

Getting the Most Out of Our Frontal Lobes

Dr. Elaine Larson, Columbia University

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*Getting the Most Out of Our Frontal Lobes:
What We Don't Know (or Forget)
Might Hurt Us*

Dr. Elaine Larson
Columbia University

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Hosted by Paul Webber
paul@webbertraining.com

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OR

*Changing Habits Among
Healthcare Workers to
Prevent Healthcare-
Associated Infections*

Goals

- Discuss the brain and implications of the current demographic of healthcare epidemiologists
- Reassess our assumptions and approaches to infection prevention

Recent 'Brain' Books

- Welcome to your brain: Why you lose your car keys but never forget how to drive
- The little book of big stuff
- Brain rules: 12 principles for surviving and thriving at work, home and school
- Saving your brain



Themes

- Our brains are hardly models of intelligent design
- We can exhaust our brain's capacity unless we enhance it
- Best thing we can do for our brains is exercise
- Our responses are not just related to 'facts'

Surprise

- It is commonly believed that our brains became larger to accommodate more intelligence, but it probably had to do with improved olfactory capability.
- "We then randomly evolved other abilities to make use of all the brain extra space"

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Sneakiness increases with brain size

- Tactical deception with the express purpose of misleading requires considerable behavioral suppleness and is observed most often in the 'brainiest' animals



Chimpanzees

- A male chimpanzee flirting with a female will drop his hands to cover his erection when an alpha male strolls by.
- NY Times Science Section 12/23/08



Pain Perception

- Pain is perceived to be worse if the harm seems intentional rather than random (i.e. inflicted by a colleague)



Gray & Wegner. Psychol Science 2008; 19:1260-2



Success/Failure Can Be Bred

- It's possible to breed mice to be low risk takers/high anxiety/depressed
 - BUT more environmental controls and successes (e.g. playing with toys) can modify genetic predisposition to improve innovative and risk taking behaviors
- Akil H (e.g. Brain Res. 2008;1224:63-8)



Clever (infection control) ways to use your brain

- 2008, Rep Vito Fossella (R-Staten Island) protested a drunk driving charge by saying that hand sanitizers can be absorbed in the body



Other clever ways...

- 1976, assassin of SF mayor had mood swings from eating Twinkies and soda
- 1991, woman driven to prostitution by nymphomania brought on by side effects of an antidepressant



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The Aging Brain

- Brain weight and volume decrease
- Grooves on the brain's surface widen
- Decayed portions of the branch-like dendrites that extend from the neurons, increase.
- Senile plaques form

USC Health Magazine, Spring 2001

Generational Themes



Baby Boomers

- Born ~1945-1964, currently ages 43-60+
- Greater than one-fourth of population
- Influenced by WWII
- Television
- Contraception (~1960)
- Ed Sullivan, The Beatles
- Space flight



Baby Boomers

- Need to be 'nice, well liked, cooperative
- Large, crowded, competitive generation
- Win/lose world
- Care what others think
- Want to be part of a team
- Recognition is important

Generation Xers

- Born 1965-1980, ages 25-42
- About 14% of population
- First 'latchkey kids'
- Civil rights, 'hippies', Vietnam war, music



GenXers

- Do not like to participate, attend meetings, or hear others' opinions
- "Just tell me what you want done and I'll do it"
- Recognition less important; individualistic
- Value technology, speed, continuous change

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Millennials (GenYs)

- Born 1981-present, aged up to 26, 3 times the size of GenX
- The digital era (computers, videogames, cell phones, iPods, cable TV)
- Teens with machines, 90% use internet
- Immersed in their own universe



Millennials (GenYers)

- Digital generation
- Texting, emailing, instant messaging



Attitudes

- Boomers: Tell me what I need to know
- Gen X: Show me how to do it
- Gen Y: Why do I need to know this?



Challenges for Behaviour Change:

Most 'teachers' are boomers, most 'learners' are GenX

Adapt and develop educational approaches across generations



<i>Aging Pros</i>	<i>Aging Cons</i>
<ul style="list-style-type: none">• Experience brings wisdom and perspective• Ability to take shortcuts (you've seen this before)	<ul style="list-style-type: none">• More to lose (financial, respect, reputation)• More difficult to consider innovation and change



Implications for our specialty

- We prefer to do things the way we always have—it's simply easier
- We have more to 'protect' and take fewer risks



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Implications as we age

- Besides picking the right parents, it still appears that cognitive loss is often largely preventable
- Rate of change may be hastened or slowed by lifestyle factors
- 'Use it or lose it'

So we better take advantage of what we have—learn from the past and keep exercising



Fogey

- Someone whose style is out of fashion
- A person behind the times, over-conservative, or slow
- A dull old fellow



Danger Signs of Old-Fogeyism in Infection Prevention

- Repetition—more of the same, new names for old games
- Even worse--going backwards

The History of Medicine (<http://www.who.int/infectious-disease-report/2000/index.html>)

2000 B.C. – Here, eat this root

1000 A.D. – That root is heathen. Here, say this prayer.

1850 A.D. – That prayer is superstition.

Here, drink this potion.

1920 A.D. – That potion is snake oil. Here, swallow this pill.

1945 A.D. – That pill is ineffective.

Here, take this penicillin.

1955 A.D. – Oops....bugs mutated.

Here, take this tetracycline.

1960-2009 – 39 more "oops"...Here, take this more powerful antibiotic.

2010 A.D. – Here, eat this root.

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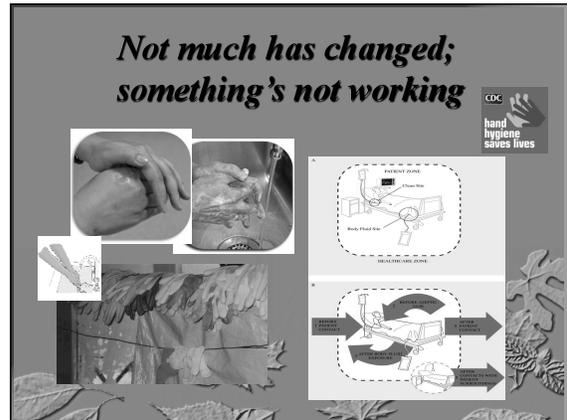
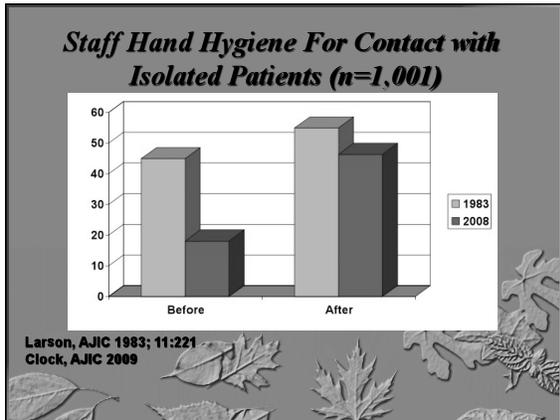
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“NIH stands for National Institutes of Health, not the National Institutes of Biomedical Research..”

“..the enormous resources being put into biomedical research, and the huge strides made in understanding disease mechanisms, are not resulting in commensurate gains in new treatments, diagnostics and prevention...”

“In some sense much translational research is just rebranding—clinical research and development by a different name...the term ‘translational research’ first appeared in PubMed in 1993..”

Nature 453, 840-42 (2008)

Thoughts for Infection Prevention

- Traditionally, translational research has gone from bench to bedside
- ‘There is much to be learned by pushing the other way’

(Nature 453, 843-45 (2008))

Sad (but true) that we sometimes must be reminded of our core mission

<p>Electric toothbrush:</p> <ul style="list-style-type: none"> • Insert brush into mouth • Never use while sleeping • Designed for cleaning teeth only. DO NOT use for any other purposes 	<p>Coffee cup:</p> <ul style="list-style-type: none"> • Caution: Contents may be hot!
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Imagining music...

- Activates the auditory cortex almost as strongly as hearing music*
- Imaging the future of infection prevention

• Sacks O. Musicophilia. NY: Knopf, 2007

What do we assume about infection?

- Germs are everywhere
- Hospitals are dangerous places
- The more degrees you have the less you wash your hands
- Microbes are wily change artists and get ahead of any antibiotic devised

What do we know?

- Excellent hygiene practices reduce infection
- Universal precautions only work when they are truly universal:
 - Every patient
 - Every worker
 - Every time
- Infections don't all start in hospitals, but they certainly can enjoy life there!

*This is prevention: a hard sell**

- Success is invisible
- Lack of drama compared with a rescue operation
- Persistent behavior change is required
- Accrual of benefits unclear

*Harvey Fineberg, Institute of Medicine, 9/08

It's also a tough environment

- High uncertainty, high risk work
- Hierarchical, highly structured communication patterns
- Strong professional but weak institutional identity and loyalty
- Perceived or real variance in goals among staff and administration

So what do we do?

- Wring our hands and say 'it's bigger than all of us'?
- Do lots of paperwork and messaging so we can show that we've tried?
- Hire more infection prevention staff to watch everyone and report behavior?

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Step back and think it through

- Understand risks from everyone's viewpoint
- Consider rewards from multiple perspectives
- Design something new

Whose viewpoint?

- Patient
- Family
- Direct care-givers
- On-unit support staff
- Transient staff
- Front office staff
- Top management

Patient and family

- I want to leave here as soon as possible, without acquiring any new problems
- I don't want my loved one to come home with multiple problems

Care-givers

- I already give the best care I can
- I don't want to be belittled with slogans or slaps
- Management doesn't understand how little support I get to do things the right way

Support Staff

- 'They' require more paper/computer work that keeps me from having time to think
- Every unit has at least one 'do it my way' person
- No one ever explains things to me
- I'm too busy to think about this

Front office and top management

- We're punished for things beyond our control
- Clinical staff don't appreciate how much we're doing for them
- It can't be that hard to get everyone to clean their hands
- I'm tired of excuses
- I thought we fixed this with the last consultant we hired

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How and why do people change?

It's worth their while

- Professional pride
- Peer pressure
- Economics
 - Gain or loss of business
 - Penalties and rewards

Mental paradigms are important

- Parents raised in a post-polio, post-measles world think differently about immunizations
- For Nightingale, 'cleanliness is next to godliness' worked as well as the germ theory of disease

Priority Research Recommendation: Action Plan to Prevent HAIs

"Investigate the human cultural and organizational barriers to successful implementation of practices at the unit and institutional levels"

Executive Summary, 1/09

Determinants of health model

- Health is the product of multiple interactions
 - Genetic endowment
 - Physical and social environments
 - Learned behavior
 - Access to care
 - Diagnoses made
 - Care given
- All of these must interact positively to lead to a state of well-being or sense of health

Preferred Outcome: Infection-free Behavior

- | | |
|--|---|
| <ul style="list-style-type: none">• Genetic endowment<ul style="list-style-type: none">• Beyond our control• Physical environment<ul style="list-style-type: none">• We control the space• Social environment<ul style="list-style-type: none">• Family, staff, visitors• Learned behavior<ul style="list-style-type: none">• Ours and others | <ul style="list-style-type: none">• Access to care<ul style="list-style-type: none">• However it happened, the patient is here• What components of care are missing?• Care given<ul style="list-style-type: none">• Who identifies and initiates? |
|--|---|

Making the Future

- Starting with the social environment
 - How does physical space influence interaction?
 - What learned behaviors govern who speaks to whom and when?
 - What assumptions are made about who decides infection prevention strategies in what social circumstances?

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What about learned behavior?

- Physicians and nurses
 - When and why do they decide to attend to infections?
 - Who helps them acquire new behaviors?
- Family members and patients?
- Support staff: Record keepers? Housekeepers?

Systems thinking is essential

- We've thought a lot about control systems
 - New checklists
 - 'Bundles' of steps to be taken
- Re-think the system from the point of view of every possible interaction

The single biggest mistake in communication is the belief that it has taken place

George Bernard Shaw

Infection Prevention: Different Points of View

- IT: We need technology to improve communication
- Sociology: We need mutual trust, shared culture, and team building
- Regulatory: We need uniform enforcement
- HR: We need supervision and incentives

Infection Prevention: Reality

- It's a complex problem
- Approaching prevention from one viewpoint means we are a little right and mostly wrong

Adapted from Wachter RM, UCSF

And ever changing...

- Early phase: Change mental model, remove 'shame and blame', move focus from individuals to systems (checklists, etc)
- Backlash: Individual as well as institutional accountability, more vigorous reporting and oversight

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What we don't know WILL hurt us

There is currently a 'no harm, no foul' philosophy in healthcare (e.g. it's OK to skip hand hygiene if the patient doesn't get an infection)

Our behavioral choices matter; 'no harm, no foul' is no longer acceptable

David Marx, JD, President, Outcome Engineering,
APIC Futures Summit, 9/08

Only two tools

--Systems design

--Help staff make the right choices

'Blended science' acknowledges difficulty of isolating influence of one strategy of infection prevention when multiple strategies are deployed

David Marx, JD, President, Outcome Engineering,
APIC Futures Summit, 9/08

We need simple rules...

- No patient should be harmed by an HAI
- *Targeting* zero infections is a laudable goal
- Infection prevention must be an organizational goal
- Chief executives must deliver clear expectations, set goals and provide necessary resources
- Everyone is responsible

Alvarado, APIC, 2007

Why Are Bundles and Checklists Successful?

- Explicit and overt support from the top down
- People feel they are part of a 'movement'
- Simple, clear, measurable actions
- Clear, measurable outcomes
- Address personal AND organizational factors needed for change

Change can't be all at once

- With the list of possibles, select some priorities for action that
 - engage multiple perspectives
 - can be tied to rewards (recognition and/or resources)
 - are affordable

So, are we fogeys?



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An 'ideal world'....

Let me figure out what to do, tell everybody else, and then they should do it

Making the most of our frontal lobes: What it will take for our 'aging' brains?

- Shared vision
- Sense of urgency
- Empowered team

Sociology of Healthcare Epidemiology

- Major challenges are systemic, inter-personal and inter-professional, not scientific



People differ less from century to century than we are apt to suppose

You will encounter the same opposition,
If you attack any prevailing opinion...
Let not such experiences...foster any love of
dispute for its own sake.
It is not often that an opinion worth expressing,
Cannot take care of itself.

Holmes, 1862



Thanks to

- K. Gebbie, C. Alvarado and many others for insights and slides
- Colleagues at Columbia University Center for Interdisciplinary Research to Reduce Antimicrobial Resistance (CIRAR)

A promotional graphic for a teleclass subscription. The background is dark with white and yellow fireworks. The text reads: "Fall Year Subscription 2011". Below this, three phrases are listed: "SAVE MONEY (Save 20% on teleclass registrations)", "SAVE TIME (Every teleclass one registration)", and "SAVE THE WORLD (... or at least help it a little)". At the bottom left is a logo for "2011 TELECLASS EDUCATION TEN YEARS ANNIVERSARY". At the bottom right is the email address "subscription-info@webbertraining.com".

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