Pursuing Excellence During a Global Pandemic  
Professor Robert J. Pratt, Thames Valley University  
Teleclass sponsored by Virox Technologies & JohnsonDiversey  
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E.M. Cottrell Inaugural Lecture
Pursuing excellence during a global pandemic  
Professor Robert J. Pratt CBE FRCN  
Thames Valley University

Global Influenza Pandemic

Pandemic
epidemic occurring widely within the same time frame throughout a region, country, continent or globally

Pandemic criteria
- caused by emerging or re-emerging pathogens, e.g., zoonoses
- lack of population immunity to novel infection
- able to infect people
- efficiently transmissible from person to person
- spread widely
- cause significant clinical illness in a high proportion of those infected

3 Vignettes

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Pandemic *Staphylococcus aureus* phage 80/81

*Staphylococcus aureus*
- Commonly colonises the skin, nares, throat, perineum, axilla
- Globally, 1 out of 3 persons regularly colonised
- Causes
  - minor skin infections
  - invasive infections, e.g., SSI, pneumonia, BSI
- Produces multiple toxins associated with serious clinical outcomes, e.g., necrotic skin and lung disease, toxic shock syndrome

*Staphylococcus aureus* 80/81
- *virulent penicillin-resistant* strain Phage type 80/81 (1953) Australia/Canada
- became pandemic 1950s-60s
- produces Panton-Valentine leucocidin (PVL) cytotoxin
- treated with penicillinase stable β-lactam antibiotics: meticillin & its derivates, cloxacillin & flucloxacillin ➔ pandemic receded

*Staphylococcus aureus* 80/81
- Decesendants of SA phage 80/81 acquired meticillin resistance in Europe in early 1960s
- By 1980, re-emerged as Community-acquired MRSA
  - CA-MRSA produce PVL cytotoxin
  - CA-MRSA strain USA300 of great concern

Points of excellence
- multiple national and local infection prevention initiatives bringing MRSA rates under control
- Driven and led by infection prevention and control heroes

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Heroes & Heroines
Distinguished by: courage, fortitude, outstanding achievement, noble qualities
Lance Corporal Johnson Beharry VC

Heroes & Heroines
Distinguished by: courage, fortitude, outstanding achievement, noble qualities
Florence Nightingale OM RRC

Points of excellence
• 1959 – the West Country – birth of the modern age of infection control nursing in England

Torbay Hospital - mid-to-late 1950s
• in the midst of the phage 80/81 S. aureus epidemic
• Widely disseminated on surfaces and fabrics and among nursing and domestic staff
• established control measures inadequate and infection surveillance unreliable

Heroes of Torbay Hospital
• Matron and Hospital Pathologist
• Hospital Infection Committee
• E.M. Cottrell (Theatre Sister) appointed Infection Control Sister in April 1959

Sister E.M. Cottrell
Responsibilities
• Hospital epidemiology and infection surveillance
• Teaching
• Clinical supervision of aseptic techniques
• Infection control research

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Infection Control Nurses Association
- Founded 1970
- Expanded membership, terms of reference & rebranded in 2007 as the
  Infection Prevention Society
- preeminent infection prevention professional association in Europe

Human Immunodeficiency Viruses types 1/2

1970s - 2009


5 cases reported in England in 1981

Approximate number of known cases by the end of 1981

< 1,000 worldwide

29 years later

Estimated number of people living with HIV globally, 1990–2007

2.7 million new infections in 2007

Deaths 2007
2 million

33 million

Total Deaths: 1981-2007
25-30 million

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308 persons will be infected every hour
i.e., 5 new infections every minute

Over 7,400 new HIV infections a day in 2007

* More than 96% are in low and middle income countries
* About 1000 are in children under 15 years of age
* About 6,300 are in adults aged 15 years and older
  of whom:
    - almost 50% are among women
    - over 45% are among young people (15-24)

2007 global HIV and AIDS estimates
Children (<15 years)

* Children living with HIV  2.0 million [1.9-2.3 m.]
* New HIV infections in 2007  370 000 [330 000-410 000]
* Deaths due to AIDS 2007  270 000 [250 000-290 000]

Children orphaned as the result of the HIV-related deaths of one or both parents

HIV and AIDS diagnoses and deaths, UK
77,400 adults living with HIV/AIDS end 2007

7,734 new diagnoses of HIV infection in 2007

Of 73,300 persons aged 15-59, 28% (20,700) were unaware of their infection

AIDS Orphans

12 million AIDS orphans in sub-Saharan Africa 2007

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Exposure & Transmission

Bloodborne virus

- Sexual exposure
- Mother-to-child transmission
- Injecting drug use
- Healthcare practices and techniques

Points of excellence

- New approach emerged for preventing exposure to bloodborne pathogens
  - Blood & Body Fluid Precautions
  - Universal Precautions
  - Body substance isolation
  - Standard Infection Prevention and Control Precautions

Points of excellence

- Early fears of contagion quickly receded
- HIV-infected patients not stigmatised or discriminated against
- A powerful lobby of patient groups campaigned for better services, swifter access to drugs, more involvement

Heroes

Distinguished by: courage, fortitude, outstanding achievement, noble qualities

Richard Wells FRCN 1950-1993

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Heroes

Distinguished by: courage, fortitude, outstanding achievement, noble qualities

Jonathan M. Mann MD 1947-1998

2009 Pandemic Influenza A(H1N1)v virus

Emergence of New Human Influenza Subtypes

Drift (minor mutations)

Shift (major change)

RNA segmented genome

8 segments containing a total of 10 genes

Pandemics of influenza

Reproduced and adapted (2009) with permission of Dr. Masato Tashiro, Director, Center for Influenza Virus Research, National Institute of Infectious Diseases (NIID), Japan.

Animated slide: Press space bar

2009 influenza A(H1N1)v virus

- March-April 2009 – novel influenza A virus identified as the cause of influenza outbreaks in the US, Canada & Mexico - quickly spread globally
- WHO declared a global pandemic on 06 June 2009
- New strain has a genetic composition not seen previously
- First wave of the pandemic completed by end of the northern summer
- Second wave expected mid-autumn (may be starting now)
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UK Government Planning Assumptions
September 2009 to mid-May 2010

<table>
<thead>
<tr>
<th>Clinical Attack Rate</th>
<th>Up to 30% of population</th>
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<tbody>
<tr>
<td>Peak Clinical Attack Rate</td>
<td>Nationally, up to 6.5% of population per week</td>
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<tr>
<td></td>
<td>Locally, 4.5%-8% of population per week</td>
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<tr>
<td>Case Complication Ratio</td>
<td>Up to 15% of clinical cases</td>
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<tr>
<td>Case Hospitalisation Ratio</td>
<td>Up to 1% of clinical cases, of whom up to 25% could require intensive care at any given time</td>
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<tr>
<td>Case Fatality Ratio</td>
<td>Up to 0.1% of clinical cases</td>
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<tr>
<td>Peak Absence Rate</td>
<td>Up to 12% of workforce</td>
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Transmission

Droplet Transmission
- Principal method of transmission is via large respiratory droplets.
- Requires close personal contact as these droplets are too large to remain suspended in the air & can only travel short distances through the air (not more than a metre)

Contact Transmission
- Direct or indirect contact can easily transfer virus by hands contaminated as a result of:
  - Shaking hands with an infected person
  - Touching inanimate objects in patient environment, e.g., counter tops, plastic washing-up bowls that have been contaminated by droplets
  - Banknotes !!!
  - Light switches, door knobs

Aerosol Transmission
- Aerosol-generating procedures, e.g., ET intubation, suctioning, nebuliser treatment, bronchoscopy ‘may’ increase risk of droplet nuclei
- There is no significant evidence that in any other circumstances, small particle aerosols are significantly involved in influenza virus transmission

Prevention & Treatment
Immunisation for pandemic influenza

- Vaccine available mid-October 2009
- Priority groups for vaccination identified
- Vaccine is safe; serious adverse reactions uncommon
- Vaccination for seasonal influenza is still required in addition to pandemic influenza immunisation

Immunisation for pandemic influenza

- Frontline health and social care workers will be encouraged to be vaccinated as:
  - they are at increased risk of infection and transmitting that infection to susceptible patients
  - if they become ill, their absence from work will further stress health and social care services

Point of excellence

- An increased uptake of pandemic and seasonal influenza vaccination amongst health and social care staff

Reflections

- Irregular occurrences of pandemic diseases are a feature of human life on earth
- Quality preparedness strategies offer the most effective means of amelioration
- Striving for excellence in practice is a *sine qua non* of professionalism
- Excellence is not accidental; it is achieved one step at a time

The Pursuit of Excellence

IPS Annual Research Awards

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IPS Research Strategy

- Influence the national research agenda
- Generate high quality research for practice
- Secure resources for the Society’s research programme
- Engage in collaborative research
- Develop research capability and capacity
- Enhance members’ understanding and use of research in practice

Prieto et al. 2007
“Curiouser and curiouser!” cried Alice

IPS Research Priorities
• Human behaviour
  - staff, patient attitudes
  - knowledge and perception
  - communication and compliance
  - psychological and social impact of infection
• Infection prevention interventions
  - isolation,
  - decontamination
  - hand hygiene
  - use of protective equipment.

IPS Research Awards
• Individual Post-doctoral Awards - £3,000 p.a. for 2 years
• Collaborative Small Project Awards for Teams of ≤5 researchers - £5,000 for 1 year
• Novice Investigator Awards - £1,000 p.a. for 3 years

Further Information
• JIP article (Loveday et al, 2009)
• Oral Poster during Conference
• Heather Loveday available at Conference or by email (heather.loveday@tvu.ac.uk)
• IPS Branch Representatives available for support
• Application packs available from the IPS website
• Closing date: Friday, 15 January 2010

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