## The older adult also travels!

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oshua Lederberg, the Nobel laureate famously said that: 'The microbe that felled one child in a distant continent yesterday can reach yours today, and seed a global pandemic tomorrow.' The current West African Ebola epidemic has caused widespread, and at times irrational, fears of a global spread of the disease, leading to travel restrictions and bans. As at 2nd November 2014, this viral heamorrhagic fever has infected close to 13 000 since the beginning of the year, with nearly half succumbing to it.<sup>1</sup>

Currently there is no proven vaccine or treatment. It has to be borne in mind that malaria, which is much more prevalent in West Africa, kills 1700 DAILY, and effective prophylaxis and treatment exists for it. Travelers are acutely aware of these conditions, but other major causes of preventable death, such as those caused by pneumococcal disease, are often not considered.

The World Health Organisation (WHO) estimates that 1.6 million die annually due to infection caused by these diplococci.<sup>2</sup> The burden is still the highest in the under five age group despite the availability of an effective vaccine existing as the vaccine is not always available in under resourced countries. In countries where the pneumococcal conjugate vaccine (PCV) is used in children, there is a shift of invasive pneumococcal disease (IPD) towards the elderly,<sup>3</sup> and a disproportionately higher mortality has been observed.<sup>2</sup> And we know that even this older age group travel and need to be protected against vaccine preventable diseases such as pneumococcal disease.

The definition of the elderly varies. In Germany it is defined as someone who is not productive in society, in first world countries it generally is considered to be when someone reaches pensionable age, and the WHO<sup>4</sup> considers someone over the age of 50 in rural Africa as 'elderly.' Terms such as 'young old', 'old young,' 'golden age' are bandied about, but the one certain fact is that the elderly will travel! Data from a large travel clinic<sup>5</sup> revealed that:

- 48% of travellers were over 50.
- 33% were over 60.
- 1.5% were over 80

Other studies estimate that 15-30% of travellers are older than 60, and one British study estimated that 50% of adults over the age of 48 flew at least once a year. When consideration is taken that 3.3 billion air passengers are predicted for 2014 and that about 1.3 billion of them would be taking international flights, it becomes apparent that a large number of the older population will indeed travel.



Figure 1: German incidence of invasive pneumococcal disease (IPD) in different age groups/100 000 population<sup>3</sup>





Pneumococcal vaccination is not often considered a travel vaccine, but it has an important role to play in the travel medicine consultation. This is an ideal time to catch up on routine vaccination such as against tetanus, pertussis and of course pneumococcus in the older traveller. In Europe and first world countries pneumococcus is the leading cause of community acquired pneumonia (CAP), and in the USA it is responsible for 500 000 cases of pneumonia, 40% of which needs hospitalisation.<sup>6</sup> Pneumococcus has often been labelled as the 'friend of the aged,'7 as it 'caused them to 'die gently without severe symptoms.' Osler stated that 'to die of pneumonia is almost the natural end of old people.' The rise in antibiotic resistance is also contributing to concerns about the elderly being more easily felled by the organism; close to one third of invasive pneumococcal disease (IPD) cases were either intermediate resistant or resistant to penicillin in 2013.8 South African death statistics are revealing of the prevalence of fatal pneumococcal infections. It, together with influenza, has been the second commonest cause of death, with 7.5% of deaths in 2009, 7.2% in 2010 and 6.6% in 2011.9 Only tuberculosis has caused more deaths over the same period.

Certain groups are known to be at higher risk of pneumococcal disease. These include patients with diabetes, sickle cell disease and other haemoglobinopathies, cerebrospinal leaks, chronic liver and renal failure, immunosuppression after organ transplantation, asplenia and dysfunctional spleens, and HIV patients whether on ARV's or not. Those over sixty five are also recognised to be at higher risk. All these risk groups, irrespective of age, need to be appropriately advised before they embark on a journey. Medical facilities and availability at travel destinations should also be considered and whereas CAP may be easily treated in certain countries, it could be a fatal infection in poorly resourced destination. All these factors should be considered and appropriate vaccination offered. A Boston analysis of over 15 00010 travellers revealed that 18% had a high risk condition. Of the high risk group 73% had medical co-morbidities whilst 23% were immunocompromised. The risk of travel related diseases was increased by a factor of 2.3 in the high risk group. Also, 9% of USA adults over 65 travelled outside the USA.

Respiratory tract infections (RTI) are common in travellers. In a large GeoSentinel study<sup>5</sup> which covered over 63 000 ill returning travellers, acute diarrhoea was the most frequent diagnosis in those over 60 with 16.7% of patients presenting with it, whilst respiratory tract infections was the second commonest presentation at 14.6%. Lower respiratory tract infections (LRTI) were much higher in the older age group (over 60) at 7.3% compared to 2.8% in the 18-45 age group. An Israeli study<sup>11</sup> found 4.7% of travellers over 60 had respiratory symptoms during travel and 2.6% had it after travel. Diarrhoea was reported in 9.9% prior to travel and 0.5% respectively in the same cohort. Other investigations revealed that 24% of a febrile Australian sample returning from the tropics had LRTI12 (malaria was the commonest at 27%), 25% of 56 respiratory admissions following travel was due to pneumonia, and 2 out of ten admission due to pneumonia in another study had pneumococcus isolated. It has to be noted that in the last study another four cases had no pathogen documented. Very few studies specifically looked for a causative pathogen, but a common vaccine preventable one such as pneumococcus can definitely not be excluded.

Yet the prevention of RTI is not a topic usually covered in the pre-travel consultation.<sup>10</sup> In a study, the nine topics most frequently covered were diarrhoea, vectors, malaria, animal bites, food, sexual risk, insurance, blood safety and altitude. Only 2/28 (7.1%) of immunocompromised and 9/48 (18.8%) of patients with medical co-morbidities received the pneumococcal vaccine. Less than one sixth of elderly travellers received the vaccine.<sup>10</sup>

The Hajj is the largest annual mass gathering on earth, with between three and five million pilgrims performing set rituals in a relatively confined space over a period of five days.<sup>13</sup> A large percentage is elderly with medical co-morbidities. Pneumonia was the cause of 39% of hospital admissions in 2002. Pneumonia was diagnosed in 24/10 000 Iranian pilgrims in 2004 and 34/10 000 in 2005, though causative organisms were not documented.<sup>14</sup> Pneumococcus was the cause of 6/9 cases of meningitis in a 2003 study, and pneumococcus was isolated in 5% of hospital admissions in another investigation. The 'PREVENT'15 (The PRevEntive Vaccination for pnEumococcal disease iN mass gatherings) expert opinion panel concluded that: 'The advisory board members feel that while there are limited data on the burden of pneumococcal disease at Hajj, the available data as well as the circumstances of Hajj (vulnerability of large proportion of pilgrims due to their age and pre-existing illnesses, intense crowding and air pollution) warrant pneumococcal vaccination. 'Conjugate vaccines may become the vaccines of choice for Hajj pilgrims if supported by the local epidemiology.'

Deep vein thrombosis (DVT) is not normally associated with pneumonia, but a recent population based study found that pneumonia in the last year increased the risk of DVT by a factor of five compared to controls.<sup>16</sup> They excluded risk factors such as recent travel. It is known that the risk of DVT is increased in those travellers on long haul flights who had pneumonia in the preceding few months. Long haul travel on its own increases the risk of DVT 2-4 times. Finally, age is a known risk factor for the development of DVT's during travel, rising from 7.6/million for those under 40 years, to 140/million for those over 75 years. No studies have been done to determine an association between pneumococcal vaccination in the older traveller and DVT prevention, and it is certainly warranted.

The relationship between pneumococcal disease and preceding influenza is well established. Mechanisms involve the destruction of respiratory epithelium and exposure of the basement membrane by the virus leading to bacterial invasion, up-regulation of molecules used as receptors by bacteria, and impairment of certain immunological responses. Antigenic shift and drift makes leads to unpredictable re-assortment of viral antigens making vaccine production difficult. The 2009 H1N1 'swine flu' pandemic highlighted this issue. It has to be taken into account that the spread of the H1N1 pandemic was clearly travel related. The route of disease reports mirrored that of the routes followed by aircrafts out of Mexico, where the disease was first reported.17 Vaccine production could not keep up with the spread of the disease, leaving a number of the younger population vulnerable to superadded bacterial invasion. There was relative sparing of the older age group, probably due to some pre-existing immunity, but this may not be the case with the next pathogenic strain. Furthermore, the influenza virus is only about 60% effective in the elderly population, so vaccinating them against pneumococcal disease is a plausible strategy.

References on request.

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