Archie, Ed, and Dean:
How Carolina Basketball Can Fix Healthcare
Bullitt History of Medicine Club
Chapel Hill, NC
March 1, 2017

Abraham M. Nussbaum, MD, MTS
Chief Education Officer, Denver Health
Associate Professor of Psychiatry, CU SOM
www.abrahamnussbaum.com
Archibald “Archie” Cochrane

- 1909-1986
- Physician & epidemiologist
- Namesake of the Cochrane Collaboration
- 1917: Father killed in Battle of Gaza
- 1931-4: Psychoanalysis with Theodor Reik (Vienna)
- 1934-6: Medical student
- 1936: International brigade, Spanish Civil War
- 1939-46: Captain, Royal Army Medical Corps
Spanish Civil War

Medical School
The POW years
A Bradford-Hill and Causality. I

BRITISH MEDICAL JOURNAL
LONDON SATURDAY SEPTEMBER 30 1950

SMOKING AND CARCINOMA OF THE LUNG
PRELIMINARY REPORT
BY
RICHARD DOLL, M.D., M.R.C.P.
Member of the Statistical Research Unit of the Medical Research Council
AND
A. BRADFORD HILL, Ph.D., D.Sc.
Professor of Medical Statistics, London School of Hygiene and Tropical Medicine; Honorary Director of the Statistical Research Unit of the Medical Research Council

... I have no wish, nor the skill to embark upon a philosophical discussion of the meaning of 'causation'

Credit: http://nfs.unipv.it/nfs/minf/dispense/patgen/lectures/files/disease_causality.html
## Hill’s Criterion of Disease Causation

<table>
<thead>
<tr>
<th>Criterium</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>Strength of association</td>
<td>A strong association is more likely to have a causal component than is a modest association</td>
</tr>
<tr>
<td>Consistency</td>
<td>A relationship is observed repeatedly</td>
</tr>
<tr>
<td>Specificity</td>
<td>A factor influences specifically a particular outcome or population</td>
</tr>
<tr>
<td>Temporality</td>
<td>The factor must precede the outcome it is assumed to affect</td>
</tr>
<tr>
<td>Biological gradient</td>
<td>The outcome increases monotonically with increasing dose of exposure or according to a function predicted by a substantive theory</td>
</tr>
<tr>
<td>Plausibility</td>
<td>The observed association can be plausibly explained by substantive matter (e.g. biological explanations)</td>
</tr>
<tr>
<td>Coherence</td>
<td>A causal conclusion should not fundamentally contradict present substantive knowledge</td>
</tr>
<tr>
<td>Experiment</td>
<td>Causation is more likely if evidence is based on randomised experiments</td>
</tr>
<tr>
<td>Analogy</td>
<td>For analogous exposures and outcomes an effect has already been shown</td>
</tr>
</tbody>
</table>

“Under the best conditions one would have expected an appreciable mortality; there in the Dulag I expected hundreds to die of diphtheria alone in the absence of specific therapy. In point of fact there were only four deaths, of which three were due to gunshot wounds inflicted by the Germans. This excellent result had, of course, nothing to do with the therapy they received or my clinical skill. It demonstrated, on the other hand, very clearly the relative unimportance of therapy in comparison with the recuperative power of the human body. On one occasion, when I was the only doctor there, I asked the German Stabsarzt for more doctors to help me cope with these fantastic problems. He replied, “Nein! Ärzte sind überflüssig.” (“No! Doctors are superfluous.”) I was furious and even wrote a poem about it; later I wondered if he was wise or cruel; he was certainly right.”

Ref: Cochrane 1972
A familiar debate? The NHS as model
The Catcher In The Rye?

- Advocated for reforming the NHS by embracing RCTs
- Provide *only* those interventions with favorable cost benefit profile
- Influenced generations of epidemiologists and policymakers
- *Cochrane later regretted that he left out a third “E” from the title: equity*
Iain Chalmers gathers the evidence


Edited by Iain Chalmers

Murray Enkin, Marc J. N. C. Keirse, and Iain Chalmers
New Cochrane Review Ecosystem

1. Develop question
2. Plan methods
3. Write & publish protocol
4. Develop search
5. Run search
6. Select studies
7. Collect data
8. Assess risk of bias
9. Analyze data
10. Interpret findings
11. Write & publish review

Communities
- Cochrane Review Groups
- Cochrane Crowd
- Comms support
- Editing support

Processes
- Plan
- Search

Applications
- PICO linked data
- Review database
- Linked Data tools
- Archie
- CRS-D
- GRADE Pro GDT
- EPPI Reviewer

Data Stores
- Rev Man Web
- Evidence Pipeline
- Covidence
- Cochrane

Authors
- Task exchange
- Training

Write
- Training

Analyze
- Training
„Nein! Ärzte sind überflüssig.“
### How do you operationalize a Review?

---

#### Ref: Nussbaum and Stroup 2008

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Paliperidone palmitate</th>
<th>Paliperidone Consta</th>
<th>Risk Ratio</th>
<th>M-H, Fixed, 95% CI</th>
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<tr>
<td></td>
<td>Events</td>
<td>Total</td>
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<tr>
<td>Fleischhacker 2010</td>
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<td>375</td>
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<td>1.17 (1.02, 1.33)</td>
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<td>Pardina 2011</td>
<td>140</td>
<td>607</td>
<td>613</td>
<td>1.05 (1.06, 1.28)</td>
</tr>
<tr>
<td>Subtotal (95%) CI</td>
<td>369</td>
<td>327</td>
<td>370</td>
<td>1.17 (1.02, 1.33)</td>
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4.1.2 adverse event

<table>
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<tr>
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<td>379</td>
<td>370</td>
<td>1.13 (0.66, 1.89)</td>
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<td>Pardina 2011</td>
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<td>607</td>
<td>613</td>
<td>2.62 (0.86, 8.28)</td>
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<td>Subtotal (95%) CI</td>
<td>49</td>
<td>35</td>
<td>370</td>
<td>1.39 (0.94, 2.21)</td>
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4.1.3 subject choice

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<th>Study or Subgroup</th>
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<td>374</td>
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<td>607</td>
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<td>Subtotal (95%) CI</td>
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<td>114</td>
<td>374</td>
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4.1.4 lost to follow-up

<table>
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<th>Study or Subgroup</th>
<th>Paliperidone palmitate</th>
<th>Paliperidone Consta</th>
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<td></td>
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<tr>
<td>Fleischhacker 2010</td>
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<td>378</td>
<td>370</td>
<td>1.18 (0.52, 2.54)</td>
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<td>0.67 (0.26, 1.48)</td>
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<td>Subtotal (95%) CI</td>
<td>24</td>
<td>29</td>
<td>370</td>
<td>1.18 (0.52, 2.54)</td>
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</table>

4.1.5 lack of efficacy

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<th>M-H, Fixed, 95% CI</th>
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<td></td>
<td>Events</td>
<td>Total</td>
<td>Weight</td>
<td></td>
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<td>Fleischhacker 2010</td>
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<td>378</td>
<td>370</td>
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<tr>
<td>Subtotal (95%) CI</td>
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<td>0</td>
<td>370</td>
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4.1.6 other unspecified reason

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<th>Risk Ratio</th>
<th>M-H, Fixed, 95% CI</th>
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<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Fleischhacker 2010</td>
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<td>379</td>
<td>373</td>
<td>0.91 (0.56, 1.46)</td>
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<td>Subtotal (95%) CI</td>
<td>51</td>
<td>50</td>
<td>373</td>
<td>0.91 (0.56, 1.46)</td>
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</table>
Wm. Edwards Deming

- 1900-1993
- Mathematician and industrial engineer
- Founder of QI
- 1921: BS, Wyoming
- 1925: MS, CU
- 1928: PhD, Yale
- WWII: Census bureau → Japanese Union of Scientists and Engineers
- Toyota → LEAN
- *Out of the Crisis* (1986)
The Demings visits Japan
Deming’s 14 Points for Management

1) Create consistency of purpose toward improvement of product and service.
2) Adopt a new philosophy. Acceptance of poor product and service is a roadblock to productivity.
3) Cease dependence on mass inspection. Replace by improved processes.
4) End the practice of awarding business on the basis of price tag alone.
5) Find problems and fix them. Continually reduce waste and improve quality.
6) Institute modern methods of training on the job.
7) Institute modern methods of supervision.
8) Drive out fear.
9) Break down barriers between departments and locations.
10) Eliminate numerical goals, posters, and slogans. Don’t ask for new levels of productivity without providing methods.
11) Eliminate work standards and numerical quotas.
12) Remove barriers that stand between the worker and his right to pride of workmanship.
13) Institute a vigorous program of education and training.
14) Create a structure in top management that will push every day on the above 13 points.
Deming’s System of Profound Knowledge

The New Economics
For Industry, Government, Education
Second Edition

Appreciation of a system
Theory of Knowledge
Psychology
Understanding Variation

The Foundation of the Science of Improvement

Values
Systems
Psychology
Understanding Variation

API-2014
Deming's 7 Deadly Diseases of Management

1. Lack of constancy of purpose
2. Emphasis on short-term profits
3. Evaluation by performance, merit rating, or annual review of performance
4. Mobility of management
5. Running a company on visible figures alone
6. Excessive medical costs
7. Excessive costs of warranty, fueled by lawyers who work for contingency fees

W Edwards Deming
1900-1993

"We have learned to live in a world of mistakes and defective products as if they were necessary to life. It is time to adopt a new philosophy in America."
A bad system will beat a good person every time.

source: quotes.deming.org/10091
Surgical Safety Checklist

Before induction of anaesthesia
(with at least nurse and anaesthetist)

1. Has the patient confirmed his/her identity, site, procedure, and consent?
   - Yes
   - No
   - Not applicable

2. Is the site marked?
   - Yes
   - No
   - Not applicable

3. Is the anaesthesia machine and medication check complete?
   - Yes
   - No
   - Not applicable

4. Is the pulse oximeter on the patient and functioning?
   - Yes
   - No

5. Does the patient have a:
   - Known allergy?
     - No
     - Yes
   - Difficult airway or aspiration risk?
     - No
     - Yes
     - Yes, and equipment/assistance available
   - Risk of >500ml blood loss (7ml/kg in children)?
     - No
     - Yes
     - Yes, and two IVs/central access and fluids planned

Before skin incision
(with nurse, anaesthetist and surgeon)

1. Confirm all team members have introduced themselves by name and role.
   - Yes
   - No

2. Confirm the patient’s name, procedure, and where the incision will be made.
   - Yes
   - No

3. Has antibiotic prophylaxis been given within the last 60 minutes?
   - Yes
   - No

4. Anticipated Critical Events
   - To Surgeon:
     - What are the critical or non-routine steps?
     - How long will the case take?
     - What is the anticipated blood loss?
   - To Anaesthetist:
     - Are there any patient-specific concerns?
   - To Nursing Team:
     - Has sterility (including indicator results)
       been confirmed?
     - Are there equipment issues or any concerns?

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

1. Nurse Verbally Confirms:
   - The name of the procedure
   - Completion of instrument, sponge and needle counts
   - Specimen labelling (read specimen labels aloud, including patient name)
   - Whether there are any equipment problems to be addressed

2. To Surgeon, Anaesthetist and Nurse:
   - What are the key concerns for recovery and management of this patient?

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Credit: World Health Organization
Special Communication

Error in Medicine

Lucian L. Leape, MD

FOR YEARS, medical and nursing students have been taught Florence Nightingale’s dictum—first, do no harm. Yet evidence from a number of sources, reported over several decades, indicates that a substantial number of patients suffer treatment-caused injuries while in the hospital.¹²

In 1964 Schumé reported that 20% of patients admitted to a university hospital medical service suffered iatrogenic injury and that 20% of those injuries were serious or fatal. Steel et al found that 36% of patients admitted to a university medical service in a teaching hospital suffered an iatrogenic event, of which 22% were serious or life-threatening. More than half of the injuries were related to use of medication.¹² In 1991 Bedell et al reported the results of an analysis of cardiac arrests at a teaching hospital. They found that 54% were preventable. Again, inappropriate use of drugs was the leading cause of the cardiac arrests. Also in 1991, the Harvard Medical Practice Study reported the results of a population-based study of iatrogenic injury in patients hospitalized in New York State in 1984.¹³ Nearly 4% of patients suffered an injury that prolonged their hospital stay or resulted in measurable disability. For New York State, this equaled 98,609 patients in 1984. Nearly 14% of these injuries were fatal. If these rates are typical of the United States, then 180,000 people die each year partly as a result of iatrogenic injury, the equivalent of three jumbo-jet crashes every 2 days.

When the reasons are investigated, it is found that most iatrogenic injuries are due to errors and are, therefore, potentially preventable.²⁷ For example, in the Harvard Medical Practice Study, 69% of injuries were due to errors (the balance was unavoidable).² Error may be defined as an unintended act (either of omission or commission) or one that does not achieve its intended outcome. Indeed, injuries are but the “tip of the iceberg” of the problem of errors, since most errors do not result in patient injury. For example, medication errors occur in 2% to 14% of patients admitted to hospitals,²⁸ but most do not result in injury.⁹

Aside from studies of medication errors, the literature on medical error is sparse, in part because most studies of iatrogenesis have focused on injuries (eg, the Harvard Medical Practice Study). When errors have been specifically looked for, however, the rates reported have been distressingly high. Autopsy studies have shown high rates (35% to 40%) of missed diagnoses causing death.¹⁰ One study of errors in a medical intensive care unit revealed an average of 1.7 errors per day per patient, of which 29% had the potential for serious or fatal injury.¹¹ Operational errors (such as failure to treat promptly or to get a follow-up culture) were found in 52% of patients in a study of children with positive urine cultures.¹²

WHY IS THE ERROR RATE IN THE PRACTICE OF MEDICINE SO HIGH?

Physicians, nurses, and pharmacists are trained to be careful and to function at a high level of proficiency. Indeed, they probably are among the most careful professionals in our society. It is curious, therefore, that high error rates have not stimulated more concern and efforts at error prevention. One reason may be a lack of awareness of the severity of the problem. Hospital-acquired injuries are not reported in the newspapers like jumbo-jet crashes, for the simple reason that they occur once a time in 5000 different locations across the country. Although error rates are substantial, serious injuries due to errors are not part of the everyday experience of physicians or nurses, but are perceived as isolated and unusual events—“outliers.” Second, most errors do no harm. Either they are intercepted or the patient’s defenses prevent injury. (Few children die from a single misdiagnosed or mistreated urinary infection, for example.)

But the most important reason physicians and nurses have not developed more effective methods of error prevention is that they have a false and particularly clear misunderstanding of the nature of medical practice. Physicians are socialized in medical school and residency to strive for error-free practice.³⁰ There is a powerful emphasis on perfection, both in diagnosis and treatment. In everyday hospital practice, the message is equally clear: mistakes are unacceptable. Physicians are expected to function without error, an expectation that physicians translate into the need to be infallible. One result is that physicians, unlike test pilots, come to view error as a failure of character—you weren’t careful enough, you didn’t try hard enough. This kind of thinking lies behind a common reaction by physicians: “How can there be an error without negligence?”

From the Department of Health Policy and Management, Harvard School of Public Health, Boston, Mass. Reprint requests to Department of Health Policy and Management, Harvard School of Public Health, 677 Huntington Ave, Boston, MA 02115 (Dr Leape).

JAMA, December 21, 1994—Vol 272, No. 23

Ref: Leape JAMA 1994

Error in Medicine—Leape
From IOM reports to Federal Law

D. Berwick + L. Leape
1999

D. Berwick + L. Leape
2001

Pres. Obama
2010
D. Berwick running CMS
CMS alone has 13 QI programs
These groups all require QI
Don’t let yourself be. Find something new to try, something to change. Count how often it succeeds and how often it doesn’t. Write about it. Ask a patient or a colleague what they think about it. See if you can keep the conversation going.

— Atul Gawande —

AZ QUOTES
You can't manage what you don't measure.

- W. Edward Deming
POINTS PER SHOT IN THE NBA
2014-15

BY: @KIRKGOLDSBERRY

GRANTLAND
Dean Oliver, UNC PhD 1994

Credit: http://www.nba.com/kings/blog/dean-oliver-talks-analytics-fivethirtyeight/
The 1st basketball usage stats
Dean Smith Was Pioneer in Use of Analytics

By MARC TRACY  FEB. 9, 2015

For decades, Coach Dean Smith would tell his players, both at halftime and after a game, how many points they had scored and had allowed per possession. In the 1960s, he began to assign managers to track the statistic.

“That was always something we went over,” said Jeff Lebo, now East Carolina’s head coach, who played for Smith at North Carolina from 1985 to 1989. “‘We’re 1.2 per possession, the other team’s 0.6.’ We knew what that meant.”

Today, employing statistics that are
Dean Smith + math
Smith’s legacy lives on
In his 36 seasons as a coach for the men’s basketball team, Smith influenced many of his players to start coaching.

**1950s**
- Dean Smith
- Larry Brown
- Bill Guthridge

**1960s**
- Doug Moe
- Larry Brown
- Eddy Fogler
- Roy Williams
- George Karl
- Tony Shaver
- Randy Witt
- Tom Hubert
- Rashad Wallace

**1970s**
- Aug. 2, 1982
- Smith joins the UNC coaching staff as an assistant under head coach Dean Smith.
- Smith named head coach at Virginia Military Institute.

**1980s**
- Buzz Peterson
- Matt Doherty
- Jeff Lebo
- Phil Ford

**1990s**
- Scott Cherry
- King Rice
- Rashed Wallace

**2000s**
- Smith’s 879th win
- Smith’s 1,000th career coaching victory

The winning numbers behind the Tar Heel coaching legend

- 879 Wins
- 17 ACC regular season championships
- 13 ACC Tournament championships
- 9 ACC Coach of the Year awards
- 2 NCAA Championships
- 1 Olympic gold medal

**Five Hall of Fame Memberships**
- FIBA Hall of Fame
- Kansas Sports Hall of Fame
- North Carolina Sports Hall of Fame
- Naismith Memorial Basketball Hall of Fame
- National Collegiate Basketball Hall of Fame

3 jerseys retired during UNC coaching tenure

- #12
- #52
- #23
• Introduction entitled “The Statistical Basis For the System” indicates how much Dean believed in analytics

• Even a Dookie (Jay Bilas) called it “the best book on basketball I have ever read...”
The kind of stats he kept and...
...the ones that meant the most

appendix:

lettermen under dean smith
at north carolina

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>Degree</th>
<th>Graduate Work</th>
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<td>AB (History)</td>
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<td>Industrial Relations, International Telephone and Telegraph, New York City, New York</td>
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<tr>
<td>Jim Hudock</td>
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<td>BS (Ind. Rel.)</td>
<td>DDS '68</td>
<td>Dentist, Kinston, North Carolina</td>
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<tr>
<td>Harry Jones</td>
<td>'62</td>
<td>AB (Philosophy)</td>
<td>MA (Phil.) '63</td>
<td>College Teacher, New York</td>
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<tr>
<td>Don Walsh</td>
<td>'62</td>
<td>AB (Pol. Sci.)</td>
<td></td>
<td>Head Basketball Coach, Denver Nuggets (NBA), Denver, Colorado</td>
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<tr>
<td>Eddie Burke (Mgr)</td>
<td>'62</td>
<td>BS (Ind. Rel.)</td>
<td>JD (Law) '65</td>
<td>Manager, IBM, Washington, D.C.</td>
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<tr>
<td>Larry Brown</td>
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<td>Head Basketball Coach, UCLA, Westwood, CA</td>
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<tr>
<td>Dieter Krause</td>
<td>'63</td>
<td>AB (Recreation)</td>
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<td>Col. U.S. Army, Germany</td>
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<tr>
<td>Yogi Poteet</td>
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<td>AB (Sociology)</td>
<td>MAT (Educ.) '65</td>
<td>Education Specialist, Department of Army, Petersburg, Virginia</td>
</tr>
<tr>
<td>Richard Vinroot</td>
<td>'63</td>
<td>BS (Bus. Adm.)</td>
<td>JD (Law) '66</td>
<td>Attorney at Law, Charlotte, North Carolina</td>
</tr>
<tr>
<td>Mike Cooke</td>
<td>'64</td>
<td>AB (English)</td>
<td></td>
<td>Executive, Blue Bell Mfg. Co., Bethesda, Md.</td>
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<tr>
<td>Art Katz</td>
<td>'64</td>
<td>AB (Education)</td>
<td>MAT (Educ.) '66</td>
<td>High School Teacher, Wayne, New Jersey</td>
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<tr>
<td>Bryan McSweeney</td>
<td>'64</td>
<td>AB (Pol. Sci.)</td>
<td>MBA (Prof. Mgmt.) '75</td>
<td>Monex International Ltd., Newport Beach, California</td>
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<tr>
<td>Charles Shaffer</td>
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<td>AB (History)</td>
<td>JD (Law) '67</td>
<td>Attorney at Law, Atlanta, Georgia (Pres. Atlanta Bar Association)</td>
</tr>
<tr>
<td>Elliott Murnick (Mgr)</td>
<td>'64</td>
<td>BA (Pol. Sci.)</td>
<td></td>
<td>Sports Promotion, Raleigh, North Carolina</td>
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<tr>
<td>Bill Brown</td>
<td>'65</td>
<td>AB (History)</td>
<td>JD (Law) '68</td>
<td>Attorney at Law, Atlanta, Georgia</td>
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<tr>
<td>*Bill Cunningham</td>
<td>'65</td>
<td>AB (History)</td>
<td></td>
<td>Head Basketball Coach, Philadelphia 76ers, (NBA), Philadelphia, Pennsylvania</td>
</tr>
</tbody>
</table>

*Have played pro basketball in United States
**Have played pro basketball in Europe.
THE CAROLINA LEGACY

EXCELLENCE. TRADITION. HISTORY. GREATNESS.

These are all words that come to mind when thinking of Carolina basketball. More than a century in the making, this storied program has continually revolutionized the world of college athletics by producing outstanding players of limitless talent through the guidance of truly visionary coaches. Here's a look back at the first hundred years of Tar Heel history—a visual celebration of North Carolina's best coaches, players and the records they set.

THE PLAYERS

- Jack Cobb
- George Glamack
- Lennie Rosenbluth
- Phil Ford

THE COACHES

- Frank McGuire
- Dean Smith
- Ray Williams

THE RECORD

Credit: http://reesenews.org/2011/03/18/the-carolina-legacy/12104/
• Post-retirement leadership book
• Includes chapter “The Olympics: When Winning Was the Goal”
• Distinguished between playing for relationships and playing for wins
The Carolina Way?

• Instead of Moneyball for Medicine
• Could you have a medicine which used analytics to spur innovation while also pursuing relationships and virtues?
• That, incidentally, produced great outcomes?
Quantification is “a technology of distance”
Which devalues trust and relationships
...So we encourage physicians to “count something” instead of “seeing someone”
Pursuing a disease or a person?

Platonic medicine pursues disease as an ontological entity. (What you have.)

Hippocratic medicine pursues understanding of a person. (Who you are.)

Credit: wikimedia
How medicine works

Trauma surgery: *heal with steel*

Infectious disease: *heal with pills*

Psychiatry: *heal with relationships*

Credit: wikipedia, prevention.com, correcttech.com
“May I always act so as to preserve the finest traditions of my calling and may I long experience the joy of healing those who seek my help.”
References

References

• Holden, R. J. 2009. "People or systems? To blame is human. The fix is to engineer." Prof Saf 54 (12):34-41.
• Institute of Medicine (U.S.), Committee on Quality of Health Care in America, Crossing the Quality Chasm: A New Health System for the Twenty-first Century (Washington, D.C.: National Academy Press, 2001)
References

• Nussbaum AM, Stroup TS: Paliperidone for schizophrenia. The Cochrane Database of Systematic Reviews, 16(2): CD006369, 2008 PMID: 18425951
Questions?

www.abrahamnussbaum.com

Credit: Fritz Kahn