People, Borders and Disease

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Health Disparities in a Mobile World

Brian Gushulak

Workshop:
Globalization, Movement of Pathogens (and their hosts) and the revised International Health Regulations

Washington DC
December 16-17, 2008
Outline

• Forces
  – Growing migrant volumes
  – Increasingly rapid mobility
  – Sustained global disparities, and
  – Dynamic and sustained migrant diversity

• Challenges
  – Policy and program design focused primarily on acute infections
  – Often centered on administrative as opposed to functional migrant classifications
  – Often limited to the border or frontier
Suggestions / Considerations

• Approach to modernizing migration health in terms of
  – Greater consideration of risk as opposed to administrative migrant classification
  – Approaching the issues from the perspective of modern population mobility
  – Longitudinal perspective for infections with chronic or latent implications
  – Extending interventions and mitigation from the border/frontier
Migration and Disease
A Long Relationship
Long Historical Relationship between Human Mobility, Disease and Attempts at Control

• Many population movements (commerce, colonization, travel, pilgrimage and/or migration) associated with disease outbreak introductions
  – Leprosy Medieval Europe
  – Syphilis introduction/spread (consequences of colonization/exploration)
  – Plague (beginning of Quarantine)
  – Cholera (relation to history of IHRs)
  – Malaria (early recognition of impact of globalization – e.g. Anopheles gambiae in Brazil)
The first Global Map of the Distribution of Human Diseases: Friedrich Schnurrer's 'Charte Uber die geographische Ausbreitung der Krankheiten' (1827)
Migration and Disease Through the Lens of Interventions to Protect Health

• A metaphor for the evolution of Public Health and Security

| Classical, medieval               | • Walled communities, hospitals and lazarettos |
| 14th Century                      | • Isolation or denial of entry; Quarantine, Civic Health Officers |
| 19th-20th Centuries               | • Health assessment with intervention or denial of admission at borders (new residents [immigration health]; pilgrims/travellers [travel medicine]) |
| 21st Century                      | • Public health intelligence: surveillance, analysis, reporting |
People
Current Factors Present Influences that Exceed History’s Examples

World Population Growth Through History

# International Migrants

**UN Definitions 2007**

<table>
<thead>
<tr>
<th>Region</th>
<th>1990</th>
<th>2005</th>
<th>Change #</th>
<th>% of Migrants 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Total</td>
<td>154.8</td>
<td>190.6</td>
<td>35.8</td>
<td>100</td>
</tr>
<tr>
<td>More developed</td>
<td>82.4</td>
<td>115.4</td>
<td>33.0</td>
<td>61</td>
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<tr>
<td>Less developed</td>
<td>72.4</td>
<td>75.2</td>
<td>2.8</td>
<td>39</td>
</tr>
</tbody>
</table>
## Nations with more than 100 Million Inhabitants

Source: UN Dept of Economic and Social Affairs

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>1,316</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>1,103</td>
</tr>
<tr>
<td>3</td>
<td>United States of America</td>
<td>298</td>
</tr>
<tr>
<td>4</td>
<td>Indonesia</td>
<td>223</td>
</tr>
<tr>
<td>5</td>
<td>Brazil</td>
<td>186</td>
</tr>
<tr>
<td>6</td>
<td>Pakistan</td>
<td>158</td>
</tr>
<tr>
<td>7</td>
<td>Russian Federation</td>
<td>143</td>
</tr>
<tr>
<td>8</td>
<td>Bangladesh</td>
<td>142</td>
</tr>
<tr>
<td>9</td>
<td>Nigeria</td>
<td>132</td>
</tr>
<tr>
<td>10</td>
<td>Japan</td>
<td>128</td>
</tr>
<tr>
<td>11</td>
<td>Mexico</td>
<td>107</td>
</tr>
</tbody>
</table>
Borders
Not all Borders are National

• Migrants cross functional frontiers in addition to formal borders
  – Disparity and Diversity are functional boundaries

• Moving across and between those dimensions can bridge disparity across several dimensions.

Photo: Silvia Irene Palma C. Guatemala
Disparities and Diversity
Disparities in Health Care Expenditures

Share of general government expenditure spent on health care
(2003 expenditure ratios)

(Source: WHO, 2006)
Figure 9
Typology of Countries by Health Care Status

Category 1: Countries with highly developed health care infrastructures
- National system of epidemiological surveillance, response, and prevention capacity throughout the country.
- High-quality care available to 90-100 percent of the population.
- Modern primary, secondary, and tertiary health care delivery capability.
- Excellent pharmaceutical availability and production capability.
- Budgetary resources present and programmed effectively; high-income economies.
- Health care and public health education are high national priorities.

Category 2: Countries with developed health care infrastructures
- National system of epidemiological surveillance, response, and prevention capacity in most of the country.
- Medical care available to 70-90 percent of the population.
- Established primary, secondary, and tertiary health care capability.
- Pharmaceutical availability generally available to population with adequate production capability.
- Budgetary resources available; middle-income economies.
- Health care is a high national priority.

Category 3: Countries with developing health care infrastructures
- System of epidemiological surveillance, response, and prevention in developed areas of the country.
- Medical care available to 50-70 percent of the population.
- Primary and secondary health care developing; tertiary care generally available.
- Pharmaceutical availability good in urban areas, limited production capabilities.
- Budgetary resources available; lower-middle-income economies.
- Health care is a national priority.

Category 4: Countries with less-developed health care infrastructures
- Epidemiological surveillance, response, and prevention concentrated in capital, minimally present in most of the country.
- Medical care available to 40-50 percent of the population.
- Rudimentary primary and secondary health care; tertiary care minimally available.
- Pharmaceutical availability restricted in urban areas, minimally available in rural areas; limited production capabilities.
- Budgetary resources available; lower-income economies.
- Health expenditures dependent upon outside assistance; lower-income economies.
- Health care is a lower national priority.

Category 5: Countries with least-developed health care infrastructures
- System of epidemiological surveillance, response, and prevention dependent on humanitarian organizations; no domestic capability.
- Medical care available to less than 40 percent of the population.
- Primary, secondary, and tertiary health care provided primarily by humanitarian organizations.
- Pharmaceutical availability dependent on humanitarian organizations.
- Health expenditures heavily dependent upon outside assistance; lowest-income economies.
- Health care is an extremely low national priority.

*Individual countries within each category do not necessarily conform to all the criteria for that category.
Disparity Influences Disease Prevalence

- Through effects on Health Determinants
  - At both individual and population level
    - Socio-economic status
      - Employment, income, housing, education, nutrition, access to care, etc.
    - Behavior
      - Social, health care utilization, risk acceptance/taking, etc.
    - Genetic/biological make up
      - Resistance / susceptibility, gene-phenotype expression
    - Environment
      - Geographic, infrastructural, occupational, domestic, cultural, political
      - Affects exposure, may be acute and / or sustained
The Prevalence Gap in Action

- RUBELLA - VIET NAM (HO CHI MINH CITY)
- ****************************************
- A ProMED-mail post
- <http://www.promedmail.org>
- Date: Mon 21 Mar 2005
- From: ProMED-mail <promed@promedmail.org>
- Source: Xinhua News Agency on line, Fri 18 Mar 2005
- Viet Nam: German measles casts shadow over Ho Chi Minh City
Population Mobility

For passenger security screening

In The Chinese Civil Aviation Safety and Security Statute, it is stated that passengers are strictly prohibited from dropping off or carrying other people’s stuff.
Population Mobility

• Growing recognition of mobility as an integral component of globalization
  – Both as a contributing factor and a consequence.
• Directly and indirectly related to other components of globalization:
  – economics/trade, technology/telecommunications, security, and environment/climate.
• Appreciation of its role as a determinant of health outcomes
  – Mobility history as a health determinant
Speed of Global Travel in Relation to World Population Growth

From: Murphy and Nathanson Sems. Virol. 5, 87, 1994
Influence of Speed of Travel
Cliff & Haggett British Medical Bulletin 2004;69-87-99
Traditional Migration Paradigm

Departure
Limited origins

Journey
Direct

Arrival
Managed

Integration
Assumed host characteristics
What has Changed?

• Post Colonial population flows
• Post Vietnam refugee movements
• Humanitarian Emergencies / Conflicts
• Collapse of Soviet Union
• The concept of Human Capital
• Ease of Transportation
Health Impacts of Modern Migration

- **Demography**
  - Significant and rapid changes in migrant population make up
    - Important in population health and disease

- **Speed of Change**
  - Diminished relevance of historical examples
  - Can be faster than mitigation programs can appreciate or prepare for

![Proportion of Foreign Born Residents](chart)
Modern Migratory Process

Origins
Diverse

Journey
Complex

Return
Common

Reception
Variable

Integration
Increasingly variable
Each Component has Health Consequences

• Pre travel component
  – Local environment and history impact
    • Culture, economics, geography, political, social factors

• Journey itself
  – Duration, style, environment
    • Refugees, transit, displacement, trafficking

• Arrival
  – Status, reception, integration, isolation, marginalization, poverty

• Return
  – Time at destination, repetative, voluntary, assisted, forced
Epidemiological Consequences of Migration

• In nations of high population mobility
  – Infectious disease incidence at migrant origin may exert significant influences on domestic epidemiology
  – Particularly important for diseases with chronic components
    • Population size increases over time
Tuberculosis Provides an Example

Proportion of tuberculosis cases by origin - Norway

Proportion of tuberculosis cases by origin - Canada
Infections and Mobility

• Acute – More Awareness
  – ‘Traditional’ diseases in tourists/travellers
    • Lack of immunity
  – New diseases in all (SARS / Avian flu)
  – Presentation in proximity to travel
  – Association with travel generally understood
    • Improves DX and Rx

• Chronic – Less Awareness
  – More common in migrants
    • Longer exposure
  – Presentation may be delayed
  – Not as well appreciated
    • Long period of latency
    • Delayed Rx
    • Low index of suspicion
  – Over time can be significant in reception nations
Current Issues

SIXTY-FIRST WORLD HEALTH ASSEMBLY

Agenda item 11.9

24 May 2008

Health of migrants

The Sixty-first World Health Assembly,

Having considered the report on health of migrants:

Recalling the United Nations General Assembly resolution 58/208 underlining the need for a high-level dialogue on the multidimensional aspects of international migration and development (New York, 23 December 2003);
Who or what is a Migrant?

- Context has evolved
- Complicates traditional approaches to migrant health
  - VFR travellers
  - Dual Citizens
  - Circular migration
  - “Permanent” temporary workers
### Mobility and Infections – More than just Travel

<table>
<thead>
<tr>
<th>Health Practices</th>
<th>Immunization</th>
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<tbody>
<tr>
<td>• <strong>Dietary Practices</strong></td>
<td>• Differences between source and destination (i.e. Hep A, Mumps)</td>
</tr>
<tr>
<td>• <strong>Animals</strong></td>
<td>• Ethnic health care</td>
</tr>
<tr>
<td></td>
<td>• Animal components</td>
</tr>
<tr>
<td></td>
<td>• Imported / home prepared food</td>
</tr>
<tr>
<td></td>
<td>• Botulism, Trichinella</td>
</tr>
<tr>
<td></td>
<td>• Bushmeat</td>
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<tr>
<td></td>
<td>• Pets</td>
</tr>
<tr>
<td></td>
<td>• Rabies</td>
</tr>
<tr>
<td></td>
<td>• Exotic pets</td>
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</tbody>
</table>
The Consequences of Migration Extend Beyond the Process Itself

- The epidemiological factors generated at the migrants’ origin may continue to exert influence after arrival (VFR Travel)
  - Tracking these cases in the context of foreign or domestic birth may mask behavior and risk factors
Looking Forward
The Challenges of the Future will be Different

• Will result from more complex interactions between mobility and other health determinants
  – socio-economics, environment, genetics/biology, and behavioral characteristics
  – at both individual and population levels.
• Will be promoted by sustained and possibly increasing gaps in health and disease prevalence
• Will be modified by new migration forces
  – Speed of movement, volume, new origins and destinations
• Will reflect a wider scope of Public Health
  – Broader issues than infectious diseases
  – As considerations of threat and risk are now integrated components of economics/trade, security, environment, as well as health.
To the man who only has a hammer in the toolkit, every problem looks like a nail (Abraham Maslow)

- The history of how immigration health has been approached has primarily been disease and migrant class based
  - Nations with specific disease control programs applied them to migrant groups often at arrival
    - Frequently flowed from Quarantine, international (IHR) or national public health regulations which were traditionally disease-list based
    - When introduced travel time exceeded incubation period of many infections of interest
Low Incidence Responses to High Incidence Challenges

- Threats exist and risk arises beyond jurisdiction
  - Therefore these situations **do not** represent a failure of local control
    - Although that may be the initial conclusion
    - Applying more resources at the destination may not improve effectiveness

- Local initiatives and policies will be unsuccessful unless they take place in collaboration with global and regional strategies
Topical Issues in Migrant Receiving Nations

- Diseases or conditions of low domestic incidence or elevated public health importance
  - TB particularly MDR / XDR
  - VPDs
    - Different vaccine uses can create disparities in coverage between some mobile and host populations
      - Measles, mumps, varicella e.g.
    - Infections of long duration (HBV, HCV)
  - Tropical / parasitic diseases
    - Chagas’ / Malaria / Cystercercosis / strongyloidies
  - Other Antimicrobial Resistant Infections
The significant problems we face cannot be solved at the same level of thinking we were at when we created them.  

Albert Einstein
How do these New Challenges Test the Limits of Traditional Migration Health Activities?

- Border and frontier now less relevant
- Chronic infections are assuming greater prominence, while many programs were designed for dealing with more acute short term infections

- Limits of traditional approaches
  - Based on short contact and little follow up post arrival
  - Often related to status at time of immigration formalities
  - Frequently assumed full integration into host health system and similar outcomes to host population
How does this relate to global public health?

- As wealthy nations strive control, or eliminate disease within their boundaries, the greatest risk for some diseases will be presented by mobile populations originating in or transiting areas less able or with less capacity to manage some health matters.

- At the very least this demands a global component of all prevention policy planning that considers migration and population mobility.
What to Do?

• Focus on mobility as a process rather than discrete items such as migrant class / disease lists
  • Consider acute threats in the context of all travelers
  • Chronic threats more relevant for migrants
  – This will assist risk identification and mitigation in a globally standardized fashion
  – And support approaching challenges in a globally integrated fashion
  – Migration screening as a global surveillance tool for example

• Anticipate and plan for the long term outcomes likely to result from the sustained movement across differences in prevalence.
Specific Mobile Populations may Require Specific Attention

Preventing Infectious Diseases during and after International Adoption

Lin H. Chen, RN; Hazel J. Bennett RN; and May E. Wilson MD

Families of internationally adoptee children have risks associated with travel if they pick up their children overseas. Unlike other travelers, they also have risk because close contact with a child with uncertain infection and disease status, "microbes other organism, hepatitis A virus, hepatitis B virus, and salmonella disease have been transmitted from adopted child to family and community members. Infectious disease, meningitis, hepatitis, and other infection disease agents can also be transmitted. Some of these infectious may be inapparent or may not manifest in adopted children until years after the adoption. Increase attention to prevention measures for family members and early diagnosis of infectious diseases in adopted children can advance immunization of the organisms causing those infections. Those providing health care to families planning international adoption should know about screening procedures, as well as the presence of possible infections in adopted children so that they can protect the health of the family members and adoptive children who will welcome the new child into their homes.

From 1980 to 2002, U.S. families adopted more than from many countries and in years focusing on child infections.

Climatic Environmental Migrants (NTS Alert Climate refugees a crisis in the making? October 2008)
Shift in Focus will be Needed

• Recognition that the role of the border/frontier and immigration status per sec is diminishing
  – Surveillance, awareness, diagnostic capacity and mitigation should be integrated and extend across the spectrum from global to community level and through the origin – destination – return cycle

• Greater attention applied towards the predictive monitoring of regional/global health disparities in the context of mobility and population flows
  – Attention to person, place and time
  – i.e. As migrant populations age their TB prevalence represents where they came from
Gratitude

• The organizers of this meeting
• Contributors to the scientific knowledge and understanding of migrant health issues presented today