

Figuring out what makes populations sick: unraveling disease mysteries

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McGill University MiniMed Lecture Series
October 21, 2014

Outline

- The **practice** of **community** vs. **clinical** medicine
- **Epidemiological Research** → knowledge for the practice of community medicine (public health)
- **Research challenges:** people; timescales; safety/scale
- **Population-level epidemiological research: examples:**
 - 18th&19th century: smallpox; cholera; puerperal fever
 - 20th&21st: birth defects; illnesses of childhood & adulthood
 - hospital-acquired infections (MUHC)
 - The biggest-ever public health experiment

Community vs. clinical medicine

- Clinical doctor's clients are individuals, cared for one at a time
- Community doctor's client is the population of the community (s)he serves
- Task: keeping people in the community from becoming *patients*
- US Public Health Service definition of public health
 - 'the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals'

Population-level epidemiological research is not easy

- People



- Timescales: hours – days – weeks – years – decades
- Safety: 1 adverse event in 10 – 100 – 1,000 – 100,000

PhD

A bright young *chachem* told his grandmother that he was going to be a Doctor of Philosophy.

She smiled proudly: 'Wonderful. But what kind of disease is philosophy?'

Leo Rosten: *The Joys of Yiddish* (1970), cited in a 2011 mini-dictionary of epidemiology



Disease

THE EXTRAORDINARY STORIES BEHIND
HISTORY'S DEADLIEST KILLERS

MARY DOBSON

Quercus

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ENCEPHALITIS LETHARGICA

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A 17th-century physician wearing a traditional plague-preventive costume.

PARASITIC DISEASES

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AFRICAN TRYPANOSOMIASIS

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LYMPHATIC FILARIASIS

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Syphilis, painted in 1910 by the artist Richard Cooper.

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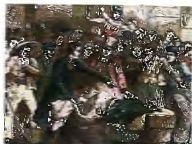
AIDS

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SARS

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The body louse, carrier of typhus.



A depiction of the 1832 cholera epidemic in Paris.

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The body louse, carrier of typhus.



SMALLPOX



16 days after inoculation with



Smallpox

A dairymaid with cowpox, May 1796



First (Documented) 'Vaccination': May 14, 1796



He was **inoculated** on the 1st of July with variolous matter, immediately taken from a pustule, but **no disease followed**.

Repeated several months later, and again no disease.

Edward Jenner vaccinating his 11 month old son



16 days after inoculation with



Smallpox



Cowpox

Montreal 1885



Bangladesh 1973



CHOLERA

c1831: Venetian, aged 23, depicted before and after contracting CHOLERA



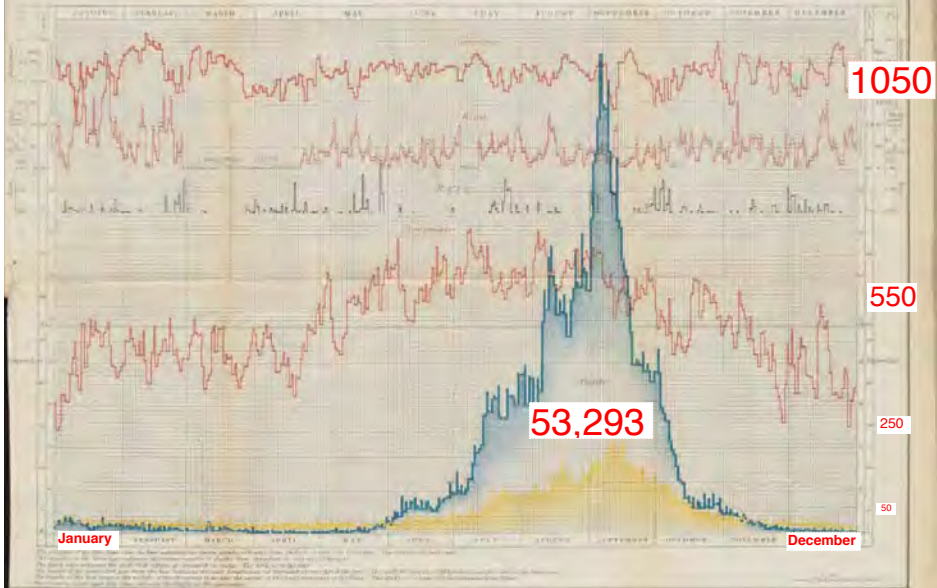
Theories as to how the cholera 'poison' is spread

- Direct person-to-person contact
- Miasma:
 - a vaporous exhalation
 - a heavy vaporous emanation or atmosphere
 - an unpleasant or unhealthy smell or vapour
- Miasma Theories

attribute diseases to an infection from an invisible and possibly otherwise undetectable, emanation from rotting organic matter - swamps, sewers or filthy cities. [Hamlin]

Daily Numbers of Deaths from Cholera in England in 1849

CHOLERA 18294 DEATHS ALL ENGLAND DIARRHŒA 14887 DEATHS
DIAGRAM REPRESENTING THE DEATHS FROM CHOLERA AND DIARRHŒA ON EACH DAY OF THE YEAR 1849,
WITH THE METEOROLOGICAL PHENOMENA REGISTERED AT GREENWICH ON THE CORRESPONDING DAYS.



JOHN SNOW

Anaesthetist
to a Queen
and
Epidemiologist
to a Nation



A
Biography

David A.E. Shephard

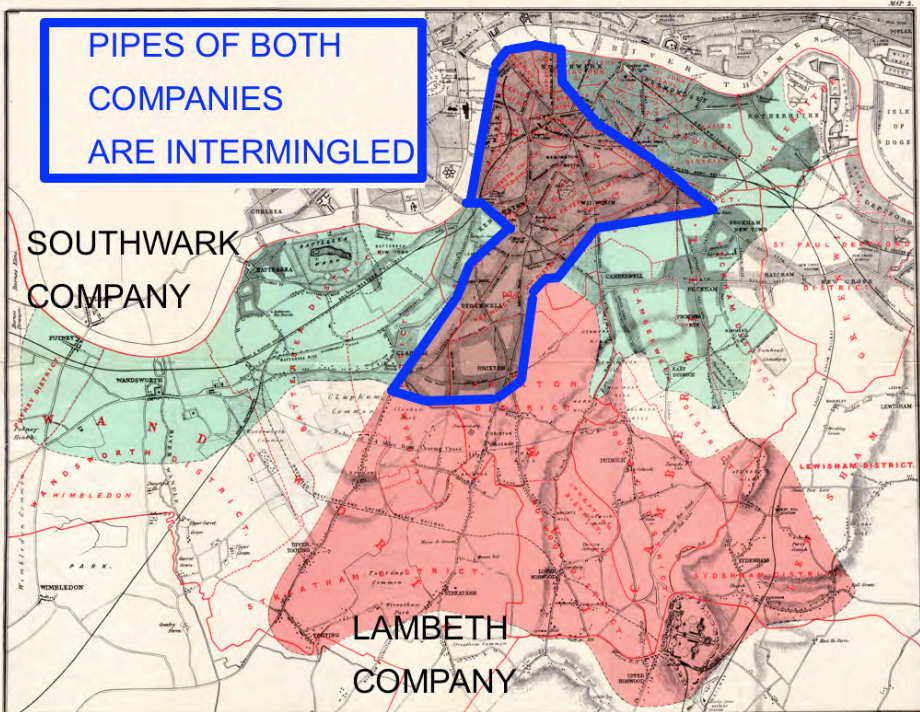
1849 pamphlet:

- **FAECAL-ORAL ;
WATERBORNE**
- 'When no other **water** can be obtained, so much of it as is **used for drinking** and culinary purposes **should be filtered and well-boiled**'

PIPES OF BOTH
COMPANIES
ARE INTERMINGLED

SOUTHWARK
COMPANY

LAMBETH
COMPANY



Cholera Deaths/100,000

AREA SUPPLIED BY...

SOUTHWARK CO. ONLY

BOTH, INTERMINGLED

LAMBETH CO. ONLY

1849

1854

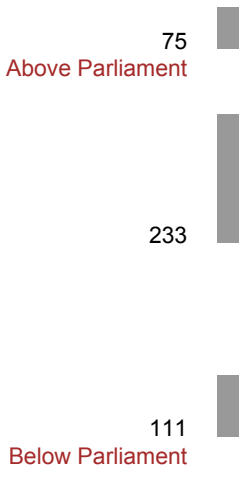
75

Above Parliament

233

111

Below Parliament



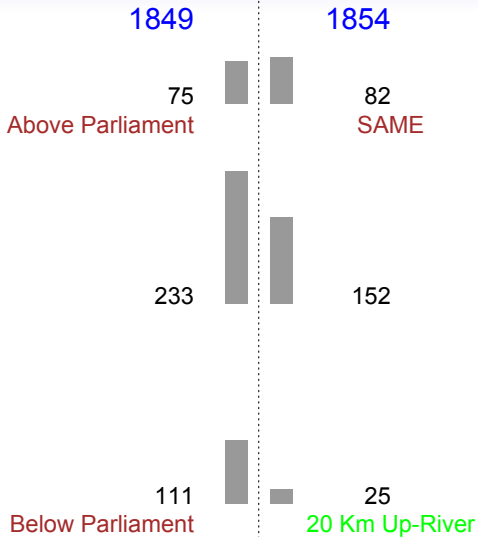
Cholera Deaths/100,000

AREA SUPPLIED BY...

SOUTHWARK CO. ONLY

BOTH, INTERMINGLED

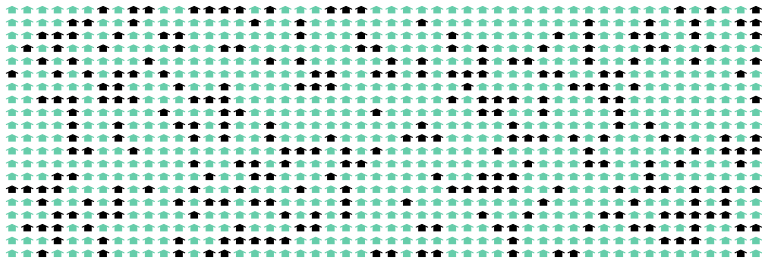
LAMBETH CO. ONLY



334 Deaths In First 4 Weeks of 1854 Epidemic

Death
Rate

286 in 40,000 houses supplied with water taken from River



13

:

1

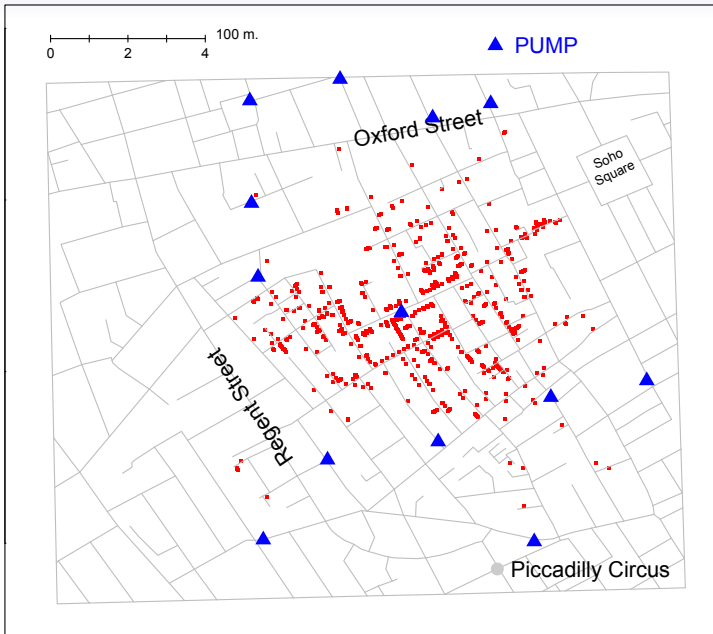
14 in 26,000 houses supplied with water taken from Up-River

34 in houses that obtained drinking water from drains, directly from River, etc

★ = 40 houses
★ = 1 cholera death

Meanwhile, starting night of Thursday Aug. 31, in Soho district

Situation of deaths in and around Broad Street



Local curate identified 'Index Case'



Rev. Henry Whitehead,
20 years later

- Infant **died on day 3** of epidemic, but diarrhea **4 days** previous to death
- **Soiled diapers** steeped in pail; water from pail poured into **cesspool**
- Cesspool blocked; brickwork defective; leaked contents into drain. Drain less than **3 feet from well that fed pump**
- defective brickwork of drain let **fluid matter seep into well.**

12 years on: Cholera returns; worst in East London

CHOLERA
AND
WATER.
BOARD OF WORKS
FOR THE LIMEHOUSE DISTRICT,
Comprising Limehouse, Ratcliff, Shadwell,
and Wapping.

The INHABITANTS of the District within
which CHOLERA IS PREVAILING, are
earnestly advised

**NOT TO DRINK ANY WATER
WHICH HAS NOT
PREVIOUSLY BEEN BOILED.**

Fresh Water ought to be Boiled every
Morning for the day's use, and what
remains of it ought to be thrown away
at night. The Water ought not to stand
where any kind of dirt can get into it,
and great care ought to be given to see
that Water Butts and Cisterns are free
from dirt.

BY ORDER,
THOS. W. RATCLIFF,
CLERK OF THE BOARD.

1ST AUGUST, 1866

(Wellcome Images)



DEATH'S DISPENSARY
OPEN TO THE POOR, GRATIS BY THE
PERMISSION OF THE PARISH

George J. Pinwell, August 18, 1866

20th CENTURY

Birth Defects

Defect	Agent	Counter-measure
Eyes, ears, heart ['41]	1st trimester rubella	Vaccination ['69→]
Limbs ['61]	Thalidomide	Withdrawn from market
Central nervous system ['65]	Folate deficiency	Supplements, fortification †

† White flour & bread ['98→]

Infancy / youth / ...

Sickness	Agent	Counter-measures
Poliomyelitis	Virus	Vaccination
Dental Caries	Fluoride [†]	Paste/supplements/drinking water
Vaginal Cancer	In utero DES	Avoidance

[†] Preventive

Adulthood

Sickness

Agents/ Preventives

Heart Disease

Cancer

Pulmonary Disease

Bone Fracture

Diabetes

Pulmonary Embolus

Ruptured Abdominal Aortic Aneurysm

Dementia

...

...

...

TOOLS

1941

CONGENITAL CATARACT FOLLOWING GERMAN MEASLES IN THE MOTHER.

By N. McALISTER GREGG,
Sydney.

In the first half of the year, 1941, an unusual number of cases of congenital cataract made their appearance in Sydney.

The total number of cases included in this review is seventy-eight.

In all but ten cases in this series the history of "German measles" infection is present.

THALIDOMIDE AND CONGENITAL ABNORMALITIES

SIR,—Congenital abnormalities are present in approximately 1.5% of babies. In recent months I have observed that the incidence of multiple severe abnormalities in babies delivered of women who were given the drug thalidomide ('Distaval') during pregnancy, as an anti-emetic or as a sedative, to be almost 20%.

These abnormalities are present in structures developed from mesenchyme—i.e., the bones and musculature of the gut. Bony development seems to be affected in a very striking manner, resulting in polydactyly, syndactyly, and failure of development of long bones (abnormally short femora and radii).

Have any of your readers seen similar abnormalities in babies delivered of women who have taken this drug during pregnancy?

Hurstville, New South Wales.

W. G. McBRIDE.

FOLIC ACID METABOLISM AND HUMAN EMBRYOPATHY

RESULTS OF FIGLU EXCRETION TESTS IN 98 MOTHERS OF MALFORMED
INFANTS

Mothers	FIGLU excretion test		Total	% FIGLU- positive
	Positive	Negative		
<i>Of all malformed infants..</i>	61	37	98	62
<i>Of all infants with C.N.S. malformations</i>	48	25	73	66
<i>Matched pairs:</i>				
Mothers of malformed infants	35	19	54	65
Mothers of normal in- fants	8	46	54	17
Mothers of infants with C.N.S. malformation	24	11	35	69
Mothers of normal in- fants	6	29	35	17

ADENOCARCINOMA OF THE VAGINA***Association of Maternal Stilbestrol Therapy with Tumor Appearance in Young Women**

ARTHUR L. HERBST, M.D., HOWARD ULFELDER, M.D., AND DAVID C. POSKANZER, M.D.

Abstract Adenocarcinoma of the vagina in young women had been recorded rarely before the report of several cases treated at the Vincent Memorial Hospital between 1966 and 1969. The unusual occurrence of this tumor in eight patients born in New England hospitals between 1946 and 1951 led us to conduct a retrospective investigation in search of factors that might be associated with tumor appearance. Four matched controls were established for each patient; data were obtained by personal interview. Results show maternal

bleeding during the current pregnancy and previous pregnancy loss were more common in the study group. Most significantly, seven of the eight mothers of patients with carcinoma had been treated with diethylstilbestrol started during the first trimester. None in the control group were so treated (p less than 0.00001). Maternal ingestion of stilbestrol during early pregnancy appears to have enhanced the risk of vaginal adenocarcinoma developing years later in the offspring exposed.

Summary of Data Comparing Patients with Matched Controls.

CASE No.	MATERNAL AGE (YR)		MATERNAL SMOKING		BLEEDING IN THIS PREGNANCY		ANY PRIOR PREGNANCY LOSS	
	CASE	MEAN OF 4 CONTROLS	CASE	CONTROL	CASE	CONTROL	CASE	CONTROL
1	25	32	Yes	2/4	No	0/4	Yes	1/4
2	30	30	Yes	3/4	No	0/4	Yes	1/4
3	22	31	Yes	1/4	Yes	0/4	No	1/4
4	33	30	Yes	3/4	Yes	0/4	Yes	0/4
5	22	27	Yes	3/4	No	1/4	No	1/4
6	21	29	Yes	3/4	Yes	0/4	Yes	0/4
7	30	27	No	3/4	No	0/4	Yes	1/4
8	26	28	Yes	3/4	No	0/4	Yes	0/4
Total Mean	26.1	29.3	7/8	21/32	3/8	1/32	6/8	5/32
Chi square (1 df)*			0.53		4.52		7.16	
p value			0.50		< 0.05		< 0.01	
	(N.S.)†		(N.S.)					

* Matched control chi-square test used as described by Pike & Morrow.⁹

† Standard error of difference 1.7 yr (paired t-test); N.S. = not statistically significant.

Summary of Data Comparing Patients with Matched Controls.

CASE No.	MATERNAL AGE (YR)		ESTROGEN GIVEN IN THIS PREGNANCY		BREAST FEEDING		INTRA-UTERINE X-RAY EXPOSURE	
	CASE	MEAN OF 4 CONTROLS	CASE	CONTROL	CASE	CONTROL	CASE	CONTROL
1	25	32	Yes	0/4	No	0/4	No	1/4
2	30	30	Yes	0/4	No	1/4	No	0/4
3	22	31	Yes	0/4	Yes	0/4	No	0/4
4	33	30	Yes	0/4	Yes	2/4	No	0/4
5	22	27	No	0/4	No	0/4	No	0/4
6	21	29	Yes	0/4	No	0/4	No	1/4
7	30	27	Yes	0/4	Yes	0/4	No	1/4
8	26	28	Yes	0/4	No	0/4	Yes	1/4
Total			7/8	0/32	3/8	3/32	1/8	4/32
Mean	26.1	29.3						
Chi square (1 df)*			25.22		2.35		0	
p value			< 0.00001		0.20			
	(N.S.)†				(N.S.)		(N.S.)	

* Matched control chi-square test used as described by Pike & Morrow.*

† Standard error of difference 1.7 yr (paired t-test); N.S. = not statistically significant.



Framingham Heart Study

A Project of the National Heart, Lung, and Blood Institute and Boston University

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[Offspring Cohort](#)

[Generation Three Cohort](#)

[New Offspring Spouse Cohort](#)

[Omni Cohort](#)

[Brain Tissue Program](#)

[News](#)

[Consent](#)

Original Cohort

The Original Cohort of the Framingham Heart Study consisted of 5,209 respondents of a random sample of 2/3 of the adult population of Framingham, Massachusetts, 30 to 62 years of age by household, in 1948. Exam 28 for the Original Cohort ended in December of 2005. Exam 30 for the Original Cohort began in May of 2008 and ends in February of 2010.

AGE-SEX DISTRIBUTION AT ENTRY (1948)

	Age	29-39	40-49	50-62	Totals
Men		835	779	722	2,336
Women		1,042	962	869	2,873
Totals		1,877	1,741	1,591	5,209



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The Nurses' Health Studies are among the largest and longest running investigations of factors that influence women's health. Started in 1976 and expanded in 1989, the information provided by the 238,000 dedicated nurse-participants has led to many new insights on health and disease. While the prevention of cancer is still a primary focus, the study has also produced landmark data on cardiovascular disease, diabetes and many other conditions. Most importantly, these studies have shown that diet, physical activity and other lifestyle factors can powerfully promote better health.

Please choose from the links across the top of the page or the navigation menu on the left to find out more about the Nurses' Health Studies.

Join NHS3!

The Nurses' Health Study is recruiting 100,000 female RNs, LPNs, and nursing students for NHS3. Become part of the next generation of NHS! [Join NHS3!](#)



Do We Really Know What Makes Us Healthy?



Reinhard Hunger

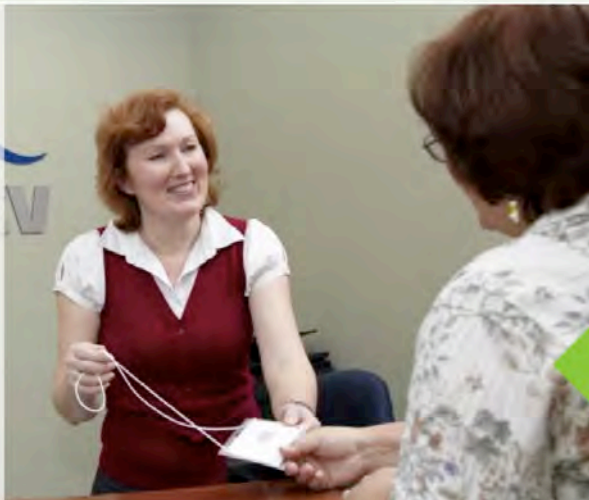
By GARY TAUBES

Published: September 16, 2007

SIGN INTO F

Learn more about the CLSA

The Canadian Longitudinal Study on Aging (CLSA) is a large, national, long-term study that will follow approximately 50,000 men and women between the ages of 45 and 85 for at least 20 years.





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Français English

Contact Us

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[The Study](#)

[The Team](#)

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[Acknowledgements](#)

Updated June 9 2014



Q**U**ebec A**D**ipose and
L**I**ifestyle I**N**ves**T**igation
in Y**O**uth

About Us

Welcome to the QUALITY website!

QUALITY is short for **Q**UEbec **A**dipose and **L**ifestyle **I**nves**T**igation in **Y**outh. The main purpose of the study is to increase understanding of the natural history of cardiovascular disease risk factors and Type 2 diabetes in children. Our findings will help program planners design effective health promotion and disease prevention interventions.

MUHC hospital, 2015

ORIGINAL INVESTIGATION

Infection Acquisition Following Intensive Care Unit Room Privatization

Dana Y. Tetsch, MSc; James Hanley, PhD; Vivian Loo, MD, MSc, FRCPC; Peter Goldberg, MD, FRCPC; Ash Gursahaney, MD, FRCPC; David L. Buckeridge, MD, PhD, FRCPC

ORIGINAL INVESTIGATION

Infection **RATES**

Following Intensive Care Unit

^
SWITCH TO AN ALL-PRIVATE-ROOMS

*Dana Y. Teltsch, MSc; James Hanley, PhD; Vivian Loo, MD, MSc, FRCPC; Peter Goldberg, MD, FRCPC;
Ash Gursahaney, MD, FRCPC; David L. Buckeridge, MD, PhD, FRCPC*

the MGH

Methods: We compared the rates of acquisition of infectious organisms in an ICU **before** and **after** a change from multibed to single rooms. As a control, we used acquisition rates in the ICU of a nearby university teaching hospital, which contained both multibed and single rooms, during the study period. We used a statistical model to adjust for background time trends common to both hospitals.

*the
RVH*

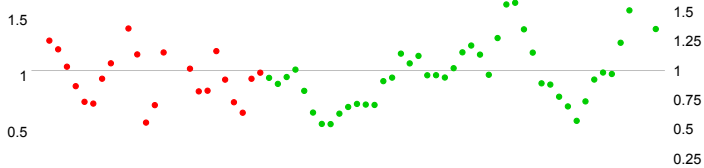
XXXXXXXXX

xxxx Ratio (MGH vs RVH)



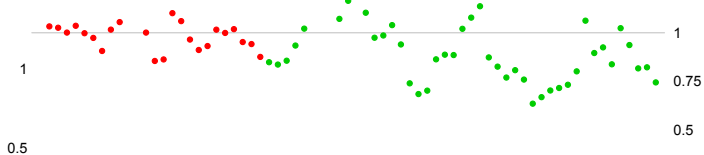
YYYYYYYYY

yyyy Ratio (MGH vs RVH)



ZZZZZZZZZ

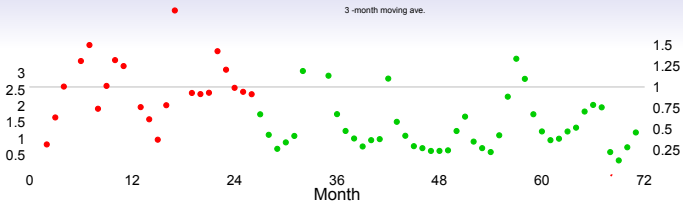
zzzz Ratio (MGH vs RVH)



XXXXXXXXX

xxxx Ratio (MGH vs RVH)

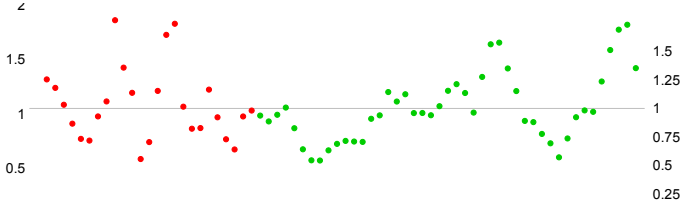
- * C difficile
- * MRSA
- * VRE
- * Acinetobacter species
- * Stenotrophomonas maltophilia
- * Fungal-molds



YYYYYYYYY

yyyy Ratio (MGH vs RVH)

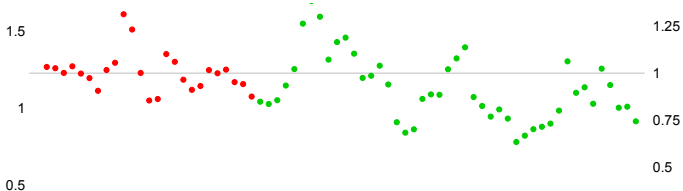
- * Coagulase-negative Staphylococcus species
- * Haemophilus species
- * Streptococcus viridans



ZZZZZZZZZ

zzzz Ratio (MGH vs RVH)

- * Number of Days Stay in the ICU



0.5

0.5

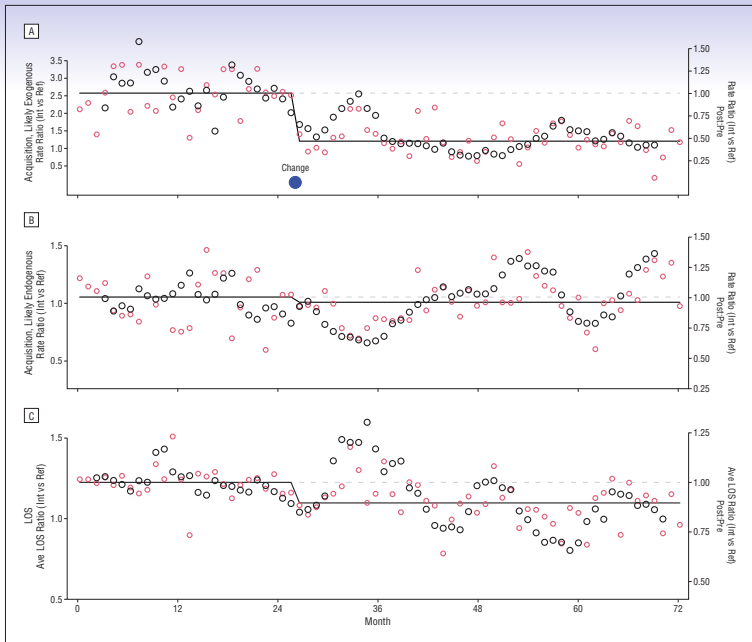


Figure. Monthly contrasts of event rates and length of stay (LOS) in the intervention (Int) vs comparison (Ref) hospitals preintervention (Pre) and postintervention (Post). Black circles represent ratios within each month; brighter (red) circles represent the fitted residuals. On the left is the axis of the ratios; on the right, the magnitude of the change in the average (Ave) ratios pre-post intervention. A, Monthly ratios of acquisition rates of likely exogenous organisms. B, Monthly ratios of acquisition rates of likely endogenous organisms. C, Monthly ratios of average LOS.

Infection Acquisition Following Intensive Care Unit Room Privatization

Dana Y. Teltsch, MSc; James Hanley, PhD; Vivian Loo, MD, MSc, FRCPC; Peter Goldberg, MD, FRCPC; Ash Gursahany, MD, FRCPC; David L. Buckeridge, MD, PhD, FRCPC

Background: Patients in intensive care units (ICUs) often acquire infections, which impose a heavy human and financial burden. The use of private rooms may reduce the acquisition of certain pathogens, but the limited evidence on this topic is inconsistent.

Methods: We compared the rates of acquisition of infectious organisms in an ICU before and after a change from multibed to single rooms. As a control, we used acquisition rates in the ICU of a nearby university teaching hospital, which contained both multibed and single rooms, during the study period. We used a statistical model to adjust for background time trends common to both hospitals.

Results: The adjusted rate of acquisition of *Clostridium difficile*, vancomycin-resistant *Enterococcus* species, and methicillin-resistant *Staphylococcus aureus* combined decreased by 54% (95% confidence interval [CI], 29%-70%) following the intervention. The methicillin-

resistant *S aureus* acquisition rate fell by 47% (95% CI, 1%-71%), the *C difficile* acquisition rate fell by 43% (95% CI, 7%-65%), and the yeast acquisition rate fell by 51% (95% CI, 34%-64%). Twelve common and likely exogenous organisms and exogenous/endogenous organisms had a reduction in acquisition rates after the intervention; for 6 of them, this reduction was statistically significant. No effect was observed on the acquisition rate of coagulase-negative *Staphylococcus* species, the most common endogenous organism, for which no change would be expected. The adjusted rate ratio of the average length of stay in the ICU was 10% (95% CI, 0%-19%) lower after the intervention.

Conclusion: Conversion to single rooms can substantially reduce the rate at which patients acquire infectious organisms while in the ICU.

The biggest-ever public health experiment

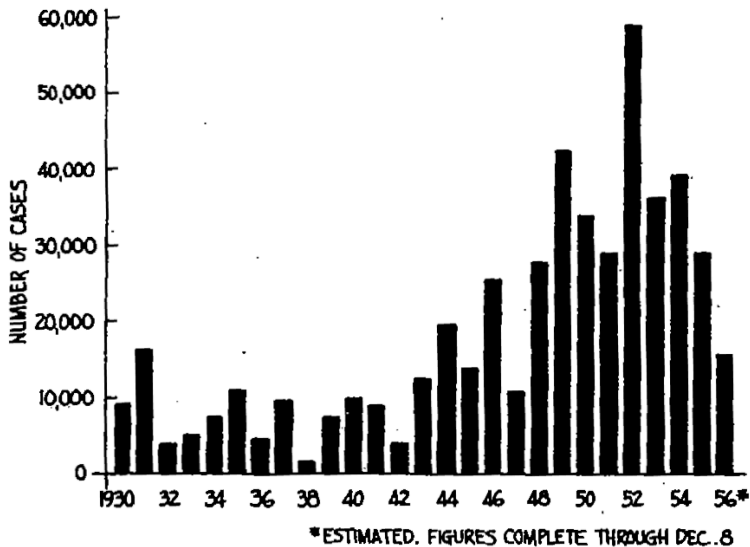


FIGURE 1

Poliomyelitis in the U.S., 1930-56. Source: Meier (1957)

STUDY GROUP	STUDY POPULATION
-------------	---------------------

All areas: Total	1,829,916
-------------------------	-----------

Placebo control areas: Total	749,236
-------------------------------------	---------

Vaccinated	200,745
------------	---------

Placebo	201,229
---------	---------

Not inoculated*	338,778
-----------------	---------

Observed control areas: Total	1,080,680
--------------------------------------	-----------

Vaccinated	221,998
------------	---------

Controls**	725,173
------------	---------

Grade 2 not inoculated	123,605
------------------------	---------

Source: Adapted from Francis (1955), Tables 2 and 3.

* Includes 8,577 children who received one or two injections of placebo.

** First- and third-grade total population.

POLIOMYELITIS CASES

STUDY GROUP	STUDY POPULATION	Paralytic	
		No.	Rate
All areas: Total	1,829,916	685	37
Placebo control areas: Total	749,236	270	36
Vaccinated	200,745	33	16
Placebo	201,229	115	57
Not inoculated*	338,778	121	36
Observed control areas: Total	1,080,680	415	38
Vaccinated	221,998	38	17
Controls**	725,173	330	46
Grade 2 not inoculated	123,605	43	35

Source: Adapted from Francis (1955), Tables 2 and 3.

* Includes 8,577 children who received one or two injections of placebo.

** First- and third-grade total population.

(Rates per 100,000)

Take-away messages

- The knowledge behind public health practice: it's a major contributor to improved longevity & health
- Evidence that advances this knowledge is not easily obtained
- It takes smarts, big (and small) data, time, ...
- It takes time for evidence to be translated into correct knowledge

FUNDING, CO-ORDINATES, DOWNLOADS

Natural Sciences and Engineering Research Council of Canada

Le Fonds québécois de la recherche sur la nature et les technologies

Canadian Institutes of Health Research (2011-2014)

.....

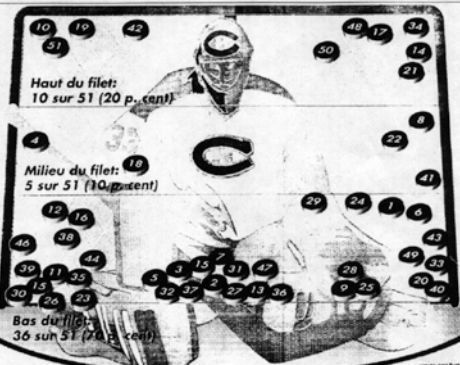
James.Hanley@McGill.CA

<http://www.med.mcgill.ca/epidemiology/hanley/minimed>

La Presse
Sports

**Sutter a trop parlé;
 personne ne va
 toucher à Roy,
 foi de Carbo**

Page 2 à 3



Pour battre Roy, mieux vaut lancer bas...

Quand on se rappelle que les gens des Bruins de Boston ne savent pas lancer les tirs, on s'étonne que Roy en ait lancé dans le haut du filet, comme il l'a fait lors de sa dernière sortie sur le terrain. Le joueur de l'équipe de Boston a réussi à lancer 10 tirs dans le haut du filet sur 51 tirs au total. Au cours des cinq dernières saisons, les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total. Les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total. Les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total.

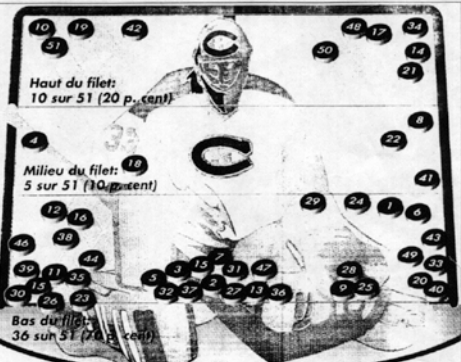
Le joueur de l'équipe de Boston ne sait pas lancer les tirs, on s'étonne que Roy en ait lancé dans le haut du filet, comme il l'a fait lors de sa dernière sortie sur le terrain. Le joueur de l'équipe de Boston a réussi à lancer 10 tirs dans le haut du filet sur 51 tirs au total. Au cours des cinq dernières saisons, les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total. Les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total. Les Bruins ont lancé 10 tirs dans le haut du filet sur 51 tirs au total.

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La Presse
Sports

**Sutter a trop parlé;
personne ne va
toucher à Roy,
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Page 2 à 3



Pour battre Roy, mieux vaut lancer bas...

Quand même étonnant que les gens des Bruins de Boston ne soient pas plus intéressés. En évitant Sutter Roy ne va pas dans le haut du filet, comme il veut lui aussi, les Bruins perdent leur temps. Le joueur le plus efficace pour le moment au cours des cinq matches des séries éliminatoires est Sutter, un joueur le Canadien a inscrit 11 buts (16 contre les Nordiques, 12 face aux Sabres, 11 et 12 face aux Islanders et aux Kings). Des 51 buts inscrits par le meilleur gardien du monde, 25, soit 72 p. cent d'entre eux, ont eu la rampe parvenant dans la partie inférieure du filet, à 46 la queue comme on dit. Sutter en 22, soit 43 p. cent. Les succès ont été après la partie supérieure du filet. La série de 1983-84, Roy réussit malheureusement à cacher les tacles de l'attaque. Les joueurs ont bien remarqué sur les oppositions, on en est sûr. Plus en forme, le gardien Roy dans la Presse d'her au volontarisme puisqu'il s'agit de... (text is partially obscured)

AUTOUR DU... 13248

Numbers of Goals

10

5

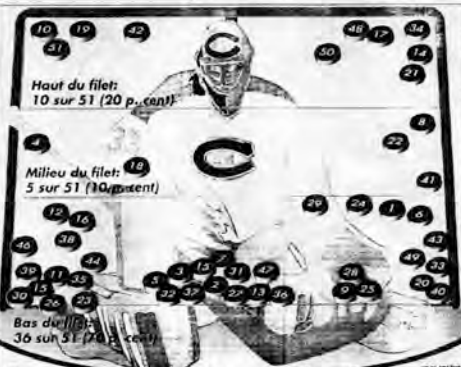
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51

La Presse
Sports

**Sutter a trop parlé;
personne ne va
toucher à Roy,
foi de Carbo**

Page 2 et 3



Pour battre Roy, mieux vaut lancer bas...

Quand même étonnant que les gens des Bruins ne soient pas plus intéressés. Ils veulent battre Roy en lançant dans le haut du filet. Pourquoi ? C'est sûr, les Bruins ont un meilleur joueur. Le joueur, le gardien, le point à deux. Au cours des sept matches des séries éliminatoires il a marqué six buts. Le joueur a marqué 11 buts et 17 points en 12 matchs. Les Bruins ont marqué 11 et 12 buts sur 51 tirs au total. Les 11 buts marqués par le meilleur gardien de la ligue. Il a 10772 et 2000 tirs au total. Pourquoi les Bruins ne sont pas plus intéressés ?

Il n'y a pas de quoi s'étonner. Les Bruins ont un meilleur gardien. Le joueur, le point à deux. Au cours des sept matches des séries éliminatoires il a marqué six buts. Le joueur a marqué 11 buts et 17 points en 12 matchs. Les Bruins ont marqué 11 et 12 buts sur 51 tirs au total. Les 11 buts marqués par le meilleur gardien de la ligue. Il a 10772 et 2000 tirs au total. Pourquoi les Bruins ne sont pas plus intéressés ?

**Numbers of
Goals SHOTS**

10 202

5 101

36 297

51 600

