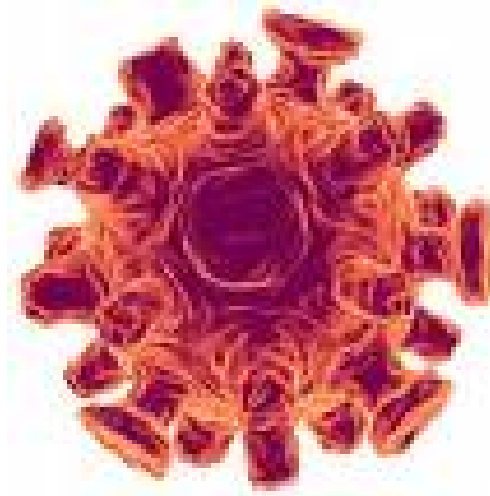


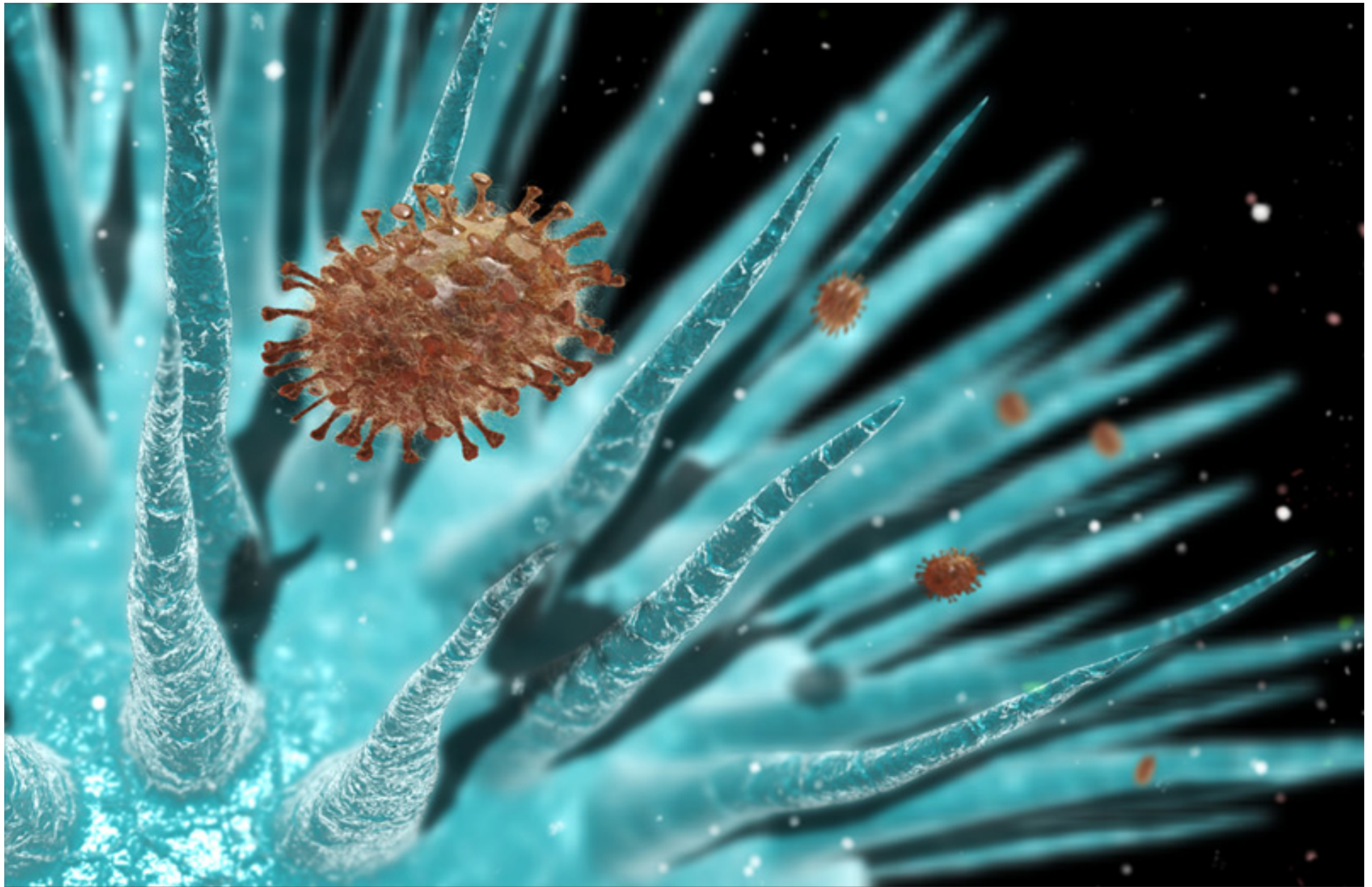
# The Burden of Childhood Influenza in a Tertiary Paediatric Setting

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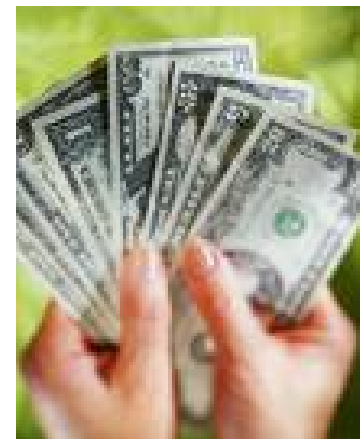
Conceptual image of flu virus particles (brown) invading cilia (blue)  
Image by Karsten Schneider/Science Photo Library



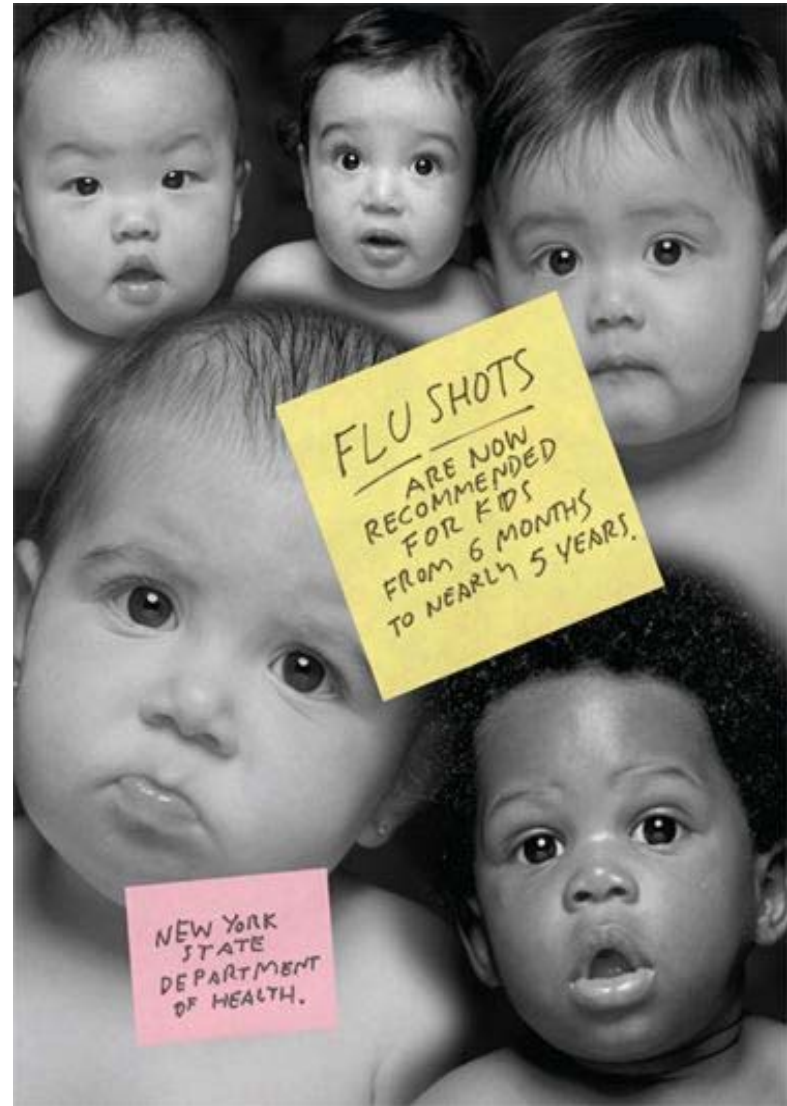
# Influenza



- **Common illness of childhood, especially preschoolers**
- **Mild and self-limiting BUT complications and death occur**
- **Attack rates of up to 30 to 40% in childcare settings**
- **Children ‘viral reservoir’**
- **Health care and wider socioeconomic cost**
- **USA: \$87 billion**



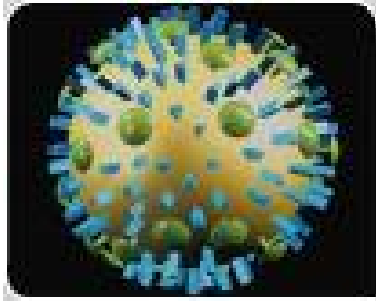
- **Contrasting immunization schedules**
  - **Australia (>6 months, chronic disorder)**
  - **USA (>6 months to 5 years, all children)**
- **Point-of-care testing**
- **Neuraminidase inhibitors**
  - **Influenza-specific antiviral agents**
  - **eg Oseltamivir (Tamiflu)**
- **2007: 6 child deaths reported**



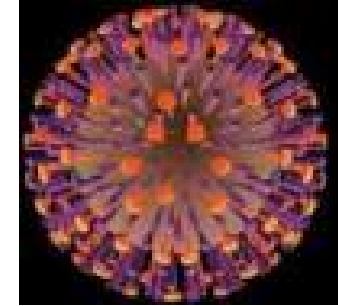
# Aim

**To assess the impact of influenza admissions to the Children's Hospital at Westmead (CHW) during 2007**

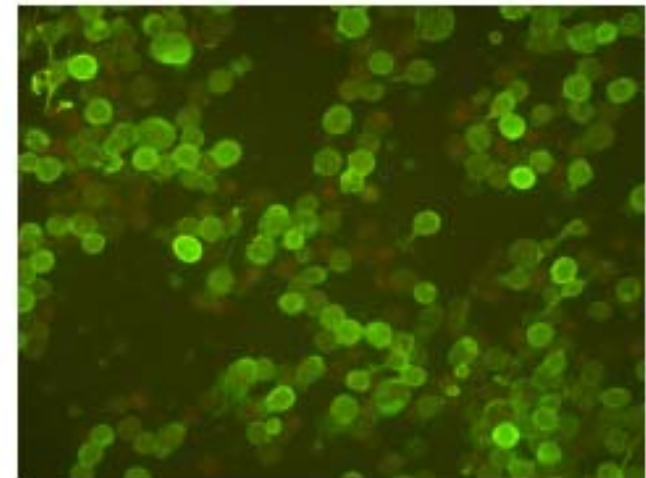


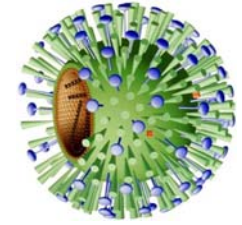


## Method

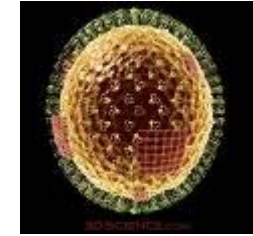


- **Case definition: laboratory confirmed influenza admission to CHW during 2007**
- **Direct immunofluorescence (DFA) from a nasopharyngeal aspirate (NPA)**
- **Retrospective medical record review**

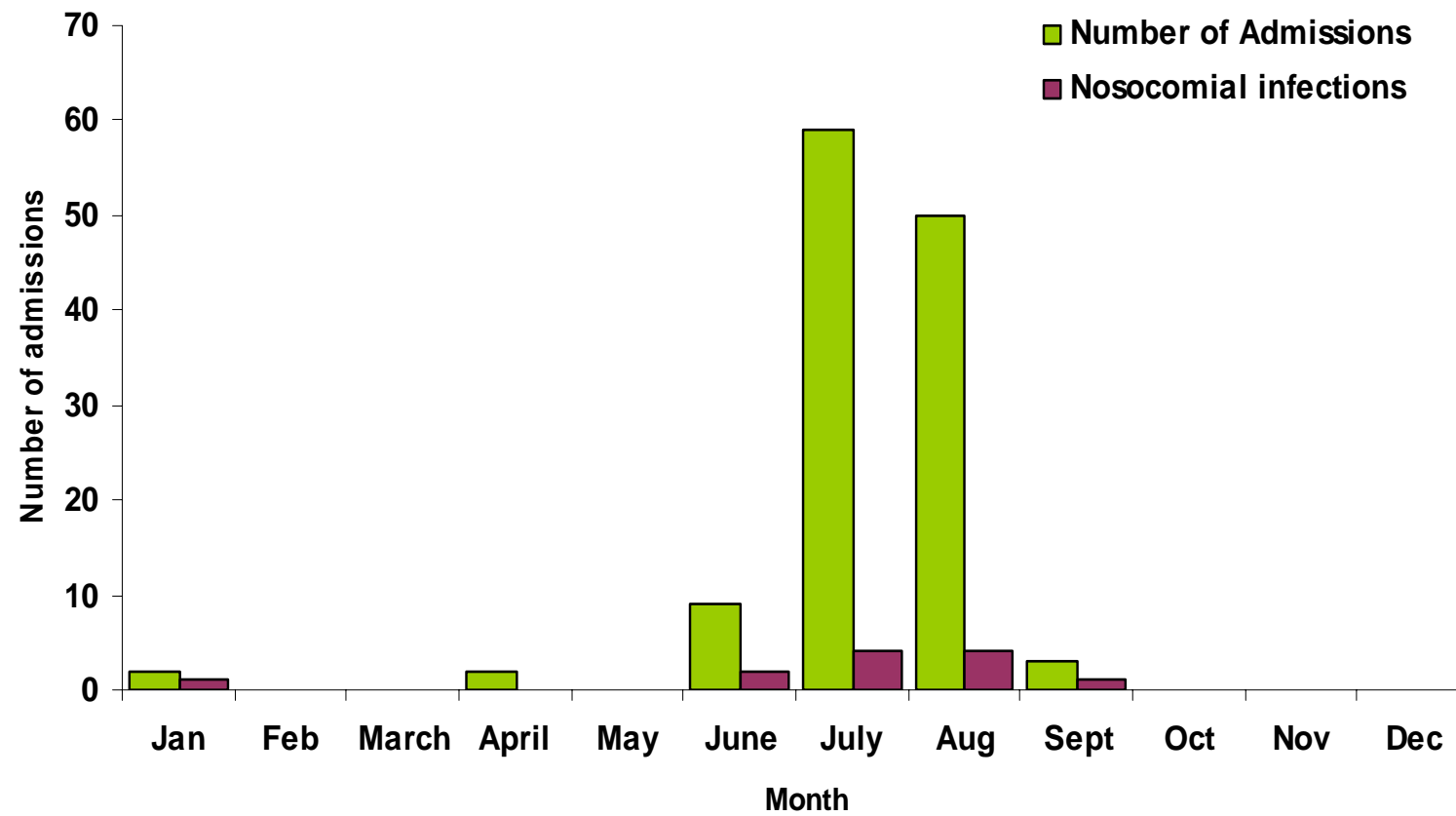


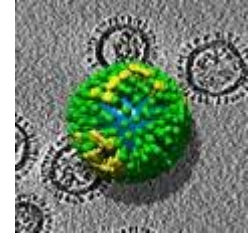


<b>Patient Characteristics (n=122)</b>	<b>Number</b>	<b>%</b>
<b>Male / Female</b>	<b>69 / 53</b>	<b>56.6 / 43.4</b>
<b>ATSI</b>	<b>2</b>	<b>1.6</b>
<b>Median age (years; range)</b>	<b>1.4 (0.02-19.4)</b>	
<b>Influenza A</b>	<b>119</b>	<b>97.5</b>
<b>Other chronic disorder</b>	<b>54</b>	<b>42.6</b>
<b>Immunocompromised</b>	<b>21</b>	<b>17.2</b>
<b>Nosocomial infection</b>	<b>12</b>	<b>9.8</b>
<b>Documented influenza vaccination</b>	<b>1</b>	<b>0.08</b>
<b>Estimated clinical staff vaccination rate</b>		<b>&lt;30</b>

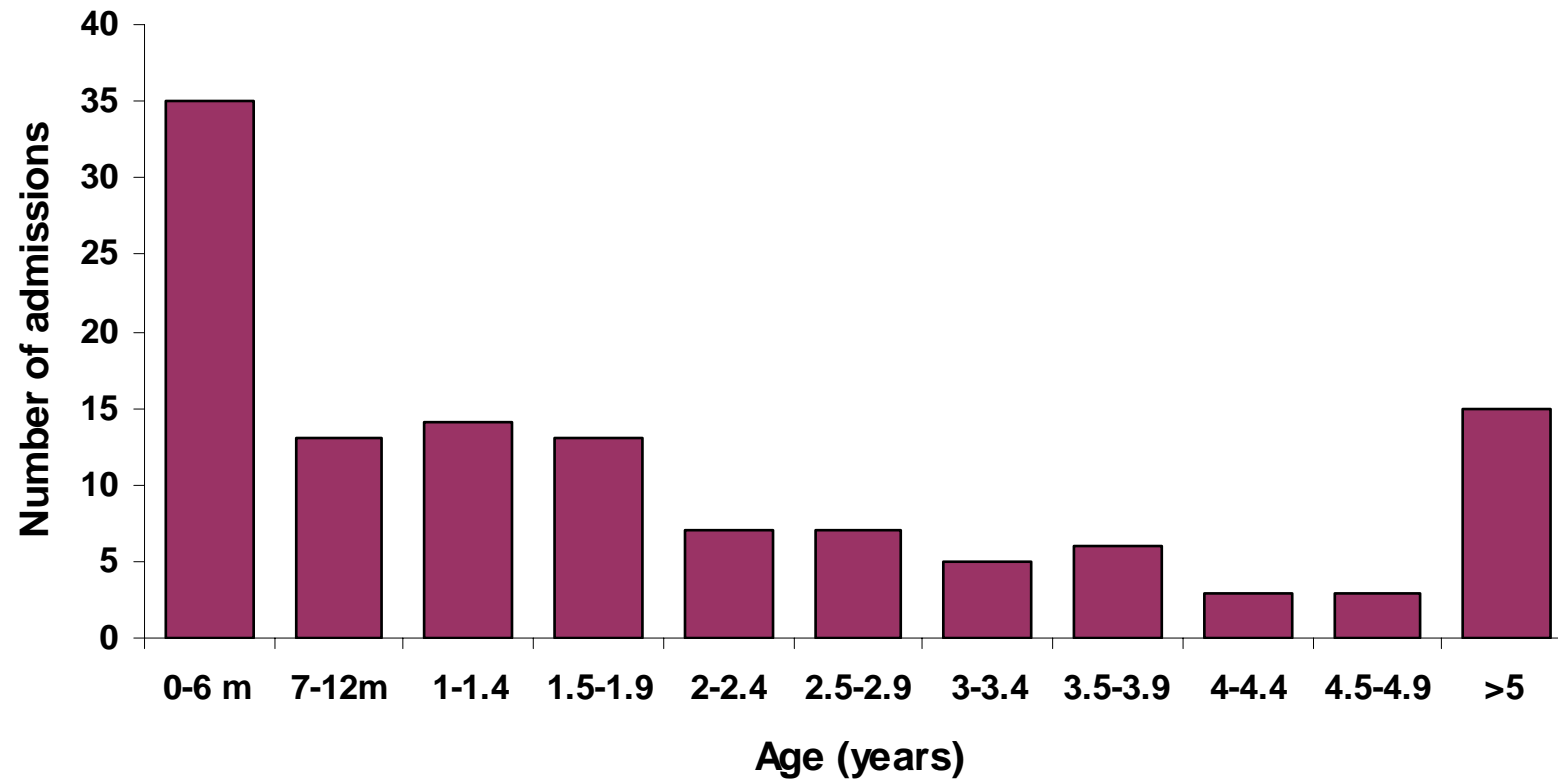


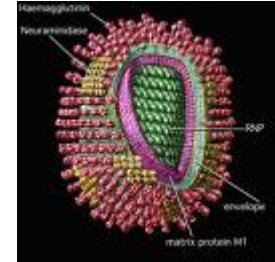
## Seasonal variation in the total number of admissions for influenza, and nosocomial infections





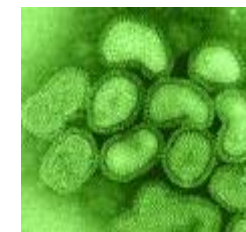
## Age distribution of children admitted with influenza in 2007





<b>Clinical Presentation (n=122)</b>	<b>Number</b>	<b>%</b>
<b>Fever</b>	<b>119</b>	<b>97.5</b>
<b>Cough</b>	<b>85</b>	<b>69.7</b>
<b>Coryza</b>	<b>79</b>	<b>64.8</b>
<b>Dyspnoea</b>	<b>29</b>	<b>23.8</b>
<b>Fever alone</b>	<b>14</b>	<b>11.5</b>
<b>Fever, cough and coryza</b>	<b>60</b>	<b>49.2</b>

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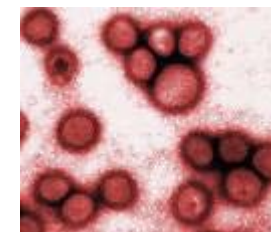


<b>Investigations (n=122)</b>	<b>Number</b>	<b>Median (range)</b>
<b>WCC</b>	<b>113</b>	<b>8.6 (0.5 to 57.9)</b>
<b>Neutrophils</b>	<b>113</b>	<b>4.4 (0.2 to 47.5)</b>
<b>CRP</b>	<b>21</b>	<b>22 (0 to 500)</b>

	<b>Number</b>	<b>%</b>
<b>Lumbar puncture</b>	<b>28</b>	<b>22.9</b>
- age < 3 months	<b>18</b>	
- positive CSF culture	<b>Nil</b>	<b>0</b>
<b>CT head</b>	<b>5</b>	<b>4.1</b>

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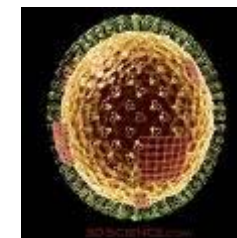


<b>Complications</b>	<b>Number</b>	<b>%</b>
<b>Pneumonia (presumed viral)</b>	<b>23</b>	<b>18.9</b>
<b>Shock</b>	<b>13</b>	<b>10.7</b>
<b>Ventilated (IPPV+CPAP)</b>	<b>9</b>	<b>7.4</b>
<b>Rapid deterioration</b>	<b>4</b>	<b>3.3</b>
<b>Seizures</b>	<b>3</b>	<b>2.5</b>
<b>Clotting abnormality</b>	<b>3</b>	<b>2.5</b>
<b>Encephalopathy</b>	<b>2</b>	<b>1.6</b>
<b>Myositis</b>	<b>2</b>	<b>1.6</b>

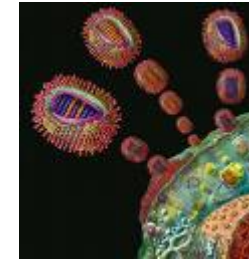
<b>Coinfection</b>		
<b>Pertussis</b>	<b>4</b>	<b>3.3</b>
<b>RSV</b>	<b>2</b>	<b>1.6</b>

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<b>Management (n=122)</b>	<b>Number</b>	<b>%</b>
<b>Oxygen</b>	<b>28</b>	<b>23.0</b>
<b>Antibiotics</b>	<b>82</b>	<b>67.2</b>
<b>Intravenous</b>	<b>74</b>	<b>60.6</b>
<b>Oral</b>	<b>8</b>	<b>6.6</b>
<b>Antiviral (Oseltamivir)</b>	<b>16</b>	<b>13.1</b>
<b>Oncology / BMT</b>	<b>11</b>	<b>9.0</b>
<b>Other</b>	<b>5</b>	<b>4.1</b>

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<b>Outcome</b>	<b>Number</b>	<b>%</b>
<b>Discharge alive</b>	<b>122</b>	<b>100</b>
<b>Ongoing sequelae</b>	<b>1</b>	<b>0.8</b>

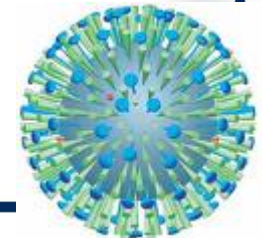
  

<b>Length of stay</b>	<b>Median (range)</b>
<b>Hospital</b>	<b>2 (1-50)</b>
<b>PICU (12 patients)</b>	<b>2 (1-25)</b>

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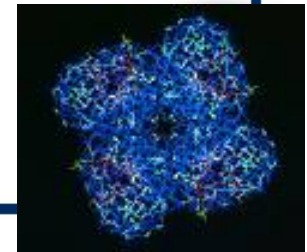
## Conclusions

- **Burden of influenza, especially < 2 years**
  - 530 bed days
  - 52 PICU days
  - Cost \$264 000 (bed costs alone)
- **Range of complications**
- **No deaths at CHW in 2007 (compared to 3 in 2003)**
- **Limited use of anti-influenza medication**



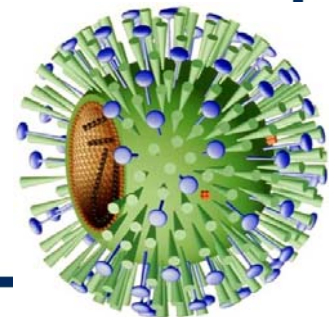
## Conclusions

- High rate of antibiotic usage
- Invasive investigations (lumbar puncture)
- Vaccination poorly documented
- Nosocomial infections (9.8%)
- Staff vaccination (<30%)



## Future Directions

- **Extended immunisation schedule**
- **Clinical trial and economic evaluation:**
  - Point-of-care testing
  - Anti-influenza medication
- **Meanwhile:**
  - patient and staff vaccination
  - hand washing



# Acknowledgements

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