

# Sexual behaviour of Kiribati seafarers: second generation surveillance in 2005 and 2008

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## ABSTRACT

*High-risk sexual activity, including engaging in transactional sex, concurrent sexual partnerships, and inconsistent condom use, increases the risk of infection with HIV and other sexually transmitted infections (STI). The demands of seafaring, such as long periods spent away from home, and the availability of commercial sex around seaports, can contribute to a culture of high-risk activity such as multiple casual sexual encounters and poor condom use. In 2005 and 2008, the Kiribati Ministry of Health conducted HIV and STI prevalence and behaviour surveys among seafarers. The results suggest that, while knowledge of HIV prevention and transmission improved from 2005 to 2008, this did not correlate with reduced levels of risky sexual activity in the same period. These findings suggest that HIV and STI prevention programs must extend beyond providing information, and testing and treatment facilities, towards implementing strategies that encourage and support safer sexual behaviours amongst seafarers and their partners, in particular transactional sex partners.*

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**Key words: seafarers, Sexually Transmitted Infections (STI), Human Immunodeficiency Virus (HIV), Second Generation Surveillance**

## INTRODUCTION

The risk of sexually transmitted infections (STI) amongst seafarer populations was recognized as early as 1924 with the development of the Brussels Agreement, which provided for the establishment of free STI examination and treatment facilities for seafarers in the world's major ports [1]. Research has continued to find higher rates of HIV and other STIs amongst seafarers compared to the general population. For example, a 1989 study documented a Human Immunodeficiency Virus (HIV) prevalence of 4.5% amongst 336 Belgian seafarers at a time when the national HIV infection rate in the general Belgian population was 0.062% [2].

Sexually transmitted infections are a major public health concern in the Pacific, with rates of Chlamydia infection amongst the highest in the world. A number of key risk factors may contribute to the spread of STIs in the region, including multiple and concurrent sex partners, inconsistent condom use, as well as sexual violence and excessive alcohol consumption leading to unsafe sex. Seafarers are thought to experience high levels of such risk behaviours due to the factors inherent in the nature of their work, such as international travel and spending long periods away from home.

Second generation surveillance for HIV/AIDS is the systematic collection, analysis, and interpretation of

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information for use in tracking and describing changes in the HIV/AIDS epidemic over time. In low-level epidemics where relatively little HIV is measured in any group, SGS systems or surveys focus largely on high-risk behaviours, looking for changes in behaviour which may foster a rapid spread of infection [3].

In 2004–2005 a Second Generation Surveillance (SGS) behavioural and HIV and STI prevalence survey was conducted amongst male seafarers from Kiribati. Following the survey, a number of prevention programs were established for seafarers including a “seafarer’s diary” providing information on HIV and STI prevention in a personal agenda format, and the development of seafarer social drop-in centres for testing, treatment, and information. In 2008, a follow-up SGS survey was conducted amongst seafarers in Kiribati. This paper compares some of the key findings from the 2005 and 2008 SGS surveys.

## PARTICIPANTS

A total of 302 and 160 male seafarers were recruited in 2005 and 2008, respectively. In 2005, seafarers were recruited consecutively from December 2004 to July 2005 from the Marine Training Centre, Kiribati Islands Overseas Seafarers Union, Seamen’s Hostel, and the Fisheries Training Centre. In 2008, seafarers were recruited consecutively from March to June 2008 from the Marine Training Centre only. Seafarers who were aged between 15 and 54 in 2005, and 15 and 49 in 2008 were eligible for participation. To ensure consistent age criteria, only those seafarers aged 15 to 49 from the 2005 survey were included for this analysis, yielding a total of 275 responses from the 2005 dataset.

## MATERIAL AND METHODS

Participation in both surveys was voluntary, and informed consent was obtained from all eligible participants prior to data and sample collection. Questionnaires based on Family Health International’s Behavioural Surveillance Survey (BSS) forms [4] were adapted to be relevant to Kiribati and seafarers. The interviewers signed and dated a consent form upon verbal consent being provided by each seafarer. The questionnaire in 2005 consisted of ten sections whilst the questionnaire in 2008 had seven sections. Both questionnaires asked participants a range of questions regarding demographic characteristics, marital status, marine work experience, sexual history, drug and alcohol use, HIV knowledge and attitudes, and experiences of HIV testing and STI symptoms. The

questionnaires were interviewer-administered in English on both occasions and took between 25 and 40 minutes to complete.

The surveys included a set of questions to assess knowledge of HIV transmission and prevention, which correspond to UNGASS indicator 14 for most-at-risk populations [5]. While all 5 of the current questions were included in the 2008 survey, this indicator had changed slightly between survey periods so only four questions are directly comparable.

Confidential linked testing for HIV, syphilis, and hepatitis B was conducted in both surveys. In 2005, a 5 ml blood sample was collected from participants and sera were tested at Tungaru Central Hospital. All reactive HIV test samples were sent to South Western Sydney Area Pathology Service, Australia, for confirmatory testing. Screening for syphilis was by Determine syphilis TP. In 2008, a 10 ml blood sample was taken for testing. Screening for Syphilis was by Rapid Plasma Reagin (RPR) and *Treponema Pallidum* Particle Agglutination test (TPPA), and for Hepatitis B and HIV by Enzyme Linked Immunosorbent Assay (ELISA) (Determine and Serodia). Blood specimens were tested at the National Laboratory of Tungara Central Hospital, excluding HIV confirmatory tests, which were sent to the Regional Reference Laboratory, Centre for Communicable Disease Control, Maitaika House, Suva, Fiji.

Principal funding for both the 2004 and 2008 surveys was through the Global Fund to Fight AIDS, Tuberculosis, and Malaria and was administered by the Secretariat for the Pacific Community (SPC). The Kiribati Ministry of Health provided the personnel and other resources required for conducting the surveys. Further support was provided by the SPC in both 2004 and 2008, and in 2004 additional support was provided by the WHO Representative for the South Pacific and the University of New South Wales.

## DATA ANALYSIS

Data from both surveys were initially entered into Microsoft Access databases and analysed using SPSS (version 13 for Windows: SPSS Inc, Chicago, Illinois, USA) in 2005 and Epi Info (Version 3.5.1, Centers for Disease Control and Prevention, Atlanta, GA, USA) and Microsoft Excel (2007) in 2008. To allow for comparisons, data from both surveys were transferred to Microsoft Excel 2007 for cleaning and synchronizing of variables. Descriptive analysis, comparison of means, and Chi square tests (Yates correction) were conducted in Epi Info (Version 3.5.1, Centers for Disease Control and Prevention, Atlanta, GA, USA) and SPSS (version 13 for Windows: SPSS Inc, Chicago,

**Table 1.** Demographic characteristics from 2005 and 2008 surveys

|  | 2005      |       | 2008      |        |
|--|-----------|-------|-----------|--------|
|  | n [N]     | (%)   | n [N]     | (%)    |
| <b>Mean age</b>                            | 36 years* |       | 33 years  |        |
| <b>Age group</b>                           |           |       |           |        |
| 15–34                                      | 127 [275] | 46.2  | 101 [160] | 63.1   |
| 35+  | 148 [275] | 53.8  | 59 [160]  | 36.9   |
| Total                                      | 275 [275] | 100.0 | 160 [160] | 100.0  |
| <b>Education</b>                           |           |       |           |        |
| Never                                      | 0         | 0     | 2 [158]   | 1.3    |
| Primary                                    | 88 [268]  | 32.8  | 4 [158]   | 2.5    |
| High school                                | 171 [268] | 63.8  | 59 [158]  | 37.3   |
| Higher                                     | 9 [268]   | 3.4   | 93 [158]  | 58.9** |
| <b>Currently Married</b>                   | 192 [238] | 80.7  | 127 [132] | 96.2   |
| <b>Mean years since completed training</b> | 14.9*     |       | 11.6      |        |
| <b>Ever worked overseas</b>                | 251 [270] | 93.0  | 150 [159] | 94.3   |
| <b>No. of months away on last trip</b>     |           |       |           |        |
| 1 to 6                                     | 19 [271]  | 7.0   | 7 [143]   | 4.9    |
| 7 to 12                                    | 184 [271] | 67.9  | 105 [143] | 73.4   |
| > 12                                       | 68 [271]  | 25.1  | 31 [143]  | 21.7   |

\*Significant at  $p < 0.01$ ; \*\* $p < 0.001$

Illinois, USA). Unless otherwise specified, differences were considered significant when  $p < 0.05$ .

## RESULTS

Table 1 summarizes the demographic indicators from the two surveys. Participants in 2005 were slightly but significantly older than those from 2008 (36 years vs. 33 years,  $p < 0.01$ ), and consequently, seafarers in the 2005 survey had been out of seafarer training for a greater number of years than seafarers in 2008 (14.9 years vs. 11.6 years,  $p < 0.01$ ). A significantly larger number of seafarers from the 2008 survey indicated that they had completed higher education compared to 2005 (58.9% vs. 3.4%,  $p < 0.001$ ).

Table 2 summarizes sexual activity in the past 12 months. Almost all of the seafarers in both surveys had sexual intercourse in the past 12 months. Whilst there were no statistically significant differences in the median number of sex partners in the past 12 months, seafarers surveyed in 2008 were more likely to have reported more than one sex partner in the previous 12 months than those surveyed in 2005 (40.8% vs. 55.2%,  $p < 0.05$ ).

Table 3 shows the experience of transactional sex and condom use from the two surveys. Transactional sex, in these surveys, was defined as giving or receiving money, goods or favours in exchange for sex. A number of respondents (85 in 2005, 30 in 2008) declined to answer the question of whether they had engaged in any transactional sex in the previous twelve months and were excluded from further analysis. Overall, more than 1/3 (35%) of seafarers across both studies had engaged in transactional sex in the past 12 months; however, seafarers from the 2008 survey were more likely to have had transactional sex in the past 12 months compared to seafarers from the 2005 survey (63.2% vs. 34.4%;  $X^2 = 23.9$ ,  $p < 0.01$ ). Of those who engaged in transactional sex in the past 12 months, seafarers surveyed in 2008 were also more likely to have had multiple transactional sex partners than seafarers surveyed in 2005 (78.2% vs. 49.2%,  $X^2 = 9.3$ ,  $p < 0.01$ ). Although condom use during transactional sex tended to be higher in 2005 than 2008, the differences were not statistically significant.

**Table 2.** Number of sex partners in the past 12 months, 2005 and 2008 surveys

|  | 2005      |      | 2008      |       |
|--|-----------|------|-----------|-------|
|  | n [N]     | (%)  | n [N]     | (%)   |
| Sex in the last 12 months                    | 250 [273] | 91.5 | 138 [147] | 93.9  |
| Median no. of sex partners in last 12 months | 1         |      | 2         |       |
| More than one sex partner in last 12 months  | 102 [250] | 40.8 | 69 [125]  | 55.2* |

\*p &lt; 0.05

**Table 3.** Participation in transactional sex and condom use amongst seafarers, 2005 and 2008

|  | 2005     |      | 2008     |        |
|--|----------|------|----------|--------|
|  | n [N]    | (%)  | n [N]    | (%)    |
| Had transactional sex in last 12 months <sup>^</sup>                     | 63 [184] | 34.2 | 59 [125] | 47.2*  |
| Median No. of transactional sex partners in last 12 months               | 1        |      | 3**      |        |
| Multiple transactional sex partners in the past 12 months                | 31 [63]  | 49.2 | 43 [55]  | 78.2** |
| Used a condom with every transactional sex partner in the last 12 months | 14 [27]  | 51.9 | 25 [59]  | 42.3   |
| Used a condom during last sex with a transactional partner               | 25 [42]  | 59.2 | 32 [59]  | 54.2   |

\*p < 0.05; \*\*p < 0.01; <sup>^</sup>85 participants in 2005 and 30 in 2008 did not answer this question

Table 4 compares HIV prevention and transmission knowledge in 2005 and 2008 as measured by 4 of the 5 standard questions which relate to UNGASS indicator 14 [3]. Seafarers surveyed in 2008 demonstrated significantly better knowledge of HIV prevention and transmission compared to seafarers in 2005.

## HIV AND STI RESULTS

No seafarers tested positive for HIV in either the 2005 or 2008 study. Different testing methods were used for syphilis screening in the 2005 and 2008 surveys: the prevalence of syphilis in 2005 was 5.9% (95% CI: 3.4–9.4) and in 2008 no reactive syphilis results were reported. Hepatitis B antigen was detected in 20.2% (95% CI: 14.7–26.8) of seafarers in 2005 and 27.0 % in 2008.

Figure 1 summarizes the findings of several key risk behaviours and knowledge indicators. Although differences between the surveys were not significant for all risk factors, the direction shown in the diagram above indicates that despite improved knowledge of HIV prevention and transmission from 2005 to 2008, a greater proportion of surveyed seafarers in 2008 reported high-risk behaviours.

Table 6 compares seafarers across both surveys who engaged in transactional sex in the past 12 months, with those who did not.

Significantly more seafarers who reported engaging in transactional sex in the past 12 months were surveyed in 2008 than in 2005; seafarers who reported engaging in transactional sex in the past 12 months were significantly younger (15–34) and more likely to report multiple sex partners in that time period than seafarers who did not report participating in transactional sex. Also of interest is the finding that there were no differences with regards to engaging in transactional sex associated with marital status, or between those with correct HIV knowledge and those with incorrect HIV knowledge.

Given the high proportion reporting recent multiple sex partners amongst those who had engaged in transactional sex, further analysis was conducted regarding those who did and those who did not report more than one sex partner in the past 12 months. Of those who reported multiple recent partners, the majority were aged 15 to 34 years (51.4% vs. 33.3%, p < 0.001), not married (60% vs. 39%, p < 0.05), and potentially heavier drinkers, for whom usual alcohol consumption was 10 or more standard drinks (57.4% vs. 45.8%, differ-

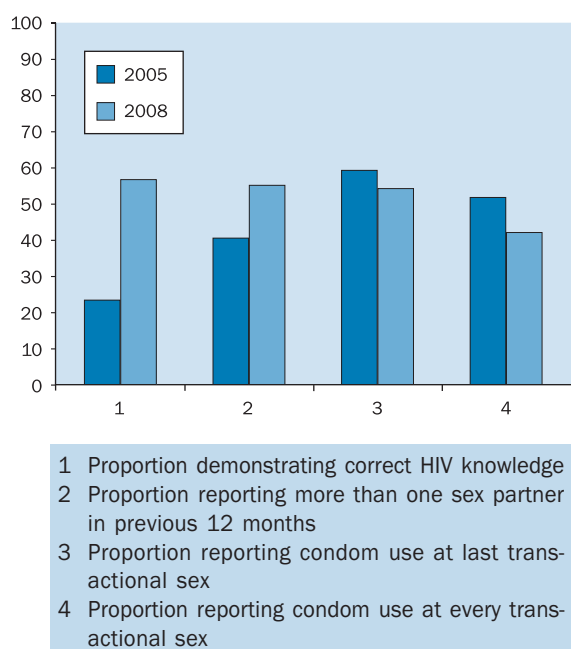
**Table 4.** Comparison of HIV knowledge amongst seafarers, 2005 & 2008

|  | 2005      |      | 2008      |        |
|--|-----------|------|-----------|--------|
|  | n [N]     | (%)  | n [N]     | (%)    |
| Correct knowledge of HIV prevention                        | 100 [275] | 36.4 | 128 [160] | 80.0** |
| Correct knowledge of HIV transmission                      | 170 [275] | 61.8 | 116 [160] | 72.5*  |
| Correct knowledge of BOTH HIV prevention and transmission^ | 64 [275]  | 23.6 | 91 [160]  | 56.9** |

\*p < 0.05; \*\* p < 0.01; ^Correct HIV knowledge refers to those participants who correctly answered all 4 HIV prevention questions and HIV transmission questions

**Table 5.** STI test results, 2005 & 2008

| Year        | 2005     |           | 2008     |           |
|-------------|----------|-----------|----------|-----------|
|             | n/%      | 95% CI    | n/%      | 95% CI    |
| HIV         | 0        | 0         | 0        | 0         |
| Hepatitis B | 37/20.2% | 14.7–26.8 | 43/27.0% | 20.3–34.7 |
| Syphilis    | 16/5.9%  | 3.4–9.4   | 0        | 0         |

**Figure 1.** HIV knowledge and risk behaviours amongst seafarers, 2005 & 2008

ence not significant). There was no difference between seafarers with correct or incorrect knowledge of HIV transmission and prevention, with regards to reporting more than one sex partner in the past 12 months.

Similar analyses comparing different behaviour variables amongst seafarers who did or did not report using a condom with every transactional sex partner found no significant differences.

## DISCUSSION

The results of the two surveys, taken together, indicate that the seafarer population in Kiribati is potentially a high-risk group for STI transmission as evidenced by multiple recent sex partners, high levels of transactional sex, and inconsistent condom use. If HIV were introduced into this population, there is a real possibility for explosive spread. Some of this risk activity is higher in seafarers than amongst other population groups. For example, rates of transactional sex in both survey years were higher than reported among male youths (27%) in Kiribati from a separate SGS survey in 2008 (unpublished SGS survey report 2008, Kiribati Ministry of Health).

The findings indicate that whilst existing prevention activities between 2005 and 2008 have been effective in improving HIV knowledge, they have not been effective in reducing risk behaviour amongst seafarers in Kiribati. This suggests that HIV and STI prevention programs need to extend beyond the provision of information, education, and testing and treatment facilities towards implementing strategies that encourage and support safe sex behaviours amongst seafarers and their partners, in particular transactional sex partners. The 100% condom program in Thailand is a successful example of increasing condom use amongst sex workers and their clients [4].

Differences in methodology limited the comparability between the two surveys. In particular, slightly different questionnaires were used which restricted possible analysis between survey years. Additionally, the change

**Table 6.** Comparison of seafarers reporting/not reporting transactional sex in the past 12 months

| Variables   | Transactional sex in past 12 months<br>n (%) | No transactional sex in past 12 months<br>n (%) |
|---|--|---|
| <b>Year of Survey</b>   |  |   |
| 2008  | 59 (47.2)*                                   | 70 (53.8)                                       |
| 2005  | 63 (34.2)                                    | 127 (66.8)                                      |
| <b>Age Group</b>  |  |   |
| 15-34   | 79 (45.4)**                                  | 95 (54.6)                                       |
| 35+   | 44 (30.1)                                    | 102 (69.9)                                      |
| <b>HIV knowledge indicator<sup>^</sup></b>                        |  |   |
| All correct   | 52 (43.0)                                    | 69 (57.0)                                       |
| Other   | 71 (35.7)                                    | 128 (64.3)                                      |
| <b>More than 1 partner in past 12 months</b>                      |  |   |
| Yes   | 112 (71.8)***                                | 44 (28.2)                                       |
| No  | 9 (5.9)                                      | 143 (94.1)                                      |
| <b>Currently married</b>  |  |   |
| Yes   | 164 (63.6)                                   | 94 (36.4)                                       |
| No  | 16 (55.2)                                    | 13 (44.8)                                       |
| <b>Usual level of alcohol consumption in one drinking session</b> |  |   |
| 1 to 9 drinks   | 37 (38.1)                                    | 60 (61.9)                                       |
| 10 or more  | 56 (50.0)                                    | 56 (50.0)                                       |
| <b>Length of last trip</b>  |  |   |
| 1 to 11 months  | 58 (38.9)                                    | 91 (61.1)                                       |
| 12 or more  | 50 (41.4)                                    | 85 (58.6)                                       |

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001; <sup>^</sup>correct HIV knowledge refers to those participants who correctly answered all 4 HIV prevention questions and HIV transmission questions

in recruitment strategies may partly explain the differences in the mean age of respondents in 2005 and 2008 as participants in 2008 were recruited only from the training centre. Future SGS surveys in seafarers should use consistent methodologies in order to be able to monitor changes in risk behaviours more effectively, and to provide additional evidence to support the observations and recommendations made in this report.

## CONCLUSIONS

Certain characteristics of seafaring may be conducive to increased risk for engaging in sexual behaviours that could increase HIV and STI transmission. Programs aimed at preventing HIV and STI infection in seafarer communities must translate knowledge and awareness into action through appropriately targeted interventions that encourage and support safe sex behaviours amongst seafarers and their partners.

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