Pathways in Infectious Diseases: Public Health

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Is This the Face of Public Health?

• “Talk to us about worrying observations in your practice.”

• “We really do care.”
Why **Do** We Get Involved With Public Health?

- Compassion (Altruism)
- Through a population lens, compassion translates to social justice
- Compassion is motivation and perhaps method but we are the principle stewards of other valuable tools
- Epidemiology is essential to your toolkit
What Would A Nice ID/Micro Doc Like You Be Doing in Public Health?

- Surveillance
- Outbreak Investigation
- Discovery (Agents, Tests, Vaccines, Drugs)
- Designing and implementing Controls
- Measuring Impact
Emerging Infectious Diseases

• Newly seen or newly recognized infectious diseases in a population
• There are generic responses
  – Infection control
  – Isolation and Quarantine
  – Pre and post exposure treatment / prevention
• And then we can get creative
Uncertainty is the Seed of Science

• “Not to be absolutely certain is, I think, one of the essential things in rationality.”
  Bertrand Russell

• New answers may be required

• Rapid Response Research
Rapid Recognition, Rapid Response: When Would You Like to Intervene?

Intervene prior to exponential growth phase. Coast to success on the down-slope of the epidemic curve.
The Approach

- Readiness to coordinate during emergencies and experiments of nature
- Public health and Academics Linked
- Interdisciplinary collaboration
- State of the art methods/technologies
- Ego subversion
Research and Programmatic Examples
HIV in IDU

- Identified outbreak in mid-90’s
- Took epidemiology to the community with colleagues from BC CfE HIV/AIDS
- Cocaine, Housing
- Primary Infection

With Strathdee, Schechter et al.
Cryotococcus gattii

Distribution of Human and Animal Cryptococcal Cases in Southwestern British Columbia, 1999-2002*

With Fyfe, Galanis, Bartlett, Kronstad, Stephen, Mak et al.
SARS Accelerated Vaccine Initiative (SAVI)

• Origins in Mid-April 2003 during my meeting with the Premier of British Columbia

• Developed three vaccine candidates in parallel after six months of research
Pseudo-SARS 2003

- Pseudo-SARS – summer of 2003
- Explained the basis of serological cross-reactivity between SARS Coronavirus and other human coronaviruses

With multiple colleagues from UBC, NML and Fraser Health
Beyond Individual Analysis - Networks

With Remple et al.
Rapid Response Research and Pandemic Influenza

• Initial community outbreak study
• Vaccine effectiveness assessment
• Sero-epidemiology (MSFHR)
• Immunization evaluation - WA / BC
• Recruitment of Mathematical Modeling to PH decision-making

With Skowronski, Pourbohloul et al.
Male Circumcision for HIV Prevention And Other Roles for Urologists

- CIHR funded consultation and demonstration December 2008
- January 2009 - Dr. Binagwaho announces Rwanda’s support for a neonatal approach
- June 2010, CUA has first meeting to plan IH roles

With Schneiderman, Kinahan, Pollock
Antibiotic Resistance and Populations

• A result of natural selection
• We can:
  – Reduce the rate of infections (immunization)
  – Reduce spread of established resistant organisms (hygiene and infection control), or
  – Reduce the force of natural selection favouring the increasing prevalence of resistant organisms
Do Bugs Need Drugs?

Program Implementation and Evaluation in BC

With Blondel-Hill, Carson, Dreher, Marra, Chong, McKay et al
Population Level Antibiotic Use
Macrolides for URTI in Children < 15, BC
Complex Chronic Diseases: Can New Sequencing Methods Point to Causation?

http://inlinethumb33.webshots.com/2720/2118862360052741287S500x500Q85.jpg
1880-1898 A Revolution in the Discovery of Causative Agents

- Typhoid
- Leprosy
- Malaria
- Tuberculosis
- Glanders
- Cholera
- Streptococcus
- Diphtheria
- Typhoid
- Staphylococcus
- Tetanus
- Coliform diarrhea
- Pneumococcus
- Brucellosis
- Chancroid
- Gas Gangrene
- Plague,
- Botulism,
- Dysentery
Idiopathic Chronic Diseases of Old

• Consumption -> Tuberculosis
• Non-A non-B Hepatitis
  -> Hepatitis C
• Gastric and Duodenal Ulcers -> *H. pylori*
• Cat Scratch / Bacillary Angiomatosis -> Bartonella
• Cancer of the Cervix -> HPV

Barry Marshall
Genomics and Microbiological Discovery for the Non-Molecular Doc

Specimen

Standard Lab (eg PCR)

Virus Chip

Deep Sequencing

Paraphrased from Joseph Derisi at IDSA 2010
Change Yourself
Change the World