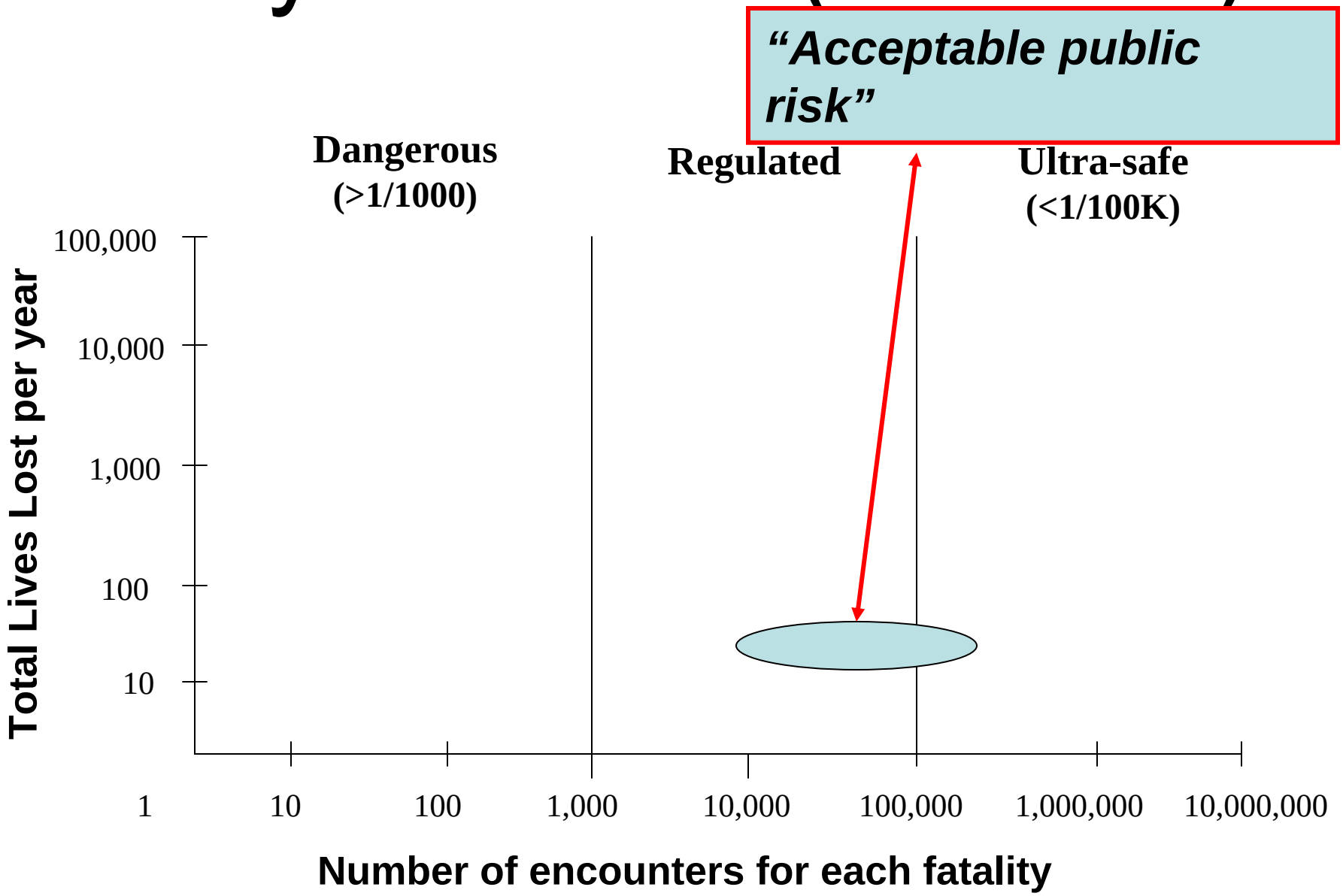

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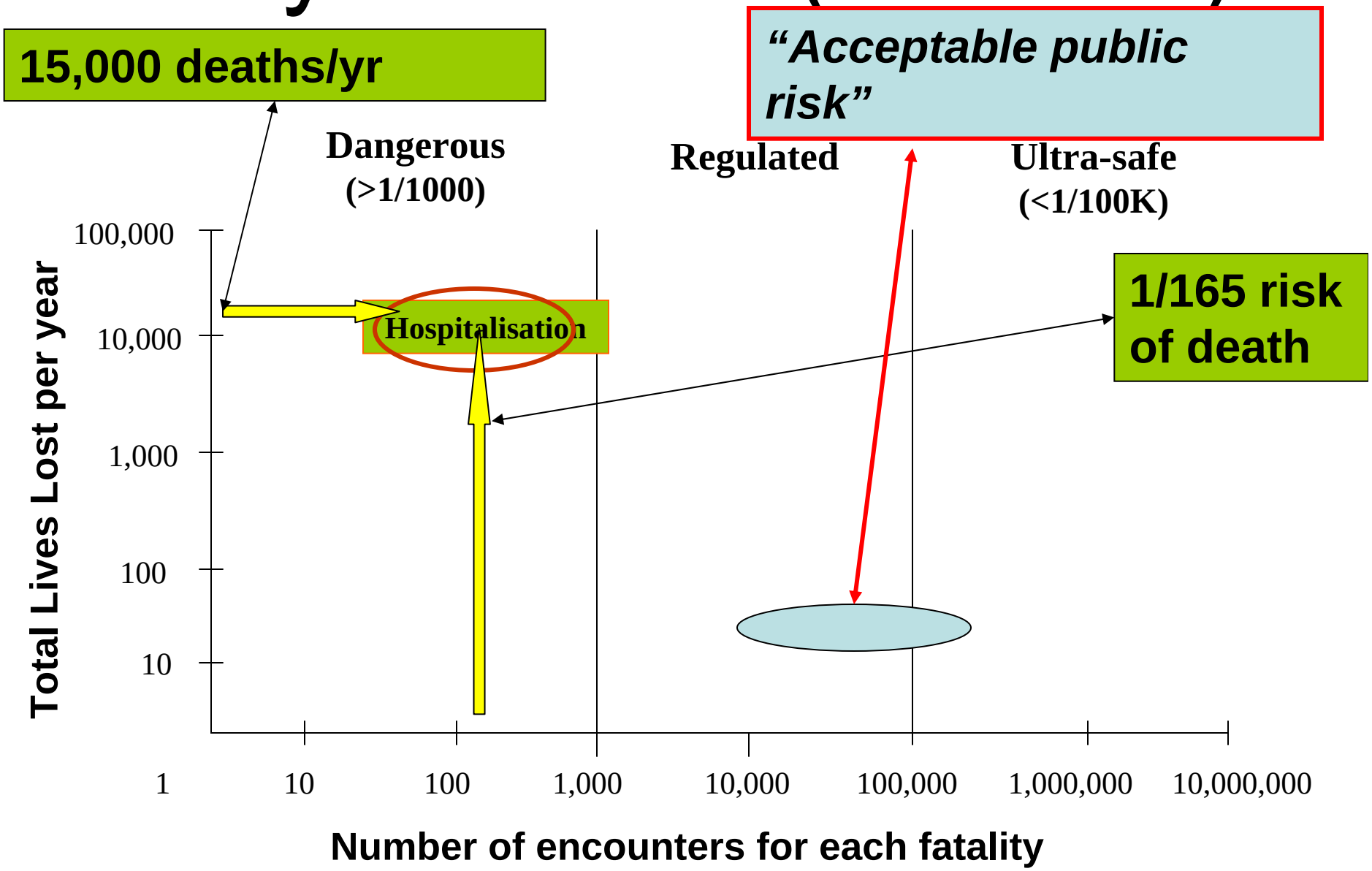

Three types of reliability problems

- Overuse
  - Using procedures, tests, drugs, etc. that cannot help
- Under use
  - Not using procedures, tests, drugs, etc. that can help
- Misuse
  - To use wrongly or improperly

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Under use examples

Health Quality Council of Saskatchewan

In September 2004 published **Heart Attack Care in Saskatchewan: Outcomes and Secondary Prevention**

Figure 1: 90-day post-discharge dispensing rates for beta-blockers, ACE inhibitors, and statins for acute myocardia infarction (AMI) patients age 20 and older in Saskatchewan, 1997-98 to 2001-02

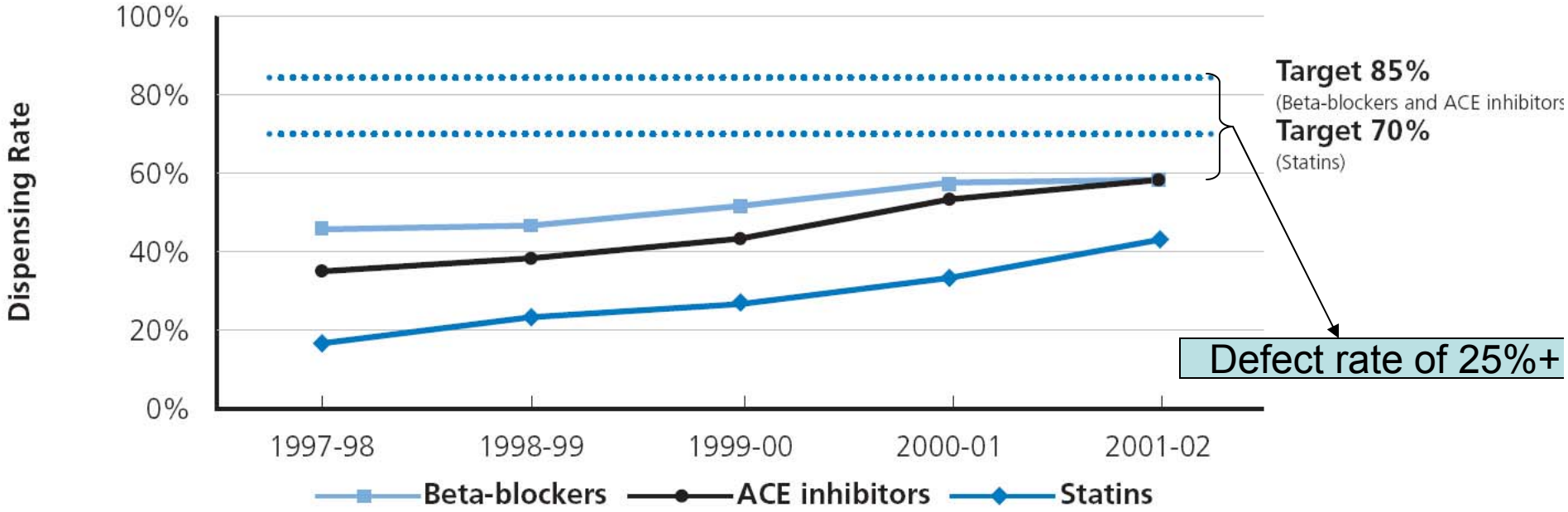

Table 1: Provincial comparison of 90-day dispensing rates for beta-blockers, ACE inhibitors, and statins for new heart attack patients 65 and older, 1999-2000

	Saskatchewan	Nova Scotia	Quebec	Ontario	British Columbia
Beta-blockers	68%	83%	68%	68%	56%
ACE inhibitors	65%	58%	57%	65%	53%
Statins	29%	36%	43%	40%	35%

Health Quality Council of Saskatchewan, 2004

Overuse examples

- “A major cause of [antibiotic] resistance is ... overuse or inappropriate use of drugs such as antibiotics” – Health Canada website
- “Despite evidence-based guidelines, plain x-rays are used more extensively than recommended in low back pain” - New Zealand JFP 2002
- The most common minor surgical procedure in gynaecological practice [D & C] may be performed unnecessarily ... says a University of Alberta researcher - Journal of Obstetrics and Gynaecology Canada 2002

Misuse

About patient safety and adverse events

The bottom line is that we should aim for …

- Safety
- Effectiveness
- Patient-centeredness
- Timeliness
- Efficiency
- Equity

- No Needless Deaths
- No Needless Pain or Suffering
- No Unwanted Waits
- No Helplessness
- No Waste

…….For Anyone

Don Burwick

Practical Solutions

- Consistently effective interventions:
  - Educational outreach visits (for prescribing in North America)
  - Reminders (manual or computerized)
  - Multifaceted interventions (a combination that includes two or more of the following: audit and feedback, reminders, local consensus processes, or marketing)
  - Interactive educational meetings (participation in workshops that include discussion or practice)

Bero LA et al. Getting research findings into practice: Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *BMJ* 1998;317 (7156):465-468.

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- Interventions of variable effectiveness:
  - Audit and feedback (or any summary of clinical performance)
  - The use of local opinion leaders (practitioners identified by their colleagues as influential)
  - Local consensus processes (inclusion of participating practitioners in discussions to ensure their agreement that the chosen clinical problem is important and the approach to managing the problem is appropriate)
  - Patient mediated interventions (any intervention aimed at changing the performance of healthcare providers for which specific information was sought from or given to patients)

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Bero LA et al.

Practical Solutions

- Interventions that have little or no effect:
  - Educational materials (distribution of recommendations for clinical care, including clinical practice guidelines, audiovisual materials, and electronic publications)
  - Didactic educational meetings (such as lectures)

Bero LA et al.

Possible ehealth opportunities

- Detecting Adverse Events
- Information explosion
- New and better drugs
- New and ?better? diagnostics
- Emerging diseases and disease patterns
- Increasingly complex surgery
- Shift to community based care
- Overuse
- Under use
- Reminders
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- Patient mediated interventions (any intervention aimed at changing the performance of healthcare providers for which specific information was sought from or given to patients)

A caution

- Ehealth is not a magic bullet
- Solutions must preserve the powerful clinician-patient interactions
- “If you think a computer will solve your problems you don’t understand your problem yet” (after D. Berwick)

Every day you may make progress. Every step may be fruitful. Yet there will stretch out before you an ever-lengthening, ever-ascending, ever-improving path. You know you will never get to the end of the journey. But this, so far from discouraging, only adds to the joy and glory of the climb.

Sir Winston Churchill