Novel strategies to engage travellers visiting friends and relatives
Disclosures and funding sources

• DISCLOSURES
  – Research support: GSK, Sanofi Pasteur
  – Paid consultancy: GSK

• FUNDING SOURCES
  – Australian Research Council (ARC) Discovery Project (DP), 2007-2009: *Who acquires infection from whom across international borders? New approaches for control of emerging infections through understanding travel patterns.* (CIs Macintyre, Plant, Watkins)
Outline

• The **major health risks** of the VFR population
• The **major barriers** to uptake of pre-travel health care and the **risk behaviours** that lead to increased travel health risks in VFR travelers
• **Novel strategies and interventions** to engage immigrant communities to improve the health of VFRs travelers
Who are VFR travellers?

- Intended purpose of travel is to visit friends and relatives
- First- or second-generation migrant
  - Immigrant VFR – first generation
  - Tourist VFR – second generation
  - Importance of cultural links
- Originally from a low- or middle-income country now living in a high-income country
  - Epidemiological gradient of health risk between the two locations

Keystone. Traveler’s Health (Yellow Book). Chapter 8: Immigrants Returning Home to Visit Friends & Relatives (VFRs). CDC
**Who are VFR travellers?**

Australian population
23.1 million

- 32% Asia (incl Sth A)
- 10% Africa/Middle East
- 66% recent arrivals (1997-2006) from NESB

5.3 million migrants\(^1\)
(25% Aust pop.)

7.1 million international departures\(^2\)
(23% VFR)

23% 2\(^{\text{nd}}\) generation Australians

39% Asia

Airport survey; VFRs = 28% of departing Australians\(^4\).

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Major health risks of the VFR population
VFRs are disproportionately represented

<table>
<thead>
<tr>
<th>Mosquito-borne diseases</th>
<th>Faecal-oral transmitted diseases</th>
<th>Respiratory transmitted diseases</th>
<th>STIs and blood-borne infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria¹,⁵</td>
<td>Typhoid³, ⁵</td>
<td>TB*⁸</td>
<td>Hepatitis B*</td>
</tr>
<tr>
<td>Chikungunya⁵</td>
<td>Paratyphoid⁵</td>
<td>Measles*⁵</td>
<td>HIV</td>
</tr>
<tr>
<td>Dengue*⁷</td>
<td>Hepatitis A⁴</td>
<td>Influenza²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hepatitis E⁵,⁶</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Paediatric VFRs including second generation migrants

5. Heywood et al. unpublished data
6. Slinko et al. CDI 2008
Where does this data come from?

- Observational studies of returned travellers
  - Travel health clinics
  - Hospitalised patients
  - Few GP studies
- Traveller surveillance
  - Geosentinel surveillance data
  - TropNetEurope
- National notifiable disease surveillance systems
  - Enhanced surveillance
GeoSentinel – immigrant and traveller VFRs

- Dermatologic condition
- Sexually transmitted disease
- Schistosomiasis
- Tuberculosis
- Influenza
- All respiratory syndromes
- Hepatitis A
- Intestinal parasite
- Chronic diarrhea
- Parasitic diarrhea
- Bacterial diarrhea
- All acute diarrhea
- Typhoid fever
- Dengue fever
- Malaria
- All systemic febrile illness

Adjusted ORs and 95% CIs

Enhanced surveillance - Australia

- Prospective study
- 7 notifiable diseases
  - Typhoid, paratyphoid, hepatitis A, hepatitis E, malaria, chikungunya, measles
- 2 States: New South Wales & Victoria
- 1 year: Feb 2013 – Jan 2014

53% of the total Australian population
Sydney/Melbourne – 65% of passenger arrivals/departures – ¼ VFRs
<table>
<thead>
<tr>
<th>Trip characteristic n (%)</th>
<th>Typhoid</th>
<th>Paratyphoid</th>
<th>HAV</th>
<th>HEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent travel</td>
<td>32/35 (91)</td>
<td>25/25 (100)</td>
<td>39/58 (67)</td>
<td>13/14 (93)</td>
</tr>
<tr>
<td>VFR travel</td>
<td>31 (97)</td>
<td>18 (72)</td>
<td>24 (62)</td>
<td>10 (77)</td>
</tr>
<tr>
<td>Migrant status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Migrants</td>
<td>22 (63)</td>
<td>16 (64)</td>
<td>18 (31)</td>
<td>10 (71)</td>
</tr>
<tr>
<td>• Aust-born/migrant parents</td>
<td>11 (31)</td>
<td>3 (12)</td>
<td>25 (43)</td>
<td>3 (21)</td>
</tr>
<tr>
<td>• Aust-born/Aust-born parents</td>
<td>2 (6)</td>
<td>6 (24)</td>
<td>15 (26)</td>
<td>1 (7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trip characteristic n (%)</th>
<th>Measles</th>
<th>Malaria</th>
<th>Chik</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent travel</td>
<td>25/44 (57)</td>
<td>26/26 (100)</td>
<td>20/20 (100)</td>
<td>180/222 (81)</td>
</tr>
<tr>
<td>VFR travel</td>
<td>11 (44)</td>
<td>14 (54)</td>
<td>9 (45)</td>
<td>117 (65)</td>
</tr>
<tr>
<td>Migrant status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Migrants</td>
<td>13 (30)</td>
<td>18 (69)</td>
<td>8 (40)</td>
<td>105 (47)</td>
</tr>
<tr>
<td>• Aust-born/migrant parents</td>
<td>14 (32)</td>
<td>3 (12)</td>
<td>2 (10)</td>
<td>61 (28)</td>
</tr>
<tr>
<td>• Aust-born/Aust-born parents</td>
<td>17 (39)</td>
<td>5 (19)</td>
<td>10 (50)</td>
<td>56 (25)</td>
</tr>
</tbody>
</table>
Median age: 26.5 years
Range: 0-80 years.
Children (<18 yrs) - 34.7%
  - Hepatitis A 50%
  - Typhoid 49%
  - Measles 48%
Adults: 60% university edu.
92% Australian citizens/PRs
  - 6 student visas; 7 temp residents work/family visas + 4 NZ citizens
Migrants: 25% recent (≤5 yrs)
63% spoke language other than English (LOTE)
### Enhanced surveillance – travel history

<table>
<thead>
<tr>
<th>Factor</th>
<th>Range (days)</th>
<th>Median</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFR travellers</td>
<td>4-365</td>
<td>36</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>Other travellers</td>
<td>6-730</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Australian-born/Australian-born parents</td>
<td>6-290</td>
<td>15</td>
<td>&lt;0.001‡</td>
</tr>
<tr>
<td>Australian-born/migrant parents</td>
<td>4-365</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Migrant Australians</td>
<td>7-730</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

- Multiple trips to their country of birth after migration
  - Of the 96 migrants, only 6 (6.5%) had not returned to their country of birth since migration (4/6 were children).
  - 23 (24.0%) migrants, 7 (16.3%) Australian-born/migrant parents → 5+ international trips in past 5 years.
Migrant health and infectious diseases in the UK: findings from the last 10 years of surveillance

K.S. Wagner, Migrant Health Scientist, J. Lawrence, Travel Health Scientist, L. Anderson, Senior Scientist (Epidemiology), Z. Yin, Scientist (Epidemiology), V. Delpech, Consultant Epidemiologist and Head of HIV and AIDS Reporting Section, P.L. Chiodini, Director, Health Protection Agency Malaria Reference Laboratory, Consultant Parasitologist, Hospital for Tropical Diseases, London, C. Redman, Epidemiologist and J. Jones, Consultant Epidemiologist and Head of Travel and Migrant Health Section

Address correspondence to K.S. Wagner, E-mail: karen.wagner@hpa.org.uk

Abstract

Background Migrants account for an increasing proportion of the UK population. They are at risk of acquiring infectious diseases in their country of origin (prior to migration or during return visits), during migration, as well as in their destination country. Migrants can therefore have different risk profiles to the indigenous population.

Methods UK enhanced surveillance data for TB, HIV, malaria and enteric fever were analysed, with a focus on 2010, for migrant (non–UK born) populations.

Results South Asia was the most common region of birth for TB and enteric fever cases (57 and 80% of migrant cases, respectively). Sub-Saharan Africa was the predominant region of birth for HIV in heterosexuals and malaria cases (80 and 75% of migrant cases, respectively). The majority of cases of TB, HIV in heterosexuals, malaria and enteric fever reported in the UK are migrants. Among UK–born cases, ethnic minorities are disproportionately represented.

http://pubehealth.oxfordjournals.org/content/early/2013/03/20/pubmed.fdt021.full

- **Malaria**: 70-88% migrants
- **TB**: 62-73%
- **Enteric fever**: 62-65%
- **Heterosexual cases of HIV**: 80%
- **UK-born cases**:
  - ethnic minorities are over-represented
  - majority <20 years
Hepatitis A in travellers

- Incidence of hepatitis A per 100,000 non-immune travellers to low/middle income countries → decreases since 1980s/90s.\(^1\)
  - 1970s – 300 per 100,000 travellers\(^2\)
  - 2000s – 12.8 per 100,000 travellers\(^3\)

### Incidence of hepatitis A (cases/100,000 visits/month) and relative risk by destination

<table>
<thead>
<tr>
<th>Destination</th>
<th>1990</th>
<th>1991</th>
<th>1992</th>
<th>Mean for 1990-2</th>
<th>Risk relative to risk in France and Scandinavia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indian subcontinent:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All travellers</td>
<td>114</td>
<td>87</td>
<td>81</td>
<td>94</td>
<td>1835</td>
</tr>
<tr>
<td>Age &lt;15:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting friends and relatives</td>
<td>128</td>
<td>119</td>
<td>113</td>
<td>120</td>
<td>2347</td>
</tr>
<tr>
<td>Tourists or purpose of visit not known</td>
<td>29</td>
<td>11</td>
<td>5</td>
<td>15</td>
<td>295</td>
</tr>
<tr>
<td>Age ≥15:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting friends and relatives</td>
<td>64</td>
<td>50</td>
<td>52</td>
<td>55</td>
<td>1083</td>
</tr>
<tr>
<td>Tourists or on business or purpose of visit not known</td>
<td>66</td>
<td>52</td>
<td>53</td>
<td>57</td>
<td>1111</td>
</tr>
</tbody>
</table>

*Bangladesh, India, Nepal, Pakistan, Sri Lanka.*
Hepatitis A in VFR travellers

- Up to 91% of imported cases in very low risk countries
  - Often reported by country of birth

- Swiss study\(^1\)
  - % cases VFR increased 1988-93 (15.5%) \(\rightarrow\) 2000-04 (28.2%)
  - VFRs: mostly 0-14 years
  - Other travellers: mostly 15-29 years


Figure 4. Rate of hepatitis A infection associated with international travel to endemic areas for persons born in Australia compared with those born in countries with moderate to high endemicity.
Hepatitis A immunity - New Delhi

- Challenges to assumption of prior immunity if born in high risk country
- Serological study of 500 urban residents, New Delhi:

<table>
<thead>
<tr>
<th>Age group (yrs)</th>
<th>Number tested</th>
<th>% susceptible</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24 yrs</td>
<td>109</td>
<td>46%</td>
</tr>
<tr>
<td>25-34 yrs</td>
<td>189</td>
<td>41%</td>
</tr>
<tr>
<td>35-44 yrs</td>
<td>111</td>
<td>13%</td>
</tr>
<tr>
<td>&gt;45 yrs</td>
<td>91</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>29%</td>
</tr>
</tbody>
</table>
HAV seroprevalence by 10 year cohort, by serosurvey year, age-standardised to the 2008 Victorian population*

In 2007, a 22-year-old Pakistani student living in Melbourne, tested positive for polio after visiting Pakistan on university holidays.

Sparked a huge contact tracing effort – aeroplane, household contacts and patients/staff at GP clinic and hospital, including 83 HCWs.
Malaria

- Majority of travel-associated cases – travel to sub-Saharan Africa
  - enhanced surveillance study – equal to SE Asia.
- UK: Increase in % *P. falciparum* malaria\(^1\)
  - reflecting change in migration/travel patterns + change in *P. vivax* epidemiology in India//Pakistan
  - 2007: 78% VFR; incl. ~14% UK-born
- UK National Malaria Ref Lab
  - 39,300 cases, 1987-2006
    - 65% VFR
  - VFR Africa: RR 3.7
  - VFR S Asia: RR 7.7

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Risk of acquiring malaria by purpose of travel - Geosentinel

1. Leder K et al. Clin Infect Diseases 2006;43:1185-93
• Migrants over-represented in TB notifications
  – Difficult to tease out cases acquired through travel and reactivated disease in migrants
• Californian case-control study of Tuberculin skin testing in children <6 years
  – Risk travel: aOR 3.9 (95%CI 1.9-7.0)
    o US-born children, aOR 4.7, 95%CI 2.0-11.2
  – OS visitor: aOR 2.4 (95%CI 1.0-5.5)
• BCG vaccination:
  – risk benefit analysis of children aged <5 years, travelling to a high TB incidence country for an extended period
  – No specific recommendations for children of migrants

Hepatitis B
- Majority of cases in developed countries are in arriving migrants (chronic carriage)
- Risk to family members
- Risk from medical procedures during travel

HIV – majority of heterosexually acquired infections – migrants (UK data)

- 44.5% had returned to central African countries within previous 5 years.
- 40% of men and 21% of women had new sexual partner while traveling.
- 42% did not use condom.

Compared to tourist travellers
- More likely to have sexual partners from the local population

Fenton et al AIDS 2001;15;1442-5
Major barriers to uptake of pre-travel health care and the risk behaviours that lead to increased travel health risks in VFR travellers
Major risk factors for increased risk

1. Circumstances of travel
2. Misconceptions of health risks
3. Access to services
Trip characteristics

- Local health system
- VFR travel
- Destination
- Trip duration
- Contact patterns
- Access to mosquito avoidance measures
- Food and water
Health beliefs

- Perceptions of reduced or absent risk of “going home”
- Belief that they are immune
- Lack of awareness of risks
  - Lack of awareness of travel medicine as a resource
  - Previous healthy travel
- Belief that Western HCPs are not knowledgeable about risks in their home country

“We were going home. I never thought we would get disease from there.” (32 year old, Lebanese-born, hepatitis A)

“I thought she had all her childhood vaccines. The doctor explained that only hepatitis B is in the schedule” (Burmese-born mother of 7 year old, hepatitis A)

1. Seale H, et al. Improving the uptake of pre travel health advice amongst migrant Australians: exploring the attitudes of primary care providers and migrant community groups. Submitted to: BMC Infectious Diseases
45/180 (25.0%) sought advice; 34/45 (77.3%) from their regular GP, only 3 from a travel medicine clinic.

<table>
<thead>
<tr>
<th>Reason for Not Seeking Advice</th>
<th>Migrants (n=76)</th>
<th>Australian-born/migrant parents (N=27)</th>
<th>Australian-born/Australian-born parents (N=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn’t seek advice</td>
<td>57 (75%)</td>
<td>14 (52%)</td>
<td>12 (48%)</td>
</tr>
<tr>
<td>Didn’t think I was at risk</td>
<td>34 (60%)</td>
<td>9 (64%)</td>
<td>12 (100%)</td>
</tr>
<tr>
<td>Previous “healthy’ travel to COB*</td>
<td>20 (35%)</td>
<td>9 (64%)</td>
<td>-</td>
</tr>
<tr>
<td>Previous “healthy’ travel</td>
<td>7 (12%)</td>
<td>5 (36%)</td>
<td>8 (67%)</td>
</tr>
<tr>
<td>Thought I was fully vaccinated</td>
<td>3^ (5%)</td>
<td>0</td>
<td>2^ (17%)</td>
</tr>
<tr>
<td>Saw GP previous trip</td>
<td>4** (7%)</td>
<td>0</td>
<td>2** (17%)</td>
</tr>
<tr>
<td>Not enough time</td>
<td>5 (9%)</td>
<td>2† (14%)</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>31/37 (84%)</td>
<td>9/12 (75%)</td>
<td>5/8 (63%)</td>
</tr>
</tbody>
</table>

* To country of birth/parents country of birth
^ All cases were paratyphoid (including 1 GP)
† Booked and departed within 1 day
** Typhoid cases
• Airport study\(^1\)
  – Tourists 51\% vs. VFR-travellers 35\%
  – Australian-born, 53\% vs. OS-born Australians, 28\% (aOR 2.0, 1.3-3.3)
    – Australian VFRs – 93\% sought that advice from GP (compared to 80\% tourists)
• More likely to take advice from friends and relatives
• VFR paediatric travellers < non–VFR paediatric travellers (32\% vs 51\%; P<0.001) \(^2\)

Pre-travel health advice – USA → India

- 2005 USA Airport study – 3 airports (Chicago, NYx2) – departing 4 India
  - 95% Indian/S Asian ethnicity
  - 75% primary reason= VFR
  - 34% sought pre-travel advice
    - lack of awareness that advice was needed (59%) and
    - the belief that vaccinations and medications were current (32%).
  - 46% reported prior hepatitis A vaccine + 8% prior infection

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pretravel health advice†</th>
<th>Hepatitis A protected‡</th>
<th>Typhoid fever protected§</th>
<th>Antimalarial chemoprophylaxis¶</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFR status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFR</td>
<td>283 (29.8)†</td>
<td>361 (50.9)</td>
<td>51 (9.4)</td>
<td>139 (16.3)</td>
</tr>
<tr>
<td>Non-VFR</td>
<td>147 (48.4)</td>
<td>181 (68.8)</td>
<td>75 (36.6)</td>
<td>108 (39.4)</td>
</tr>
<tr>
<td>Prevalence ratio, p</td>
<td>0.62, &lt;0.001</td>
<td>0.74, &lt;0.001</td>
<td>0.26, &lt;0.001</td>
<td>0.41, &lt;0.001</td>
</tr>
</tbody>
</table>

†Pretravel advice: visited a health care professional in preparation for the current trip.
‡Hepatitis A protected: reported history of hepatitis A infection, hepatitis A vaccination, or immune globulin.
§Typhoid fever protected: up-to-date typhoid vaccine (ie, oral vaccine in previous 5 y or injectable vaccine in previous 2 y).
¶Appropriate antimalarial chemoprophylaxis: melloquine, atravuquine-proguanil, or doxycycline, as defined by Centers for Disease Control and Prevention recommendations for travelers to India.
**Enhanced surveillance study – travel plans**

- **VFRs - seek advice closer to departure:**
  - Global TravEpiNet: median 16 days vs. 28 days tourists
- **Median 2 mths (range 2d-7mths) booking → departure**
  - No difference by disease, reason for travel, VFR
    - Australian-born/Australian-born parents: median 60 days (3-365)
    - Australian-born/migrant parents: **median 42 days (2-365)**
    - Migrant Australians: median 60 days (1-210)

- Booked through travel agent
  - VFR travellers – 36/48 (75%)
  - Other travellers – 3/9 (33%)
Primary healthcare providers

• Migrants: more likely to see GPs from their own ethnicity
  – GPs consulting in other languages, less likely to consider VFRs at increased risk²

• GP study, migrant-rich suburbs, NSW, Australia (N=554)
  – 76% speak language other than English (LOTE)
    o 65% practiced in LOTE
    o More likely to ask about travel plans
  – 87% no additional travel medicine training
    o Median 3 travel patients per week
    o 44% travel health promotional material
      ▪ 10% VFR specific
  – GP perception of risk for VFR travel
    o VFRs at higher risk than holiday travellers: 39.8%
      ▪ GP consult LOTE: aOR=0.61, p=0.01

Heywood et al. General practitioners’ perception of risk for travellers visiting friends and relatives. Submitted to Journal of Travel Medicine
### Barriers to the provision of pre-travel medical care to VFR travellers by GPs

<table>
<thead>
<tr>
<th>Barrier</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient-centred</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late presentation by VFR travellers</td>
<td>482</td>
<td>85.6</td>
</tr>
<tr>
<td>Patients’ low perception of risk in home country</td>
<td>453</td>
<td>80.5</td>
</tr>
<tr>
<td>Patients’ believe previous immunity will be protective</td>
<td>356</td>
<td>63.2</td>
</tr>
<tr>
<td>Patients’ fear of side effects</td>
<td>304</td>
<td>54.0</td>
</tr>
<tr>
<td><strong>Provider-centred</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in assessing prior vaccination or disease exposure</td>
<td>350</td>
<td>62.2</td>
</tr>
<tr>
<td>Lack of knowledge about the travel destination</td>
<td>249</td>
<td>44.2</td>
</tr>
<tr>
<td>Difficulty in locating up-to-date disease information</td>
<td>224</td>
<td>39.8</td>
</tr>
<tr>
<td>Difficulty in locating up-to-date country information</td>
<td>224</td>
<td>39.8</td>
</tr>
<tr>
<td>Lack of training in travel medicine</td>
<td>188</td>
<td>33.4</td>
</tr>
<tr>
<td>Lack of consultation time</td>
<td>182</td>
<td>32.3</td>
</tr>
<tr>
<td>Language difficulties</td>
<td>164</td>
<td>29.1</td>
</tr>
<tr>
<td><strong>System-centred</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of vaccines/medications to patient</td>
<td>442</td>
<td>78.5</td>
</tr>
<tr>
<td>Lack of culturally appropriate resources for patients</td>
<td>279</td>
<td>49.6</td>
</tr>
<tr>
<td>Cost of medical consultation to patient</td>
<td>191</td>
<td>33.9</td>
</tr>
</tbody>
</table>

Role of primary care providers

- Survey of immigrant families in the Bronx, New York (N=129)
  - Parents of children born in malaria endemic countries who present for routine health maintenance visit
    - 36% planned to travel within 12 months
    - >90% reported any future travel plan
  - Highlights the importance of routine outpatient visits to provide travel consultations, advice and education.
Pre-travel vaccination

- Modest uptake reported in population-based/airport traveller studies
  - 7-12% prior to travel\textsuperscript{2,3,5}
  - 4-37\% report previous vaccination\textsuperscript{5}
- Australian airport study\textsuperscript{3}: 17\% tourists vs. 9\% VFRs reported pre-travel vax (p<0.05)
- GP – major role in pre-travel vaccine delivery to all travellers, esp. VFRs
  - Any consultation is an opportunity to ask about travel plans
  - A travel consultation is an opportunity to update with routine vaccinations

\textsuperscript{(1)} Zwar. MJA.2003; (2) Zwar & Streeton JTravMed 2005; (3), Heywood et al., 2008
Malaria chemoprophylaxis

- Less likely to adhere to malaria chemoprophylaxis
  - Often underestimate their risk due to waning or absence of immunity
  - Those taking chemoprophylaxis may leave drugs behind for family members

- Canadian study: VFRs to S. Asia
  - Travelling to high-moderate malaria risk region – 94%
  - Considered malaria a moderate-severe illness - 69%
  - Sought pre-travel health advice - 54%
  - Intended to use any chemoprophylaxis – 31%
    - Higher with longer duration of migration; family history of malaria
  - Intended to use measures to prevent mosquito bites - <10%
  - Prescribed recommended drug regimen – 7%

Dos Santos et al. Survey of use of malaria prevention measures by Canadians visiting India. CMAJ 1999;160:195-200
Malaria chemoprophylaxis – poor knowledge

- **French migrants, sub-Saharan African ethnicity, VFR travellers**

  Recruited after pre-travel clinic visit
  N=122

  Recruited from travel agents specialising in travel to sub-Saharan Africa N=69

  10% (19/191) visiting Africa to attend funeral of a relative

  Malaria a concern – 47%
  Failed to identify mosquito bites in transmission – 29%
  Reported availability of malaria vaccine – 35%
  Malaria vaccine required prior to travel – 62%

  Perceived high risk for malaria – 7%
  Travels home every 1-3 years – 34%
  Median trip length – 44 days
  Low “social class” – 55%

  Perceived high risk for malaria – 33%
  Travels home every 1-3 years – 62%
  Median trip length – 25 days
  Low “social class” – 29%

  No difference by age, sex, African-born, French citizenship

## Other travel precautions – Australian domestic and international students

**Table 2 Uptake of travel health precautions for any international travel in the past 12 months by enrolment status (N = 829)**

<table>
<thead>
<tr>
<th>Health Precaution</th>
<th>All N = 829 (%)</th>
<th>Domestic N = 644 (%)</th>
<th>International N = 185 (%)</th>
<th>P-value*</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunscreen</td>
<td>567 (68.4)</td>
<td>466 (72.4)</td>
<td>101 (54.6)</td>
<td>&lt; 0.001</td>
<td>2.18 (1.6-3.1)</td>
</tr>
<tr>
<td>Travel insurance</td>
<td>492 (59.3)</td>
<td>425 (66.0)</td>
<td>67 (36.2)</td>
<td>&lt; 0.001</td>
<td>3.42 (2.4-4.8)</td>
</tr>
<tr>
<td>Pain medication (e.g. paracetamol or aspirin)</td>
<td>476 (54.7)</td>
<td>406 (63.4)</td>
<td>68 (36.8)</td>
<td>&lt; 0.001</td>
<td>2.98 (2.1-4.2)</td>
</tr>
<tr>
<td>Avoided certain foods/tap water</td>
<td>443 (53.4)</td>
<td>386 (59.9)</td>
<td>57 (30.8)</td>
<td>&lt; 0.001</td>
<td>3.36 (2.4-4.8)</td>
</tr>
<tr>
<td>First aid kit</td>
<td>696 (49.1)</td>
<td>347 (53.9)</td>
<td>60 (32.4)</td>
<td>&lt; 0.001</td>
<td>2.43 (1.7-3.4)</td>
</tr>
<tr>
<td>Insect repellent</td>
<td>371 (44.8)</td>
<td>333 (51.7)</td>
<td>38 (20.5)</td>
<td>&lt; 0.001</td>
<td>4.14 (2.8-6.1)</td>
</tr>
<tr>
<td>Vitamins (e.g. vitamin C or multivitamins)</td>
<td>292 (35.2)</td>
<td>200 (31.1)</td>
<td>92 (49.7)</td>
<td>&lt; 0.001</td>
<td>0.46 (0.3-0.6)</td>
</tr>
<tr>
<td>Anti-diarrhoeal medication (e.g. Imodium)</td>
<td>237 (28.6)</td>
<td>207 (32.1)</td>
<td>30 (16.2)</td>
<td>&lt; 0.001</td>
<td>2.45 (1.6-3.7)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>184 (22.2)</td>
<td>149 (23.1)</td>
<td>35 (18.9)</td>
<td>0.2</td>
<td>-</td>
</tr>
<tr>
<td>Condoms</td>
<td>159 (19.2)</td>
<td>137 (21.3)</td>
<td>22 (11.9)</td>
<td>0.004</td>
<td>2.00 (1.2-3.2)</td>
</tr>
<tr>
<td>Anti-malarial medication</td>
<td>106 (12.8)</td>
<td>98 (15.2)</td>
<td>8 (4.3)</td>
<td>&lt; 0.001</td>
<td>3.97 (1.9-8.3)</td>
</tr>
<tr>
<td>Vaccination card (with previous travel and non-travel vaccines)</td>
<td>90 (10.9)</td>
<td>76 (11.8)</td>
<td>14 (7.6)</td>
<td>0.1</td>
<td>-</td>
</tr>
<tr>
<td>Water purification kit</td>
<td>37 (4.5)</td>
<td>33 (5.1)</td>
<td>4 (2.2)</td>
<td>0.09</td>
<td>-</td>
</tr>
<tr>
<td>None of the above</td>
<td>47 (5.7)</td>
<td>24 (3.7)</td>
<td>23 (12.4)</td>
<td>&lt; 0.001</td>
<td>0.27 (0.2-0.5)</td>
</tr>
</tbody>
</table>

* Pearson’s Chi-square test
Factors affecting travellers’ uptake of preventative measures against infectious diseases

- **Traveller characteristics**
  - Socio-demographic
  - Socio-economic
  - Prior knowledge and awareness (risks and interventions)

- Trip-related factors
- Perceived risk of travel-associated disease
- Risk tolerance
- Intervention-related factors

- Motivators to action
- Use of preventative measures
- Likelihood of travel-associated disease

Access to services

• Financial barriers to pre-travel health care and vaccination
  • Just enough funds to cover the cost of flights
  • Regular travel
• Poor health (system) literacy
• Cultural and language barriers with health care providers
  • Lack of professional interpreters
  • uptake of preventative health behaviours positively associated with a longer duration of migration.
• Lack of travel health information or services targeting culturally diverse backgrounds

“… Our greatest barrier is language and that’s not just with office workers [at the MRC] talking to migrants, … we’re always having to, even when there’s written and translated material, to really unpack what it means” (MRC Staff member)
Novel strategies and interventions to engage immigrant communities to improve the health of VFRs travellers
Strategies to address poor uptake of pre-travel health advice and vaccination in VFR travellers

• Improving awareness amongst VFR travellers
  – Community consulted approaches

• Improving awareness/training amongst GPs
  – Evidence base for effective travel health interventions
  – Effective education → behavioural change

• Improving links between organisations
  – Culturally appropriate communication
Community interventions

- Public health messages tailored to VFR travellers are lacking
- PH educational materials and health promotion messages
  - regional/local;
  - not widely circulated or
  - evaluated
- National resources – inadequate
• novel initiatives to inform ethnic groups
• Simple messages in media (newspaper, radio, web-based, and television), via printed materials (posters, tear sheets and z-cards) and at community festivals
  – translated
developed health education materials targeting international students regarding tuberculosis and travel risks

key agencies identified: student support advisors, medical practitioners, health insurers, and government and professional organisations → asked to evaluate resources
Stay healthy during your trip home

Health advice for those travelling outside of Australia

Your immune system changes when you spend time away from your home country. Even within a few months, you start losing immune protection to certain infections.

If you were born overseas and are now living in Australia, you may be a risk of getting sick if you go home for a visit.

Visit your doctor or travel clinic at least 4-6 weeks before you leave to talk about:

- how to reduce your risk of food-borne and water-borne infections
- immunisation
- how to avoid mosquitoes
- anti-malarial medications

Seek medical advice if you become unwell during or after your trip and mention you have been overseas.

For further information, visit or call:
Royal Melbourne Hospital Travel Clinic (YIDS)
Tel: 03 9342 7390

Smartraveller

The Travel Doctor
www.traveldoctor.com.au
Tel: 1300 668 944

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International Students:
Stay Healthy During Your Trip Home

See your doctor before you travel

- Your immune system changes when you spend time away from your home country
- Even within a few months, you start losing immune protection to certain infections
- If you were born overseas and are now living in Australia, you may be at risk of getting sick if you go home for a visit

Things to discuss include:

- Immunisations
- Medication to prevent malaria
- Avoiding food-borne and water-borne infections
- Avoiding mosquito bites

Also, see a doctor if you are unwell during or after your trip

For information, visit or call: www.traveldoctor.com.au; www.smartraveller.gov.au;
Royal Melbourne Hospital Travel Clinic: 03 9342 7390

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Figure 6  Travel health PowerPoint slide.
Resource kit for GPs

- VFR patient handout
- Waiting room poster
- Review of literature
- Contacts

Slide courtesy of Professor Nick Zwar - Australian Visiting Friends & Relatives Medical Advisory Group (AVMAG).

Visit the website [here](link).
Media campaigns

- NaTHNaC – PH England sponsored
- Uses international events e.g. World cup, World Malaria Day etc. to promote website.
  - >175% increase in traffic after dengue media – outbreak in Madeira
- No VFR-specific information and no plans for other languages
Engagement with migrant communities

- Patients returning to their communities ("word of mouth")
- Community/ethnic news and information channels
  - TV, newspapers, radio, web postings and blogs
- Use of bilingual community educators, community radio, ethnic newspapers and posters to disseminate pre-travel health information
- National well-publicised resources (for communities and GPs)
  - Culturally appropriate and in languages other than English
  - Advice tailored to the cumulative risk of multiple return visits

"I would like to get more information on what precautions to take next time we go to India, would like to circulate the information to friends and relatives living in Australia as well." (HAV, Mother of 13 year old Indian-born)
Improving links between organisations

- Travel Medicine specialists with primary care
- Travel agents
  - E.g. Hajj pilgrims
- Migrant resource centres and community organisations
- Ethnic Medical Associations
Summary

• Monitor trends
  – Improve reporting of travel history, country of birth and ethnicity

• Reduce barriers to accessing pre-travel health
  – Patient
  o VFR children are over-represented in disease data and under-represented for pre-travel health consultations
  – Healthcare provider
  – System

• Target VFRs for pre-travel health interventions
  – Determine the most appropriate strategies
    o Addressing multifactorial barriers
  – Disseminate successful strategies
  – Evaluate these strategies
    o Few published accounts of VFR health promotion
Thank you