



Office of Clinical Research First Friday

 **Health**™ IN SCIENCE LIVES HOPE.

**Ignaz Semmelweis
and Childbed Fever**

Friday, November 5th, 2021

Learning Objectives:

- 1) Describe how hand washing reduces illness in the hospital setting**
- 2) Recognize the statistical elements required to compare two groups**
- 3) Explain why handwashing is one of the most effective actions taken in order to reduce the spread of pathogens and prevent infections**
- 4) Understand historical aspects of scientific advancements, and how barriers to health care advances are still propagated in the modern world**

Target Audience:

Clinical Research Professionals (CRPs) at UC/H and Cincinnati Children's Hospital Medical Center (CCHMC): including Principal Investigators (PIs), Research Nurses (RNs), Critical Care Unit Nurses (RNs), Pharmacy Technicians and Regulatory Specialists.

Off-Label Disclosure Statement:

Faculty members are required to inform the audience when they are discussing off-label, unapproved uses of devices and drugs. Physicians should consult full prescribing information before using any product mentioned during this educational activity.

Learner Assurance Statement

The University of Cincinnati is committed to resolving all conflicts of interest issues that could arise as a result of prospective faculty members' significant relationships with drug or device manufacturer(s). The University of Cincinnati is committed to retaining only those speakers with financial interests that can be reconciled with the goals and educational integrity of the CME activity.

Accreditation Statement for Directly Sponsored Activity

The University of Cincinnati is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The University of Cincinnati designates this live activity for a maximum of 1 *AMA PRA Category 1 Credit*™. Participants should claim only the credit commensurate with the extent of their participation in the activity.

CRPs, NPs, PAs, and RNs can count activities certified for *AMA PRA Category 1 credit*™ for professional credit reporting purposes. Other healthcare professionals should inquire with their certifying or licensing boards.

Disclaimer Statement

The opinions expressed during the live activity are those of the faculty and do not necessarily represent the views of the University of Cincinnati. The information is presented for the purpose of advancing the attendees' professional development.

Speaker Disclosure:

In accordance with the ACCME Standards for Commercial Support of CME, the speakers for this course have been asked to disclose to participants the existence of any financial interest and/or relationship(s) (e.g., paid speaker, employee, paid consultant on a board and/or committee for a commercial company) that would potentially affect the objectivity of his/her presentation or whose products or services may be mentioned during their presentation. The following disclosures were made:

Planning Committee Members:

- Maria Stivers, MS, CIP; Course Director – No Relevant Relationships
- Nathaniel L. Harris, BS, Course Coordinator – No Relevant Relationships
- Zachary Johnson, BS – No Relevant Relationships
- Brandon Armstrong, CME Program Coordinator – No Relevant Relationships

Speakers:

Elizabeth Kopras

Senior Research Associate

Pulmonary, Critical Care & Sleep Medicine

University of Cincinnati

No Relevant Relationships

November 2021 Study of the Month

Obesity Research Study

For Participants That Do Not Have Binge Eating Disorder

What

The purpose of this research study is to learn more about the role of the circadian system in binge eating disorder (BED). Participants will be asked to come in for 4 visits over approximately 4 weeks, and will wear an activity monitor and provide saliva samples.

Who

Adults age 18-50 with obesity that do not have current or lifetime history of BED or bulimia nervosa. Not currently experiencing other psychiatric disorders.

Pay

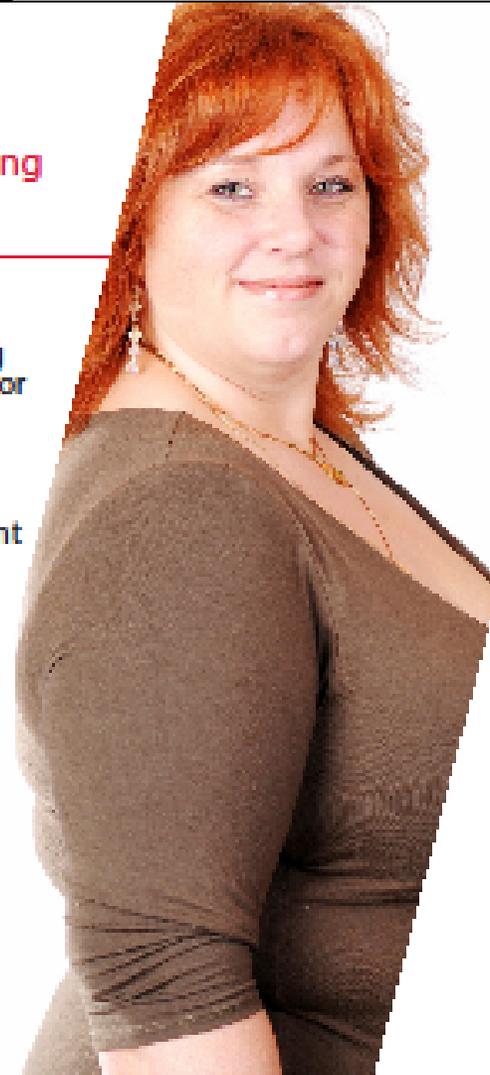
Eligible participants will be paid up to \$215.

Details

For more information, contact Brian or George at (513) 536-0707 or visit LCOH.info and fill out a pre-screen questionnaire. Located at the Lindner Center of HOPE in Mason, Ohio.



14-21 IRB # 2020-0345



Compliance Corner

S.O.P. Update:

Ancillary Research Services Review for UC Health Research Approval:

This SOP has been updated to be congruent with SOP:

UCH-OCR-REV-SOP-002: Submission Process for UC Health Research Approval-06

Updates to the Ancillary Services SOP reflect changes to the UC Health Research Approval Process with our Online Submission System.

Please refer to the recently updated SOP:

UCH-OCR-REV-SOP-009-05: Ancillary Research Services Review for UC Health Research Approval

All OCR SOPs are accessible from the UC Health intranet home page utilizing the Compliance 360 policy search function or reach out to the Office of Clinical Research with any questions or concerns.



Thursday, November 18th, 2021, 12:00noon - 1:00pm
Virtual Presentation

General Data Protection Regulation (GDPR): The European equivalent of HIPAA

Lorren Ratley
Director of Privacy
University of Cincinnati

Today's Presentation:

Ignaz Semmelweis and Childbed Fever

Elizabeth Kopras

Senior Research Associate

Pulmonary, Critical Care & Sleep Medicine

University of Cincinnati

IGNAZ SEMMELWEIS AND CHILDBED FEVER

(HE ACTUALLY DID HIS OWN RESEARCH)

Elizabeth J. Kopras

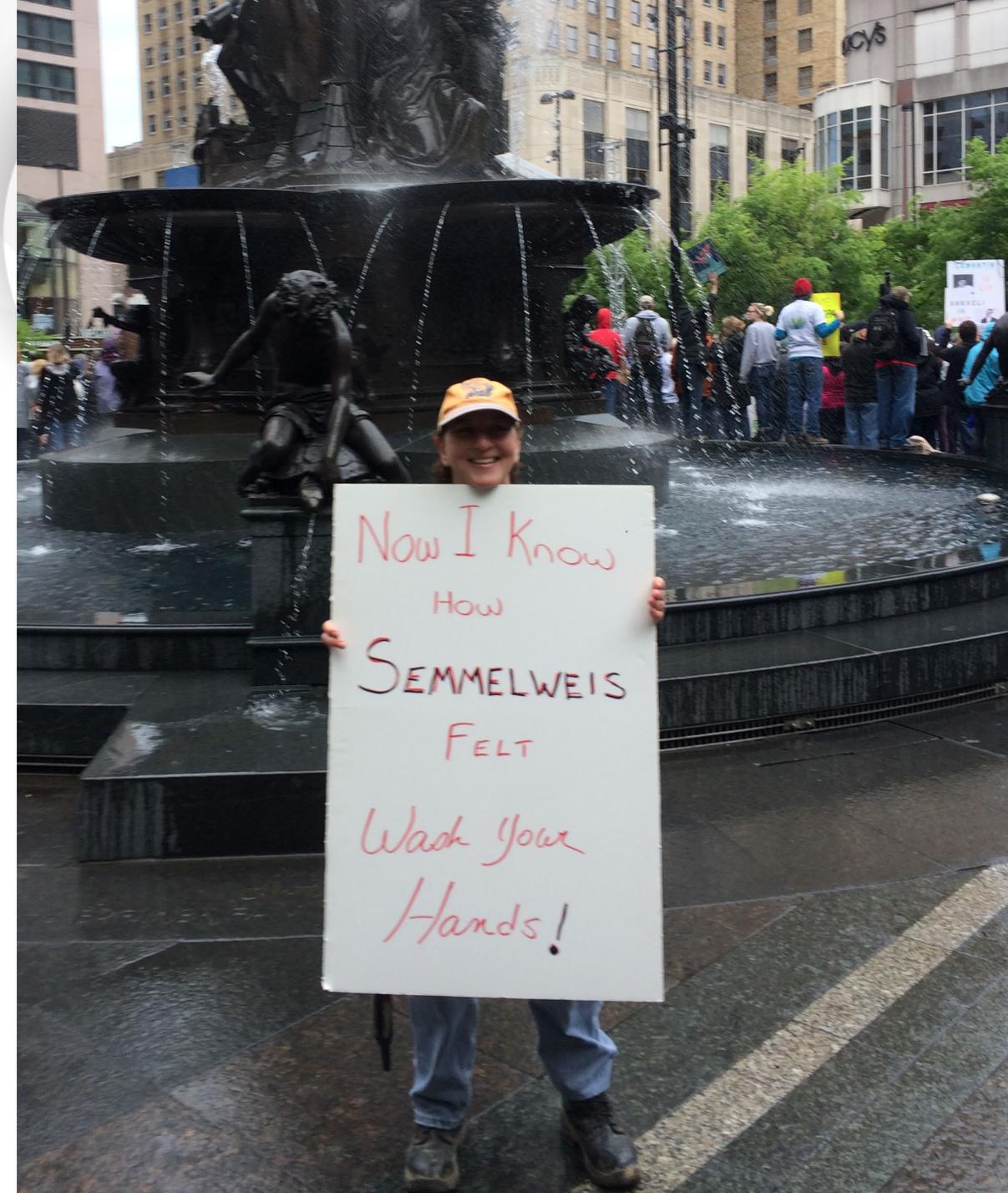
Pulmonary, Critical Care & Sleep Medicine

11/05/2021

Conflicts of interest: None.

LEARNING OBJECTIVES—PARTICIPANTS WILL:

- Describe how hand washing reduces illness in the hospital setting
- Recognize the statistical elements required to compare two groups
- Explain why handwashing is one of the most effective actions you can take to reduce the spread of pathogens and prevent infections
- Historical aspects of scientific advancements, and how barriers to health care advances are still propagated in the modern world



Now I Know
How
SEMMELWEIS
FELT
Wash your
Hands!

Ignaz Semmelweis

“July 1846. Next week I will take up a position as “Herr Doktor” at the First Ward of the [maternity clinic](#) of the Vienna General Hospital.”

“I was frightened when I heard about the percentage of patients who die in this clinic.”

“This month not less than **36 of the 208** mothers died there, all from puerperal fever. Giving birth to a child is as dangerous as first-degree pneumonia.”



28 years old

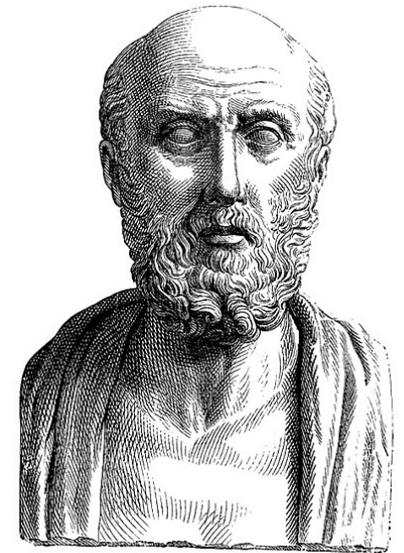
Ignaz Semmelweis—New job

“Delivery with prolonged dilation almost inevitably led to death”

“Everything was in question; everything seemed inexplicable; everything was doubtful. **Only the large number of deaths was an unquestionable reality**”

Puerperal Fever

- Childbed fever, Maternal sepsis, Maternal infection, Puerperal infections
- Endometritis --inflammation of the inner lining of the uterus
- Metrophlebitis --inflammation of the veins of the uterus
- Peritonitis --inflammation of the membrane lining of the abdomen



Hippocrates

Puerperal Fever—ICD-10

- Diagnosis Code **O86.4**
Pyrexia of unknown origin following delivery
- A temperature rise above 38 °C (100.4 °F) maintained over 24 hours or recurring during the period from the end of the first to the end of the 10th day after childbirth or abortion.

Puerperal Fever

- 1-2% of vaginal deliveries (2015)
- 5-13% of C-section deliveries
- 11% of pregnancy-related deaths in the US

- Microbial infections—Ureaplasma, Streptococcus, others

- **Antibiotics**

http://apps.who.int/iris/bitstream/10665/186171/1/9789241549363_eng.pdf

Berenson, AB (April 1990). "Bacteriologic Findings of Post-Cesarian Endometritis in Adolescents". *Obstetrics and Gynecology*. 75 (4): 627–629.

State of knowledge in 1840-50

What causes disease?

- Miasma– bad air or water
- Time of the year
- Unbalanced humours
 - Blood-letting (starting to die out in 1820s)

Top causes of death: Tuberculosis, Dysentery/diarrhea, Cholera, Malaria, Typhoid Fever, Pneumonia, Diphtheria, Scarlet Fever, Meningitis, Whooping Cough

Antonie van Leeuwenhoek (1632–1723)

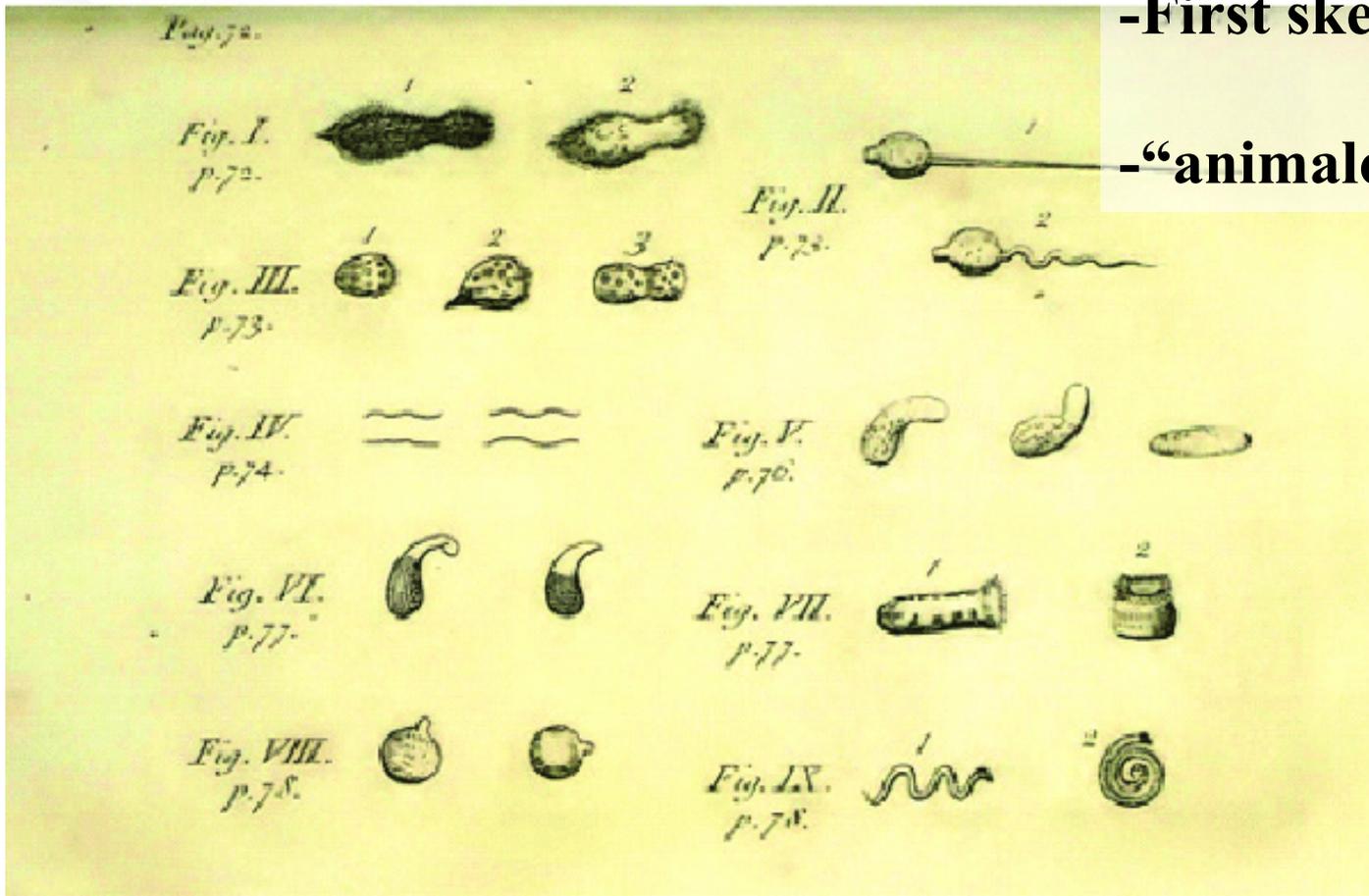
- **Bacteria**

~1676

-Cloudy pepper water

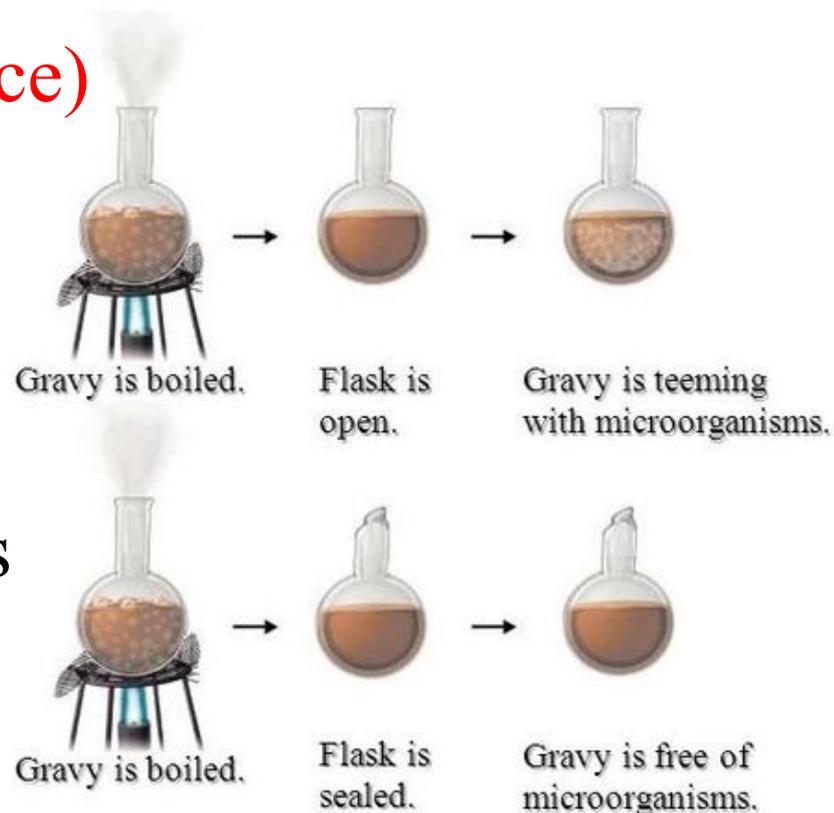
-First sketch of bacteria

-“animalcules”



Spontaneous Generation 1786

- Living organisms arise from nonliving matter (grain =>mice)
- Lazzaro Spallanzani argued against 'spontaneous generation' theory
- But others argued that air was required for spontaneous generation, long boiling destroyed vital force



State of science in 1840's

- 1849 Louis Pasteur marries Marie Laurent
- 1862 Spontaneous generation and germ theory (used cotton)
- 1865 Saved the silk industry by heating silkworm eggs to destroy microbes
- 1879 Extend germ theory to develop vaccines for anthrax, cholera, TB, and smallpox
- 1873 Started attenuating rabies; used it in [1885](#)

Viruses– Tobacco Mosaic Virus (TMV)

1886-- Adolf Mayer

- Described tobacco mosaic disease transmission

1892-- Dmitri Ivanovsky

- Filtered out bacteria (*‘unculturable tiny bacterium’*)
- Sap remained infectious despite filter

1898--Martinus Beijerinck *Contagium vivum fluidum*

1935--Wendell Meredith Stanley

- Crystallized virus; Nobel prize in chemistry, 1946

1958—Rosalind Franklin spent a month with Stanley

- Designed a model of TMV for the 1958 Worlds' fair
- Speculated that virus was hollow, ssRNA

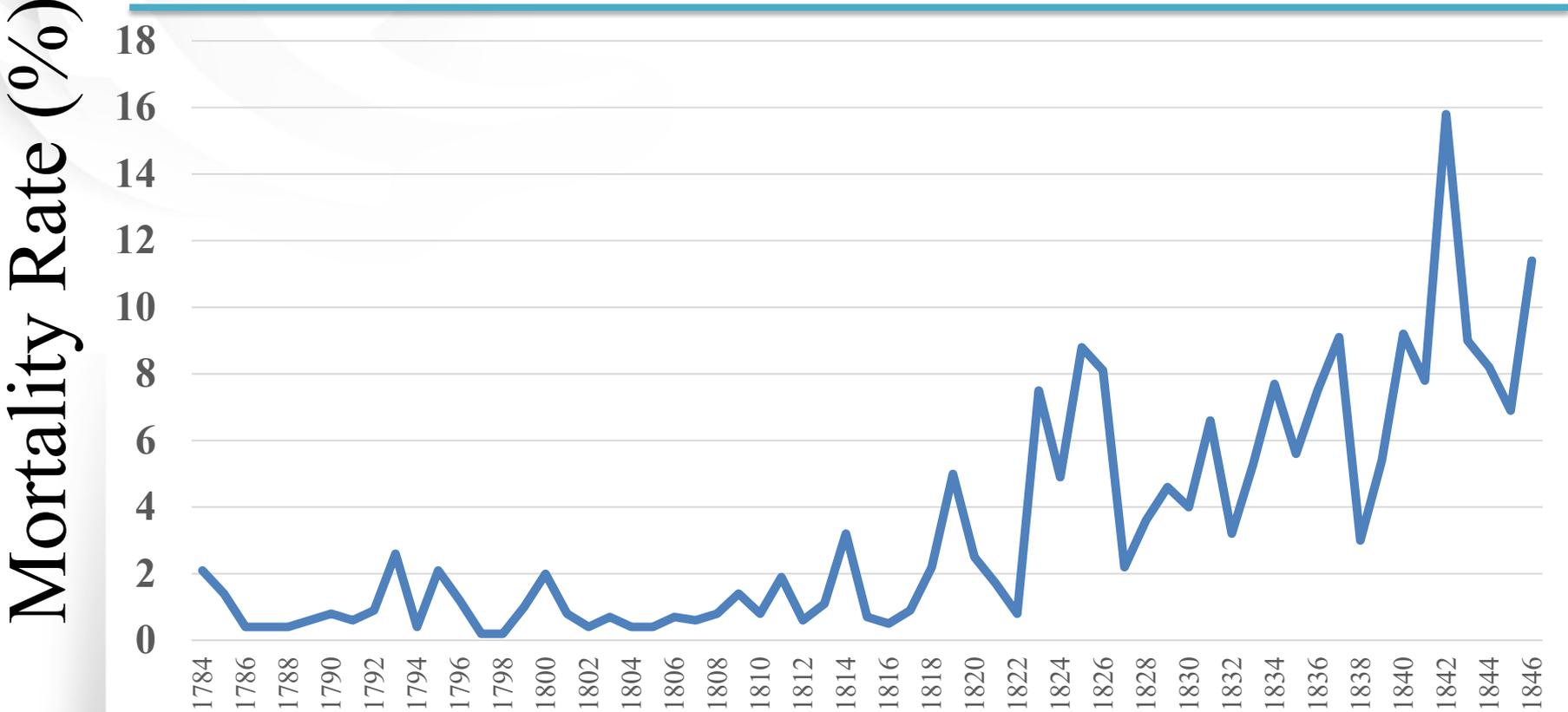
Maternity ward deaths: Hypotheses

- Using what we know, make a testable statement about cause and effect
- Science—process of creating hypotheses with the least bias possible

1861--The Etiology, Concept, and Prophylaxis of Childbed Fever

1983 Carter translation

Are mortality rates stable?

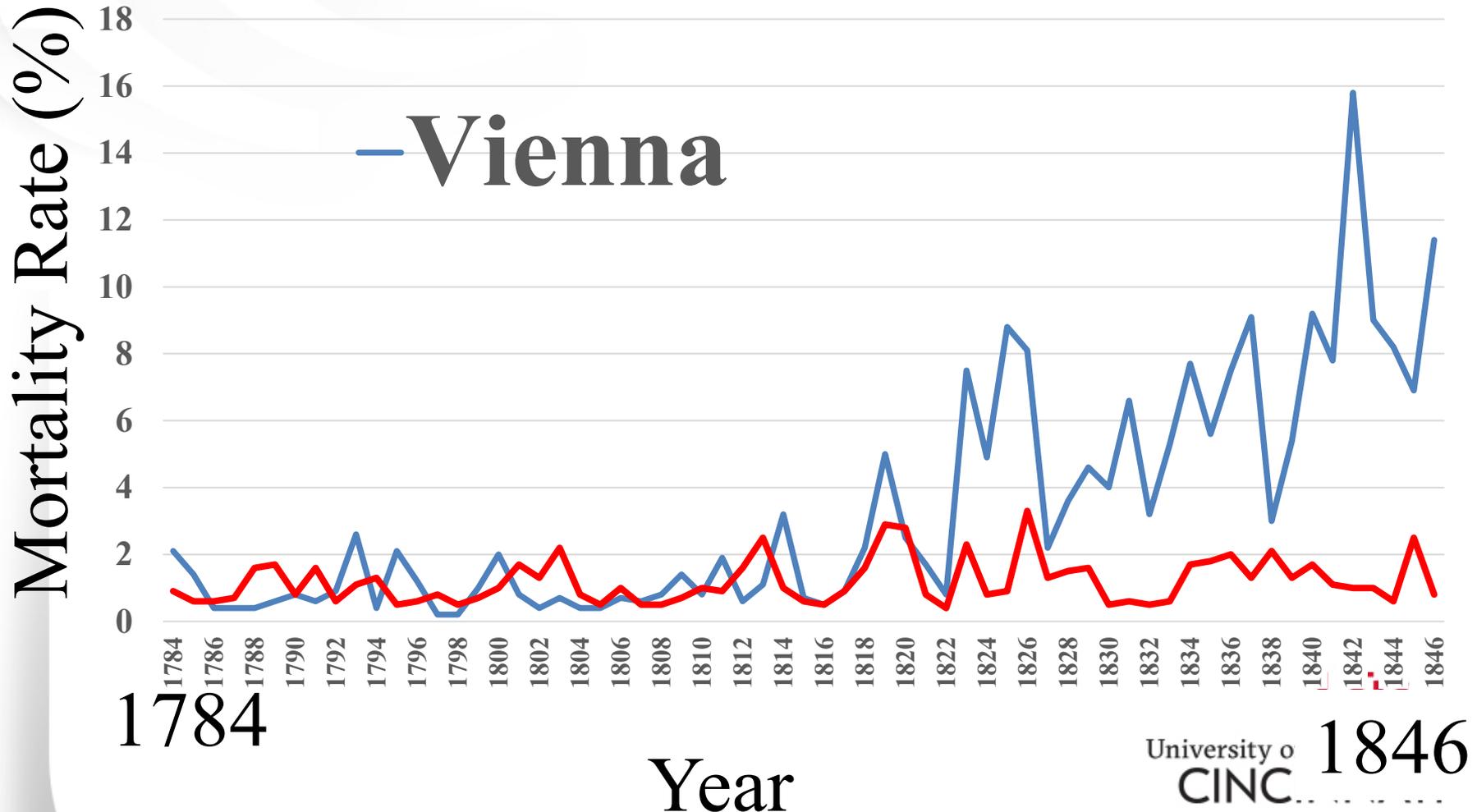


1784

1846

Year

Mortality rates by year – Vienna vs. Dublin



Are deaths caused by Miasma?

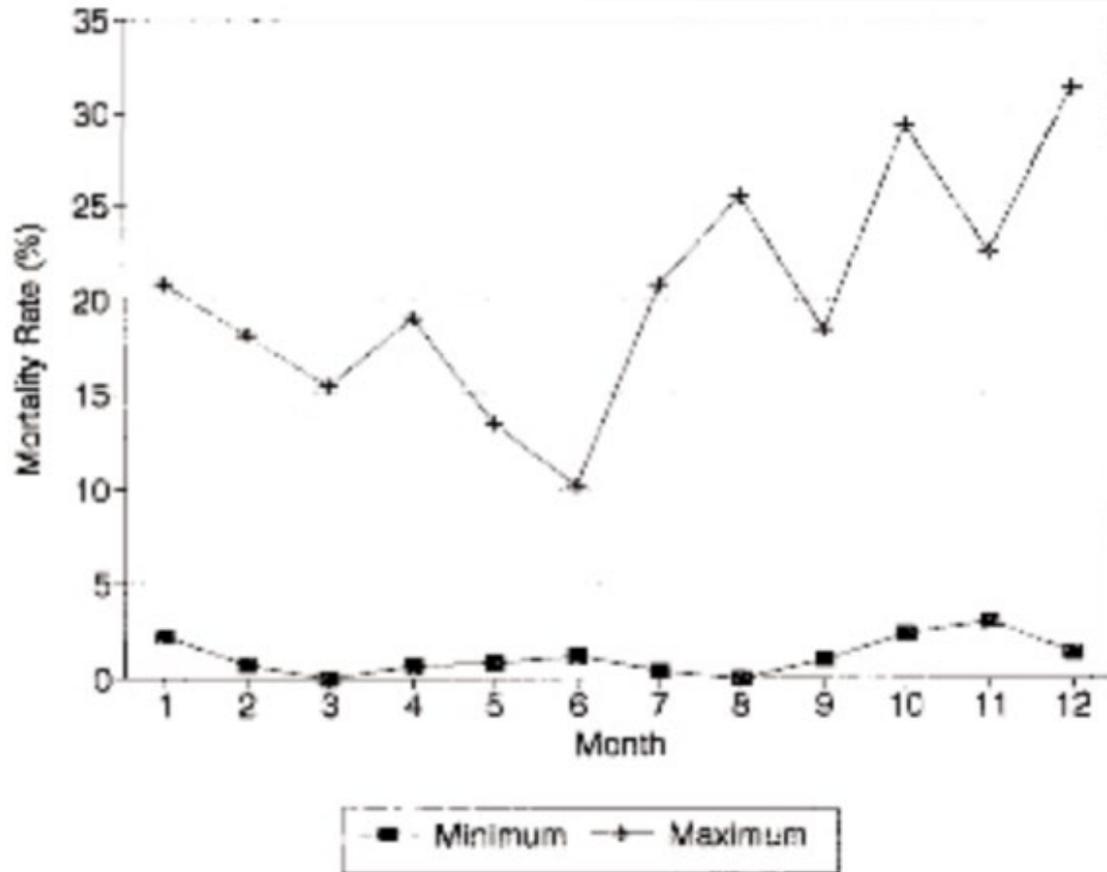


FIGURE 3. Extreme mortality rates by month Semmelweis used the great difference in the minimum and maximum to show that outbreaks of puerperal fever could occur in any month. The period covered is the years 1841 to 1849

Malaria
Yellow fever



1st Clinic vs 2nd Clinic

- Obstetric students
- Men
- Midwives
- Women

| Sunday | Monday | Tuesday | Wednes | Thurs | Friday | Saturday |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1 st | 1 st | 2 nd | 1 st | 2 nd | 1 st | 2 nd |

Are clinic mortality rates the same?

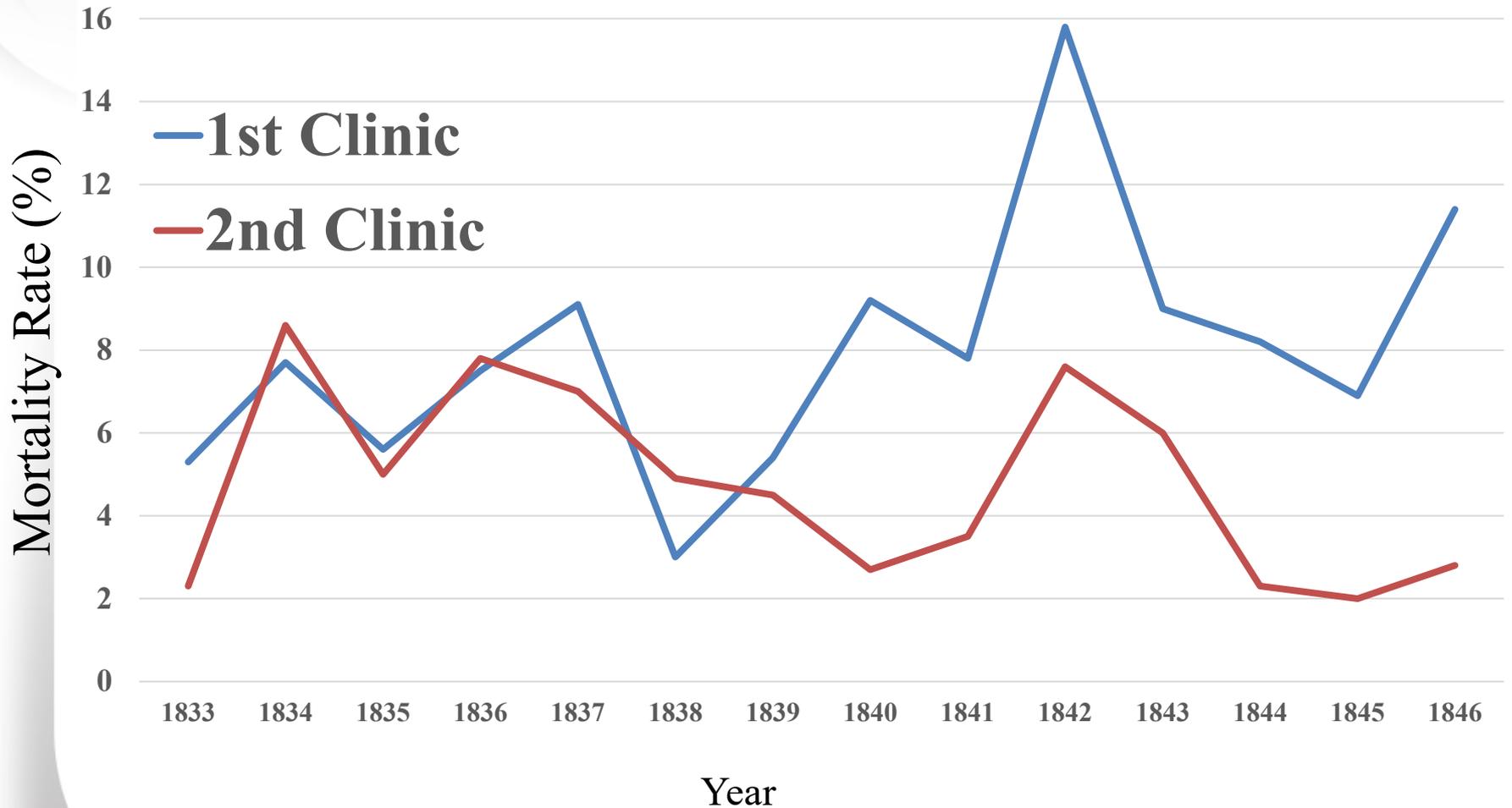
[3] TABLE 1

| | First Clinic | | | Second Clinic | | |
|-------|--------------|--------|------|---------------|--------|------|
| | Births | Deaths | Rate | Births | Deaths | Rate |
| 1841 | 3,036 | 237 | 7.7 | 2,442 | 86 | 3.5 |
| 1842 | 3,287 | 518 | 15.8 | 2,659 | 202 | 7.5 |
| 1843 | 3,060 | 274 | 8.9 | 2,739 | 164 | 5.9 |
| 1844 | 3,157 | 260 | 8.2 | 2,956 | 68 | 2.3 |
| 1845 | 3,492 | 241 | 6.8 | 3,241 | 66 | 2.03 |
| 1846 | 4,010 | 459 | 11.4 | 3,754 | 105 | 2.7 |
| Total | 20,042 | 1,989 | | 17,791 | 691 | |
| Avg. | | | 9.92 | | | 3.38 |

Actually higher, because 1st clinic transfers to general hospital

1st Clinic vs 2nd Clinic

1840—Male and female students separated



Overcrowding?

exist or that the second clinic must have the larger rate. [11] If overcrowding were the cause of death, mortality in the second clinic would have been larger, because the second clinic was more crowded than the first. Because of the bad reputation of the first clinic, everyone sought admission to the second clinic. For this reason, the second clinic was often unable to resume admissions at the specified time because it was impossible to accommodate new arrivals. Or if the second clinic began to admit, within a few hours it was necessary to resume admitting patients to the first clinic because the passageway was crowded with such a great number of persons awaiting admission to the second clinic. In a short time all the free places were taken. In the five years I was

Overcrowding?

2nd clinic more crowded than 1st

short time all the free places were taken. In the five years I was associated with the first clinic, not once did overcrowding make it necessary to reopen admission to the second clinic. This was true even though once each week the first clinic admitted continuously for a period of forty-eight hours. In spite of this overcrowding, the mortality rate in the second clinic was strikingly smaller.

Epidemic influences?

- Atmospheric-cosmic-terrestrial conditions
- But the atmosphere is the same for 1st and 2nd clinic

ences, the same conditions must operate with minimal variation in the second clinic. Otherwise, one is forced to the unreasonable assumption that lethal epidemic influences undergo twenty-four-hour remissions and exacerbations and that the remissions, through a series of years, have exactly coincided with admissions to the second clinic, while the exacerbations begin precisely at the time of admission to the first clinic.

Sick building syndrome?

Could contagion be ‘left over’ in the rooms?

[13–32] One may believe that a location in which so many thousands of individuals have given birth, contracted childbed fever, and died must inevitably be so infested that the presence of childbed fever is no surprise. If this were the case, however, the mortality in the second clinic would be greater, since in the location of the second clinic, even in [Rogers Lucas Johann] Boër's times,⁴ serious epidemics of puerperal fever raged. At that time, the building now occupied by the first clinic was not even built.

Patients scared to death?

It has been proposed that the evil reputation of the institution, with its great annual contingent of deaths, so frightens the newly admitted patients that they become ill and die. The patients really do fear the first clinic. Frequently one must witness moving scenes in which patients, kneeling and wringing their hands, beg to be released in order to seek admission to the second clinic. Such persons have usually been admitted because they are ignorant of the reputation of the first clinic, but they soon become suspicious because of the large number of doctors present. [33] One

sees maternity patients with abnormally high pulse rates, bloated stomachs, and dry tongues (in other words, very ill with puerperal fever), still insisting only hours before death that they are perfectly healthy, because they know that treatment by the physicians is the forerunner of death. Nevertheless, I could not con-

Patients scared to death?

perfectly healthy, because they know that treatment by the physicians is the forerunner of death. Nevertheless, I could not convince myself that fear was the cause of the high mortality rate in the first clinic. As a physician, I could not understand how fear, a psychological condition, could bring about such physical changes as occur in childbed fever. Moreover, it would have required a long period of time with consistently unequal mortality rates for ordinary people, who did not have access to hospital reports, to become aware that one clinic had a much greater mortality rate than the other. Fear could not account for the initial difference.

Soldiers are in fear-inducing situations and don't develop fever

Single women? Street delivery?

The high mortality was also attributed to the clinic's practice of admitting only single women in desperate circumstances. These women had been obliged throughout their pregnancies to support themselves by working hard. They were miserable and in great need, often malnourished, and may have attempted to induce miscarriages. But if these conditions constituted the cause, the mortality rate in the second clinic should have been the same, since the same type of women were admitted there.

one hundred cases.

As I have noted, women who delivered on the street contracted childbed fever at a significantly lower rate than those who delivered in the hospital. This was in spite of the less favorable conditions in which such births took place. [45] Of course, in most of these cases delivery occurred in a bed with the assistance of a midwife. Moreover, after three hours our patients were obliged to walk to their beds by way of the glass-enclosed pas-

Priest scaring patients?

Even religious practices did not escape attention. The hospital chapel was so located that when the priest was summoned to administer last rites in the second clinic, he could go directly to the room set aside for ill patients. On the other hand, when he was summoned to the first clinic he had to pass through five other rooms because the room containing ill patients was sixth in line from the chapel. According to accepted Catholic practice,

had to be summoned again. [34] One can imagine the impression that was created on the other patients when the priest came several times a day, each time accompanied by the clearly audible bell. Even to me it was very demoralizing to hear the bell hurry past my door. I groaned within for the victim who had fallen to an unknown cause. The bell was a painful admonition to seek

Priest scaring patients?

that even this difference in the two clinics explained the different mortality rates. During my first period of service, I appealed to the compassion of the servant of God and arranged for him to come by a less direct route, without bells, and without passing

through the other clinic rooms. Thus, no one outside the room containing the ill patients knew of the priest's presence. The two clinics were made identical in this respect as well, but the mortality rate was unaffected.

The first **intervention** that is mentioned

Modesty? Presence of men?

It had also been suggested that the mortality rate in the first clinic resulted from the offense to modesty incurred through the presence of males at delivery. As those familiar with the Viennese maternity hospital realize, patients are troubled by fear but not by offended modesty. Moreover, it is not clear how this offended modesty would bring about the exudative mortal processes of the disease.

Looking for the **mechanism** of disease

Conception ?

proposed as causes of childhood leukaemia.

Recent investigators blame the disease on the most remote of all possible causes—conception itself. Supposedly, the penetration of sperm occasions a manifold series of alterations, including partially unknown changes in the blood. But I suspect that I am not misinformed in claiming that those who delivered in the second clinic must also have conceived. What is the origin, then,

Rough handling?

It had also been proposed that the high mortality rate in the first clinic resulted from the obstetricians examining the patients in a rougher manner than did the student midwives. [35] If inserting the finger, however roughly, into the vagina and to the adjacent parts of the uterus—already widened and extended by pregnancy—was sufficient to cause damages leading to so horrible a condition, then surely the passage of the baby's body through the birth canal must cause damage so much worse that every birth would end in the death of the mother.

- Mechanism
- True difference between 1st and 2nd clinic
- Could blame foreign students

Rough handling?

- Reduced # of male examiners
- Reduced # of exams

- Got rid of foreigners

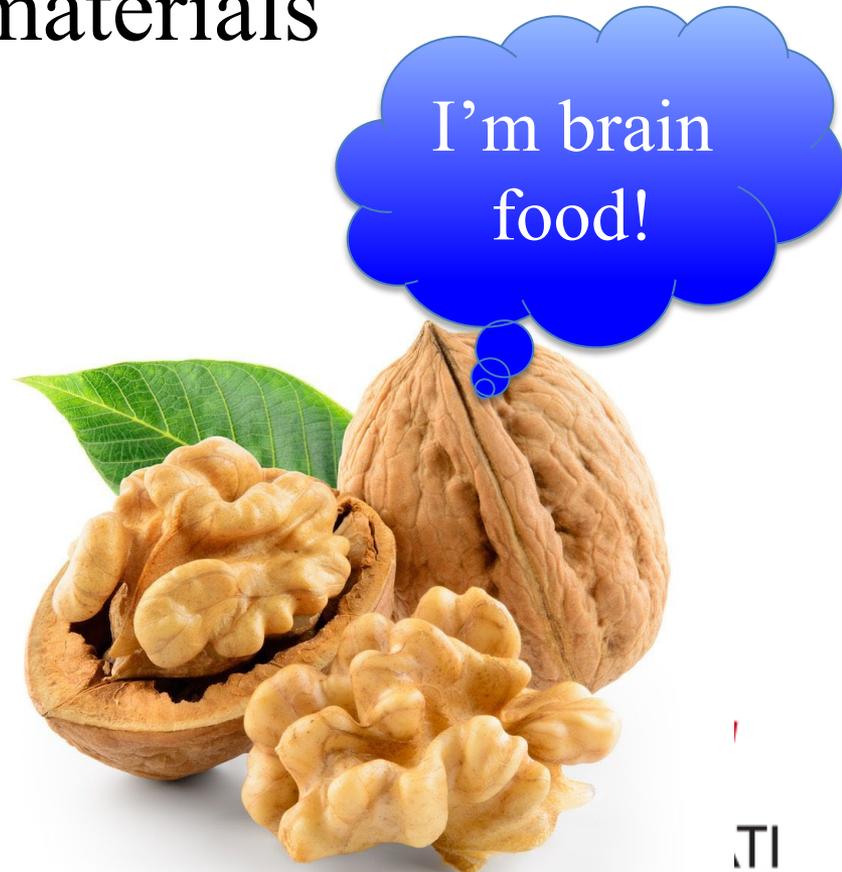
their examinations. [49] As a result of this opinion the number of students was reduced from forty-two to twenty. Foreigners were almost entirely excluded, and examinations were reduced to a minimum. The mortality rate did decline significantly in December 1846, and in January, February, and March of 1847. But in spite of these measures, fifty-seven patients died in April and thirty-six more in May. This demonstrated to everyone that the view was groundless. To further the reader's understanding,

Why would patients of medical students have higher mortality rates?

- Professor Jakob Kolletschka died from a minor injury incurred while dissecting a corpse
- Babies also die from fever, along with mothers
- Vienna hospital death rates rose with trainee access to autopsies—
 - Decaying animal organic matter
 - Cadaverous and ichorous particles

Why would patients of medical students have higher mortality rates?

- Nature and property of materials
- Doctrine of signatures
- So, it made sense that dead tissue could make other tissue dead



Cadaverous particles?

- Death rate and anatomy classes

[192] TABLE 15

| | Before Separation of Clinics | | |
|-----------------------------|------------------------------|--------|------|
| | Births | Deaths | Rate |
| Before pathological anatomy | 71,395 | 897 | 1.25 |
| After pathological anatomy | 28,429 | 1,509 | 5.30 |

Hand washing with chlorine

- 1774—Carl Wilhelm Scheele isolated
- 1785—Claude Berthollet bleached fabrics
- 1820—Antoine Germain Labarraque used to combat putrefaction in animal processing
 - Disinfected latrines
 - Clean stables
 - Blackleg in cattle

Hand washing with chlorine

Death rate = 3.57 (1st clinic) 3.06 (2nd clinic)

After Separation of Clinics

| | First Clinic | | | Second Clinic | | |
|--|--------------|--------|------|---------------|--------|------|
| | Births | Deaths | Rate | Births | Deaths | Rate |
| Male and female students Equally divided between clinics | 23,059 | 1,505 | 6.56 | 13,097 | 731 | 5.58 |
| Students divided by sex, before chlorine washings | 20,042 | 1,989 | 9.92 | 17,791 | 691 | 3.38 |
| After chlorine washings | 47,938 | 1,712 | 3.57 | 40,770 | 1,248 | 3.06 |
| Total | 91,043 | 5,206 | | 71,656 | 2,670 | |
| Avg. | | | 5.71 | | | 3.72 |

Hand washing with chlorine

Dublin = 1.84%

Vienna = 2.06%

| | | | | Chlorine Washings Used in Physicians' Clinic | | |
|------|-------|----|------|---|-----|------|
| 1847 | 1,703 | 47 | 2.75 | 3,490 | 176 | 5.00 |
| 1848 | 1,816 | 35 | 1.92 | 3,556 | 45 | 1.27 |
| 1849 | 2,063 | 38 | 1.84 | 3,858 | 103 | 2.06 |



Professional response

- Physicians are not to blame
- Gentlemen's hands are not dirty
- Lots of really bad statistics
 - Letters claiming childbed fever rates were not bad in other hospitals, but **data did not agree**

Political situation

- 1848 –Hungarian revolution
- Semmelweis's superior, Prof. Johann Klein, was a conservative Austrian
- Semmelweis application denied
- left Vienna because he was "unable to endure further frustrations in dealing with the Viennese medical establishment”

After Vienna

1850-1857

- Unpaid position in a small hospital in Pest (Budapest, Hungary)
- First evening, told that childbed fever was raging, but no anatomy classes, so he was wrong

1850-1857 Szent Rókus Hospital

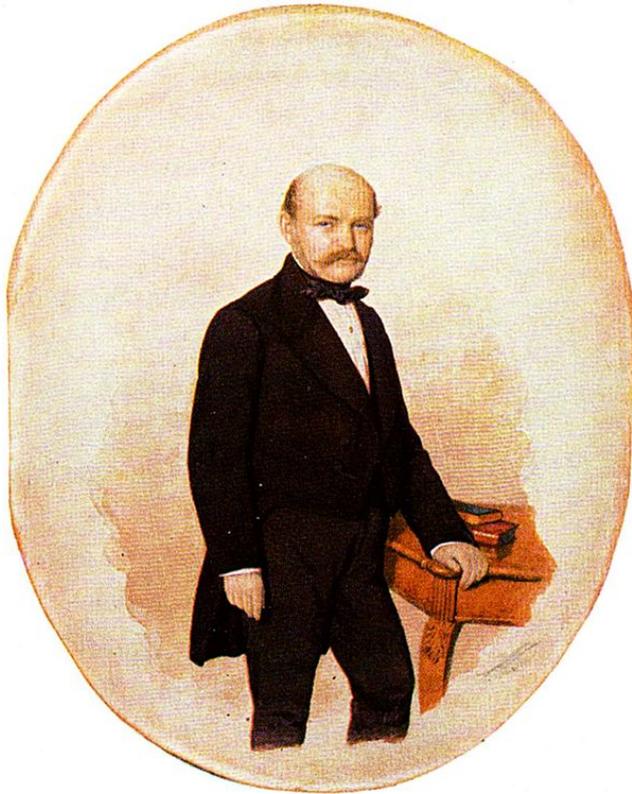
contaminated by decaying animal-organic matter.

On the following morning, in order to convince myself, I visited the maternity hospital. There I found a corpse, not yet removed, of a person who had just died of puerperal fever, another patient in severe agony, and four others seriously ill with the disease. The other persons present were not maternity patients but suffered from various disorders. [82] Thus the unhealthy condition of the maternity patients was clearly established, but this did not contradict but rather confirmed my opinion on the origin of childbed fever. Closer inspection disclosed that the obstetrical ward was not independent but was assigned to a surgical ward. The head physician of obstetrics was simultaneously a head surgeon and a juridical anatomist. Moreover, lacking a coroner, the various division physicians were obliged to perform autopsies. The head physician first visited the surgical wards and then the maternity ward. Thus, while the obstetrical ward of the St. Rochus Hospital had no student examiners whose hands were contaminated with decaying animal-organic matter, the head physician and the other physicians assigned to him, having visited the surgical ward, did examine with contaminated hands.

1850-1857 Szent Rókus Hospital

- Starting hand washing
- Separated surgery and maternity
- 1856--Childhood fever deaths = 0.84% !!
- 1857—death rate increased
 Linens were not washed
- Ede Flórián Birly, U. of Pest director,
 puerperal fever due to uncleanness of the
 bowel
- Purging was the preferred treatment

1857 --- Got Married !



Wedding portraits of Ignaz Semmelweis
and Mária Weidenhofer (1857) Wikipedia

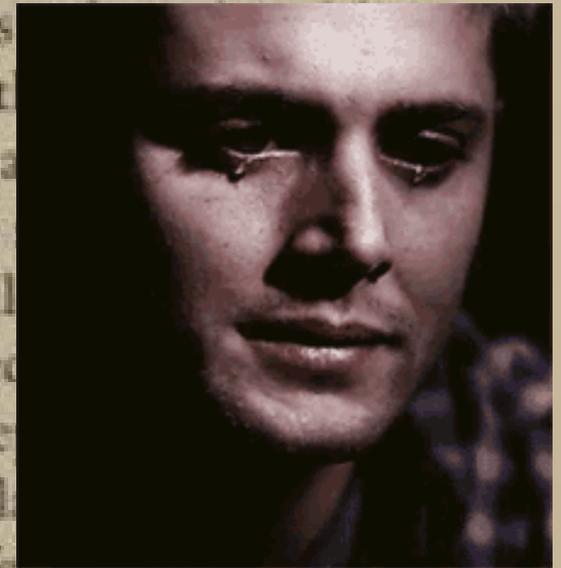
1861 – Publishes ‘Etiology’

- Thought that his previous work should have proved his hypothesis
- Quiet for four years
- “*Experience teaches otherwise*”

[274] This much was public from the beginning. One would have assumed that for scientists, whose purpose is saving lives, such indications would have been sufficient to warrant serious reflection, especially concerning a disease that everyone agrees is so horrible. One would believe that the clarity of things would have made the truth apparent to everyone and that they would have behaved accordingly. Experience teaches otherwise. Most

1861 – Publishes ‘Etiology, Concept, and Prophylaxis of Childbed Fever

have behaved accordingly. Experience teaches
medical lecture halls continue to resound with
demic childbed fever and with discourses against it.
Ever new generations of infectors are thereby
life, and it remains to be seen when the last vill
midwife will infect for the last time. The med
the last twelve years continues to swell with re
epidemics, and in 1854 in Vienna, the birthpla
400 maternity patients died from childbed fever. In published
medical works my teachings are either ignored or attacked. The
medical faculty at Würzburg awarded a prize to a monograph
written in 1859 in which my teachings were rejected. I will cite



Whole section of “Etiology” devoted to refuting publications refuting his work.

1/17

ATI

1861 – Post ‘Etiology’

- Began to denounce prominent European obstetricians as irresponsible murderers
- Drunk and disorderly
- Suggested Alzheimer's or syphilis
- Friend and colleague (von Hebra) invited him to ‘visit’ a new institute
- Semmelweis tried to escape.
- May have been beaten and injured

1865—Epilogue

- Semmelweis put in straight jacket
- Doused with cold water; Laxatives
- Infected wound – died two weeks later; 47yo
- Death not mentioned at Hungarian Association of Physicians and Natural Scientists
- Pest University maternity clinic mortality rate went from 1% to 6%

Handwashing proponents

- 1843—Oliver Wendell Holmes, Sr: Physicians with unwashed hands were responsible for transmitting puerperal fever
- Leading Philadelphia obstetrician, Charles D. Meigs declared that any practitioner who met with epidemic cases of puerperal fever was simply “unlucky.”
- 1856 --*A Manuel of the Practice of Medicine*, George Hilaro Barlow
 - The influence of cadaverous matter in produceing puerperal fever, and the efficacy of chlorine as a disinfectant, ar remarkably shown in the experiences of the Lying-in Hospital at Vienna.

Why is handwashing important?

- Health-care associated infections
- Nosocomial infections
- ~2,000,000 every year*
- ~99,000 Americans die every year*

<https://www.cdc.gov/handhygiene/science/index.html>

Hand Hygiene--Compliance

MICU August 2020: **85%**

MICU August 2021: **50%**

| HHC % | Intervention | HHC % |
|-------|---|-------|
| 49 | Broad-scaled educational efforts (1) | 81 |
| 43 | Light-guided nudging (2) | 55 |
| 64 | Data-driven performance feedback (2) | 80 |
| 49 | Interventional handwashing campaign (3) | 75 |
| 13.2 | Hospital acquired infections | 9 |

1) Kiehl J Prev Med Hyg. 2021; 2) Iversen AM Am J Infect Control. 2021;
3) Gutierrez J Glob Infect Dis. 2021;

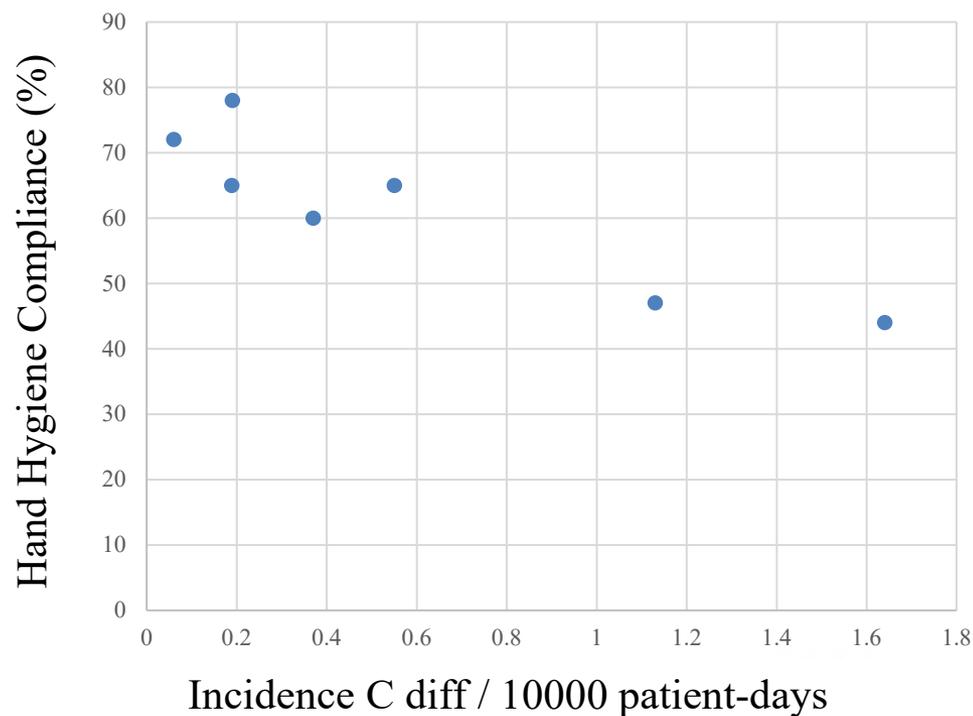
ORIGINAL ARTICLE

Healthcare-associated *Clostridium difficile* infection: role of correct hand hygiene in cross-infection control

R. Ragusa¹, G. Giorgianni², L. Lupo³, A. Sciacca⁴, S. Rametta², M. La Verde², S. Mulè², M. Marranzano^{2,3}

¹Clinical Directorate, University Hospital "G. Rodolico" Catania, Italy; ²School of Specialization in Hygiene University of Catania, Italy; ³Department of Medical, Surgical and Advanced Sciences, University of Catania, Italy; ⁴Microbiological Laboratory A.O.U. Policlinico V. Emanuele, Catania, Italy

| Area | Incidence / 10000 patient-days | Compliance (%) |
|---|--------------------------------|----------------|
| General Medicine area 2016 55 1.64 823 44 | 1.64 | 44 |
| General Medicine area 2015 | 1.13 | 47 |
| Intensive care unit 2016 3 0.37 457 60 | 0.37 | 60 |
| Surgical area 2016 10 0.189 840 65 | 0.189 | 65 |
| Paediatric area 2016 38 0.55 830 65 | 0.55 | 65 |
| Surgical area 2015 4 0.06 840 72 | 0.06 | 72 |
| Paediatric area 2015 8 0.19 828 78 | 0.19 | 78 |



Childbed fever is still with us

Social Science & Medicine 272 (2021) 113543



ELSEVIER

Contents lists available at [ScienceDirect](#)

Social Science & Medicine

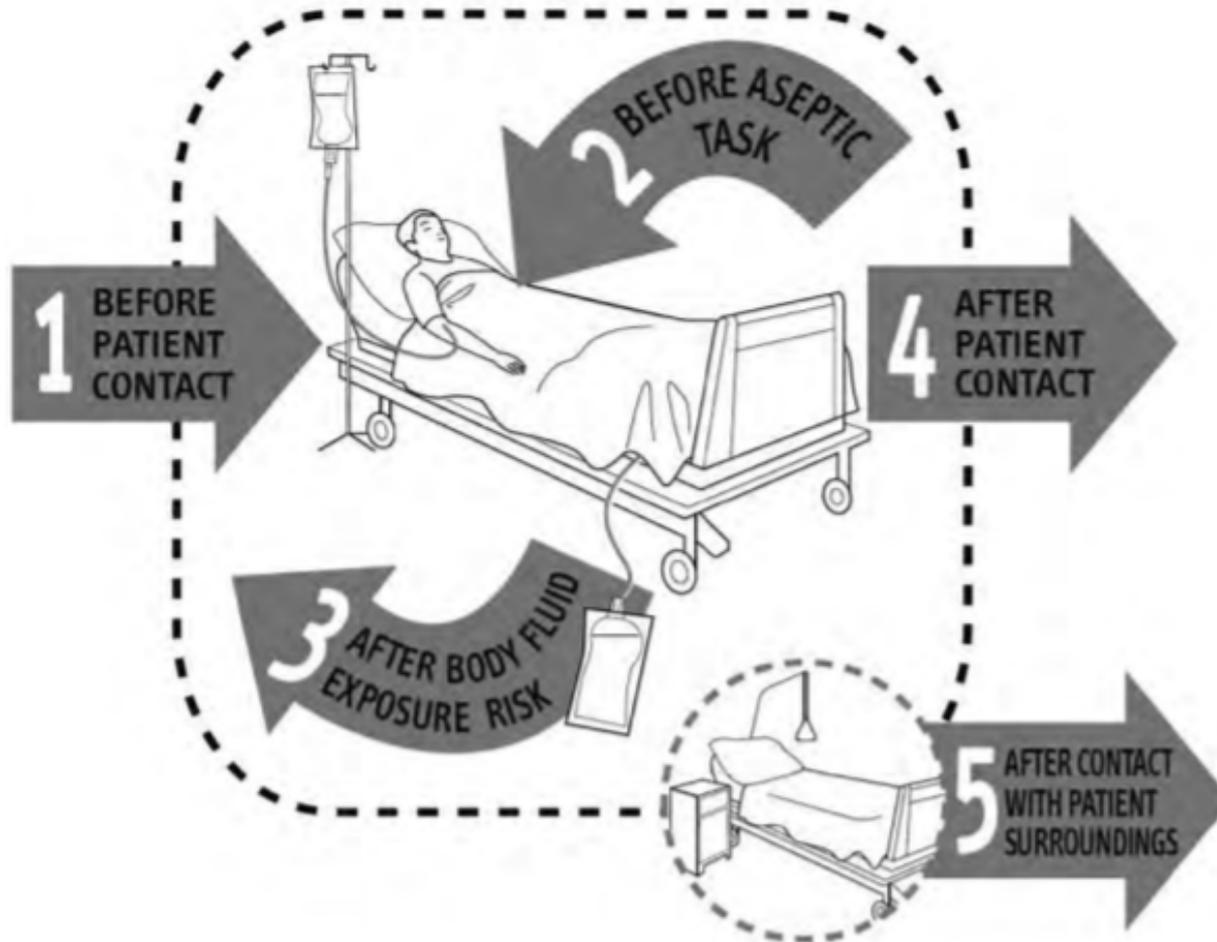
journal homepage: <http://www.elsevier.com/locate/socscimed>

Understanding infection prevention behaviour in maternity wards: A mixed-methods analysis of hand hygiene in Zanzibar

Mícheál de Barra^{a,b,*}, Giorgia Gon^c, Susannah Woodd^c, Wendy J. Graham^{a,c},
Marijn de Bruin^{a,d}, Catherine Kahabuka^e, A. Jess Williams^{a,f}, Khadidja Konate¹, Said M. Ali^g,
Rukaiya Said^h, Loveday Penn-Kekana^c

^a University of Aberdeen, UK

Your 5 moments for HAND HYGIENE*



World Health Organization (WHO): WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft): A Summary. Geneva, Switzerland: WHO, 2006.



WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.



The Joint Commission standards require that health care organizations to:

- implement a hand hygiene program based on regulations, Centers for Medicare & Medicaid Services (CMS) requirements (if deemed), manufacturer instructions and evidence-based guidelines (either Centers for Disease Control and Prevention or World Health Organization)
- identify opportunities to improve compliance with hand hygiene
- set goals to improve compliance based on identified priorities
- monitor compliance with the hand hygiene program and progress toward goals
- improve results through appropriate actions

Handwashing Experiment

- Materials: slices of bread or apples; plastic bags or jars; marker to label; gloves; time
- Using gloves, put one slice in container (control)
- Handle after regular activities
- Handle after **washing** with soap and water
- Handle after using hand sanitizer
- Wipe on commonly used equipment
- Put each slice in a plastic bag or jar; wait

Bread Experiment Results | Jaralee Annice Metcalf



Untouched

Dirty hands

Soap and
water

Hand Sanitizer

Wiped on
Chromebook

IGNAZ SEMMELWEIS

The **ETIOLOGY,**
CONCEPT, and
PROPHYLAXIS
of **CHILDBED**
FEVER

Translated by
K. CODELL CARTER

<https://archive.org/projects/>

- Carter's version is abridged
- Deletes many data tables, animal experiments

Die Aetiologie, der Begriff
und
die Prophylaxis
des
Kindbettfiebers.

Von
Ignaz Philipp Semmelweis,
Dr. der Medicin und Chirurgie, Magister der Geburtshilfe, o. ö. Professor der theoretischen
und practischen Geburtshilfe an der kön. ung. Universität zu Pest
etc. etc.


ity of
CINCINNATI

Semmelweis Reflex / Effect

- The reflex-like tendency to reject new evidence or new knowledge because it contradicts established norms, beliefs, or paradigms
- Illustrates ‘invincible social power of false truths’ (Tomas Szasz)

Epilogue

[537] I do not undertake these polemics because of pugnaciousness. My four years of silence prove this. Given the opposition to my beliefs, however, the unbiased reader will agree not only that the time for silence is past but also that I have the right and obligation to engage in these polemics.

When, with my current convictions, I look into the past, I can endure the miseries to which I have been subjected only by looking at the same time into the future; I see a time when only cases of self-infection will occur in the maternity hospitals of the world. In comparison with the great numbers thus to be saved in the future, the number of patients saved by my students and by me is insignificant. If I am not allowed to see this fortunate time with my own eyes, therefore, my death will nevertheless be brightened by the conviction that sooner or later this time will inevitably arrive.