

**A SYSTEMATIC LITERATURE REVIEW OF HIV AND AIDS RESEARCH  
IN PAPUA NEW GUINEA  
2007-2008**

**BY EVELYN KING AND TONY LUPIWA**

## TABLE OF CONTENTS

<b>ABSTRACT</b> .....	<b>4</b>
Common themes and key findings.....	6
<b>INTRODUCTION</b> .....	<b>7</b>
Purpose .....	7
Objectives.....	8
<b>METHODS</b> .....	<b>8</b>
Inclusion criteria.....	8
Search methods for identifying studies.....	9
Selection of studies .....	9
Data extractions and management.....	10
Quality appraisal of included studies .....	10
Analysis .....	11
<b>RESULTS</b> .....	<b>11</b>
Outcome of the search strategy.....	11
Characteristics of included studies.....	12
Quality appraisal findings.....	13
Subgroup analysis .....	13
Outline of common themes and key findings from data analysis.....	14
Tradition, culture, customs and norms.....	15
Gender.....	17
Christianity and Christian beliefs .....	19
Sexuality .....	20
Sexually Transmitted Infections.....	23
HIV knowledge.....	24
HIV vulnerability .....	25
HIV prevention.....	28
HIV testing .....	32
Living with HIV and AIDS.....	34

Leadership .....	36
Fear as a response to HIV .....	36
Public services and government sectors.....	37
Epidemiology .....	38
<b>DISCUSSION.....</b>	<b>40</b>
Limitations of the review .....	40
Recommendations .....	40
Donors, government, HIV providers .....	40
Researchers, academics, academic and research institutions .....	42
Research indicators for population based surveys .....	42
<b>REFERENCES .....</b>	<b>44</b>
Included studies .....	44
Excluded studies .....	49
<b>APPENDIX 1: INCLUSION FLOW CHART-SCREENING TOOL.....</b>	<b>57</b>
<b>APPENDIX 2: DATA EXTRACTION FORM.....</b>	<b>59</b>
<b>APPENDIX 3: QUALITY APPRAISAL TOOL FOR DESCRIPTIVE STUDIES.....</b>	<b>63</b>
<b>APPENDIX 4: QUALITY APPRAISAL TOOL FOR ANALYTICAL STUDIES .....</b>	<b>67</b>
<b>APPENDIX 5: QUALITY APPRAISAL TOOL FOR INTERVENTION STUDIES .....</b>	<b>70</b>
<b>APPENDIX 6: NUMBER OF STUDIES CONDUCTED IN PROVINCES AND TOWNS.....</b>	<b>71</b>
<b>APPENDIX 7: STUDY DESCRIPTIONS .....</b>	<b>72</b>
<b>APPENDIX 8: QUALITY APPRAISAL RATINGS .....</b>	<b>79</b>

## **ABSTRACT**

### **Background**

Papua New Guinea (PNG) is currently facing a rapidly expanding HIV epidemic. Although HIV interventions and initiatives are underway, there are questions related to the nature and impact of the epidemic, as well as questions related to the effectiveness of the national response. A number of research studies have been conducted in the past. However, these studies have neither been synthesized for common findings nor assessed for quality.

### **Objectives**

The primary objectives of the review were to systematically collect and review studies on HIV, AIDS, STIs and STDs conducted in PNG between 2007 and 2008; to assess the quality and reliability of these studies; and to synthesize the research findings under common thematic areas. The secondary objective of the review was to identify relevant recommendations for researchers, policy makers, practitioners, and stakeholders.

### **Search strategy**

Electronic databases were systematically searched using pre-determined search terms. Internet searches were conducted, and key informants were contacted, in an effort to identify potential studies. The overall search for studies took place between January and May 2009.

### **Selection criteria**

The inclusion criteria allowed for the following study designs: Randomized Controlled Trials, Cohort Studies, Systematic Reviews, Meta-analyses, Intervention Studies and Evaluations, Case Control Studies, Cross-sectional Studies, Descriptive/Qualitative Studies and Ethnographic Studies. Expert Opinion Studies and Secondary Research

Studies were excluded from the review. Studies with participants who were male or female of any age living in PNG at the time of the study were included in the review. Studies were considered for inclusion if the purpose of the study was to evaluate interventions specific to HIV, AIDS, STIs, or STDs; or if the purpose of the study was to measure outcomes specific to HIV, AIDS, STI or STDs. In addition, studies with the purpose of describing or investigating issues directly related to HIV, AIDS, STIs or STDs in PNG were also considered for inclusion.

### **Data collection and analysis**

The two authors independently screened the results of the search. The full text of all potentially relevant studies was obtained and studies were independently assessed using a pre-determined criteria. The quality of studies included in the review was assessed using validated quality appraisal tools. Common themes were identified via a subgroup analysis.

### **Main Results**

From the search strategy a total of 2735 citations were identified; 2572 citations were excluded as clearly irrelevant and the full text of 163 studies was reviewed. A total of 62 studies met the inclusion criteria and were assessed for research quality and then analysed for common themes. The majority of studies (n=33) were conducted in National Capital District and no studies were conducted in Bougainville. Most of the studies were unpublished literature (56%; n=35), and the large majority of studies were cross-sectional in design (92%; n=57). The quality of the studies varied although the majority were rated 'moderate.'

### **Discussion**

Limitations of the review were related to publication date, types of study designs, study quality, lack of information, and lack of access to a few electronic databases. The proposed course of action based on this

literature review is for a new approach to the HIV national response in PNG, calling for a 'change to the face of HIV and AIDS.' Under this new approach recommendations include: engagement with the Church as a primary partner in all aspects of strategic planning and implementation; guidance from tradition and culture; more options for women; targeted interventions for married couples; creation of a new national strategy for HIV messages and awareness; prioritization of provincially and community led and driven response; strategies for condom use; positive engagement with PLHIV, and support towards public sector strengthening. Other recommendations are specific to research study type and design as well as suggested indicators for population-based surveys.

## Abbreviations and acronyms

ABC	Abstain, Be faithful, Condom Use
AIDS	Acquired Immune Deficiency Syndrome
ART	Anti Retroviral Therapy
CBO	Community Based Organization
FBO	Faith Based Organization
HIV	Human Immunodeficiency Virus
NCD	National Capital District
NACS	National AIDS Council Secretariat
NGO	Non Government Organization
PLHIV	People Living with HIV
PNG	Papua New Guinea
STI	Sexually Transmitted Infections
STD	Sexually Transmitted Diseases

## Outline of common themes and key findings

### Tradition, culture, customs, and norms

- Progression from traditional to modern culture
- Socio-cultural norms and practices (*marriage, family and childbearing; violence as a social norm*)
- Interpretations of HIV (*Culture and tradition; conflict between biomedical, Christian and traditional beliefs; terminology and language; communication on reproductive and sexual health*)

### Gender

- Gender identities and norms (*men and masculinity; women and femininity*)
- Gender-based violence (*physical violence; sexual violence; counselling and support*)

### Christianity and Christian beliefs

- Church denominations
- Church response to HIV

### Sexuality

- Sexual norms (*traditional and modern meanings of sexuality; sexual identity*)
- Sexual practices (*pre-marital sex and sexual debut; changes in traditional sexual practices; sexual desire; sexual networks, transactional sex; sexual violence and negotiation; types of sex*)

### Sexually Transmitted Infections

- Burden of disease
- Cultural interpretations
- Biomedical treatment and knowledge
- Barriers to STI testing
- STI treatment resistance

### HIV knowledge

- Modes of transmission
- HIV knowledge in rural settings
- HIV risk perceptions
- Knowledge verses behaviour change

### HIV vulnerability

- Women
- Men
- Children and young people
- Vulnerability related to poverty and socio-economic decline
- High risk settings and periods of time
- High risk practices

### HIV prevention

- HIV awareness campaigns (*exposure and sources of information; community led initiatives; responses to the NACS mass media campaign; ABC model*)
- Male condom (*knowledge and use; access and availability; beliefs and experiences*)
- Female condom
- Male circumcision

### HIV testing

- National and group testing
- Knowledge and attitudes
- Provider initiated counselling and testing
- Barriers to testing (*fear of stigma and discrimination; lack of privacy and confidentiality; lack of information and risk perceptions; availability and access of testing sites; testing and treatment*)

### Living with HIV and AIDS

- Community responses (*Christian response and socio-cultural response; stigma and discrimination*)
- People living with HIV within communities (*knowledge of someone living with HIV; biomedical treatment; traditional medicine and Christian healing; care and support; AIDS related deaths*)

### Leadership

#### Fear as a responses to HIV

#### Public services and government sectors

- Health sector
- Education sector
- Law and justice sector
- Agriculture

#### Epidemiology

- National surveillance
- HIV prevalence in a hospital setting
- Projection of HIV prevalence
- Genetics and transmission patterns

## INTRODUCTION

PNG is currently facing a rapidly expanding HIV epidemic. In 2007, there were an estimated 23,210 people living with HIV, which translates to an estimated national prevalence of 1.28%<sup>1</sup>. A strong national response is currently underway, including a range of prevention, treatment, care, and support programs and initiatives. However, there is an urgent need for research that can guide the development and delivery of effective and context-specific responses. Research is also needed to provide insight into the underlying factors driving the progression of the epidemic, and to provide knowledge of the impact on specific communities and society.

While there is some knowledge regarding HIV transmission in PNG, many HIV researchers and service providers claim that this knowledge is often anecdotal and based on limited reliable evidence<sup>2</sup>. In the absence of a population-based survey, there is also a question as to whether the HIV epidemic in PNG is truly 'generalized' or 'concentrated'. Although PNG is experiencing a generalized epidemic based on the UNAIDS criteria, there is also evidence of particular 'groups-at-higher-risk' and specific high risk settings where there may be a higher frequency of HIV transmission.<sup>3</sup>

Coordinated support to researchers is needed in order to effectively answer questions and address gaps in knowledge outlined in the National Research Agenda for HIV and AIDS 2008-2013. Researchers require access to studies that have been conducted in order to plan and

implement future studies. Service providers, practitioners, and policy makers also require access to HIV synthesized research reports in order to develop evidenced-based policies, programs, and activities. Other stakeholders, such as People Living with HIV (PLHIV) also require access to HIV research and best practice in order to make informed decisions regarding issues that affect many aspects of their lives.

While there have been recent efforts to improve HIV research coordination in PNG (such as the development of the National HIV Research Coordination Unit), there have been few processes and structures in place to collect, review, and synthesize HIV studies conducted in PNG. For example, over 100 HIV-related studies were conducted within the country over the past nine years and yet there has been no comprehensive synthesis, or systematic literature reviews conducted to date<sup>4</sup>. As such, there are questions as to the quality and reliability of past studies, as well as questions as to whether there are common findings within these studies.

## Purpose

The purpose of the review was twofold---to address the need for greater HIV research coordination and to address the gap in synthesized HIV knowledge in order to guide the national HIV response in PNG. A systematic literature review was identified as the best way to synthesize the literature and assess the quality of studies based on the aim of systematic reviews, "to summarize research using explicit methods, to perform a thorough literature search, and to critically appraise individual studies in order to identify valid and applicable evidence"<sup>5</sup>

---

<sup>1</sup>NDOH. (2007d) *HIV Estimation Report 2007*, Port Moresby, National Department of Department of Health.

<sup>2</sup> NACS. (2008) *National Research Agenda for HIV and AIDS in Papua New Guinea 2008-2013*. Port Moresby, National AIDS Council Secretariat.

<sup>3</sup> Millan J., Yeka, W., Obiero, W. & Pantumari, J. (2007) *HIV/AIDS Behavioural Surveillance Survey (BSS1) within high risk settings, Papua New Guinea- Draft*. Port Moresby, National AIDS Council Secretariat.

---

<sup>4</sup> NACS. (2008) *National Research Agenda for HIV and AIDS in Papua New Guinea 2008-2013*. Port Moresby, National AIDS Council Secretariat.

<sup>5</sup> The Cochrane Collaboration (2008). Retrieved 10 January 2008. <http://www.cochrane.org/reviews/clibintro.htm>

## Objectives

The objectives of the Systematic Literature Review of HIV and AIDS Research in PNG 2007-2008 were as follows:

### Primary objectives

1. To systematically collect and review all PNG research studies on HIV, AIDS, STIs and STDs conducted or published in 2007 and 2008.
2. To assess the quality and reliability of PNG research studies on HIV, AIDS, STIs and STDs conducted or published in 2007 and 2008.
3. To synthesize research findings under common thematic areas.

### Secondary objective

1. To identify relevant recommendations for researchers, policy makers, service providers and stakeholders

## METHODS

### Inclusion criteria

The criteria for determining which studies would be included in the literature review consisted of the study type (i.e. study design, publication date, location of study), the types of participants enrolled, and the outcome measures within each study.

### Types of studies

#### Study design

In order to capture as many types of studies conducted to date, a range of study designs were included in the review. These included: Randomized Controlled Trials, Cohort Studies, Systematic Reviews, Meta-analyses, Intervention Studies and Evaluations, Case Control Studies, Cross-sectional Studies, Descriptive/Qualitative Studies and Ethnographic Studies. Study designs that were excluded were: Expert Opinion Studies and Secondary Research Studies (which were not systematic

reviews or meta-analyses). These studies were excluded due to limitations in appraising quality or reliability. Although excluded from analysis, Expert Opinion Studies and Secondary Research Studies were reviewed and used as a reference where relevant.

#### Publication dates

In an effort to retrieve the most relevant information, only studies conducted or published in 2007 and 2008 were included in the review. These two years were selected based on the recent scale-up of HIV programs in prevention, treatment, care, and support. These years also reflect the commencement and implementation of the Papua New Guinea National Strategic Plan on HIV/AIDS 2006-2010<sup>6</sup> as well as the commencement of the PNG-Australia HIV and AIDS Program (AusAID) - a key donor partner in the national HIV response in PNG. Studies that were excluded due to publication date (i.e. prior to 2007) were reviewed and used as a reference where relevant.

Both published and unpublished studies were included in the review. Conference proceedings were included if adequate information was provided (i.e. author name, dates, methodology, and outcomes of the study).

#### Location of study

Only studies conducted in PNG were included in the review. However, multi-site studies (in which data was collected for other countries in addition to PNG) were included if data specific to PNG could be disaggregated.

#### Types of participants

Studies were included in the review only if study participants were PNG nationals living in the country at the time of the study, were residents of PNG, or were visitors, students, workers, or volunteers living in PNG at

---

<sup>6</sup> NACS. (2006) Papua New Guinea National Strategic Plan on HIV/AIDS 2006-2010. Port Moresby, National AIDS Council Secretariat



the time the studies were conducted. The review had no age restriction in terms of study participants.

## Outcome measures

Studies were considered for inclusion if the purpose of the study was to evaluate interventions specific to HIV, AIDS, STIs, or STDs, or if the purpose of the study was to measure outcomes specific to HIV, AIDS, STI or STDs. In addition, studies with the purpose of describing or investigating issues directly related to HIV, AIDS, STIs or STDs in PNG were also considered for inclusion.

## Search methods for identifying studies

The review used a range of possible sources to identify relevant peer reviewed articles, unpublished reports, books, and policy documents. Studies were identified through:

- Contacting local and relevant agencies (e.g., the National AIDS Council Secretariat - Grants Department and Research Coordination Unit), NGOs, CBOs, FBOs, research and academic institutions, relevant government departments, and international donors and partners represented in PNG. Key informants (e.g. researchers, deans of academic schools and librarians of research institutions and universities) were also contacted for unpublished studies and reports.
- Systematic searching using relevant search terms on electronic research databases (Pub Med, Medline, EBSCO Host, EMBASE, PsychInfo) for articles published between 2007 and 2008. Where electronic journals were not available, journals were hand searched.
- Systematic searching Internet search engines (Google and Google scholar) for published and unpublished articles and reports.

- ‘Snow-balling;’ that is, reviewing the reference sections of included studies to find additional studies that might fit the inclusion criteria.

The following search terms were used to search the electronic database Medline and adapted for other electronic databases and Internet searching:

#1 Exp Acquired Immunodeficiency Syndrome [MeSH]

#2 Exp HIV Infections [MeSH]

#3 Exp (“Human Immunodeficiency Virus”)

#4 Exp HIV [MeSH]

#5 (“HIV OR AIDS\*”)

#6 #1 OR #2 OR #3 OR #4 OR #5

#7 Exp (“Sexually Transmitted Infection\*”)

#8 Exp STI [MeSH]

#9 Exp (“Sexually Transmitted Disease\*”)

#10 Exp STD

#11 Exp Sex

#12 #7 OR #8 OR #9 OR #10 OR #11

#13 #6 OR #12

#14 Exp (“Papua New Guinea\*”)

#15 Exp PNG

#16 #14 OR #15

#17 #13 AND #16

## Selection of studies

Between January and May 2009, the two investigators (EK and TL) contacted and reviewed all listed sources for relevant studies. The investigators then ran the relevant search strategies across the pre-determined electronic databases and separately checked the titles and abstracts of the citations to determine whether each paper met the pre-determined criteria. All studies that

did not meet the selection criteria were excluded. The full text of all potentially relevant studies was obtained and assessed independently by each investigator using a screening tool to determine whether each study met the inclusion criteria (See Appendix 1).

## Data extractions and management

The two investigators (EK and TL) extracted data from each of the included articles using a purposely-developed data extraction form (See Appendix 2). The data extracted included the study location, time and duration of the study, sample size, participant selection, method of allocation (for intervention studies), types of methodologies used (including data collection and data analysis methods), outcome measures, key findings, generalisability, and study limitations.

## Quality appraisal of included studies

The quality of studies was assessed with the aim of presenting outcomes in a descriptive manner with sensitivity to the heterogeneity of the studies.<sup>78</sup> The two investigators assessed the quality of each included study using adapted versions of quality appraisal tools and frameworks designed specifically to capture the particular aspects of quality unique to each research design (See Appendix 3-5). With the use of these tools, the quality of studies was appraised and determined to be of weak, moderate, or strong quality.

The investigators also took note of the particular research designs used, and how the limitations of these

---

<sup>7</sup> Wells, GA., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., Tugwell P. *The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomized studies in meta-analysis*. Department of Epidemiology and Community Medicine, University of Ottawa, Canada [Online]. [cited 2008 Jan 18]; Available from URL: <http://www.lri.ca/programs/ceu/oxford.htm>

<sup>8</sup> Spencer, L., Ritchie, J., Lewis, J., Dillion, L. (2003) *Quality in Qualitative evaluation: A framework for assessing research evidence*. London, Government Chief Social Researcher's Office.

designs may affect reliability and generalisability of key findings.

The studies were divided into two groups based on whether the studies were of a descriptive or analytical design:

1. Studies were classified as descriptive in design if the study did not try to quantify a relationship, but rather provided a description of what was happening in a given population. The types of studies placed in this category included cross sectional studies (descriptive) and qualitative studies (e.g., case reports and ethnographic studies).
2. Studies were classified as analytical in design if the study attempted to quantify the relationship between two factors (i.e. the effect of an intervention or exposure on an outcome). Types of studies that were placed in this category included experimental designs (i.e. randomized controlled trials) and observational analytical designs, which included systematic reviews or meta-analyses. Cohort studies, cross sectional (analytical), and case-control studies were also included if they investigated and recorded exposure or observed outcomes as they occurred, and/or if they included matched groups of participants and assessed the associations between exposure or outcomes.

## Appraisal of analytical studies

The quality of analytical studies was appraised using two different tools. Observational analytical designs (Cross sectional - analytical studies and case control studies), were assessed using adapted versions of the Newcastle-Ottawa Scale (NOS)<sup>9</sup> and the Quality Assessment of

---

<sup>9</sup> Wells, GA., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., Tugwell P. *The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomized studies in meta-analysis*. Department of Epidemiology and Community Medicine, University of Ottawa, Canada [Online]. [cited 2008 Jan 18]; Available from URL: <http://www.lri.ca/programs/ceu/oxford.htm>

HIV/AIDS Provider Training Tool (Health Services Group of the HIV Group on HIV Infection/AIDS, 2003).<sup>10</sup> Both of these tools are recommended by the Cochrane (Systematic) Review Group on HIV/AIDS.<sup>11</sup> Experimental designs (only non-randomised interventional studies and evaluation studies) were assessed using an adapted version of the Newcastle-Ottawa Scale (NOS) and a validated Cochrane Review quality appraisal tool designed to assess HIV interventions in developing countries.<sup>12</sup> Other quality appraisal tools were identified for assessing randomized controlled trials, however these types of experimental studies were not found in the review.

### Appraisal of descriptive studies

The quality of descriptive studies, including cross-sectional studies (descriptive) and qualitative studies (case reports and ethnographic accounts) was assessed using an adapted version of the “Quality Appraisal Tool for Descriptive Studies” designed by Spencer, L., et al., 2003<sup>13</sup> (Appendix 3). The tool is designed to address issues of quality that are unique to qualitative studies. It is based on guiding principles and the degree to which

the studies are: 1) contributory, 2) defensible in design, 3) rigorous in conduct, and 4) credible in claim.<sup>14</sup>

### Analysis

Descriptive and analytical studies that met the literature review inclusion criteria were analysed using grounded theory. A subgroup analysis was performed with the aim of identifying common themes specific to geographical context (study locations and regions), age, gender and areas of interest related to the HIV epidemic in PNG, including HIV risk, HIV vulnerability, the affects of HIV on particular groups (including people living with HIV), as well as culture, tradition, and religion.

## RESULTS

### Outcome of the search strategy

Based on the search strategy, a total of 2735 citations were identified (see Figure 1). After reviewing the title and/or abstract of all the citations and removing duplicates, 2572 citations were excluded as clearly irrelevant. The full text was retrieved for the remaining 163 studies. These were reviewed independently by the two investigators. A final number of 62 articles met the inclusion criteria.

---

<sup>10</sup> Health Services Group of the HIV Group on HIV Infection/AIDS. Quality Assessment of HIV/AIDS Provider Training. [Online] Sept. 2003. [cited 2008 Jan. 10]; Available from URL:<http://www.medepi.net/meta/forms.html>

<sup>11</sup> The Cochrane Collaborative Review Group on HIV infection and AIDS. Editorial Policy: Inclusion and Appraisal of Experimental and Non-experimental (Observational) Studies. [Online]. 2006 Jul 4 [cited 2006 Aug 18]; Available from URL: <http://www.igh.org/Cochrane>

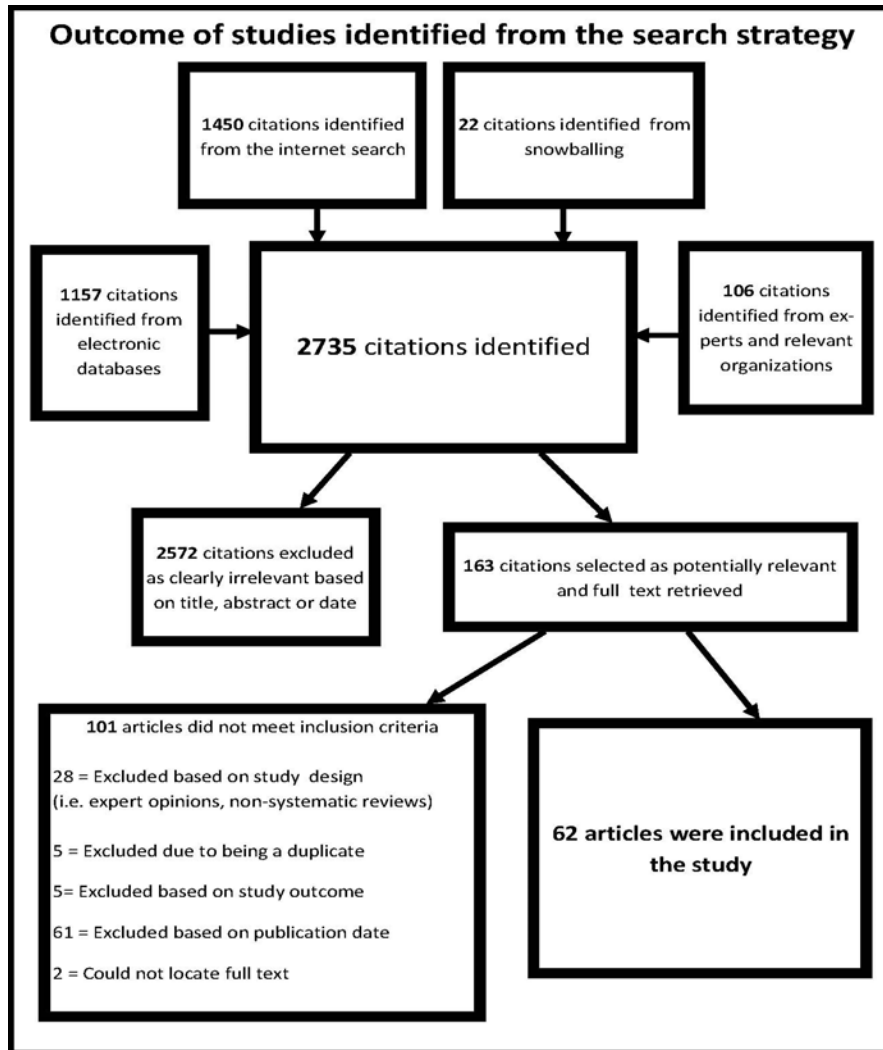
<sup>12</sup> Bateganya, M., Abdulwadud, OA., Kiene, SM. (2007). Home-based HIV voluntary counseling and testing in developing countries. Cochrane Database of Systematic Reviews 2007, Issue 4.

<sup>13</sup> Spencer, L., Ritchie, J., Lewis, J., Dillion, L. (2003) Quality in Qualitative evaluation: A framework for assessing research evidence. London, Government Chief Social Researcher's Office.

---

<sup>14</sup> Spencer, L., Ritchie, J., Lewis, J., Dillion, L. (2003) Quality in Qualitative evaluation: A framework for assessing research evidence. London, Government Chief Social Researcher's Office.

Figure 1. Outcome of studies identified from the search strategy



## Characteristics of included studies

### Demographics

The 62 studies included in the review were conducted in all provinces of PNG with the exception of no studies conducted in the Autonomous Region of Bougainville. The highest number of studies was conducted in National Capital Province (n=33), followed by Morobe (n=16), Eastern Highlands (n=14) and Western Highlands (n=13). A low number of studies were conducted in Manus (n=3), West New Britain (n=3), and Chimbu (n=3) (See Appendix 6). The majority of the studies were

conducted in an urban setting (n=43), slightly less (n=33) were conducted in rural settings, and only a few were conducted in rural remote setting (n=7). There was a range in terms of study sample sizes; the study with the smallest sample size reported 24 participants and the largest sample size consisted of 3659 participants. There was a total number of 25,955 participants reported across the 62 included studies. However, approximately one third of the studies did not report a study sample size, and some of the same study participants may have been enrolled in more than one study. The age of

participants in each study varied between newborn and 60+ years (See Appendix 7 for study details).

### Types of studies

Most of the studies included in the review were unpublished studies (56%, n=35) consisting of 12 conference presentations/proceedings, 21 unpublished reports/articles, and 2 master's theses. The 27 published studies included 19 peer-reviewed articles, 7 book chapters, and 1 monograph.

An overwhelming majority (92%, n=57) of the studies that met the inclusion criteria were of a cross-sectional design. Some of the cross-sectional studies were analytical (n=26) and the rest were descriptive (n=31). The studies that were not cross-sectional designs included 2 interventional studies, 2 case studies, and 1 case control. There were no cohort studies or randomized controlled trials.

### Quality appraisal findings

The quality of the studies was appraised using three different quality appraisal tools. The majority of the studies (69%, n=43) had an average of moderate quality

across the various quality appraisal indicators. Only a few studies (11%, n=7) had an average of strong quality ratings and the remainder of studies (20%, n=12) had an average of poor quality ratings (Appendix 8). Most of the studies had limitations in regards to methodology and analysis of data. Several of the studies were subject to bias and lacked justification for the specific research design and/or the appropriate study methods used. Many studies did not include a description of research methods used (i.e. data collection, sampling, participant selection, and triangulation). Furthermore, data analysis was not comprehensive and, in many studies, data analysis software was not used. Many studies did not run statistical tests and confounding factors were not controlled for. Most of the studies also failed to draw on research literature in PNG or internationally to justify the need for the study or to support key findings.

### Subgroup analysis

A comprehensive thematic analysis was performed and common themes within the 62 included studies were identified (See Table 1). The following sections discuss these common themes and key findings.

Table 1. Outline of common themes and key findings from data analysis

<b>Outline of common themes and key findings</b>	
<p><b>Tradition, culture, customs, and norms</b></p> <ul style="list-style-type: none"> <li>• Progression from traditional to modern culture</li> <li>• Socio-cultural norms and practices (<i>marriage, family and childbearing; violence as a social norm</i>)</li> <li>• Interpretations of HIV (<i>Culture and tradition; conflict between biomedical, Christian and traditional beliefs; terminology and language; communication on reproductive and sexual health</i>)</li> </ul> <p><b>Gender</b></p> <ul style="list-style-type: none"> <li>• Gender identities and norms (<i>men and masculinity; women and femininity</i>)</li> <li>• Gender-based violence (<i>physical violence; sexual violence; counselling and support</i>)</li> </ul> <p><b>Christianity and Christian beliefs</b></p> <ul style="list-style-type: none"> <li>• Church denominations</li> <li>• Church response to HIV</li> </ul> <p><b>Sexuality</b></p> <ul style="list-style-type: none"> <li>• Sexual norms (<i>traditional and modern meanings of sexuality; sexual identity</i>)</li> <li>• Sexual practices (<i>pre-marital sex and sexual debut; changes in traditional sexual practices; sexual desire; sexual networks, transactional sex; sexual violence and negotiation; types of sex</i>)</li> </ul> <p><b>Sexually Transmitted Infections</b></p> <ul style="list-style-type: none"> <li>• Burden of disease</li> <li>• Cultural interpretations</li> <li>• Biomedical treatment and knowledge</li> <li>• Barriers to STI testing</li> <li>• STI treatment resistance</li> </ul> <p><b>HIV knowledge</b></p> <ul style="list-style-type: none"> <li>• Modes of transmission</li> <li>• HIV knowledge in rural settings</li> <li>• HIV risk perceptions</li> <li>• Knowledge verses behaviour change</li> </ul> <p><b>HIV vulnerability</b></p> <ul style="list-style-type: none"> <li>• Women</li> <li>• Men</li> <li>• Children and young people</li> <li>• Vulnerability related to poverty and socio-economic decline</li> <li>• High risk settings and periods of time</li> <li>• High risk practices</li> </ul>	<p><b>HIV prevention</b></p> <ul style="list-style-type: none"> <li>• HIV awareness campaigns (<i>exposure and sources of information; community led initiatives; responses to the NACS mass media campaign; ABC model</i>)</li> <li>• Male condom (<i>knowledge and use; access and availability; beliefs and experiences</i>)</li> <li>• Female condom</li> <li>• Male circumcision</li> </ul> <p><b>HIV testing</b></p> <ul style="list-style-type: none"> <li>• National and group testing</li> <li>• Knowledge and attitudes</li> <li>• Provider initiated counselling and testing</li> <li>• Barriers to testing (<i>fear of stigma and discrimination; lack of privacy and confidentiality; lack of information and risk perceptions; availability and access of testing sites; testing and treatment</i>)</li> </ul> <p><b>Living with HIV and AIDS</b></p> <ul style="list-style-type: none"> <li>• Community responses (<i>Christian response and socio-cultural response; stigma and discrimination</i>)</li> <li>• People living with HIV within communities (<i>knowledge of someone living with HIV; biomedical treatment; traditional medicine and Christian healing; care and support; AIDS related deaths</i>)</li> </ul> <p><b>Leadership</b></p> <p><b>Fear as a responses to HIV</b></p> <p><b>Public services and government sectors</b></p> <ul style="list-style-type: none"> <li>• Health sector</li> <li>• Education sector</li> <li>• Law and justice sector</li> <li>• Agriculture</li> </ul> <p><b>Epidemiology</b></p> <ul style="list-style-type: none"> <li>• National surveillance</li> <li>• HIV prevalence in a hospital setting</li> <li>• Projection of HIV prevalence</li> <li>• Genetics and transmission patterns</li> </ul>

## Tradition, culture, customs, and norms

### Progression from traditional to modern culture

A central theme found throughout most of the included studies in the literature review was that of culture, tradition, and social practices. Life in PNG is influenced by over 800 traditional cultures. However, as a result of socio-economic development there has been a progression from traditional to modern culture (18, 24, 17, 10). The influence of traditional customs and norms is decreasing and communities are beginning to change and look more towards Christianity, lifestyles in urban PNG, and international cultures. With this shift there is evidence of cultural pluralism; many people (especially those living in rural areas) find themselves interpreting life from a traditional, modern-secular, and modern-Christian worldview (10, 24, 17).

Some studies noted that there are fewer social boundaries and, although traditional leaders may still be respected, they are rarely approached for wisdom and guidance (32, 33, 60, 16). Most significantly, there have been changes in attitudes related to gender. It appears that levels of gender inequality have increased. For example, traditions such as bride wealth have continued but have taken on different meanings related to ownership, and generally women face higher levels of vulnerability (61, 32, 33). Decreases in traditional social order have also led to increased risk of violence, crime, and sexual practices that were once considered taboo (6, 33, 60, 17). Some studies also highlight specific development initiatives, such as how communities along the Highlands Highway have changed in regards to marriage and now include interethnic partnerships (5, 16, 48). Migration linked to economic development and changes in settlement patterns have led to increased conflicts, sexual violence, drug use, and loss of land for subsistence farming (5, 16).

Some communities believe that changes from traditional and Christian practices to a more modern-secular culture actually caused the HIV epidemic in PNG and HIV transmission in their communities. As a result, some call

for a moral reform as a response to the socio-cultural shift (17, 12, 16). Some of these communities call for moral reform, including a stronger commitment to Christian principles and values (60, 12). Other communities desire the reinstatement of traditional cultural practices (16).

### Socio-cultural norms and practices

#### *Marriage, family, and childbearing*

Despite shifts in traditional culture, there were some commonly reported socio-cultural norms and practices. Marriage, polygamy and extramarital sexual relationships were reported in a number of the studies (11, 39). Separation and divorce were also common and in one study was reported by 96.4% of women based in the National Capital District (NCD) (11). Inter-generational and inter-ethnic marriages were reported as becoming more common in society (5, 16).

Almost all of the studies made reference to family and childbearing as a significant value in PNG life and society (27, 61, 23, 3, 61, 24, 28, 5, 16, 54). Socially and traditionally, life without children is seen as undesirable (5), and there were reported social expectations to support extended family ('wantok') (14).

#### *Violence as a social norm*

Violence and aggression appear to be a social norm in both rural and urban settings across many parts of the country (32, 45, 11, 4, 29, 53, 16). In one study just under half of the participants (46.5%, n=277) reported being a victim of a violent act in the past six months, and 40.3% (n=246) reported that they were perpetrators of a violent act in the past six months (36). In general, violence was associated with poverty and socio-economic decline (60, 4, 17, 5, 16); with socio-cultural change (60, 17); with economic development and migration (5); and with alcohol and drugs (13, 4, 29). Although the impact of violence is felt across society, women and young people were reported as common targets of violence (10, 33, 11, 29, 16). A few studies reported other extreme forms of

violence, including the use of armed weapons, torture, gang rape, and witch hunts (45, 17, 16, 38). Violence was reported to increase in frequency during particular periods of times such as elections and pay day (13, 4).

## Interpretations of HIV

### *Cultural and traditional interpretations of HIV*

Within a context of cultural change, Papua New Guineans are finding ways to interpret and respond to the HIV epidemic. Most of the interpretations related to the meaning of illness, disease, sex, and reproduction were specific to particular geographical areas and have developed from indigenous language, traditional beliefs, practices, and experiences. Examples of geographical areas that have unique cultural interpretations of HIV include the Trobriand Islands (27, 28), rural Western Province (61), rural Madang Province (24), rural West New Britain (38), rural Southern Highlands among the Huli (61, 60) or rural Southern Highlands among the Duna (17, 16). Traditional practices and accusations of sorcery as a cause of HIV or AIDS were mentioned in a number of studies. These practices do not appear to originate from traditional culture, but have developed more recently as a form of 'resistance' or deviance associated with poverty, lack of education, as a response to people living with HIV, or as a means of explaining AIDS-related deaths (61, 24, 31, 32, 17, 5, 16, 38).

### *Conflict between biomedical, Christian, and traditional beliefs*

Study findings revealed that many communities use medical pluralism (a combination of biomedical, Christian and traditional beliefs) to interpret the aetiology or cause of HIV and AIDS; and to determine an appropriate response in terms of prevention or treatment. These interpretations were specific to various provinces, rural and urban settings, education level, age, occupation, and exposure to HIV interventions and awareness (27, 07, 61, 44, 60, 23, 7, 9, 40, 52, 53, 20, 28, 12, 38, 6). A common theme recognized across these studies was the challenge

that individuals face in reconciling the various different (and at times conflicting) beliefs and types of information while simultaneously trying to address high levels of fear associated with HIV and AIDS (10, 62, 27, 32, 33, 23, 52, 12).

### *Terminology and language*

Across cultural and geographical regions of PNG, similar terms were used to describe HIV. In each study that reported HIV terminology in Tok Pisin (local language), HIV was described as a serious chronic illness, 'killer disease with no cure' or 'sickness without medicine' (27, 62, 24, 61, 23, 5). The common Tok Pisin word used to translate the English term 'HIV' was *binatang* (Tok Pisin for small insect or small live/living thing). The common Tok Pisin words used to translate the English term 'AIDS' were *sikAIDS*, *sik nogut* or *sik inogut marasin* ('disease that has no cure'). However, it is important to note that most respondents did not distinguish between HIV and AIDS and used the Tok Pisin translated words for HIV and AIDS interchangeably (32, 12, 5, 16, 38). Some studies reported the use of Tok Ples (indigenous language) to describe or express HIV and AIDS. One study in rural Western Province reported the use of a Tok Ples phrase *Melesene bininapa gite tila gi*, which translates to 'the sickness without medicine' (62). Another study conducted in Trobriand Islands reported use of the Tok Ples term *Sovasova*, which translates as 'a chronic illness resulting from relations within the same culture (27).' Although *Sovasova* was used to explain HIV, there was a belief that HIV is slightly different from *Sovasova* in terms of its cause and the lack of a cure.

Challenges related to language and translation were reported within the various studies. These challenges may be explained by the high levels of illiteracy in rural settings (31, 7, 52), or the difficulties in using direct translations for words (62, 32, 33). A reported overall challenge was translating English words, which do not exist in Tok Pisin or Tok Ples, as well as finding the appropriate word to use based on the specific context and audience (32, 33, 38). An



example of this was the difficulty in expressing the efficiency of the male condom; trying to translate '98% efficiency' as being 'highly reliable' was difficult. Percentages or proportions were not translated in Tok Pisin or Tok Ples. Therefore, condoms were frequently described as having '50/50' efficiency or 'works sometimes and doesn't work sometimes,' which translates more broadly to condoms not being reliable. These difficulties with translation have led to general confusion and low condom use (07, 33). Another commonly reported challenge was the translation of terms related to sex and intercourse and how some words translate to the equivalent of swear words in the English language (32, 33, 7, 38). In efforts to address this particular challenge, one study found the use of Tok Ples words were more appropriate and acceptable to use in a rural community forum setting and in the development of HIV awareness literature (31, 32, 33).

#### *Communication on reproductive and sexual health*

Beyond issues of language and terminology, some studies highlighted cultural norms and practices specific to the communication of reproductive and sexual health. Social norms were specific to age and sex (gender). Generally, open community discussions regarding sexual issues were not deemed as appropriate (52). For example, a mixed group of young people with their parents or other older adults was not seen as an appropriate group, and such a group would not facilitate open discussions. Likewise, a mixed group of young males and females would also restrict open communication and dialogue (32, 33, 23, 7, 52, 53, 38). Rather, same sex and same generational peer groups were reported as being socially acceptable groups for discussions on sexual and reproductive health.

At the individual inter-personal level, young people reported their experience of discussing issues related to reproductive or sexual health with adults who were same sex siblings or their parents' opposite sex sibling (i.e. a mother's brother or a father's sister) (7, 38). Despite cultural taboos, a few respondents reported receiving

sexual health education from their parents. This was reported as occurring infrequently and when it occurred, the discussion consisted of moral directions rather than biomedical reproductive or sexual health information (24, 23, 9, 52).

## Gender

### Gender identities and norms

The understanding of what it means to be a woman or man in PNG, and the expectations that society places on men and women, differs slightly across cultures and between urban and rural settings. However, some common norms and expectations were reported that apply across many parts of the country.

#### *Men and masculinity*

Gender inequality was a reported social norm that is evident across most PNG cultures and aspects of society. In many instances, men are viewed as superior to women (38). Men in PNG have more opportunities for travel and migration (24, 32, 16, 38), and more opportunities to pursue higher levels of formal education (24). It is also seen as more acceptable for men to have greater exposure and knowledge of sexual and reproductive anatomy and sexual health (24, 18, 39) compared to women. Violent behaviour by men is an accepted norm in society (4, 16), and violence by men within intimate partner relationships and marriage is commonplace (45, 11, 4, 29, 17, 5, 38, 34). Pre-marital sexual relationships (24, 23, 16) and multiple sexual partnerships are generally more acceptable for men than women. Although, historically, extramarital sexual relationships were less acceptable (or practiced with social boundaries) within particular traditional PNG cultures (61, 60, 16, 38), these types of relationships are now occurring more commonly (62, 24, 61, 60, 13, 20). In terms of social networks, men were generally found to prefer socializing with same sex peers (61, 60, 23, 7). And in some cases men reported gathering with male peers to drink alcohol and share

stories about their extramarital sexual experiences (61, 60).

In regards to social norms, men in PNG also face expectations or pressures specific to their gender. Within some cultures men are expected to pay a bride price (61, 29), be the leading financial contributor within a marriage and family (61), and to have control over the household income (14). In some cultures within PNG, being a man also means a commitment to a strong work ethic, a clean and respectable physical appearance, as well as engagement in sports and Christianity (62). For many men, regardless of their sexual orientation, there is also an expectation to marry a woman and raise a family. As such, there is an expectation for men to be heterosexual or bisexual rather than homosexual (61, 60, 54, 34).

#### *Women and femininity*

Women in PNG experience gender inequality and significantly less power in society (61, 32, 7, 11, 38). Studies reveal that women also have fewer opportunities for formal education (24, 33, 3) and are often blamed for witchcraft, seduction (17, 38), and HIV transmission (7).

Women experience social norms and expectations based on what society generally views as appropriate behaviour for women. These expectations are reinforced by both men and women. Unlike men, it is generally seen as less appropriate for women to have extramarital or pre-marital sexual relationships and young women are expected to be sexually naive in terms of sexual knowledge and experience (24, 23). Due to this social norm, and fewer opportunities for education, women tend to be less knowledgeable in terms of sexual and reproductive health and are less open to discussing issues related to sexuality (24, 29, 53, 39). With limited power and the custom of practice of bride price many women report being unable to question or confront their husband's extramarital relationships or negotiate condom use (24, 61, 11, 29).

Studies revealed that women in PNG also experience pressure and expectations to reproduce and raise a family

(61, 60, 5), contribute financially to the household, perform many of the domestic tasks (61, 60, 14), and be sexually available to their husbands (32, 33, 45,11). Women also experience pressure to be submissive to their husbands, and to be 'good Christians' and moral gatekeepers in their jobs, families, and communities (10, 24, 60, 12).

While these are some general social norms, pressures, and expectations for PNG women and men, there are some matrilineal cultures in PNG, such as that of the Trobriand Islands in Milne Bay, in which women experience more autonomy and power (27, 28).

#### *Gender-based violence*

Issues related to gender-based violence were reported in approximately one-fourth (24%, n=15) of the studies included in the review. The studies revealed that gender-based violence is common in PNG society and that particular groups are especially vulnerable. These groups include children, young people, men-who-have-sex-with-men, female sex workers, women married for longer periods of time, and women married to men who are highly educated and working (7, 11, 50, 54). While these groups are mentioned specifically, many studies report widespread violence against women from various backgrounds regardless of education levels, employment status, or marriage status (39, 29, 7, 34).

#### *Physical violence*

Participants in many of the studies reported physical abuse (7, 11, 29, 34, 39), and one study revealed abuse among 67% of the sample (11). Physical violence was reported as common across many aspects of society (17). However, some groups such as married women, men-who-have-sex-with-men (54), female sex workers, and female young people and children were found to be especially vulnerable to physical abuse (7, 11, 29, 34, 39). In one study married women expressed an attitude of accepting violence by their husband due to financial dependency and cultural customs, such as bride price and

polygamy (29). Physical abuse was found to be associated with sexual practices such as oral and anal sex (11, 29).

#### *Sexual violence (Also see sexual negotiation under Sexuality)*

Sexual abuse, including coercive sex and rape, was reported in many studies (33, 45, 13, 11, 5, 39), and there was no statistical significant difference found in the frequency of sexual abuse across four PNG provinces. Group rape (rape by more than one person at the same time) was reported by a number of women (45, 11), and, in one study, 5% of the sample reported rape by up to 10 persons at the same time (45). Women reported that sexual abuse occurred most frequently within marriage or within intimate partner relationships. Other perpetrators of adult sexual abuse included clients from transactional sex (11, 29, 48). There were also a number of reports from young women. In one study, almost one third (27.5%, n=114) of women reported sexual abuse before the age of 16 years (11). Other studies focused on young people reporting sexual abuse during their first sexual encounter (45, 29). In a different study, a school counsellor reported being approached several times a week with reports of child sexual abuse occurring in the home (7). Perpetrators of youth and child sexual abuse included uncles, stepfathers, 'cousin-brothers', and other relatives or family friends (7). With the exception of gender inequality, the actual cause/etiology of sexual abuse was not explored in many studies. However, a few studies linked alcohol and drug abuse with sexual abuse and sexual violence with cultural retaliation or 'pay-back' (38, 29, 48).

#### *Counselling and support*

As a result of gender inequality and economic dependence, survivors of abuse expressed difficulty reporting the crime to police due to shame, fear of disbelief, and fear of affecting the reputation of the perpetrator (7). In one study, the majority (75%) of women reported that they had never accessed support services (29). There was a report of one rural community offering support to survivors of abuse. In this community

health care workers reported having increased sensitivity and offering counselling services for domestic violence after they were exposed to an HIV awareness intervention (32).

#### Christianity and Christian beliefs

One of the most significant findings across the studies related to Christianity. The Christian church was found to be one of the most socially influential entities in PNG, and specifically in community responses to HIV. Lay leaders (mostly women) and clergy hold key positions of leadership within rural communities, with church groups and church buildings as the centre for social functions including community meetings, youth groups, women's groups, prayer meetings, guitar lessons, and literacy classes (60, 28). In many rural communities and districts government public services have deteriorated, and the church has stepped in to provide public services such as health services and education (6, 57).

#### Church denominations

Various church denominations were mentioned in terms of their role and presence in the community. These denominations included the Evangelical Church of PNG (10, 62, 60, 40, 16), the Pentecostal/Charismatic Church (12, 38, 16) the Lutheran Church (24, 40, 52), the Catholic Church (32, 60, 20, 28), the Seventh Day Adventist Church (60, 52, 53, 28), the Anglican Church (32, 3) and the United Church (60, 12). Most notable were the Evangelical and Pentecostal/Charismatic Churches, which have been growing in membership and influence compared to other denominations. There were reports that these particular churches incorporate less traditional customs and celebrations into Christianity compared to other mainstream churches (10, 62, 40, 16, 38).

#### Church response to HIV

The response of the Christian church to the HIV epidemic in PNG has been mixed. Many study respondents expressed and demonstrated Christian moralistic influence

and judgment. Common sentiments were 'HIV has been sent as a punishment from God' for promiscuous behaviour (24, 61, 60, 23, 7, 40, 52, 20). In other studies there were reports of church members patrolling as moral gatekeepers in communities (10); controlling access and distribution of government supplies of condoms; discouraging condom use (62, 60, 7, 40, 52); and influencing the content and dissemination of HIV education (32, 60, 7, 52). While some denominations appeared more dominant in terms of moralistic judgment, moralistic sentiments were reported across almost all of the denominations. From a geographical and cultural perspective, a study in the Trobriand Islands was the only exception in which Christianity had not generated a repressive attitude to sexuality or moralistic influence (28).

Despite the many reports and expressions of judgment by the church, some studies revealed the positive support that churches are providing in terms of HIV awareness in the Jimi Valley (32, 33). Other churches are providing HIV education and condoms in Tari (60), offering Voluntary Counselling and Testing in Port Moresby (3), and allowing the use of their church building for community HIV awareness (28). Christians are also providing spiritual counselling and support for those dying of AIDS in Port Moresby and Madang (37, 57), and church leaders are expressing an interest in addressing stigma and discrimination within the Church (6, 59). Church leaders were identified as having a great potential to support and deliver appropriate public health messages (48).

## Sexuality

### Sexual norms

Tradition, culture, Christianity and socio-economic decline have all impacted on sexual beliefs and practices. Many of the studies revealed that multiple sexual partnerships and concurrent sexual partnerships are wide spread among young and older adults (10, 27, 4, 53, 38, 34, 39). Although

still practiced, polygamy established by bride price or marriage was reported as a more historical social norm. Current reports suggest concurrent sexual partnerships based on informal arrangements (38, 34, 39) are the new social norm.

### *Traditional and modern meanings of sexuality*

Strong links were found between cultural and traditional meanings of sexuality and marriage, kinship, and reproduction (27, 62, 60, 5, 38). Historically, there were traditional practices in which men and women were taught the meaning, rules, and expectations of marital sexuality, including sexual negotiation; this is rarely taught today (62, 60, 17). However, sexual partnerships are still reported as an opportunity for strengthening lineage within a clan or for establishing relationships and social ties between clans (27, 28, 38). Some cultures still hold strong beliefs regarding sexuality and fertility, with narratives related to the power of bodily fluids. In such cultures particular sexual unions and 'uncontrolled' sexual practice is viewed to have negative physical and spiritual consequences to those directly and indirectly involved (17, 16). Within other cultures there were reported use of narratives and beliefs related to the exchange of 'potent' male and female fluids during sexual intercourse (28).

Modern meanings of sexuality were reported with more of a focus on sexual drive, power, and desire. Young people in PNG express meanings of sexuality through a more individualist worldview using narratives related to intimacy, pleasure, feelings, emotions, and relationship building between a couple, with less emphasis on the potential impact on a clan or community (23). Other modern meanings of sexuality include associations with witchcraft and sorcery (16, 38).

### *Sexual identity*

In addition to descriptions of heterosexual sexual identity, a number of studies discussed male-to-male sex. While some studies reported homosexuality between men, there were common reports of bi-sexuality, in which men

reported having sexual relationships with men and with women (53, 54, 34, 39). In a group of men who reported having male-to-male sex, only 23% identified themselves as gay or homosexual; the majority (67%, n=152) of men identified themselves as bisexual, and 10% (n=23) identified themselves as heterosexual despite their engagement in male-to-male sex (34). In another study, 11.8% of male youth interviewed from the Eastern Highlands and Madang Province reported male-to-male sex (53). Homosexual men reported experiences of discrimination from family and peers along with pressure to get married to a woman and have children (54). Other men who have male-to-male sex reported experiences of physical abuse and harassment by police (54). They expressed the need to use specific 'safe' locations to meet sexual partners. They also reported the need to use coping mechanisms such as secret signals in public to conceal their sexual identity/practices and to protect themselves from discrimination or stigma (54, 34). None of the studies described traditional-cultural homosexual practices. However, some study participants reported knowledge of traditional homosexual customs practiced in the past, but did not have knowledge of such practices occurring anymore (54). Although there were a number of reports on homosexuality among men, there were no reports of homosexuality among women.

## Sexual practices

### *Pre-marital sex and sexual debut*

Pre-marital sex was reported as common (27, 24, 23). Sexual debut was reported by 7 of the 62 studies. In the studies that reported age of sexual debut, there was a consistent average age of 16-to-17 years for men and women (45, 4, 53, 28, 34, 39, 49). Significantly, many young people reported that their first sexual experience was forced on them (45). In one study, age of sexual debut was found to be associated strongly with education levels ( $p < 0.001$ ). Participants who had not completed primary school were on average 2 years younger (14.9 years) at the age of sexual debut compared to the sample mean

(16.9 years). In the same study less than one third (27%) of young people reported using a condom the first time they had sex (53). While pre-marital sex was not generally encouraged in most cultures and regions, the Trobriand Islands was an exceptional case. In this region and culture, pre-marital sex was not seen as a taboo for young men or women. From a traditional perspective, "the commencement of sexual activity is culturally valued as an important transitional point in the physical and social development of a young person (28; pg 253)." Although rules and restrictions exist in this culture, young people experience considerable sexual freedom before marriage (28).

### *Changes in traditional sexual practices*

While some communities still express sexuality based on traditional norms and practices (28, 27), many are beginning to move away from tradition and are adhering to more modern ideology and practices. In some cultures where extramarital sexual relationships were once taboo, such practices are no longer viewed as a major transgression by husbands towards their wives (61). However, in other cultures where polygamy was once common practice, the influence of the Christian church has led to social changes encouraging monogamy (16, 38). Given the strong influence of the Church, multiple sexual partnerships, extra-marital, and pre-marital sexual relationships are commonly practiced but generally hidden to prevent moral judgment and discrimination (10, 60). In addition to changes in pre-marital and extra-marital relationship practices, alcohol and drug use was reported as becoming increasingly common and associated with sexual practice (4, 53, 34, 39).

### *Sexual desire*

Sexual desire and drive were reported as influencing sexual practices and behaviour (27, 60, 18, 28). Within the Trobriand Islands, traditional festivals such as the *Milamila* (yam festival) are noted as a time for social productivity and expressed sexual desire where unmarried men and women have multiple sexual partners. Similarly, within the

same culture, social norms and sexual desire allow men to have other sexual partners during their wives' pregnancy or period of lactation. In addition, both men and women in the Trobriand Islands report mutual pleasure and initiation for sex (27, 28). Another study reported on sexual desire with men expressing that although they wish to abstain from extramarital sex, they do not have control over their own sexual desire (60). Although not reported specifically in many studies, sexual desire and drive appeared to be an underlining issue that translates to multiple sexual partnerships and sexual violence.

### *Sexual networks*

Sexual networks were only reported among a few studies. One study based in the Trobriand Islands described sexual networks between young people within their own village (28). Networks were also described among particular groups, such as men-who-have-sex-with-men in Port Moresby (54, 34) and female sex workers in Port Moresby and Goroka (34).

### *Transactional sex (Also see HIV vulnerability)*

The exchange of money, goods, and/or services for sex is reported as a common (and growing) practice within PNG.

In one study almost one-third (28.4%, n=104) of the study participants from Port Moresby, Mt Hagen, and Wewak reported transactional sex (36). In another study consisting of young people from Eastern Highlands, 23% of the study participants reported transactional sex (53).

This increasing trend of transactional sex is most likely due to a growing cash economy, socio-economic decline in rural settings, a by-product of socio-economic development initiatives, an increase in mobility and migration, and a move from traditional culture and practices towards more modern lifestyles (61, 60, 17, 5).

Some studies highlighted particular groups who frequently engage in transactional sex, including men who travel for work, those who are in a position of power, or those who simply are in need of money (48, 39, 60, 4, 29, 34).

Women report engaging in transactional sex to address economic needs (e.g., to earn money to obtain store brought goods that are no longer available in their district, or to pay for school fees) (61, 60, 17, 5, 16). In one study, participants reported being encouraged by their male relatives to sell sex (17).

There were a few exceptions to the practice of transactional sex linked to financial hardship; these included a few reports of women engaging in transactional sex as retaliation to the knowledge of their husband's extramarital relationships (61).

### *Sexual negotiation (Also see Sexual violence under Gender)*

Within the context of sexual violence, gender inequality, alcohol abuse, and extramarital sexual relationships, women in PNG reported their limitations (and in many cases their inability) to negotiate within sexual relationships (11, 13, 29, 32, 33). Within some cultures, sexual negotiation is supported during culturally accepted circumstances such as menstruation, pregnancy, breastfeeding, new garden preparation, and tribal fighting. However with a breakdown of cultural traditions, there are less social boundaries or freedom within marriages to refuse sex (32, 33). Women report difficulty refusing sex out of fear that their husbands will have extramarital relationships, or act out of retaliation towards them or the children (32, 33). In many cases women also expressed difficulty negotiating condom use even when they knew their husbands had participated in extramarital sexual relationships (32, 45, 11, 29, 20). An exception to reports of limited capacity for sexual negotiation was that of women in the Trobriand Islands who experience greater power in terms of negotiation and communication before sexual encounters, and in which sexuality is rarely spoken of in terms of dominance and submission (27).

### *Types of sex*

Various types of sex were described within the studies. In addition to vaginal sex and masturbation, oral and anal sex was reported. Oral and anal sex between men and women

were associated strongly with violence. In one study, anal sex was reported 50% more frequently by women in abusive relationships compared to women who did not report relationship abuse (11, 29). From the sample group of women who reported anal sex, 79.3% reported physical abuse and 77.6% reported sexual abuse (11). Violence was associated with oral sex; and 80% of women who reported oral sex also reported physical violence (11).

In a study of male workers there was a range of reported heterosexual anal sex from 1% (n=2) of Ramu Sugar workers to 59% (n=139) of truck drivers interviewed (39). In a Port Moresby study almost all (99%, n=307) men-who-have-sex-with-men reported having anal sex (34). Among married out-of-school youth oral sex was reported more frequently than anal sex or masturbation (72.2% of married men and 57.8% of married women) (34).

## Sexually Transmitted Infections

### Burden of disease

The STI burden of disease in PNG is high and increasing (14). In the 2007 Annual National Surveillance STI, HIV, and AIDS report there was a total of 5675 genital ulcers reported and an annual increase in the number of genital discharge cases. However, this report provided no details in terms of specific STIs or diseases detected (41, 42). In a sample of young people from Eastern Highlands and Madang, 18.9-to-29.9% reported genital discharge in the last year (53). Similar reports were made among a sample of young people in NCD. A higher proportion of female youth (29% married females, 38% unmarried females) reported STIs symptoms compared to male youth (13% married males, 14% unmarried males). Among a sample of male workers, the majority of truck drivers (53%) reported an STI symptom in the past 12 months (39). Reported STI symptoms were found to be lower among Military personnel (29%), Ramu Sugar workers (19%), and Port workers (30%) (39).

STIs were found to be associated with lower levels of education, early age of sexual debut, and forced sex (44, 45). In one study, participants with higher levels of education were less likely to have an STI (44). In another study, men and women who had a younger age of sexual debut had higher rates of STIs. For example, females who had sexual debut at 18 years or younger were 3 times more likely to have an STI compared to other females their same age. Males with an earlier sexual debut were 1.5 times more likely to have an STI compared to other males their age whose sexual debut was later in life (45). In the same study, a higher prevalence of STIs (53%) was observed among those who had been raped compared to those who had not (47%) (45).

### Cultural interpretations

Differences were found in the cultural narrative and interpretations of HIV compared to other STIs, specifically in terms of interpreting etiology (cause) and in treatment seeking behaviour. In some cultures, sorcery was seen as the cause of STIs and community members reported going to traditional healers and witchdoctors for treatment (followed by a visit to the health clinic if traditional treatment did not work). This is different from HIV in that there was a wider belief and knowledge that there is no cure for HIV (27).

### Biomedical treatment and knowledge

In terms of biomedical treatment for STIs, one study conducted in Port Moresby General Hospital demonstrated general low levels of knowledge by study participants in terms of testing and treatment of STIs (47). However, among a sample of 320 women who sell sex in Port Moresby, there were reports of increased knowledge of STIs and increased treatment seeking behaviour after exposure to an NGO outreach program (46% at baseline, 78% post-intervention) (34).

In another study consisting of 600 women who sell sex, over 90% of women reported that they had heard of STIs and 82.7% of the women could identify two or more STI

symptoms in men and women. Knowledge of STI symptoms was also generally high among male workers (89%-100%), with military personnel demonstrating the highest knowledge of STIs (39). All study respondents who reported STIs also confirmed that they had gone to a hospital or clinic for treatment as soon as they became aware of an STI symptom (39). Similar to male workers, almost all of a sample of women who sell sex (81.0%, 88.5%) reported seeking treatment in a hospital or clinic (39). In terms of the source of information and awareness, many male workers and women who sell sex along the highway reported receiving information on STIs from HIV prevention peer educators and Provincial AIDS Committee representatives (39).

Although knowledge of STIs appeared high among particular groups that had received targeted interventions, comprehensive knowledge within the general public appeared low. Health care workers and clinical staff in public health centres reported a need for more training and information on HIV and STIs (48). This was especially evident in the rural areas; health workers in these areas raised concerns that as a result of their limited technical knowledge of HIV they were unable to diagnose HIV or provide correct information to those requiring support (60, 16).

### Barriers to STI testing

In a study that took place in the Eastern Highlands, young people identified key barriers they face in terms of accessing STI clinics or Voluntary Counselling and Testing (VCT) facilities. These barriers included fear of stigma and discrimination, lack of privacy and confidentiality, fear of positive test result, lack of knowledge, and lack of money for transportation needed to access the facilities (52). Some young people reported that health workers were judgmental towards them when they were diagnosed positive for an STI (52). Similar reports were expressed by men-who-have-sex-with-men and female sex workers in another study (58).

### STI treatment resistance

With increasing STI testing and treatment facilities it is important to note that one study found high levels of treatment resistance to first line STI treatment (Penicillin resistance: 94.4%; Tetracycline resistance: 65%) and growing treatment resistance to second-line STI treatment (Spectinomycin: 5%, Naladixic: 5%, Ciprofloxacin: 1.2%, Ceftriaxone: 0.7%) (47).

### HIV knowledge

Comprehensive knowledge of HIV among the people of PNG was reported as low (1, 44, 60, 39). In one study only 2.6% of the study sample demonstrated comprehensive knowledge of HIV (44). Most respondents did not understand the difference between HIV and AIDS (24, 32, 33, 38). Levels of knowledge were associated with age, gender, residency in an urban or rural context, occupation, and levels of education (24, 1, 44, 18, 17, 28, 12, 16). Knowledge of HIV transmission was associated with exposure to someone living with HIV. Ninety four percent of respondents in one study reported sex as a possible mode of transmission, and in this same study over half (53%) of the respondent knew an adult or child living with HIV (1). In addition, particular groups such as young people, women who sell sex in Port Moresby and Goroka, military personnel, and truck drivers who were exposed to targeted prevention programs demonstrated the highest levels of knowledge of HIV transmission (52, 34, 39).

### Modes of transmission

Most studies revealed that the majority (90%-95%) of people in PNG have the knowledge that HIV can be transmitted through sexual intercourse (27, 62, 24, 1, 44, 60, 23, 7, 12, 34, 39, 49, 59). In a study of people from rural Western Province 78% (n=112) were able to identify sexual intercourse as a mode of transmission (62). In another study 95% of participants identified sex as a mode of transmission (44).



However, knowledge of other possible modes of HIV transmission was very low (27, 62, 24, 1, 44, 60, 23, 7, 12, 34, 39). Of all the possible modes of HIV transmission, vertical transmission and breastfeeding (mother to child transmission) were least known (1, 44, 52). There were common held misconceptions regarding HIV transmission. Many study respondents believed that HIV could be transmitted through shaking hands, exchange of food, sharing utensils or via saliva, coughing, excreta, animals, or insects (62, 24, 32, 16). Some believed that HIV could penetrate through feet from others spitting on the ground (24). Common misconceptions and inaccurate knowledge were shown to have implications in terms of stigma and discrimination towards those diagnosed with HIV (62).

### HIV knowledge in rural settings

Although knowledge of all the possible modes of transmission was limited across country, knowledge of HIV transmission was found to be especially low among those living in rural PNG communities (10, 62, 24, 17, 28, 12). Although most have heard of HIV, low level of literacy, limited exposure to HIV awareness, and lack of contextualized HIV awareness have left people confused about how HIV is transmitted and how it can be prevented or treated (10, 17). Some demonstrated confusion as to whether HIV is a real issue in their community as it was not physically visible (28). Conflicting beliefs and messages from health providers, policy makers, church leaders, and traditional culture have also led to incorrect and inappropriate HIV information confusion (10, 17,38).

### HIV risk perceptions

Due to limited comprehensive knowledge, many people in rural communities have the perception that people living with HIV can be identified by how they look and that people who look healthy do not have HIV (38). Such beliefs have led to an inaccurate HIV risk perception (60, 38). In some cultures there are beliefs that HIV can only be transmitted after several sexual encounters with one person, and that HIV transmission can be prevented by

having sex a limited number of times with the same person (62). Many people underestimate risk by believing that HIV transmission only occurs in extramarital sexual relationships and not within marriage (23, 10, 60, 7). These people feel that they can trust their partner, or feel that they are at low risk of HIV transmission because their partner is a Christian (29).

### Knowledge versus behaviour change

Generally, the studies demonstrated very little evidence of behaviour change associated with either exposure to HIV awareness or prevention campaigns or with increased HIV knowledge levels. However, there were a few examples of behaviour change among groups exposed to targeted interventions (34). In one study, women who sell sex were exposed to HIV information via a peer outreach worker. After this exposure, reports indicated a significant increase in consistent use of condoms during transactional sex (63% pre-intervention, 88% post-intervention) (34). On the other hand, exposure to HIV information in the form of 36 hours of sexual and reproductive health education did not lead to significant changes in belief (or behaviour) among student teachers. Even after the training, 48% of the respondents still believed that HIV could be transmitted through kissing (40). Some studies demonstrated that a one-time exposure to an HIV awareness intervention was not enough to increase levels of knowledge or support behaviour change. But rather, repeated exposure over a period of time allows for relationship building, opportunities to raise sensitive questions, opportunities to apply new knowledge, and a more supportive environment for community and individual behaviour change (32, 33).

### HIV vulnerability

The most common factors associated with vulnerability to HIV transmission were financial hardship (61, 33, 60, 17, 14, 5, 16, 34, 39) and gender inequality (45, 13, 11, 29, 5, 54, 34, 39). Based on these factors, particular groups and communities were highlighted as having experiences that

make them most susceptible to HIV transmission or were vulnerable in terms of stigma and discrimination as a result of social practices or HIV sero-status.

### Women and HIV vulnerability

Due to socio-cultural norms and practices of gender inequality, women within the general population of PNG were identified as being more vulnerable to HIV transmission when compared to the general population of men. There are also unique challenges that make married women especially vulnerable to abuse and HIV transmission. One study found that women who were physically, sexually, or emotionally abused in their intimate partner relationships were more likely to test HIV positive compared to women who did not report abuse (29). A number of studies found that women who experience financial hardship, widows, divorced women, young women with lower levels of education, and women selling in the marketplace frequently engage in transactional sex to subsidize their income (61, 33, 60, 17, 14, 5, 16, 34, 39). Women who exchange sex for money, goods, or services were identified as vulnerable to physical and sexual abuse and, at times, are unable to negotiate condom use with their clients (5, 54, 34, 39). In addition to being vulnerable to HIV transmission, these women are also stigmatized and discriminated against in society, which makes them vulnerable to isolation and violence (10, 32, 7, 54).

### Men and HIV vulnerability

Although men appear to possess more power and autonomy in society, particular groups of men were identified to be more vulnerable to HIV transmission when compared to the general population of men. Generally, men who travel for work or who have social power and money were found to have higher numbers of sexual partners and do not use condoms consistently. The studies highlighted men who travel or work in development enclaves and logging camps, as well as military personnel and truck drivers (14, 5). Another group of men with high

vulnerability to HIV transmission include men-who-have-sex-with men. This group experiences social isolation and discrimination due to gender inequality, and many of these men reported having multiple sexual partners and inconsistent condom use (54, 34).

### Children, young people, and HIV vulnerability

Children in PNG were identified as a group especially vulnerable to HIV due to poverty and social practices. 'Street kids' interviewed in one study reported poverty as a key reason for living on the street. In fact, 39% of the children reported that stealing was their primary means of income (21). Many of these children reported knowing friends and relatives who had died due to AIDS (39%) and many others reported being approached by adults to engage in sexual activities (33%) (21). Child sexual abuse was highlighted in a number of other studies. One study found that women who reported child sexual abuse were twice as likely to be HIV positive, seven times more likely to engage in transactional sex, were more likely to be living in a violent relationship as an adult, and had a higher number of concurrent sexual partners compared to women who had not experience sexual abuse as a child (29).

Within their communities and homes, young people experience emotional and sexual abuse, which contributes to psychological distress and puts them at risk of HIV transmission (7). Young people experience less capacity in terms of sexual negotiation and some report trans-generational sexual relationships in which they often experience even less power (7, 52). In addition, out-of-school youth, those with lower levels of educations, and youth who experience financial hardships reported higher levels of transactional sex and physical and sexual violence (33, 32, 7, 4, 53, 17, 16, 34, 39). Young people also reported high levels of alcohol and drug use (4, 53, 49).

### High risk settings and periods of time

Economic development enclaves, logging camps, market places, urban settings, nightclubs, and communities and

towns along the Highlands highway were all identified as settings where people are at high risk for HIV infection. In these settings there are higher frequencies of transactional sex, sexual vulnerability, gender based violence, and a lack of regular condom supplies (62, 32, 60, 17, 5, 16, 12, 48, 39). Prisons were also identified as a place where there are frequent sexual partnerships, but lack of condom availability (43). Specific periods of time were also identified as times when increased high risk activities occurred, mostly due to increased cash flow leading to increased alcohol consumption, increased physical and sexual violence, and increased sexual activity (casual and transactional). These periods of time include coffee, cacao, and copra harvest season, pay day (32), elections, and campaigning times (13). During election time there were reports of people in campaign houses, otherwise known as 'animal houses,' participating in vote buying, drinking, socializing, and transactional and casual sex (13). Increased sexual partnerships were also reported during traditional festivals or customs, such as the *Milamala* festival or Kula trade ring (28). In addition, pregnancy and lactation were identified as periods of higher risk for HIV infection because some cultures allow men to have extramarital sexual relationships during this time (28).

### High risk practices

Practices that put people at high-risk for HIV infection including mobility, migration, and unprotected sex with multiple and concurrent sexual partners were reported as widespread (10, 27, 32, 33, 4, 53, 38, 34, 39, 58). However, other high risk practices were also reported. Alcohol, homebrew, and drug abuse were found to be common and associated with violence and sex (4, 53, 34, 39, 49). Alcohol and cannabis use were associated with social status, socializing, feelings of belonging, and as a means of attracting the opposite sex (4). In addition to alcohol, homebrew, and marijuana, a small number of study respondents reported using other illicit drugs such as ecstasy, speed (among out-of-school-youth), and heroin and cocaine (reported among female sex workers) (39).

One study demonstrated that of the respondents who reported alcohol use in the 4 weeks before the study, 36.8% (n=127) reported getting very drunk (4). In another study alcohol and drug use was strongly associated with sexual intercourse (store brought alcohol  $p<0.001$ ; homebrew  $p<0.001$ ; marijuana  $p=0.003$ ) (53). Female sex workers and men-who-have-sex-with-men reported high levels of alcohol and drug use. In one study, the majority of female sex workers in Port Moresby (88%) and Goroka (94%) reported having sex under the influence of alcohol; and similar proportions were reported in terms of sex under the influence of marijuana (34). From the same study, 91% of men-who-have-sex-with-men reported having sex under the influence of alcohol (34). These practices put these groups at risk of impaired judgment, both in terms of sexual negotiation and exposure to potentially violent partners.

### Vulnerability related to poverty and socio-economic decline

Poverty and socio-economic decline was identified as a key issue underlining HIV vulnerability. Over the past few years, rural communities' public service delivery, (including schools, health centres/aid posts and law and justice) has declined (17, 30, 28, 16). District health centres lack staffing, training, and supplies despite high incidences of tuberculosis and malaria (17, 30, 28, 24). Some schools are not operational, infrastructure is weak, and access to transportation via roads and air has decreased over the past few years (24). With the move to a cash economy people face the pressure of selling crops and finding other means of income to pay for school fees, mobile phone costs and electricity, to purchase store goods, and to fulfil financial obligations for church (24, 14). As a result, men travel for employment and an increasing number of women turn to transactional sex as an extra means of income (24, 61, 60). As a result of socio-economic decline in the rural areas there has been an increase in migration by professionals from rural to urban areas, which has further weakened rural public services

delivery in terms of disciplinary forces (e.g. police) and education (17).

Increased crime and socio-disorder appears to be a result of a shift from traditional culture to modernity, a lack of educational services, high unemployment levels, struggles over the distribution of wealth, increasing poverty, and a lack of disciplinary forces. In some areas lack of social order and expression of masculinity by young men has led to witch-hunting and increased violence (62, 24, 61, 60, 11, 17, 14, 16, 26). It is within the context of these challenges that communities attempt to address issues related to HIV. In some studies strong sentiments were expressed by rural communities that HIV was not the highest priority or concern for them; they needed and wanted basic services, roads, schools, medical supplies, and police and judicial services rather than HIV policy statements and prevention strategies (16). As one rural health care worker stated, “they sent us some condoms and booklets once, but no one around here wanted them. We have no need for such things. What we need are roads, schools, and basic medicines (16).”

## HIV prevention

A number of issues related to HIV prevention were reported among the studies, including HIV awareness campaigns, HIV education in the schools and community led initiatives, the ABC model, and the use of the female condom and male circumcision as a method of HIV prevention. The most commonly reported prevention method was the male condom, in which 40 (65%) of the studies presented findings.

## HIV awareness campaigns

The majority of the studies made reference, or reported findings related, to HIV awareness. These included initiative by the National AIDS Council Secretariat Mass Media Campaign, by the National HIV/AIDS Support Program and by NGOs programs specifically in the form of

posters, IEC (Information, Education and Communication) materials, radio and television announcements, condom distribution, peer education, and community theatre (33).

## *Exposure and sources of information*

Exposure to HIV awareness messages and information varied across parts of the country and among particular groups. However, the lowest coverage and exposure occurred at the rural community level (where over 70% of the country resides) (24, 17, 20, 12, 5, 16, 38). Sources of information reported by those exposed to HIV awareness, included friends, peer educators, radio, television, newspaper, health workers, publications, church, community theatre, adult-rated films and internet (24, 44, 23, 9, 52, 38, 34, 39). Participants in a number of studies reported peers and friends as the primary source of HIV information, followed by radio (and television in urban settings), church, and health workers (44, 23, 52, 34, 39). However, there were reports that messages from various sources were not consistent (24).

Exposure to IEC materials was high among truck drivers, military personnel, and out-of-school-youth (81%, 99%, 80% respectively). However exposure to peer educators was low among most male workers with the exception of male workers and women who sell sex in and around the city of Lae (39). Young people reported that they were not receiving comprehensive information from schools and/or parents (23, 7, 52, 49). In the review, there was no report of a formal evaluation of the HIV awareness messages in PNG.

In terms of HIV awareness and education, a few studies highlighted a preference for education and information dissemination within same sex and same generational groups (23, 7, 53, 38). This issue was highlighted as a means to respect cultural taboos. Other preferences for HIV awareness dissemination included community HIV awareness being organized through the village constituent governing body (28).

### *Example of HIV awareness best practice*

*An example of HIV awareness best practice was that of the VSO Tokaut AIDS forum theatre program, which included a qualitative evaluation study to assess progress and effectiveness. The program provided theatre forum that was participatory, delivered in the indigenous language (Tok Ples versus Tok Pisin), and included repeated exposure and follow-up to the communities. IEC materials were also developed in the indigenous language. A unique approach was used to develop and foster relationships and trust at all levels of the community, and issues related to illiteracy, social issues, gender inequality, stigma and discrimination were addressed. The program focused on working closely with community leaders, churches, teachers and health care workers (addressing prevention, treatment, care and support) and strengthening their knowledge and skills to ensure sustainability of changes observed during to the program. The specific process and outcomes (lessons learned) from the program can provide guidance to other organizations or groups working at the rural community level (31, 32, 33).*

### *Community led initiatives*

There were very few findings of HIV awareness initiatives that were developed and led entirely by communities. However, there was one report of communities and electorates who decided not to host election campaign houses due to problems related to violence, risks, and vulnerabilities experienced in previous election years (34). From the business community, companies such as OK Tedi Mining Ltd and Oil Search Ltd were commended for their HIV awareness programs and testing (18, 48).

### *Responses to the NACS Mass Media Campaign*

Generally there were not many positive sentiments expressed in regards to the NACS Mass Media Campaign. Several of the studies highlighted that the campaign messages failed to address socio-economic issues, culture, language, spiritual beliefs, or social practices (18, 7, 28, 38). In rural communities, recipients of HIV awareness

activities face challenges in terms of relating and understanding posters and community theatre forums due to high levels of illiteracy, language barriers, limited exposure to urban life, and a lack of socio-cultural contextualization in the awareness media (18, 7, 28, 5, 16, 38). In addition, the nature of HIV awareness posters and theatre performances has led to stigmatization of particular groups, such as women who sell sex (and, in some cases, women in general) (38). Theatre troupes were reported as having only basic training and did not provide clear insight as to how HIV is transmitted, which left communities in greater confusion and led to higher levels of discrimination than before the theatre troupes came to the community (38). In one urban setting, over two-thirds of young people expressed that the messages they were exposed to were unreliable, repeated too often, had become cliché, were inappropriate in tone and language, and only were focused on urban audiences (7).

### *Abstinence, Be faithful, use Condoms (ABC) model*

Knowledge of the ABC model was found to be high and widespread across PNG society (24, 32, 44, 60, 53, 39). However, there are questions as to the applicability of the message within the PNG context and culture (61, 18). Possibly as a result of Christian and cultural influence the uptake of the message has led to polarization, with many emphasizing the 'AB' (Abstinence and Be faithful [or monogamy]) of ABC (24, 40, 10, 18, 23, 7, 59). And yet, in the context of high incidences of multiple sexual relationships, polygamy, and gender inequality, 'abstinence' and 'being faithful' was not found to be a viable option for most women (45, 60, 53, 3). In one study, 80% of men disclosed having extramarital sexual experiences (24), and women experience little autonomy and freedom to express their own choices and desires in terms of abstaining from sex. Even when women are married and remain faithful they are still at high risk of HIV infection from their husbands due to limited capacity to negotiate condom use without experiencing negative consequences (24, 45, 29, 20). This is demonstrated through annual data from a VCT site in Port Moresby in

which 75% of women who tested HIV+ reported monogamy (3). In Eastern Highlands and Madang Province, knowledge of the ABC model varied among young people and possibly reflected their personal experiences; 78% reported that they knew abstinence prevented HIV, 22.1% reported they believed 'Being faithful to one partner' prevented HIV, and 44.4% reported that they believed condoms prevented HIV (53). Experiences and interpretation of the model was further highlighted in a study among the Huli men in Southern Highlands Province in which 'Being faithful' was understood, and practiced, but experienced differently by various groups (i.e. men, women, churches, and HIV policy makers) (61, 60).

## Male condom

### *Knowledge and use*

Although knowledge of the male condom was generally high (24, 53, 28, 34, 39), knowledge levels varied and was associated with gender and exposure. In one study, men were almost twice as likely (100%) to know what a condom was compared to women in the sample (55%)(24). Among the general population, HIV knowledge did not necessarily translate to use and overall there was a reported low incidence of consistent condom use across the country (32, 33, 44, 60, 23, 7, 4, 29, 52, 34, 39, 3, 58, 49). In one study among a sample of 415 women, 73.1% reported that they never used condoms. In this same study, the majority of women who tested positive for HIV (62.7%) reported that they do not regularly use condoms with their husbands or partners. The study findings also revealed that there was no statistical significant difference in condom use between women who tested HIV positive and those who tested HIV negative (29). Another study reported similar findings; 60.1% (n=1214) of those who visited a HIV testing facility reported that they never used condoms (3). Female sex workers reported high frequencies of condom use, and women who were sexually abused as children were significantly more likely to use condoms compared to women who did not report

abuse as a child (38.6% compared to 23.2%) (29, 39). Women whose husbands or male partners had university education reported higher frequency of condom use (47.8%) compared to women whose husbands did not have university education (27.0%) (29). There was also evidence of increased condom use during times of higher sexual activity such as during annual elections, in which store keepers reported increased demand and condom sales (13).

### *Access and availability*

Central to condom use were common issues related to limited access and availability of condoms (27, 62, 53, 30, 38). One study found condom supply and distribution (coverage) was limited in Morobe (20%), NCD and Central (30%), and Western Highlands (30%). East New Britain had the highest level of coverage of condoms (40%) and the highest percentage of condom promotion (40%) (30). Studies reported that condom supplies from the National AIDS Council or National Department of Health were not regular (13, 27, 48). In the areas where condoms were available, easy access proved difficult. Study participants who reported knowledge of where to obtain condoms were not able to access them quickly (i.e. in less than one hour) (53, 34, 39). While there was a request by some participants for increased access and availability of condoms, others raised strong sentiments that condoms should not be made available in particular settings such as schools because they felt it would encourage promiscuous behaviour or ruin the reputation of their school (23, 7). Similar concerns emerged from a number of studies based in rural communities where there were reports of health services workers refusing unmarried men access to condoms (10, 24, 18). As a result of these actions by health services workers and due to fear of being 'shamed' many study respondents reported unwillingness to approach health care workers for condoms (10, 62, 24, 61, 60).

Sources of condoms highlighted in various studies included aid posts, Clinton Foundation in Goroka, Save the

Children, VCT sites, STI clinics, hospitals, chemists, family planning clinics, Red Cross, street vendors, health centers, and shops (52). As part of a condom social marketing study conducted across the country, condoms were also found in trade stores and tucker boxes, supermarkets, betelnut and smoke stalls, bars, social clubs, night clubs, discos, pharmacies, hotels, motels, and lodges (30). Young men in Trobriand Islands reported receiving condoms from the local health centre (28). However, men in rural Madang reported accessing condoms from elder friends or relatives rather than through the health centres (24).

### *Beliefs and experiences*

Strong beliefs and sentiments were expressed in regards to condoms and condom use. For many people consistent condom use was not viewed as a viable option for HIV prevention. For example, many respondents reported their belief that male condoms were not reliable (1, 60, 7, 53, 23, 6). In one study, 44.4% of respondents reported that condoms could prevent HIV. However 65.2% believed that male condoms had holes and could or would break during use (53, 23). From a cultural perspective, condoms in the Trobriand Islands were generally seen as acceptable from a traditional viewpoint as a means of family planning, but they are also viewed as 'wasteful things' and in contrast with cultural beliefs and values related to sexual intercourse (28). Similarly, in other cultures, condom use is viewed in strict contrast to traditional beliefs and values related to reproduction and child-bearing (5). From a Christian and cultural moral perspective condoms use was generally viewed as unacceptable; condoms were associated with extramarital relationships and were viewed as 'propel(ling)' the HIV epidemic (62, 60, 23, 7, 12). Other study respondents stated that they did not use condoms due to personal beliefs and feelings of trust (23).

Studies revealed that individuals' experiences have a strong impact on condom use. A number of respondents reported that a major barrier to condom use was the loss of physical sensation during sexual intercourse (33, 44, 53). For others their experience of gender inequality and

violence prevented them from negotiating condom use (32, 45, 11, 29, 20). Individuals' social environments were also found to impact on condom use. After controlling for confounding factors (e.g., sex, age, location, and completion of primary school education), one study found that young people who were exposed to a favourable social environment for male condom use were 5.7 times more likely to report using a male condom. "The effect of these determinants was found to be stronger than the physical availability of condoms, exposure to condom demonstrations, or having good knowledge about condoms." (53).

### Female condom

A few studies reported findings related to the female condom. Most study participants reported that they had heard about the female condom, but few had seen a demonstration and even less had used the female condom (33, 53). In one study, participants expressed curiosity and interest in the female condom (33). Youth peer outreach workers in Eastern Highlands reported a lack of awareness and education in regards to the female condom. They also expressed that the size "scared" them and that the female condom was like 'a pair of pants.' On the contrary, men in the same study expressed acceptability of the female condom and reported that it gave them a better feeling and more physical sensation compared to the male condom (52). Among women who sell sex in Port Moresby, 40% reported that they had used a female condom, and 78% reported being able to obtain a female condom in less than one hour (34). A social marketing study revealed that there was a moderate coverage (45%) of the female condom in East New Britain, but availability was much lower in other provinces (30). Generally, access and availability of the female condom was found to be rare (48).

### Male circumcision

Male circumcision was reported in a few studies. In rural Western Province there were reports of male circumcision

performed at home by individuals in the community. However, it appears that this practice may have occurred more frequently in the past (62). The practice of male circumcision was not reported as part of traditional custom, but rather based on the belief that circumcision could prevent HIV transmission (62). In rural Madang Province study participants demonstrated basic knowledge of male circumcision and raised questions related to the legitimacy of it as a form of HIV prevention (24). In one study among 1358 adult male workers, the prevalence of male circumcision was reported as 26% among truck drivers, 45% among Ramu sugar workers, 67% for military personnel, and 70% among port workers (39). Among 1701 out-of-school youth from NCD, 58% of young sexually active males reported male circumcision compared to 11% of the non-sexually active males (39). These studies did not report whether the circumcisions had been conducted in a clinic, hospital, or home setting.

## HIV testing

### National and group testing

There were no national surveillance reports in regards to common behavioural trends in HIV testing, although there was a report of a total of 32,564 people in PNG who were tested for HIV in 2007 and 1,782 confirmed HIV confirmed positive cases that same year (41). Some studies reported testing among particular groups. In a survey of male workers, the range of reported testing among the groups was between 8.6% and 31.8%. In addition, the majority of military personnel (77.6%) reported having an HIV test (HIV testing is a requirement in their profession) (39). Among a group of 320 female sex workers in Port Moresby, 35% reported going to a VCT centre in the past 12 months. A similar proportion was found among female sex workers in Goroka in which 34% reported going to a VCT in the past 12 months (34). However, the numbers of those who actually obtained their HIV test results was slightly lower than those who had been tested (39). Less than 20% of 1701 out-of-school youth in NCD reported going for HIV testing; and a number of the study

participants reported that their test was not voluntary and approximately 1 in 5 did not return for test results (39).

### Knowledge and attitudes

Increased knowledge of HIV was found to be associated with the willingness to have an HIV test (1) and knowledge of the location of a VCT centre increased with exposure to peer outreach workers (34). Among female sex workers in Port Moresby, knowledge regarding VCT increased from 12% at baseline to 82% post-intervention. Among female sex workers in Goroka there was an increase in knowledge regarding VCT from 54% at baseline to 72% post-intervention (34). Knowledge regarding VCT was quite high (74%) among men-who-have-sex-with-men in Port Moresby; however this proportion remained constant despite exposure to an intervention (34).

Some studies reported on attitudes related to HIV testing that highlight potential breaches of human rights and widespread fear of HIV. For example, among a group of student teachers, the majority (79%, n= 875) stated that HIV testing should be compulsory (40). And in another study, respondents expressed beliefs that “once the HIV test reveals that a person is positive, he or she should be detained.” (57)

### Provider Initiated Counselling and Testing

Two studies reported findings on Provider Initiated Counselling and Testing. Both studies were conducted on the Paediatric ward at Port Moresby General Hospital. One study reported that of 215 children tested, 26.5% (n=57) were found to be positive for HIV antibodies (this represented 1% HIV prevalence among all children admitted to the hospital) (2). Children selected to be tested were more likely to have diarrhoea, malnutrition, or oral candidiasis. Suspected Tuberculosis as a presenting illness was the only condition found to be significantly predictive of HIV+ sero status in the study. In addition, clinical indicators that led to testing in the study were not generally found to be strong predictors of HIV infection, demonstrating that health care workers faced challenges



in identifying possible indicators of HIV sero-status among children (2). In another study among mothers and guardians of children at Port Moresby General Hospital, the majority (75%) reported that they would consent to a HIV test if their child was sick. However, surprisingly a much lower percentage of carers (58%) reported willingness to be tested themselves (1).

## Barriers to testing

### *Fear of stigma and discrimination*

Fear of stigma and discrimination was reported as a primary barrier to having an HIV test. This was partly due to strong social beliefs that HIV was associated with transactional sex and promiscuity (52). Study participants reported experiences of stigma and discrimination by health care workers or community members when accessing a testing facility (62, 52, 26). Study participants also reported fear of stigma and discrimination in terms of testing positive for HIV and living a life with HIV (1, 33, 26). In one study, 74.2% (n=282) reported that they believed they would be rejected by relatives and friends if they disclosed being HIV+ (26). In the same study, 95.8% of the sample reported that stigma was a major barrier to attending a VCT centre. Similarly, another study revealed that, as a result of stigma, only those who were “really sick” went to the health testing facility (62).

### *Lack of privacy and confidentiality*

Lack of privacy and confidentiality were also identified as key barriers to testing, specifically in terms of the location of the centre and the professionalism of health care workers in maintaining the confidentiality of clients (41, 60, 13, 52). Health care workers reported that clients who suspected a positive test often travelled to urban settings away from their community to ensure anonymity (60). Some reports indicated that VCT centres were set up in locations where individuals could be easily identified (13). Possibly linked to issues of confidentiality was the finding that VCT counsellors only receive a one-time training which limits their ability to provide appropriate and

professional services (58). Contrary to the number of studies that reported lack of perceived privacy and confidentiality, there was one study that reported positive experiences by a small sample of people who attended a VCT centre in Madang. The majority of respondents (87%, n=23 in 2005; 100%, n=23 in 2006) felt assured that the VCT centre kept their information confidential. (57)

### *Lack of information and risk perceptions*

Some studies revealed a lack of information about both where to go for a test result and the process of detecting HIV antibodies and sero-conversion (6). Young people in Eastern Highlands reported the need for appropriate counselling, education, and awareness in order to encourage young people to visit an STI or VCT site (52). Lack of information and knowledge also impacts on perceived risks. Rural health care workers report that many who tested HIV+ did not expect to receive a positive test result (60). In a study across four provinces, the majority of women (66.1%, n=207) who tested positive for HIV underestimated their risk of HIV or STIs; close to 40% of women who reported that their husbands were having extramarital sex perceived that they themselves were at no risk of HIV transmission (11, 29). Other studies highlighted underestimated community perceptions of risk and some report that HIV is not a problem in their community, or that HIV is only transmitted among those who sell sex (7)

### *Availability and access of testing sites*

In PNG the number of testing sites has increased over the past few years from 35 sites in 2006 to 60 sites in 2007 (42). However, limited availability of and access to HIV testing sites prevents those in rural communities from going for testing (33, 60, 17, 28). In peri-urban settings, people lack money for transportation to attend testing facilities (52). In one study there were reports of community members being exposed to HIV awareness and the importance of testing. However, there were no testing facilities available or accessible for community members to go for testing (33). In one community, the closest

testing facility was a two-to-three day walk for someone who is fit and healthy (16).

#### *Testing and treatment*

Lack of information and access to treatment was also identified as a barrier to HIV testing. In most rural areas, Highly Active Anti-Retroviral Treatment (HAART) for treatment of HIV was not available (41). As such, community members expressed beliefs that they were unlikely to receive treatment if they tested HIV+ due to unavailability. (60) In settings where treatment is available, knowledge of this treatment is not widespread (27, 1). Therefore, some study participants reported that they did not believe that they would receive help or support from health services if they tested positive for HIV (26). Finally, in another study, the majority of respondents (77%) were not even aware that HIV could be treated (1).

#### Living with HIV and AIDS

Although there were few studies that focused solely on people living with HIV, many studies included findings regarding community responses and attitudes towards HIV+ people. A few studies also reported on the common experiences shared by people living with HIV.

#### Community responses

##### *Christian response and socio-cultural response*

The most commonly reported community response to people living with HIV was that of moral judgment expressed by the Christian Church and Christians in Papua New Guinea. Church leaders and members of the Evangelical Church of PNG, the Charismatic Church, the Pentecostal Church, the Seventh Day Adventist Church, the Catholic Church, the Lutheran Church, and other denominations were reported preaching and communicating that HIV was a punishment from God for sexual promiscuity and immorality (10, 62, 61, 24, 23, 40, 52, 20, 12, 38). These views were also expressed by Christian young people (23, 7). In addition to the reported Christian moralistic view, people living with HIV were also

viewed as promiscuous and deviants from traditional socio-cultural norms (27, 24, 17, 12, 16, 38). Generally, low levels of compassion were reported; people living with HIV were blamed for bringing HIV into rural communities; and beliefs were expressed that people who tested positive for HIV were facing the result of their own actions (10, 62, 7, 12, 26).

##### *Stigma and discrimination*

The studies reported high levels of stigma and discrimination towards people living with HIV. This was found across the country among the general public as well as specifically among young people, female sex workers, and teachers. In some cases, levels of stigma and discrimination were higher among women compared to men (53, 39). Fear of HIV transmission (and lack of HIV knowledge) appeared to be fundamental to expressions of stigma and discrimination. Study respondents demonstrated and expressed fears of shaking hands or sharing utensils and food with someone living with HIV, or touching someone dying of an AIDS-related illness (32, 33, 60, 23, 52, 34, 39).

Many respondents reported feeling that people living with HIV are a threat to the wider community (10, 27, 33, 52, 38). In some cases, people living with HIV were ostracized and pushed out of the community (52). There were also some reports and recorded citations of aggression, violence, torture, death, and live burials of people living with HIV in rural areas (33, 18, 12, 16, 59). One study reported, "...one man advocated that every infected person be quarantined together in one place, have petrol poured over them, and be set alight." (12).

There were reported community efforts to identify people living with HIV, and misconceptions regarding the physical appearances of someone living with HIV (10, 32, 60, 6). Some community responses were mixed. One example was found in a study where community members accepted someone living with HIV who came as a visitor to their community, but expressed that they would not be as

welcoming towards someone from their own community if they were HIV+ (32). Stigmatizing attitudes and discrimination impact on the social and emotional well-being of people living with HIV, and prevents some from disclosing their HIV status (32, 33). In one study conducted in Port Moresby, one-third (33%) of the people living with HIV were also found to have signs and symptoms of depression (55).

A few studies reported notable levels of compassion and lower levels of stigma and discrimination among people who had interacted with someone living with HIV. Those who had inter-personal contact with someone living with HIV expressed that people living with HIV should have the human right to work, study, and have access to treatment (23, 40, 34). Similarly, lower levels of discrimination were reported after study respondents were exposed to an intervention of HIV awareness or training (40, 34). Particular groups such as homosexual men and military men reported lower levels of discrimination compared to other groups (34, 39). There were also demonstrations of Christian compassion, spiritual care, and support in a palliative setting (37).

### People living with HIV within communities

#### *Knowledge of someone living with HIV*

Despite high levels of stigmatizing behaviour and discrimination, there were particularly high numbers of people who reported knowing someone close to them either living with HIV or who had died of AIDS. Among six different studies, the majority of study respondents (52% to 90.8%) reported knowledge of someone living with HIV (40, 53, 34, 39, 1, 59). In one of the studies, 57% (n=1088) of rural and urban student teachers across six provinces reported knowing a community member or '*wantok*' who was HIV positive. Over one third of the group reported knowledge of a friend living with HIV and over 15% reported knowledge of a family member living with HIV (40). Christian leaders and clergy in one study reported knowing someone who had died due to AIDS (87%) and

they also reported currently knowing someone living with HIV (68%) (59). In yet another study, almost all (90.8%, n=193) of the young study participants from Eastern Highlands and Madang provinces reported knowing someone with HIV (53). Similarly high reports were found among MSM in Port Moresby. The majority of respondents (90%, n=270) reported knowing someone who was living with HIV or who had died of AIDS (34). Over half the sample (52%, n=788) of out-of-school-youth in NCD reported a close friend who had HIV or died of AIDS (39). A study among women who sell sex reported knowledge of someone living with HIV (86%, n=349 and 61%, n=131 respectively) (39). And over half the number of parents or guardians (53%, n=21) interviewed who attended Port Moresby hospital with a sick child reported knowledge of a child or adult living with HIV (1).

#### *Biomedical treatment*

Two studies from the National HIV Surveillance program reported an increase in the number of health facilities offering Highly Active Anti-Retroviral Therapy (HAART) across the country between 2006 and 2008; 38 health facilities offered HAART in 2007 (41). There were also reports of increased numbers of people starting HIV treatment and surviving on treatment (41, 42). On the other hand, also reported were high unmet needs and an increase in the demand for HIV treatment (52, 17). An estimated 6,348 adults and children, representing 35% of PLHIV, required treatment but were not able to access it due to availability or lack of transportation (41, 58). In addition, there are reports of only first-line HIV treatment available for people living with HIV and no treatment available for those who require second line treatment (58). One study showed there is only one health facility offering formal case management of HAART (Goroka Base Hospital) (58). Finally, none of the studies reported access or availability of treatment for Opportunistic Infections associated with advanced HIV.

### *Traditional medicine and Christian healing*

Possibly due to limited availability of Anti-Retroviral Therapy, and as a result of traditional treatment-seeking behaviour, people across the country are turning to non-biomedical treatment for cures. There are reports of street vendors, traditional healers and witch doctors who claim to specialize in herbal medicine with cures for AIDS (52, 6, 27). In addition to traditional and herbal medicine, there are also Christian beliefs of healing and cures (largely from Charismatic and Pentecostal Churches) based on moral reform and repentance (12, 38). However, despite Christian and traditional claims of supernatural healing and cures, many people expressed their belief and that there is no cure for HIV or AIDS (27, 24, 32, 60, 23, 12).

### *Care and support*

There were very few studies in which respondents reported knowledge of care and support programs for PLHIV (26). Despite high levels of stigma and discrimination in some areas, some study participants reported caring for someone living with HIV or expressed a willingness to do so in the future (33, 23, 40, 34, 39). Specifically, in one study, Christian leaders and clergy reported their commitment and willingness to care for, and accept, people living with HIV into their communities (6). Within the HIV community there were reported peer support groups such as Igat Hope at the national level and Good Samaritan and Higher Aim in Madang (58).

In terms of areas for possible future support, one study reviewed the nutrition and dietary intake of people living with HIV in Port Moresby and found that the current energy intake of people living with HIV was significantly lower than World Health Organization (WHO) recommended values (47). This study also found low levels of protein in reported diets and most of the randomized sample of participants were unemployed (62% males, 72% of females) (47). Another study that examined the impact of HIV and AIDS on agriculture and nutrition highlighted the requirement of more information and training for

PLHIV in terms of high protein diets and micronutrients that could be found in food sources specific to the PNG context (14).

### *AIDS-related deaths*

Involvement and support by family and friends appears to be minimal for people dying of AIDS in Port Moresby. As a result, the need was identified for support to meet basic needs, spiritual care, and companionship (37). In rural South Highlands Province there are reports of people who have returned to the rural areas from Port Moresby and Lae when dying of AIDS (17). Little is known about these specific cases, whether these deaths are related to lack of treatment, lack of testing facilities, or testing after AIDS has progressed. AIDS-related deaths also impact the wider community; unexplained sudden deaths (that are likely AIDS-related) are sometimes blamed on sorcery and have resulted in witch-hunts, torture, and killings of others (mostly women) in the community (16).

### **Leadership**

Issues related to leadership in HIV awareness were not covered by many of the studies. However, there were several examples of the leadership role and influence that the Christian church has across most aspects of society (10, 24, 60). Other studies highlighted attempts to engage and include community leaders in HIV awareness, which positively resulted in community social change and sustainability of HIV awareness efforts (33, 52). However, other studies commented on the lack of political leadership or interest in issues related to HIV. One example is a study conducted during the national elections in 2007 in which few (13%, n=3) reviewed campaign speeches made reference to HIV or AIDS (13).

### **Fear as a response to HIV**

Probably the most common reaction to HIV was that of fear. Fear has led to high levels of stigma and discrimination towards PLHIV, towards women in general, towards men and women who engage in transactional sex,

and towards those who have multiple sexual partners (10, 7, 32, 33, 18). Study respondents reported and expressed fear of death (27), fear of HIV transmission from PLHIV (10, 32, 33, 23, 52), fear of an HIV epidemic resulting in calamity (12), fear of stigma and discrimination if tested HIV+(33, 52, 26), fear of community judgment if seen as 'promoting condoms' (62), fear of judgment by health workers for requesting condoms (10, 52, 62, 24, 60), fear of negotiating sex or condom use in a marriage (32, 29), and fear of condoms breaking or having holes (33, 29). Causes of fear are related to lack of consistent, accurate, and contextually relevant HIV messages and information as well as a result of conflicting cultural and religious beliefs and worldview (10, 7).

## Public services and government sectors

### Health sector

Specific to the health sector there were a few studies that highlighted national surveillance, HIV testing, HIV treatment, and condom distribution and availability (42, 41, 58). Other studies highlighted more of the challenges faced by rural communities in regards to health care and services (17, 16). From national surveillance there are positive reports of increased numbers of testing and treatment facilities being made available across the country (41, 42). However, a number of studies highlighted that the challenge will be for these services to expand and meet the demand in rural areas. Other challenges include better and more comprehensive reporting by surveillance sites (41). In terms of condom distribution, there were positive reports that condoms from NDOH are found in higher proportions across the country compared to other brands of condoms (30). There were also some historical reports of successful family and sexual health promotion that occurred in rural Western Province in the 1940s. During this time period, condom use was promoted as an accepted means of family planning and contraception. These health sector efforts

from the past could be built upon today in terms of condom use to prevent sexually transmitted infections and HIV.

A number of reports highlight the suboptimal condition of health services. Health centres lack running water, power for light or refrigeration, regular medical supplies, and treatments, training, and equipment to conduct STI and HIV testing (17, 30, 28, 38, 48). In some sub-districts there are no Health Extension Officers and most of the nursing staff have relocated; those remaining as workers in health centres report that they require basic training in HIV prevention, diagnosis, and treatment (17, 16, 38). Access to provincial health centres is a challenge due to lack of finances and transport (24, 16). As a result, service demand at the district level is high and yet centres are understaffed (38). Many health care workers in rural areas are isolated from other professional peers and many have high levels of responsibility and leadership within the community. Within such contexts, some struggle with reconciling their moral beliefs, socio-cultural pressures from the community, and their professional health promotion and public health obligations when addressing issues related to STIs and HIV (10, 60, 18).

### Education Sector

Educational services in rural areas were also reported as poor; in some districts and sub-districts there were reports of schools being closed down or nominally open (60, 17, 20, 5, 16, 38). Many parents struggle to pay school fees turning to transactional sex for this money (24, 61, 14, 38). In addition, many students are unable to finish school due to financial constraint and, in some cases, the students turn to transactional sex as a means of income (34).

There were a few studies that reported on HIV issues related to the education sector. Most notably was the report of a 36-hour course on HIV and reproductive health delivered to 1914 student teachers across the country. While the evaluation of this course highlighted the need for increased support and training, the course was

reported as successful in terms of increasing educational levels and providing student teachers with more skills to address issues related to reproductive health and HIV in the classroom (40). Other studies highlighted the challenges that some teachers are facing with the introduction of HIV education in the classroom. Specific challenges include language, the sensitivity of the topic, lack of support from parents, and respecting and addressing traditional beliefs and cultural norms (32).

There were other reports from young people that sexual and reproductive health is not comprehensive (23, 52). Others expressed their beliefs and fears that teaching issues related to sexual health in the school would promote promiscuity (7). While schools struggle to address issues related to reproductive and sexual health, there are also challenges in terms of addressing social issues such as physical and sexual violence and abuse reported by students (7).

#### Law and justice sector

The majority of issues related to law and order were specific to a decline of law and order in the rural areas, violence against women, and drug use. However, none of the studies reported on the HIV and AIDS Management and Prevention Act 2003 (HAMP Act). The need for greater protection of people living with HIV cannot be overstated; many people living with HIV are vulnerable to violent behaviour resulting from stigmatizing behaviour and discrimination (17, 16).

Women are especially impacted by the decline in law and order. One study reported that court responses to violence against women needed to be strengthened, particularly at the village court level in regards to stronger penalties for men who are perpetrators (29). Women also requested more education targeted at men, and education for women informing them of their civil and human rights (29). In addition to laws related to violence against women, one study reported on police arrests related to drug abuse in NCD and Wewak. This study

highlighted the need for better reporting and statistics by police to determine the degree of alcohol and drug abuse in communities and to develop appropriate responses and support (4).

#### Agriculture

There was little reported in the area of agriculture. One study reviewed the impact of HIV on this sector but found limited data available (14). The study concluded that the current impact of HIV and AIDS is felt at the household level, but not yet noticed at the system/industry level. The study gave examples of how stigma associated with HIV reduced the support by family or '*wantok*' and that this further impacted on labour production over periods of time (14).

#### Epidemiology

##### National surveillance

Based on Annual National Surveillance there were 5038 newly diagnosed HIV infections in 2007, a cumulative total of 23,210 HIV infections from 1987 to 2007, with more female infections (n=2868, 60%) compared to male infections (n=2027, 40%). In the majority of cases (87%; n=4380) mode of transmission was not stated or reported. However, of the cases that were reported, 12.1% were identified to be due to heterosexual transmission, 0.1% were identified to be due to homosexual transmission, and 0.8% were identified as occurring through perinatal transmission (41). Based on available data, the reported cases in 2007 were from NCD Province (38%) followed by Western Highlands Province (28%), Eastern Highlands Province (13%), Morobe (5%), Southern Highland Province (4%), Enga (4%) and Simbu (2%) (41). While these findings provide important information about the epidemic, there are limitations to the reliability of some of the findings due to a history of testing sites not reporting data to NDoH (41, 42). In the first half of 2008 there was an increase in reporting, however only 61% of the HIV testing facilities

reported to NDoH in 2008; and of those who did report, many did not report on a regular basis (41).

### HIV prevalence in a hospital setting

In addition to epidemiological data from the National Surveillance program, one study conducted in Port Moresby General Hospital also reviewed HIV seroprevalence. Of the 300 blood samples tested for HIV antibodies, 18% (n=54) were confirmed positive. And of the 54 cases that were found positive for HIV antibodies, most (n=20; 37%) presented at the hospital with a respiratory tract infection (most frequently with pulmonary Tuberculosis), diarrhoea and/or oral thrush (n=14; 26%), or headache, confusion, or muscle weakness (n=4; 7%). There are, however, questions related to the generalisability of this study due to the sample size and whether the population of those presenting as sick at the hospital were representative of the entire population (8).

### Projection of HIV prevalence

One demographic study analysed recent surveillance and other information in order to project HIV prevalence in the future (19). The study suggested that HIV prevalence in PNG would rise to 5.1% by 2012 after which time the prevalence rate would stabilize. The study also predicted that the HIV epidemic would reduce the population growth rate, but the effect would not be sufficient to significantly slow down population growth, which could reach 9.3 million by 2030. However, the study also suggests that the HIV epidemic in PNG would very likely result in reduced life expectancy and therefore a lower overall quality of life (19).

### Genetics and transmission patterns

From an epidemiological perspective there were a few studies that reported on HIV subtypes, genetic testing, and transmission patterns (22, 35, 51, 36). While these studies provide some basic insight there are questions related to the generalisability of results, especially given the heterogeneity across PNG population. The findings in one

study suggest that Papua New Guineans do not possess the mutant allele CCR5-delta-32-receptor, which causes resistance to HIV infection. However, the study had methodological weaknesses and findings were not generalisable to the population of PNG (35). Another study found that based on transmission patterns, PNG could be experiencing a heterosexual sub-type C epidemic. However, this study also had methodological weaknesses and constraints in terms of the sample used, which calls into question the reliability and generalisability of the findings (51). Finally, another study reported the absence of CYP2B6 983T>C in polymorphism, suggesting that HIV treatment outcomes with efavirenz could be more effective among Papua New Guineans compared to Africans or African Americans in which the presence of polymorphisms has been reported. While this study provides a base for further studies, the study used a very small sample of Papua New Guineans from one isolated part of PNG, which could not be representative of the overall population (36).

## DISCUSSION

### Limitations of the review

All efforts were made to minimize bias and error throughout the process of this review. However, there were a few limitations to the review as a result of the inclusion criteria and the heterogeneity of study types and quality.

#### Publication date

The review provided justification for the limited inclusion of studies based on publication date (i.e. 2007 and 2008). However, there were many studies that were not included that also contribute important supportive evidence to the findings of the review. These should be considered and analysed together with this review.

#### Types of study designs and quality

The majority of the studies were cross-sectional in design. Cross-sectional studies are often subject to confounding factors and bias compared to other study types; they do not measure effect or causation and lack generalisability. The review allowed for inclusion of different types of study designs (cross-sectional, intervention studies, case reports and case-control studies) and reported on them equally, yet by nature of design some studies have more methodological limitations compared to others. The majority of the studies were rated 'moderate' in terms of quality, yet studies that were rated weak and strong in quality were included and analysed for common themes. Some of the poorly rated studies are less reliable or valid; therefore, it is important to consider this in terms of the key findings of the review.

#### Lack of information

Many studies did not provide all required information to easily appraise quality or extract data or key findings. This led to some gaps in identifying additional themes or supportive references within the review.

### Identification of studies

The two investigators were not able to access a few electronic databases during the search for articles. These databases included the Social Science Citation Index, the International Bibliography of Social Sciences, and the Web of Science. Despite lack of access to these databases, a range of other electronic databases, key informants, snowballing, and internet searches were used to identify any articles that may have been missed.

### Recommendations

The findings of the review highlight common themes related to culture, Christianity, gender inequality, stigma, discrimination, misconceptions of HIV, under-estimation of HIV risk, and low acceptance and use of condoms. Across these themes a strong message is presented: As a whole, the current PNG national response to HIV has some positive aspects, but it is not providing the intended effect, response, or change at the community and population level. There is a pressing need to adopt a new approach--- to 'change the face of HIV and AIDS', both in terms of how HIV is perceived and responded to. Therefore, the following includes some identified recommendations that aim to support a new (and possibly more effective) approach. Note that this is not an exhaustive list and details of the recommendations should be developed with specific communities.

#### Recommendations for donors, government, HIV service providers, and stakeholders:

##### *Engage with the Church as a primary partner*

- Plan and partner with Church leaders of all key denominations on every aspect of the national HIV response. Specifically focus on leadership and joint strategy development and implementation.



### *Be guided by culture*

- Consider issues related to culture and incorporate indigenous language in all HIV initiatives, projects, and services

### *Invest in Behaviour Change initiatives that are evidenced based and have been proven successful*

- Develop behaviour change programs that are grounded in social change, empowerment, and dialogue
- Address cultural, political, and economic issues that are barriers to change
- Support the strengthening of social capital within communities (i.e. social life, networks, and trust) in order for members to effectively pursue shared objectives related to HIV

### *Work with Groups-at-Higher-Risk and those who are exposed to high risk settings*

- Support the develop of risk reduction strategies
- Provide education and support

### *Provide women with more options*

- Develop income generation initiatives as an option for women who sell sex due to financial hardship
- Support efforts to address gender inequality and empowerment of women across all levels of society

### *Target married couples*

- Increase targeted interventions and education that addresses sexuality, sexual negotiation, gender norms, inequality, and power

### *Create a new national strategy for HIV messages and awareness that focuses on:*

- Misconceptions related to HIV, AIDS, and condoms
- Misconceptions of HIV risk and beliefs associated with promiscuity and HIV
- Religious morality and judgment (i.e. 'HIV is a punishment from God')
- Stigma and discrimination related to sexual practices (multiple sexual partnerships) and HIV with the aim of increasing HIV testing, condom use, and safe environments for PLHIV who wish to disclose their HIV status

### *Support and prioritize provincial HIV strategies and community led and driven responses which address HIV vulnerability and risk as well as care and support for PLHV.*

- Provide the tools and training to assist communities in developing grass-root responses and context specific responses

### *Invest in the future*

- Target youth by addressing gender inequality through the school curriculum and community and by educating youth with options and skills to delay sexual debut or minimize potential risks
- Develop income generation initiatives, vocational, and technical training for out-of-school youth

### *Re-consider condoms*

- Initiate a mass campaign addressing misconceptions of condoms (in partnership with supportive Church leaders)
- Procure and monitor regular and widespread supply of male and female condoms (in every district and ward)
- Explore alternative options to the male condom while still promoting and increasing condom access and availability

### *Positively engage with HIV+ people*

- Strengthen PLHIV advocacy on all levels
- Support PLHIV with income generation initiatives, nutrition education and options, counselling, and support beyond the provision of positive test results
- Provide support and comprehensive education and public awareness on the general care and support required by PLHIV
- Expand first-line Anti Retroviral Therapy and explore options for second-line treatment

### *Support public sector strengthening*

- *Partner with the health sector:*
  - Advocate for health services strengthening with a specific focus on increasing the quality and quantity of health services in rural communities.
  - Provide training and regular in-services to all health care workers, addressing HIV prevention, treatment, care and support, patient confidentiality, stigma, discrimination, and religious beliefs verses public health approach
- *Partner with law and justice sector and advocate for:*
  - Greater support programs and penalties that address violence against women
  - Increased monitoring and greater penalties for alcohol abuse and sexual violence
  - Community monitoring, education, and greater penalties for sorcery accusations, torture, and murder
  - Increased country-wide education that addresses stigma and discrimination related to HIV and AIDS
- *Partner with Department of Community Development* to support initiatives that greater opportunities for those living in rural areas (formal and informal

education, law and justice, infrastructure development, income generation opportunities)

- *Partner with National Department of Education* and law and justice to address:
  - Child Sexual Abuse as a matter of urgency, include training for school counsellors, community referrals processes, and criminal justice liaisons
  - Provide comprehensive education and public awareness on alcohol and drug abuse
- *Partner with National Department of Education* to address:
  - Teachers' effective delivery of sexual and reproductive health that addresses cultural and social norms
  - Better and free education for all children

### *Recommendations for researchers, academics, academic and research institutions*

#### *Types of studies and study designs:*

- Prioritize studies that explore HIV leadership within community of PLHIV, government, church, among youth, and among traditional elders
- Conduct studies that explore issues underlining sexual desire
- Conduct studies in Bougainville exploring issues related to HIV risk, vulnerability, and community response to HIV
- Conduct rigorous Evaluation Studies that assess what interventions and initiatives are working and how to build on success
- Prioritize Cohort Studies (through Behavioural surveillance) that follow groups of people over time including PLHIV, groups at higher risk, and people living/working in high risk settings

- Support training and mentoring for researchers in the area of research design, analysis, and writing

*Research indicators for population based surveys/Integrated Bio-behavioural studies:*

- Sex partners – who are they/relationship, where is contact made, motivation of selection is made
- Knowledge of STI and HIV testing (confirm knowledge levels with questions related to location, opening times, procedures)
- Knowledge of HIV treatment (confirm knowledge levels with questions related to types of treatment, process of referral, availability, effects, and outcomes of treatment)
- Condom use - frequency, and reasons for not using (explore beliefs, availability, access, stigma, knowledge of use, and exposure to condoms)
- Physical and sexual abuse (establish prevalence and frequency)
- Sexual practices between men-who-have-sex-with-men (establish prevalence, frequency, beliefs, and discrimination)
- Sexual networks (explore mobility-frequency, motivation, locations, and duration)
- Sexual partners (length of relationship, nature of relationship, and origin of relationship)
- Casual and transactional sex (establish prevalence and frequency, motivation, and risks)
- Church influence (establish degree of influence, membership and type of denomination, frequency of exposure, type of exposure [i.e. women's groups, Sunday services])

## REFERENCES

### Included Studies

1. Allison, W., Iobuna, V., Kalebe, V., Kiromat, M., Vince, J., Schaefer, M. & Kaldor, J. (2008a) Attitudes to HIV testing among carers of children admitted to Port Moresby General Hospital, Papua New Guinea. *J Paediatr Child Health*, 44, 618-621.
2. Allison, WE., Kiromat, M., Vince, J., Schaefer, M. & Kaldor, J. (2008b) *Factors associated with selection for HIV testing and HIV positive serostatus in children admitted to Port Moresby General Hospital (PMGH), Papua New Guinea (PNG)*. National Centre in HIV Epidemiology and Clinical Research, University of New South Wales.
3. Anglicare StopAIDS. (2007) *Lessons learned: Anglicare StopAIDS Data Analysis*. Port Moresby, Anglicare StopAIDS.
4. Baldwin, S., Koka, B., & Power, R. (2007) *Alcohol, homebrew, betel nut and cannabis: The impact of drug use in PNG*. Melbourne, Macfarlane Burnet Institute of Medical Research and Public Health.
5. Beer B. (2008) Buying betel and selling sex: Contested boundaries, risk milieus and discourses about HIV/AIDS in the Markham Valley, Papua New Guinea. In: Butt, L. and Eves, R. *Making sense of AIDS; culture, sexuality, and power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): 100-134.
6. Benton, KW. (2008) Saints and sinners: Training Papua New Guinean (PNG) Christian clergy to respond to HIV and AIDS using a model of care. *J Relig Health*. 47(3), 314-325.
7. Conolly, L. (2008) *Strepela Toktok bilong SikAIDS: Perception of HIV/AIDS in a Papua New Guinean school community*. Master's thesis. Macquarie University.
8. Curry, C., Bunungam, P., Annerud, C. & Babona, D. (2007) HIV antibody sero-prevalence in the emergency department at Port Moresby General Hospital, Papua New Guinea. *Emergency Medicine Aus*. 17, 359-362.
9. David, D. (2008) *Evaluation of schools health promotion HIV/AIDS in Manus Province; Is it effective*. Diploma in Community Medicine Project. School of Medicine and Health Sciences, University of Papua New Guinea.
10. Dundon, A. (2007) Warrior women, the Holy Spirit and HIV/AIDS in rural Papua New Guinea. *Oceania*, 77(1), 29-42.
11. Duffy, RM. (2008) *Report on domestic violence comparing data across four provinces in PNG*. Master's thesis. University of Canberra.

12. Eves, R. (2008) Moral reforms and miraculous cures: Christian Healing and AIDS in New Ireland, Papua New Guinea In: Butt, L. & Eves, R. *Making sense of AIDS; culture, sexuality, and power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): 100-134.
13. Gibbs, P. (2008) *Elections and HIV and AIDS in Enga*. Port Moresby, National Research Institute.
14. Grellier, R. & Omuru, E. (2008) *The potential impact of HIV and AIDS on agricultural systems and nutrition in Papua New Guinea*. Options Alliance South Africa.
15. Habon, C. (2007) *Evaluation of HIV/AIDS knowledge and attitude of top-up primary to secondary students in Nipa District, Southern Highlands Province*. University of Papua New Guinea. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
16. Haley N. (2008a) When there's no accessing basic health care: Local politics and responses to HIV/AIDS at Lake Kopiago, Papua New Guinea. In: Butt, L. and Eves, R. *Making Sense of AIDS; Culture, Sexuality, and Power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): 100-134.
17. Haley, N. (2008b) *HIV/AIDS and witchcraft: A tale from Lake Kopiago*. Department of Anthropology, The Australian National University.
18. Hammar, L. (2008), Fear and Loathing in PNG: Sexual health in a nation under siege. In: Butt, L. & Eves R, (eds.). *Making sense of AIDS, culture, sexuality, and power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): 100-134.
19. Hayes, G. (2007) The demographic impact of the HIV/AIDS epidemic in Papua New Guinea, 1990-2030. *Asia Pac Pop J*, 22 (3), 11-30.
20. Hermkens, AK. (2007) The power of Mary in Papua New Guinea. *Anthropology Today*, 23(2), 4-8.
21. Humanity Foundation Inc (2007) *Street kids survey, National Capital District*. Humanity Foundation Inc. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
22. John, L., Kevau, I., McBride, J., Wilson, K., Millan, J. & Tau, G. (2007) Sero-prevalence of *Toxoplasma gondi* antibodies in HIV/AIDS patients and healthy blood donors in Port Moresby General Hospital, Papua New Guinea. *Int J Infect Dis*. Vol. 12, 377-377.
23. Kelly, A., Akuani, F., Kepa, B., Pirpir, L., Mek, A., Kupul, M., Emori, R., Nosi, S., Walizopa, L., Cangah, B. & Keleba, K. (2008) *Young people's attitudes towards sex and HIV in the Eastern Highlands of Papua New Guinea*. Monograph 1/2008. Sydney: National Centre in HIV Social Research, The University of New South Wales.
24. Keck, V. (2007) Knowledge, morality and 'Kastom': SikAIDS among young Yupno people, Finisterre Range, PNG. *Oceania*, 77 (1), 43-57.

25. Kumb, J. (2007) *Survey on youth perceptions towards condoms and sexual behaviour; Response to HIV/AIDS in PNG*. University of Papua New Guinea, Port Moresby.
26. Lauwo, J., Esorom, D., Kitur, I., Tau, G. & Aluavula, I. (2008) Impact of HIV/AIDS: Stigma and discrimination on access to VCT and other health services in selected populations of the National Capital District, Papua New Guinea. *Pac J Med Sciences*, 5, 65-89.
27. Lepani, K. (2007) Sovasova and the problem of sameness: Converging interpretive framework for making sense of HIV and AIDS in the Trobriand Islands. *Oceania*, 77 (1), 12-28.
28. Lepani K. (2008a) Fitting condoms on culture; Rethinking approaches in HIV prevention in the Trobriands Islands, Papua New Guinea. In: Butt, L. and Eves, R. *Making Sense of AIDS; Culture, Sexuality, and Power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): Page 225-245.
29. Lewis, I., Maruia, B., Mills, D. & Walker, S. (2007) *Final report on links between violence against women and transmission of HIV in 4 provinces of PNG*. Canberra, University of Canberra.
30. Lemeki, M. (2008) *Papua New Guinea (2008) MAP study evaluating the availability of condoms and other health products in Morobe, NCD and Central, Western Highlands and East New Britain Provinces. First round*. Port Moresby, Population Services International.
31. Levy, C. (2008) Mareng language HIV/AIDS awareness material production and distribution, Jimi Valley, Western Highlands Province, PNG. *Contemporary PNG Studies DWU Research Journal*, (19), 88-97.
32. Levy, C. (2007a) HIV and AIDS awareness program in remote areas of PNG; evaluation of VSO PNG Tokaut AIDS impact in second year of activity. *Contemporary PNG Studies: DWU Research Journal*, 6, 53-62.
33. Levy, C. (2007b) HIV and AIDS awareness program in remote areas of PNG; evaluation of VSO PNG Tokaut AIDS impact in third year of activity. *Contemporary PNG Studies: DWU Research Journal*, 6, 29-44.
34. Maibani-Michie, G., Kavanamur, D., Jikian, M. & Siba, P. (2007) *Evaluation of the Poro Sapot Project: Intervention-linked baseline and post-intervention studies*. Goroka, PNG Institute of Medical Research.
35. Masta, A., Kokiva, V., Rooney, P., Abramova, I. & Panui, M. (2008) *Chemokine Receptor CCR5-Δ-32 in HIV Pathogenesis: Genetic analysis of the CCR5-Δ-32 deletion in the Papua New Guinea Population*. School of Medicine and Health Sciences. Port Moresby, University of Papua New Guinea.
36. Mehlotra, RK., Bockarie, MJ. & Zimmerman, PA. (2007) CYP2B6 983T>C polymorphism is prevalent in West Africa but absent in Papua New Guinea: Implications for HIV/AIDS treatment. *Br J Clin Pharmacol.*, 64(3), 391-395.

37. McCarthy, M. (2007) *Bikpela stap wantaim me (God is with me): Living with HIV/AIDS in Port Moresby, Papua New Guinea*. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
38. McPherson, N M. (2008) SikAIDS: Deconstructing the awareness campaign in rural West New Britain, Papua New Guinea. In: Butt, L. & Eves, R. *Making Sense of AIDS; Culture, Sexuality, and Power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): Page 225-245.
39. Millan J., Yeka, W., Obiero, W. & Pantumari, J. (2007) *HIV/AIDS Behavioural Surveillance Survey (BSS1) within high risk settings, Papua New Guinea- Draft*. Port Moresby, National AIDS Council Secretariat.
40. National Department of Education. (2007) *Primary teacher training HIV/AIDS and reproductive health baseline survey*. Port Moresby, National Department of Education.
41. NDOH. (2007a) *The 2007 STI, HIV and AIDS Annual Surveillance Report*. Port Moresby, National Department of Health.
42. NDOH. (2008b) *The 2008 STI, HIV and AIDS six monthly surveillance report: January-June, 2008*. Port Moresby, National Department of Health.
43. Pantumari, J. (2007) *Behavioural study among inmates of Bomana Prison*. National AIDS Council Secretariat. Conference Proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
44. PNG Institute of Medical Research. (2007a) *Knowledge of ABC prevention and transmission routes*. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
45. PNG Institute of Medical Research. (2007b) *The Impact of age on sexual debut and sexual violence on STI burden: Findings from ten sites*. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
46. Pomat, N., Tefurani, N., Kiromat, M., Amini, J., & Hwaihwanje, I., Iboro, J., Bussim, L., Pomat, K, Oswyn, G., Tanumei, J. & Pakule, C. (2007) *Assessment of HIV/AIDS knowledge, attitudes and behaviour of high school students in PNG*. Conference proceeding, National Research Agenda for HIV and AIDS, 2-4 October 2007, Port Moresby.
47. Pusahai-Riman, P., & Soepol N. (2008) A retrospective assessment of antibiotic susceptibility pattern of Neisseria gonorrhoeae and prevalence rate of gonorrhoea in Port Moresby General Hospital from 2005 to 2006. *Pac J Med Sciences*, 5, 90-97.
48. PSI. (2008) *Population Services International (PSI); Quarterly Report: January 2008*, Port Moresby, Population Services International.

49. Robert, I., Ravao, J., Paulus, F., Yangano, J. & Ogeasi, S. (2007) *Knowledge, attitudes and practices of high/secondary school students on HIV/AIDS in PNG*. University of Papua New Guinea. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
50. Rupali, P., Condon, R., Roberts, S., Wilkinson, L., Voss, L. & Thomas, MG. (2007) Prevention of mother to child transmission of HIV infection in Pacific countries. *Int Med J* 37, 216-223.
51. Ryan, CE., Gare, J., Crowe, SM., Wilson, K., Reeder, JC. & Oelrichs, RB. (2007) The heterosexual HIV type-1 epidemic in Papua New Guinea is dominated by subtype C. *AIDS Res Hum Retroviruses*, 23(7), 941-944.
52. SCiPNG. (2007a) *Barriers to accessing STI clinics and VCT services among youth in the Eastern Highlands Province in Papua New Guinea*. Goroka, Save the Children.
53. SCiPNG. (2007b) *Youth outreach project: Knowledge, Attitude and Practice survey among youth in the Eastern Highlands and Madang Provinces of Papua New Guinea*. Goroka, Save the Children.
54. Stewart, C. (2007) *The effect of the Law on Sex work and Male-Male Sex*. Conference proceeding, National Research Agenda workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
55. Tau, G. (2007) *Prevalence of HIV associated NCI and SSPN*. Port Moresby General Hospital. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
56. Temple, J. Ilaisa, S., Saweri, W. & Lloyd, A. (2007) *Assessment of dietary intake of people living with HIV AIDS attending Heduru Clinic: A 24 hour recall study*. School of Medicine and Health Sciences, University of Papua New Guinea. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
57. Thavung, G. (2007) *Evaluation of the Bethany VCT, Madang, Papua New Guinea*. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.
58. USAID, AusAID, USCDC, UNAIDS, FHI, WHO, Igat Hope, NACS, Clinton Foundation. (2007) *Continuum of prevention to care and treatment (CoPCT) Site assessment; Findings and Recommendations*. Bangkok, UNAIDS.
59. Wai, K. (2007) *A study of Christian churches response to HIV/AIDS epidemic in Papua New Guinea*. School of Medicine and Health Sciences, University of Papua New Guinea. Conference proceeding, National Research Agenda Workshop for HIV and AIDS, 2-4 October 2007, Port Moresby.



60. Wardlow, H. (2008) "You have to understand, some of us are glad AIDS has arrived;" Christianity and condoms among the Huli, Papua New Guinea. In: Butt L and Eves R. *Making sense of AIDS; culture, sexuality, and power in Melanesia*. 1<sup>st</sup> ed. Honolulu (Hawaii): 100-134.
61. Wardlow, H. (2007) Men's extramarital sexuality in rural Papua New Guinea. *Am J. Public Health* 97(6), 1006-1014.
62. Wilde, C. (2007) 'Turning sex into game': Gogodala men's response to AIDS epidemic and condom promotion in rural Papua New Guinea. *Oceania*, 77(1), 58-71.

## Excluded Studies

63. Allison, WE., Kiromat, M., Vince, J., Cunningham, P., & Kaldor, J. (2008) *Clinical features associated with HIV Infection in children at Port Moresby General Hospital-Interim analysis of a Prospective Study to ascertain predictors of HIV Infection*. Sydney, National Centre in HIV Epidemiology and Clinical Research.
64. AusAID. (2006) *Impacts of HIV/AIDS 2005-2025 in Papua New Guinea, Indonesia & East Timor: Synopsis report of the HIV epidemiological modeling and impact study*. AusAID, Canberra.
65. BAHA. (2007) *Private Sector HIV & AIDS Project; First Quarter Report*. Business Coalition against HIV and AIDS. Port Moresby.
66. Buchanan-Aruwafu, H. (2007) Youth vulnerability to HIV in the Pacific. In: Asian Development Bank, Editor. *Culture and Context Matters: Understanding and Preventing HIV in the Pacific*; 1<sup>st</sup> ed. Manila: 71-154.
67. Butcher, K. (2007) HIV mainstreaming in Papua New Guinea, and its role in supporting good governance. *Pacific Economic Bulletin*, 22(1), 158-164.
68. Clark, G., Chapman Y. & Mills J. (2008) HIV/AIDS education management: Meeting the challenge of Universal Access in Papua New Guinea. *Contemporary PNG Studies: DWU Research J*, (9), 98-113.
69. Daoni, E., Dakulala, P., Clark, G. & Mijch, A. (2006) Heduru Clinic Report January 2006. Port Moresby, National Department of Health.
70. Dudu, T., & Jones, R. (2006) *Student teacher's knowledge and attitude about HIV/AIDS*. Port Moresby, National Department of Education.
71. Dundon, A. & Wilde C. (2007) Introduction: HIV and AIDS in Rural Papua New Guinea. *Oceania*, 77, 1-11.

72. Duke, T. (2008) HIV in Papua New Guinea: the need for practical action, and a focus on human resources and health systems for women and children. *J Paediatr Child Health*, 44(11), 611-2.
73. Eves, R. (2003) AIDS and apocalypticism: Interpretations of the epidemic from Papua New Guinea. *Culture, Health and Sexuality* 5(3): 249-264.
74. FHI (2008) *Behaviour change communication capacity building and Community Based Care capacity building; Final Report*. Port Moresby, Family Health International.
75. Flemming, E. (2007) An analytical framework for assessing the impact of internalities on policy and projects using examples from PNG. *Impact Assessment and Project Appraisal*, 25(3), 199-207.
76. Gibbs, P. (2007) *Sex and Politics: HIV transmission during election times in Enga, PNG*. Port Moresby, National Research Institute.
77. Hammar, L. (2004) Editorial: Sexual health, sexual networking and AIDS in Papua New Guinea and West Papua. *PNG Med J*, 47 (1), 1-12.
78. Hammar, L. (2006) *"It's in every corner now" A nationwide study of HIV, AIDS, and STIs. Preliminary Report*. Goroka, Papua New Guinea Institute of Medical Research.
79. Hammar, L., (2007a) Epilogue: Homegrown in PNG - rural response to HIV and AIDS. *Oceania*, 77 (1), 72-94.
80. Hammar, L. (2007b) *Foreign objects and cognitive dissonance: the strange waters of anti-condom discourse* (Unpublished book manuscript).
81. Help Resources Inc. (2005) *A situational analysis of child sexual abuse & the commercial sexual exploitation of children in Papua New Guinea*. Port Moresby, Help Resource Inc.
82. Hughes, J. (2002) Sexually transmitted infections: a medical anthropological study from the Tari Research Unit 1990-1991. *PNG Med J*, 45(2), 128-133.
83. Humanity Foundation Inc. (2004) *NCD nightclub survey*. Project Report to Research Advisory Committee, Port Moresby, National AIDS Council Secretariat
84. IPPF & UNFPA. (2007) *Report Card: HIV Prevention for girls and young women, PNG Context*. London, International Planned Parenthood Federation.
85. Jenkins, C. (2007) HIV/AIDS, culture, and sexuality in PNG. In: Asian Development Bank, (eds), *Cultures and contexts matters: Understanding and preventing HIV in Pacific*; 1<sup>st</sup> ed. Manila, 5-69.
86. Jenkins, C. et al. (1996a) Urbanization, youth and sexuality: insight for an AIDS campaign for youth in PNG. *PNG Med J*, (39) 248-251.

87. Jenkins, C. (1996b) Final report to UNAIDS: Police and sex workers in Papua New Guinea. Goroka, Papua New Guinea Institute of Medical Research.
88. Jenkins, C. & National Sex and Reproduction Research Team. (1994) National study of sexual and reproductive knowledge and behaviour in Papua New Guinea. *Papua New Guinea Institute of Medical Research Monograph No 10*. Goroka: PNGIMR.
89. Katz, C., Bola, L., Bundu, F., Bunemiga, C., Gustafsson, B., Kaviani, N., McSmith, D., Pakure, R. & Raka, D. (2007) Putting the community at the center of measuring change in HIV prevention in Papua New Guinea: the Tingim Laip (Think of Life) Mobilisation. *Pac Health Dialog*. 14(2), 133-8.
90. Kelly, A., Toliman, P., Keleba, K., Emori, R. et al, (2007). *Response to "The HIV/AIDS crisis in Papua New Guinea"*. Retrieved 3 October 2007 from <http://www.news-medical.net/?id+2191>
91. King, E., Webster, T., Siba, P. & Pantumari, J. (2007) Medical interventions, social science, and resource-poor countries. *Lancet*, 1; 370 (9589), 739-40.
92. Kiromat, M. (2005) Assessment of HIV/AIDS knowledge, attitude and behaviour of high school students in PNG. Project Report to Research Advisory Committee, Port Moresby, National AIDS Council Secretariat
93. Lavu, E. (2004) Total lymphocyte count in adults HIV/AIDS patients in PMGH. *PNG Med J*, 47 (12) 31-38.
94. Lemeki, M. (1996) An ethnographic study of community STDs in the Eastern Highlands. *PNG Med J*, 39, 239-242.
95. Lepani, K., (2008b) Mobility, violence and the gendering of HIV in Papua New Guinea. *The Australian J Anthropology*, 19 (2), 150-164.
96. Lepani, K. (2006) *Voicing the unspeakable: How to articulate the realities of violence in HIV awareness and prevention*. Conference proceeding, PNG Forum on Reproductive Health and HIV/AIDS, 13 October 2006, Canberra.
97. Lewis, I. (2008) Violence against women in Papua New Guinea. *J Family Studies*, 14, 183-197.
98. Luker, V. (2002) "Gender, women and mothers: HIV/AIDS in the Pacific." *State, Society and Governance in Melanesia Project, Working Paper 7*, Canberra: Australian National University.
99. Luker, V. (2004) "Civil society, social capital and the churches: HIV/AIDS in Papua New Guinea." *State, Society and Governance in Melanesian Project, Working Paper 2004/1*. Canberra: Australian National University

100. Luker, V. (2005) Sexworkers and police in Port Moresby, Papua New Guinea (1994-1995): Research and intervention. In: Luker, V., Dinnen, S. & Patience A. (eds). *Law, order and HIV/AIDS in Papua New Guinea*. Canberra, Australian National University Press.
101. Maibani, G. & Yeka, W. (2005) *Baseline research for Poro Sapot Project. A project for prevention of HIV/AIDS among MSMs and FSWs in Goroka and Port Moresby, Papua New Guinea*. Goroka. PNG Institute of Medical Research.
102. Macintyre, M. (2008) Responding to gender violence in Papua New Guinea. *Anthropological News*, 28-30.
103. McManus, M. (2008) Domestic and sexual violence: Youth and media reporting in Papua New Guinea. *Contemporary PNG Studies: Research Journal*, (5), 219-234.
104. Mgone, CS., Lupiwa, T. & Yeka, W. (2002a) High prevalence of Neisseria gonorrhoeae and multiple sexually transmitted diseases among rural women in the Eastern Highlands of Papua New Guinea, detected by polymerase chain reaction. *Sex Trans Dis*, 775-779.
105. Mgone, CS., Passey, ME., Anang, J., Peter, W., Lupiwa, T., Russel, MD., Babona, D. & Alpers, MP. (2002b) Human Immunodeficiency Virus and other sexually transmitted Infections among female sex workers in two major cities in Papua New Guinea. *Sex Trans Inf* 29 (5), 265-270.
106. Mola, G. (2007) Transmission of HIV from parent to child in Papua New Guinea. *P N G Med J*. 50(3-4), 109-10.
107. NACS. (2005) *NHASP Gender Impact Report*. Port Moresby, National HIV AIDS Support Project.
108. NDOH (2007b) *Minimum standards for STI service delivery in Papua New Guinea*. Port Moresby, National Department of Health.
109. NDOH. (2007c) *Report on ART roll out site readiness visits*. Port Moresby, National Department of Health.
110. NDOH. (2007d) *HIV Estimation Report 2007*, Port Moresby, National Department of Department of Health.
111. NDOH. (2008b) *PNG National HIV, AIDS and STI Surveillance Plan 2007-2010*. Port Moresby, National Department of Health.
112. NDOH. (2008c) *Standard Treatment Manual for HIV and AIDS*. Port Moresby, National Department of Health.
113. NHASP. (2005a) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Igam Military Barracks, Morobe Province*. Port Moresby, National AIDS Council Secretariat.

114. NHASP. (2005b) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Lombrum Naval Base, Manus Province*. Port Moresby, National AIDS Council Secretariat.
115. NHASP. (2005c) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Umi Market, Markham Valley, Morobe Province*. Port Moresby, National AIDS Council Secretariat.
116. NHASP. (2005d) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Wahgi Valley Transport, Western Highlands Province*. Port Moresby, National AIDS Council Secretariat.
117. NHASP. (2005e) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Yang Creek Market, Morobe Province*. Port Moresby, National AIDS Council Secretariat.
118. NHASP. (2005f) *National HIV/AIDS Support Project NHASP High Risk Setting Strategy Project: KAPB Study of Kaiwe Market, Western Highlands Province*. Port Moresby, National AIDS Council Secretariat.
119. NHASP. (2005g) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of KK Paradise, Mt Hagen, Western Highlands Province*. Port Moresby, National AIDS Council Secretariat.
120. NHASP. (2005h) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Minj Market, Hagen Central District, Western Highland Province*. Port Moresby, National AIDS Council Secretariat.
121. NHASP. (2005i) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Red Scar, Madang, Madang Province*. Port Moresby, National AIDS Council Secretariat.
122. NHASP. (2005j) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Goroka Market and Bus Stop in Town, Eastern Province*. Port Moresby, National AIDS Council Secretariat.
123. NHASP. (2005k) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Old Airport in Lae, Morobe Province*. Port Moresby, National AIDS Council Secretariat.
124. NHASP. (2005l) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Higaturu Oil Palm Ltd (HOPI), Oro Province*. Port Moresby, National AIDS Council Secretariat.
125. NHASP. (2005m) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Ramu Sugar Ltd, Morobe Province*. Port Moresby, National AIDS Council Secretariat.

126. NHASP. (2005n) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of PPIC Oil Palm Plantation, Oro Province*. Port Moresby, National AIDS Council Secretariat.
127. NHASP. (2005o) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of OK Tedi, Tabubil, Western Province*. Port Moresby, National AIDS Council Secretariat.
128. NHASP. (2005p) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of New Britain Oil Palm, West New Britain*. Port Moresby, National AIDS Council Secretariat.
129. NHASP. (2005q) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Milne Bay Oil Palm Industry, Milne Bay Province*. Port Moresby, National AIDS Council Secretariat.
130. NHASP. (2005r) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Lae Main Wharf, Lae, Morobe Province*. Port Moresby, National AIDS Council Secretariat.
131. NHASP. (2005s) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Kiunga Wharf and surroundings, Western Province*. Port Moresby, National AIDS Council Secretariat.
132. NHASP. (2005t) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Kainantu Gold Mine, Madang, Province*. Port Moresby, National AIDS Council Secretariat.
133. NHASP. (2005u) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of RD Tuna Fishing, Madang, Madang Province*. Port Moresby, National AIDS Council Secretariat.
134. NHASP. (2005v) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Players Music Lounge, National Capital District, Central Province*. Port Moresby, National AIDS Council Secretariat.
135. NHASP. (2005w) *National HIV/AIDS Support Project High Risk Setting Strategy Project: KAPB Study of Napanapa, Motu Kea, Central Province*, National AIDS Council Secretariat.
136. NHASP. (2005x) *National HIV/AIDS Support Project High Risk Setting Strategy Project: Lihir Gold Mine Ltd, New Ireland Province*, National AIDS Council Secretariat.
137. NRI. (2004) *Evaluation of the impact and effectiveness of the PNG HIV/AIDS awareness programs in selected secondary schools in the National Capital Province*. Port Moresby, National Research Institute.

138. Passey, ME., Mgone, CM., Lupiwa, S., Suve, N., Tiwara, S., Lupiwa, T., Clegg, A., & Alpers, MP. (1996) High prevalence of *Trichomonas vaginalis* and *Chlamydia trachomatis* in Highlands of Papua New Guinea. *PNG Med J* 1996; 39: 234-238.
139. Passey, ME., Mgone, CS., Lupiwa, S., Suve, N., Tiwara, S., Lupiwa, T., Clegg, A. & Alpers, MP. (1998) Community based study on sexually transmitted diseases in rural women in the Highlands of Papua New Guinea: prevalence and risk factors. *Sex Transm Inf* 74, 120-127.
140. Reid, E. (2008) Interrogating a Statistic: The HIV prevalence rate in PNG. *Statistic Leadership Seminar Australia Bureau of Statistics*, 1-19 March 2008, Canberra.
141. Sai, A. (2007) *TAMOT: Masculinities in transitions in Papua New Guinea*. PhD thesis. Victoria University, Melbourne.
142. Seeley, J. & Butcher, K. (2006) 'Mainstreaming' HIV in Papua New Guinea: putting gender equity first. *Gender & Development* 14 (1), 104-114.
143. Seeley, J. & Butcher, K. (2005) *Vulnerability, HIV and gender in agriculture and rural development in Papua New Guinea*. Norwich, School of Development Studies, University of East Anglia.
144. Shulman, J. (2007) Lost: AIDS Stigma washes up on Papua New Guinea. *POZ*, 139:10
145. Stewart, C. (2008) Men Behave Badly; Sodomy Cases in the Colonial Courts of Papua New Guinea. *J Pacific History* 43 (1), 77-93.
146. Suligoi, B., Danaya, RT., Sarmati, L., Owen, L., Boros, S., Pozio, E., Andreoni, M. & Rezza, G. (2005) Infection with Human Immunodeficiency virus, herpes simplex virus type 2, and human herpes virus 8 in remote villages of South Western Papua New Guinea. *Am J Trop Med Hyg* 72(1), 33-36.
147. Temple, JV. (2008) Adherence to Highly Active Anti-Retroviral Therapy (HAART): Is nutrition an issue? *Pac J Med Sci* 5 (2072-1625), 65-89.
148. Tobias, MD. (2007) The HIV/AIDS Crisis in Papua New Guinea. *Centre for Independence Studies. Issue Analysis*, 81, 1-19.
149. UNAIDS. (2000) *Female sex workers HIV prevention projects. Lessons Learnt from Papua New Guinea, India and Bangladesh*. Geneva, UNAIDS.
150. UNAIDS. (2007a) *Country Situation Analysis*, Bangkok, UNAIDS.
151. UNAIDS. (2007b) Papua New Guinea AIDS crisis may mirror Africa's, UN says. *AIDS Reader* 17(11), 534.
152. UNAIDS. (2007c) *PNG UNGASS Report 2007*. Port Moresby, UNAIDS.

153. UNICEF. (2006) *Pacific: Children and HIV/AIDS; a call to action*. Bangkok, UNICEF East Asia and Pacific Regional Office.
154. UNICEF, UNESCAP & ECPAT. (2006) *Child sexual abuse and commercial sexual exploitation of children in the Pacific: A regional report*. Suva, UNICEF Pacific.
155. Vaughan, C. (2007) *Tok Piksa Project: Young Peoples photography exhibition and sharing workshop*. Project Report to NACS Activities Grant Committee, Port Moresby, National AIDS Council Secretariat
156. Wardlow, H. (2002) Giving birth to Gonolia: "Culture" and sexually transmitted disease among the Huli of Papua New Guinea. *Medical Anthropology Quarterly*, 16 (2) 151-175.
157. Wardlow, H. (2002) Passenger women: Changing gender relationships in the Tari Basin. *PNG Medical J* 45 (1-2), 142-146.
158. Wardlow, H. (2006) *Wayward women: Sexuality and agency in a New Guinea society*. In: *Berkeley*. California, University of California Press.
159. Wilde, C. (2005) Condom use in rural PNG: Awareness, access and acceptance among men in the Middle-Fly of Western Province. Port Moresby, National AIDS Council (NAC).
160. Worth, H. & Henderson, K. (2006) AIDS is a tear in the social fabric of Papua New Guinea: HIV and its impact, 2005-2025. *Health Sociology Review*, 15 (3): 293-304.



# APPENDIX 1

## INCLUSION FLOW-CHART

### (SCREENING TOOL)

Study ID # \_\_\_\_\_

↓  
**Is the study clearly outside the scope of the review?** If yes, exclude immediately.

#### Type of study

1. Is the study grey literature (book or policy report), a peer reviewed article, unpublished article or program evaluation?

Yes	Unclear	No
↓	↓	↓
Go to question 2		<b>Exclude</b>

2. Is the study a RCT, cohort, case-control, cross-sectional, descriptive study/ethnographic or expert opinion/ policy document?

Yes	Unclear	No
↓	↓	↓
Go to question 3		<b>Exclude</b>

3. Did the study take place in 2007 or 2008?

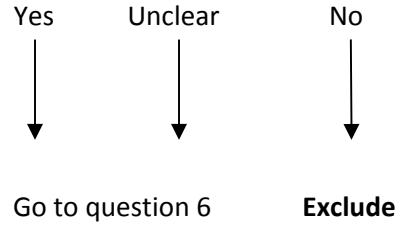
Yes	Unclear	No
↓	↓	↓
Go to question 5		<b>Go to question 4</b>

4. Was the study report published or released in 2007 or 2008?

Yes	Unclear	No
↓	↓	↓
Go to question 5		<b>Exclude</b>

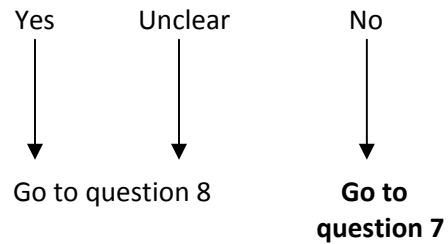
**Participants in the study**

5. Are the participants in the study Papua New Guineans living in the country, residents of Papua New Guinea or visiting the country during the time of the study?

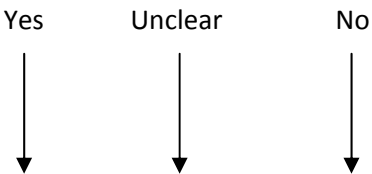


**Outcomes**

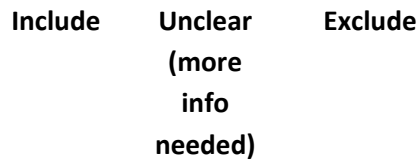
6. Was the purpose of the study to evaluate interventions or measure outcomes specific to HIV, AIDS, STIs or STDs?



7. What the purpose of the study to describe or investigate issues related to HIV, AIDS, STIs or STDs?



**8. Final decision for the study (Circle)**



Any Comments:

**APPENDIX 2**  
**DATA EXTRACTION FORM**

Page #

Study ID
----------

\_\_\_\_\_

Study citation (including title, authors, date)
Study location and setting

\_\_\_\_\_

Date of study and duration of study
-------------------------------------

\_\_\_\_\_

Sample size
-------------

\_\_\_\_\_

Study Design

Methods used

Study Eligibility Criteria:

Study Population:

Interventions:

Outcome:

Method of allocation (if applicable – for intervention studies only)

Method of Participant Selection

Type & characteristics of intervention (if applicable)

Outcome measures

If this was a before and after study - what was the measure at baseline and after the intervention?

Who carried out the measurement, was a tool/questionnaire used, if so how, was the tool validated?

What data collection methods were used (focus groups, observation, in-depth interviews)?

What were the key findings from the study?

Potential confounding factors?

Were confounding factors controlled for in data analysis?

Key findings

Generalisability of Results (what can be taken from the results in terms of generalizing to specific geographic or relevant groups)?

Limitations of the study

Notes

## APPENDIX 3

### QUALITY APPRAISAL TOOL FOR DESCRIPTIVE STUDIES

(Cross-sectional descriptive, ethnographic accounts, case studies)

Study ID \_\_\_\_\_

	Appraisal Questions	Quality Indicators	Level of Quality (Weak, Moderate, Strong, Unsure)	Notes
<b>DESIGN</b>	<b>How defensible is the research design?</b>	<ul style="list-style-type: none"> <li>-Discussion of how overall research strategy was designed to meet aims of study</li> <li>-Discussion of rationale for study design</li> <li>-Convincing argument for different features of research design</li> <li>-Use of different features of design/data sources evident in findings presented</li> <li>-Discussion of limitations of research design and their implications for the study evidence</li> </ul>		
<b>SAMPLE</b>	<b>How well defended is the sample design/target selection of cases/documents?</b>	<ul style="list-style-type: none"> <li>-Description of study locations/areas and how and why chosen</li> <li>-Description of population of interest and how sample selection relates</li> <li>-Rationale for basis of selection of target sample/settings/documents</li> <li>-Discussion of how sample/selections allowed required comparisons to be made</li> </ul>		
	<b>Sample composition/case inclusion – how well is the eventual coverage described?</b>	<ul style="list-style-type: none"> <li>-Detailed profile of achieved sample/case coverage maximising inclusion (<i>e.g. language matching or translation</i>)</li> <li>-Discussion of any missing coverage in achieved samples/cases and implications for study evidence (<i>e.g. through comparison of target and achieved samples, comparison with population etc.</i>)</li> <li>-Documentation of reasons for non-participation among sample approached/non-inclusion of selected cases/documents</li> <li>-Discussion of access and methods of approach and how these might have affected participation/coverage</li> </ul>		

<b>DATA COLLECTION</b>	<b>How well was the data collection carried out?</b>	<p>-Discussion of:</p> <ul style="list-style-type: none"> <li>• who conducted data collection</li> <li>• procedures/documents used for collection/recording</li> <li>• checks on origin/status/authorship of documents</li> </ul> <p>-Audio or video recording of interviews/discussions/conversations (if not recorded, were justifiable reasons given?)</p> <p>-Description of conventions for taking fieldnotes (e.g. to identify what form of observations were required/to distinguish description from researcher commentary/analysis)</p> <p>-Discussion of how fieldwork methods or settings may have influenced data collected</p> <p>-Demonstration, through portrayal and use of data, that depth, detail and richness were achieved in collection</p>		
<b>ANALYSIS</b>	<b>How well has the approach to, and formulation of, the analysis been conveyed?</b>	<p>-Description of form of original data (e.g. use of verbatim transcripts, observation or interview notes, documents, etc.)</p> <p>-Clear rationale for choice of data management method/tool/package</p> <p>-Evidence of how descriptive analytic categories, classes, labels etc. have been generated and used (i.e. either through explicit discussion or portrayal in the commentary)</p> <p>-Discussion, with examples, of how any constructed analytic concepts/typologies etc. have been devised and applied</p>		
	<b>Contexts of data sources – how well are they retained and portrayed?</b>	<p>-Description of background or historical developments and social/organizational characteristics of study sites or settings</p> <p>-Participants' perspectives/observations placed in personal context (e.g. use of case studies/vignettes/individual profiles, textual extracts annotated with details of contributors)</p> <p>-Explanation of origins/history of written documents</p> <p>-Use of data management methods that preserve context (i.e. facilitate within case description and analysis)</p>		
	<b>How well has diversity of perspective and content been explored?</b>	<p>-Discussion of contribution of sample design/case selection in generating diversity</p> <p>-Description and illumination of diversity/multiple perspectives/alternative positions in the evidence displayed</p> <p>-Evidence of attention to negative cases, outliers or exceptions</p> <p>-Typologies/models of variation derived and discussed</p> <p>-Examination of origins/influences on opposing or differing positions</p> <p>-Identification of patterns of association/linkages with divergent positions/groups</p>		
	<b>How well has detail, depth and complexity (i.e. richness) of the data been conveyed?</b>	<p>-Use and exploration of contributors' terms, concepts and meanings</p> <p>-Unpacking and portrayal of nuance/subtlety/intricacy within data</p> <p>-Discussion of explicit and implicit explanations</p> <p>-Detection of underlying factors/influences</p> <p>-Identification and discussion of patterns of association/conceptual linkages within data</p> <p>-Presentation of illuminating textual extracts/observations</p>		



**FINDINGS**

	<p><b>How credible are the findings?</b></p>	<ul style="list-style-type: none"> <li>-Findings/conclusions are supported by data/study evidence (<i>i.e. the reader can see how the researcher arrived at his/her conclusions; the 'building blocks' of analysis and interpretation are evident</i>)</li> <li>-Findings/conclusions 'make sense'/have a coherent logic</li> <li>-Findings/conclusions are resonant with other knowledge and experience (<i>this might include peer or member review</i>)</li> <li>-Use of corroborating evidence to support or refine findings (<i>i.e. other data sources have been used to examine phenomena; other research evidence has been evaluated</i>)</li> </ul>		
	<p><b>How has knowledge/ understanding been extended by the research?</b></p>	<ul style="list-style-type: none"> <li>-Literature review (where appropriate) summarising knowledge to date/key issues raised by previous research</li> <li>-Aims and design of study set in the context of existing knowledge/ understanding; identifies new areas for investigation (<i>for example, in relation to policy/practice/substantive theory</i>)</li> <li>-Credible/clear discussion of how findings have contributed to knowledge and understanding (<i>e.g. of the policy, programme or theory being reviewed</i>), might be applied to new policy developments, practice or theory</li> <li>-Findings presented or conceptualised in a way that offers new insights/alternative ways of thinking</li> <li>-Discussion of limitations of evidence and what remains unknown/unclear or what further information/research is needed</li> </ul>		
	<p><b>How well does the evaluation address its original aims and purpose?</b></p>	<ul style="list-style-type: none"> <li>-Clear statement of study aims and objectives; reasons for any changes in objectives</li> <li>-Findings clearly linked to the purposes of the study – and to the initiative or policy being studied</li> <li>-Summary or conclusions directed towards aims of study</li> <li>-Discussion of limitations of study in meeting aims</li> </ul>		
	<p><b>Scope for drawing wider inference – how well is this explained?</b></p>	<ul style="list-style-type: none"> <li>-Discussion of what can be generalised to wider population from which sample is drawn/case selection has been made</li> <li>-Detailed description of the contexts in which the study was conducted to allow applicability to other settings/contextual generalities to be assessed</li> <li>-Discussion of how hypotheses/ propositions/findings may relate to wider theory; consideration of rival explanations</li> <li>-Evidence supplied to support claims for wider inference (<i>either from study or from corroborating sources</i>)</li> <li>-Discussion of limitations on drawing wider inference (<i>e.g. re-examination of sample and any missing constituencies: analysis of restrictions of study settings for drawing wider inference</i>)</li> </ul>		
	<p><b>How clear is the basis of evaluative appraisal?</b></p>	<ul style="list-style-type: none"> <li>-Discussion of how assessments of effectiveness/evaluative judgments have been reached (<i>i.e. whose judgments are they and on what basis have they been reached?</i>)</li> <li>-Description of any formalized appraisal criteria used, when generated and how and by whom they have been applied</li> <li>-Discussion of the nature and source of any divergence in evaluative appraisals</li> </ul>		

		-Discussion of any unintended consequences of intervention, their impact and why they arose		
<b>REPORTING</b>	<b>How clear are the links between data, interpretation and conclusions – i.e. how well can the route to any conclusions be seen?</b>	-Clear conceptual links between analytic commentary and presentations of original data ( <i>i.e. commentary and cited data relate; there is an analytic context to cited data, not simply repeated description</i> ) -Discussion of how/why particular interpretation/significance is assigned to specific aspects of data – with illustrative extracts of original data -Discussion of how explanations/theories/conclusions were derived – and how they relate to interpretations and content of original data ( <i>i.e. how warranted</i> ); whether alternative explanations explored -Display of negative cases and how they lie outside main proposition/theory/hypothesis etc.; or how proposition etc. revised to include them		
	<b>How clear and coherent is the reporting?</b>	-Demonstrates link to aims of study/research questions -Provides a narrative/story or clearly constructed thematic account -Has structure and signposting that usefully guide reader through the commentary -Provides accessible information for intended target audience(s) -Key messages highlighted or summarised		
<b>REFLEXIVITY AND NEUTRALITY</b>	<b>How clear are the assumptions/theoretical perspectives/values that have shaped the form and output of the study?</b>	-Discussion/evidence of the main assumptions/hypotheses/theoretical ideas on which the evaluation was based and how these affected the form, coverage or output of the evaluation -Discussion/evidence of the ideological perspectives/values/philosophies of research team and their impact on the methodological or substantive content of the evaluation ( <i>again, may not be explicitly stated</i> ) -Evidence of openness to new/alternative ways of viewing subject/theories/ assumptions ( <i>e.g. discussion of learning/concepts/ constructions that have emerged from the data; refinement restatement of hypotheses/theories in light of emergent findings; evidence that alternative claims have been examined</i> ) -Discussion of how error or bias may have arisen in design/data collection/analysis and how addressed, if at all -Reflections on the impact of the researcher on the research process		
<b>OVERALL QUALITY LEVEL:</b>				

## APPENDIX 4

### QUALITY APPRAISAL TOOL FOR OBSERVATIONAL ANALYTICAL STUDIES

(Case-control studies, cross-sectional analytical studies)

Study ID \_\_\_\_\_

	Appraisal Questions	Quality Indicators	Level of Quality (Weak, Moderate, Strong, Unsure)	Notes
<b>DESIGN</b>	How defensible is the research design?	<p><b>Case control studies:</b></p> <ul style="list-style-type: none"> <li>-Clear description of criteria for cases and controls</li> <li>-Comparability: Cases and controls comparable on the basis of design or analysis</li> <li>-Exposure: Verification and ascertainment of exposure (hospital records, self-reported)</li> <li>-Exposure: Same method of ascertainment for both cases and controls</li> <li>-Exposure: Same/comparable refusal in both groups</li> </ul> <p><b>Cross sectional analytical studies</b></p> <p>Clear description of methods used and justification of use</p>		
<b>SAMPLE</b>	Was the sample selected based on the aims and expected outcomes of the study (participation selection, sample size, generalisability)?	<p><b>Case control studies:</b></p> <ul style="list-style-type: none"> <li>-Adequate case definition (e.g with independent validation)</li> <li>-Cases were consecutive/obvious representation of the series of cases</li> <li>-Selection of controls representative of the general population/community</li> <li>-Sample size allowed for validity of findings and for power of analytical tests</li> </ul> <p><b>Cross-sectional analytical studies:</b></p> <ul style="list-style-type: none"> <li>-Methods supported the selection of a representative sample from the study population/community (randomization, participation criteria)</li> <li>-Efforts were made to include 'hidden populations'</li> <li>-Sample size allowed for validity of findings and for statistical power of analytical tests</li> </ul>		

<b>DATA COLLECTION</b>	How well was the data collection carried out?	<b>Case control and cross-sectional analytical studies:</b> -Measurement bias: Use of validated and piloted data collection tool -Information bias: Discussion of: <ul style="list-style-type: none"> <li>• who conducted data collection</li> <li>• procedures/documents used for collection/recording</li> <li>• checks on origin/status/authorship of documents</li> </ul>		
	Were rigorous data analysis tools and methods used?	<b>Case control and cross-sectional analytical studies:</b> -Data analysis software or methods are described and rationalised -Statistical tests used to determine outcome -Evidence of statistical power to detect effect -Confounding factors were controlled for		
<b>FINDINGS</b>	How credible were the findings?	<b>Case control and cross-sectional analytical studies:</b> -Findings/conclusions are supported by data/study evidence -Findings confirmed by study participants or community? -Outcomes are measured and described for both cases and controls (case control studies only)		
	How has knowledge/ understanding been extended by the research?	<b>Case control and cross-sectional analytical studies:</b> -Literature review summarising knowledge to date/key issues raised by previous research -Credible/clear discussion of how findings have contributed to knowledge and understanding ( <i>e.g. of the policy, programme or theory being reviewed</i> ); might be applied to new policy developments, practice or theory -Discussion of limitations of evidence and what remains unknown/unclear or what further information/research is needed		
	How well does the evaluation address its original aims and purpose?	<b>Case control and cross-sectional analytical studies:</b> -Clear statement of study aims and objectives; reasons for any changes in objectives -Findings clearly linked to the purposes of the study – and to the initiative or policy being studied -Summary or conclusions directed towards aims of study -Discussion of limitations of study in meeting aims ( <i>e.g. are there limitations because of restricted access to study settings or participants; incomplete analysis; time constraints?</i> )		

	<p><b>Scope for drawing wider inference – how well is this explained?</b></p>	<p><b>Case control and cross-sectional analytical studies:</b></p> <ul style="list-style-type: none"> <li>-Discussion of what can be generalised to wider population from which sample is drawn/case selection has been made</li> <li>-Detailed description of the contexts in which the study was conducted to allow applicability to other settings/contextual generalities to be assessed</li> <li>-Evidence supplied to support claims for wider inference (<i>either from study or from corroborating sources</i>)</li> <li>-Discussion of limitations on drawing wider inference (<i>e.g. re-examination of sample and any missing constituencies: analysis of restrictions of study settings for drawing wider inference</i>)</li> </ul>		
<b>REPORTING</b>	<p><b>How clear are the links between data, interpretation and conclusions – i.e. how well can the route to any conclusions be seen?</b></p>	<p><b>Case control and cross-sectional analytical studies:</b></p> <ul style="list-style-type: none"> <li>-Discussion of negative cases and possible explanations</li> <li>-Discussion of how conclusions were derived – and how they relate to interpretations and content of original data</li> </ul>		
	<p><b>How clear and coherent is the reporting?</b></p>	<p><b>Case control and cross-sectional analytical studies:</b></p> <ul style="list-style-type: none"> <li>-Demonstration of link to aims of study/research questions</li> <li>Information is accessible for intended target audience(s)</li> <li>-Key messages highlighted or summarized</li> </ul>		
<p><b>OVERALL QUALITY LEVEL:</b></p>				

## APPENDIX 5

### QUALITY APPRAISAL TOOL FOR INTERVENTION STUDIES

Study ID \_\_\_\_\_

	Appraisal Questions	Quality Indicators	Level of Quality (Weak, Moderate, Strong, Unsure)	Notes
<b>Validity</b>	How well was validity of the study assured?	<p><b>External validity</b></p> <p>Use of census, consecutive or randomized sampling</p> <p>A minimum of 80% of eligible participants recruited</p> <p>Participant exposure to the interventions was confirmed and frequency/degree of exposure measured</p>		
<b>Bias</b>	How well were potential biases identified and minimized?	<p><b>Measurement bias</b></p> <p>Data collection tool was validated and piloted</p> <p>Participants, researchers/ statistician were blinded</p> <p><b>Attrition bias</b></p> <p>Characteristics of participants lost to follow-up described</p> <p>Loss to follow was less than 20%</p> <p><b>Selection bias</b></p> <p>Inclusion criteria described and justified</p> <p>Efforts to include 'hidden populations' described</p> <p>Participants and researcher/assessor blinded</p>		
<b>Confounding factors</b>	Were potential confounding factors controlled for in data analysis?	<p><b>Demographic factors</b></p> <p>Data on age, sex, education level/occupation, and marital status collected and controlled for in statistical analysis</p> <p><b>Context-specific factors</b></p> <p>Data such as geographical location, religious affiliation and membership to particular groups/communities collected and controlled for where applicable</p>		
<b>OVERALL QUALITY LEVEL:</b>				

## APPENDIX 6

### NUMBER OF STUDIES CONDUCTED IN PROVINCES AND TOWN

<b>Number of Studies Conducted in Provinces and Towns</b>		
<b>Province</b>	<b>Number of studies conducted</b>	<b>City or town reported</b>
National Capital	33	Port Moresby (31)
Morobe	16	Lae (15) Ramu (2)
Eastern Highlands	14	Goroka (13) Kainantu (6)
Western Highlands	13	Mt Hagen (13) Banz (3) Kainambi (3) Minz (1)
Madang	12	Madang (8) Teptep (3) Saidor(2) Malalamai (2)
Southern Highlands	11	Tari (4) Moro (4) Kopiago (2) Nipa (1)
Western	10	Daru (4) Balimo (2) Kiunga (1) Tabubil (4)
East Sepik	9	Wewak (7) Maprik (1)
Gulf	7	Kerema (1) Kikori (3)
Milne Bay	6	Alatau (2) Losuia (2)
East New Britain	6	Kokopo (4)
Enga	5	Wabag (2) Porgera (2)
West Sepik	5	Vanimo (3)
Central	4	No data provided
Oro	4	Popondetta (1) Higaturu (1)
New Ireland	4	Kavieng (1) Lihir (1)
Chimbu	3	Kundiawa (1)
West New Britain	3	Kimbe (1)
Manus	3	Lorengau (1)
Autonomous Region of Bougainville	0	

## APPENDIX 6

### STUDY DESCRIPTIONS

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Allison, W.	Attitudes to HIV testing among carers of children admitted to Port Moresby General Hospital, Papua New Guinea	2008	Urban	National Capital Province	Port Moresby	n=40	M=0, F=40	Convenience Sampling	16+ years	Cross-sectional (analytical)	Semi structured interviews
Allison, W.	Factors associated with selection for HIV testing and HIV positive serostatus in children admitted to Port Moresby General Hospital (PMGH), Papua New Guinea	2008	Urban	National Capital Province	Port Moresby	n=215	Not reported	Purposive selection	0-18 years	Case control	Patient record review and analysis
Anglicare Stop AIDS	Lessons Learned: Anglicare StopAIDS Data Analysis 2007	2007	Urban	National Capital Province	Port Moresby	n=2019	F=750, M=1269,	Convenience Sampling	15-60 years	Cross-sectional (analytical)	Blood sampling, observation, demographic data collection
Baldwin, S.	Alcohol, homebrew, betel and cannabis: The impact of drug use in PNG	2007	Urban	National Capital Province, Western Highlands, East Sepik	Port Moresby, Mt Hagen, Wewak	n=615	M=355, F=255, 5=Not reported	Convenience Sampling	12 years and older	Cross-sectional (analytical)	Focus group discussions and self administered questionnaire
Beer, B.	Buying betel and selling sex: Contested boundaries, risk milieus and discourses about HIV/AIDS in the Markham Valley, Papua New Guinea	2008	Rural	Morobe Province	Lae	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions, observations, ethnographic accounts
Benton, KW.	Saints and sinners: Training Papua New Guinean (PNG) Christian clergy to respond to HIV and AIDS using a model of care	2008	Urban	National Capital District, Madang Province	Port Moresby, Madang	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	Participatory methods were used via group exercises and discussions
Conolly, L.	Stretpela toktok bilong sikAIDS: Perception of HIV/AIDS in a Papua New Guinean school community	2008	Urban	National Capital Province	Port Moresby	n=98	Not reported	Convenience Sampling	Not reported	Case study	Focus group discussions and self administered questionnaire
Curry, C	HIV antibody sero-prevalence in the emergency department at Port Moresby General Hospital, Papua New Guinea	2008	Urban	National Capital Province	Port Moresby	n=54	F=25, M=22. Not reported=7	Convenience sampling	10-69 years	Cross-sectional (analytical)	Blood sampling during medical investigation



First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
David, D.	Evaluation of schools health promotion HIV/AIDS in Manus Province; Papua New Guinea; Is it effective?	2008	Rural and urban	Manus Province	Lorengau	n=259	M=124, F=135	Convenience Sampling	13-24 years	Cross-sectional (analytical)	Semi-structured interviews
Duffy, RM.	Report on domestic violence comparing data across four provinces in PNG	2007	Urban	Western, Western Highlands, Morobe and National Capital Province	Daru, Port Moresby, Mt Hagen, Lae,	n=415	M = 0, F= 415	Convenience Sampling	Not reported	Cross-sectional (descriptive)	Semi-structured interviews
Durdon, A.	Warrior women, the Holy Spirit and HIV/AIDS in rural Papua New Guinea	2007	Rural	Western Province	Balimo	Not reported	Not reported	Convenience Sampling	Not reported	Cross-sectional (descriptive)	Key informant interview, observation
Eves, R.	Moral reforms and miraculous cures: Christian healing and AIDS in New Ireland, Papua New Guinea	2008	Rural	New Ireland Province	Kavieng	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions, observations, ethnographic accounts
Gibbs, P.	Elections and HIV and AIDS in Enga	2008	Rural	Enga Province	Wabag	n=96	M=10, F =10, 46 youth = Not reported	Convenience Sampling	Not reported	Cross-sectional (descriptive )	In-depth interviews and observations
Grellier, R	The potential impact of HIV and AIDS on agricultural systems and nutrition in Papua New Guinea	2008	Rural and urban	Morobe, Milne Bay, West Sepik, Eastern Highlands Provinces	Lae, Alatau, Vanimo, Goroka	Not reported	Not reported	Convenience Sampling	Not reported	Cross-sectional (descriptive)	In-depth interviews
Habon C	Evaluation of HIV/AIDS knowledge and attitude of top-up primary to secondary students in Nipa District, Southern Highlands Province.	2007	Rural	Southern Highlands Province	Nipa	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	Semi-structured interviews
Haley, N	HIV/AIDS and witchcraft: A tale from Lake Kopiago	2008	Rural Remote	Southern Highlands Province	Kopiago	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews
Haley, N	When there's no accessing basic health care: Local politics and responses to HIV/AIDS at Lake Kopiago, Papua New Guinea	2008	Rural remote	Southern Highlands Province	Kopiago	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions and observations

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Hammar, L	Fear and loathing in Papua New Guinea: Sexual health in a nation under siege	2008	Rural and urban	Western Highlands Province, National Capital Province, Gulf, Southern Highlands, Eastern Highlands	Kikori, Tari, Moro, Daru, Pimaga, Banz, Lae,	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	Body-mapping illustrations, observation, key informant interviews
Hayes G	The demographic impact of the HIV/AIDS epidemic in Papua New Guinea, 1990-2030	2007	Rural and urban	Not reported	Not reported	Not applicable	Not applicable	Convenience Sampling	Not reported	Cross-sectional (descriptive)	Demographic and surveillance data analysis
Hermkens, AK.	The power of Mary in Papua New Guinea	2007	Urban	Madang Province, National Capital (Research conducted in Bougainville not HIV related)	Madang, Port Moresby.	n=43	M=0, F=43	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews
Humanity Foundation Inc.	Street kids survey: National Capital District	2007	Urban	National Capital Province	NCD, Port Moresby	n=92	Not reported	Randomized sampling	Not reported	Cross-sectional (analytical)	Semi-structured interviews
John, L.	Seroprevalence of Toxoplasma gondi Antibodies in HIV/Aids Patients and Healthy Blood Donors in Port Moresby General Hospital, Papua New Guinea.	2008	Urban	National Capital Province	Port Moresby	n=201	Not reported	Convenience sampling	Not reported	Cross-sectional (analytical)	Blood sampling and analysis
Keck, V	Knowledge, morality and 'Kastom': SikAIDS among young Yupno people, Finisterre Range, Papua New Guinea	2007	Rural remote	Madang Province	Teptep	n=24	M=10, F=14	Not reported	15-30 years	Cross-sectional (descriptive)	In-depth interviews, focus group
Kelly, A.	Young people's attitudes towards sex and HIV in the Eastern Highlands of Papua New Guinea	2008	Rural and urban	Eastern Highlands	Goroka, Kainantu, Henganofi	n=73	Not reported	Not reported	18-24 years	Cross-sectional (descriptive)	Focus group discussions
Kumb, J.	Survey on Youth perceptions towards condoms and sexual behaviour; Response to HIV/AIDS in PNG	2007	Rural	New Ireland Province	Lihir	n=433	M=413, F=20	Purposive selection	Not reported	Cross-sectional (analytical)	Quantitative questionnaire

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Lauwo, J.	Impact of HIV/AIDS: Stigma and discrimination on access to VCT and other health services in the selected population in National Capital District (NCD), Papua New Guinea	2008	Urban	National Capital Province	Port Moresby	n=380	M=180, F=196, Not reported =4	Random selection	15-24 years	Cross-sectional (analytical)	Semi-structure interviews using pretested questionnaire
Lemeki M	Papua New Guinea (2008) MAP study evaluating the availability of condoms and other health products in Morobe, NCD and Central, Western Highlands and East New Britain Provinces. First round.	2008	Rural and urban	Morobe, Western National Capital, Morobe, East New Britain Provinces	Lae, Port Moresby, Rabaul, Mt Hagen	Not reported	Not reported	Sites randomly selected	Not reported	Cross-sectional (descriptive)	Key Informant interviews
Lepani, K	Fitting condoms on culture: Rethinking approaches in HIV Prevention in the Trobriands Islands, Papua New Guinea	2008	Rural	Milne Bay Province	Losuia	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews and focus group discussion, ethnographic accounts
Lepani, K.	Sovasova and the problem of sameness: Converging interpretive frameworks for making sense of HIV and AIDS in Trobriand Islands	2007	Rural	Milne Bay Province	Losuia	Not reported	Not reported	Convenience Sampling	Not reported	Cross-sectional (descriptive)	Key informant interview, observation (open ended) focus group
Levy, C.	Mareng language HIV/AIDS awareness material production and distribution (Jimi Valley, Western Highlands Province, PNG)	2008	Rural	Western Highlands Province	Koinambe station	Not reported	Not reported	Not reported	Not reported	Case study	In-depth interviews and observations
Levy, C.	HIV and AIDS awareness programs in remote areas of PNG: An evaluation of VSO PNG Tokaut AIDS impact in the second year of activity	2007	Rural remote	Western Highlands Province and Madang	Jimi Koinambi; in Raikos, Saidor and in Malalamai, Teptep	n=48	M=24, F=24	Not reported	15-35 years	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions and observations
Levy, C.	HIV & AIDS Awareness Programs in Remote Areas of PNG: Evaluation of VSO PNG tokaut AIDS impact in the third year of activity	2008	Rural	Western Highlands Province and Madang	Jimi, Koinambi; in Raikos, Saidor and in Malalamai, Teptep	n=167 interviews (87 in Jimi and 80 in Raikos)	Not reported	Convenience Sampling	15-35 years	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions and observations
Levy, C.	HIV & AIDS Awareness Programs in Remote Areas of PNG: Evaluation of VSO PNG tokaut AIDS impact in the third year of activity	2008	Rural	Western Highlands Province and Madang	Jimi, Koinambi; in Raikos, Saidor and in Malalamai, Teptep	n=167 interviews (87 in Jimi and 80 in Raikos)	Not reported	Convenience Sampling	15-35 years	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus group discussions and observations
Lewis, I.	Final report on links between Violence Against Women and the transmission of HIV in 4 Province of PNG	2007	Urban	Western province, National Capital, Western Highlands, Morobe	Kiunga, Tabubil, Port Moresby, Mt Hagen and Lae	n=415	M=0, F=415	Convenience Sampling	Not reported	Cross-sectional (analytical)	In-depth interviews, semi-structured questionnaire
Maibani G	Evaluation of Poro Sapot Project: Intervention linked baseline and post-intervention studies	2007	Urban	National Capital Province, Eastern Highlands Province	Port Moresby, Goroka	n=1702	M= 567, F= 1135	Response driven Sampling (RDS)	16+ years	Intervention study (no control arm)	Semi-structured questionnaire

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Masta, A	Chemokine Receptor CCR5-delta-32 in HIV Pathogenesis: Genetic analysis of the CCR5-delta32 deletion in the Papua New Guinea population	2008	Urban	National Capital Province	Port Moresby	n=488	M=392, F=96	Convenience Sampling	16-55 years	Cross-sectional (analytical)	Blood sampling and analysis
McCarthy, M	Bikpela I stap wantaim mi (God is with me): Living with HIV in Port Moresby, PNG	2007	Urban	National Capital Province	Port Moresby	n=67	M=38, F=29	Convenience sampling	15-55+ years	Cross-sectional (descriptive)	Key informant interviews, observations
McPherson NM	SikAIDS: Deconstructing the awareness campaign in rural west New Britain, Papua New Guinea	2008	Rural	West New Britain Province	Kimbe	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews, key informant interviews, focus groups discussions, observations, ethnographic accounts
Mehlotra, RK	CYP2B6 983T>C polymorphism is prevalent in West Africa but absent in Papua New Guinea: implications for HIV/AIDS treatment	2007	Rural remote	East Sepik Province	Maprik	n=174	Not reported	Convenience Sampling	Not reported	Cross-sectional (analytical)	Polymerase chain reaction (PCR)
Millan, J	HIV/AIDS Behavioural Surveillance Survey within high risk settings, Papua New Guinea -Draft	2007	Rural and urban	Morobe, National Capital, Western Highlands Provinces	Port Moresby, Lae, Ramu, Minz,	n=3659 (1358 adult male workers, 1701 out of school youths, 600 sex workers).	M= 2146, F= 1513	Convenience Sampling	15-44 years	Cross-sectional (analytical)	Semi-structured Interviews using pretested questionnaire
National Dept of Education	Primary teacher training HIV/AIDS and reproductive sexual health baseline survey	2007	Rural and urban	National Capital, Southern Highlands, Morobe, Madang, East New Britain, East Sepik	Port Moresby, Lae, Wewak, Kokopo, Tari, Madang,	n=1914	Not reported	Not reported	Not reported	Intervention study (no control arm)	Semi-structured questionnaire
NDOH	The 2007 STI, HIV and AIDS Annual Surveillance Report	2007	Rural and urban	Western, Gulf, Central, NCD, Milne Bay, Oro, SHP, Enga, WHP, Simbu, EHP, Morobe, Madang, West Sepik, East Sepik, Manus, NIP, ENBP, WNB, NSP	Not reported	Not reported	Not reported	Convenience Sampling	0-60+ years	Cross-sectional (analytical)	Blood tests, demographic surveys
NDOH	The 2008 STI, HIV and AIDS six monthly surveillance report: January-June, 2008	2008	Rural and urban	Western, Gulf, Central, NCD, Milne Bay, Oro, SHP, Enga, WHP, Simbu, EHP, Morobe, Madang, West Sepik, East Sepik, Manus, NIP, ENBP, WNB, NSP	Not reported	Not reported	Not reported	Convenience Sampling	0-60+ years	Cross-sectional (analytical)	Blood tests, demographic surveys

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Pantumari J	Behavioural study among inmates of Bomana Prison, Port Moresby, Papua New Guinea	2007	Urban	National Capital Province	Port Moresby	n=359	Not reported	Convenience sampling	14-40+ years	Cross-sectional (analytical)	Structured questionnaires filled in by respondents
PNG Institute of Medical Research	Knowledge of ABC prevention and transmission routes	2007	Rural, rural remote and urban	Western Province, Gulf, Morobe, National Capital, Western Highlands, Southern Highlands, Eastern Highlands, East Sepik, West Sepik, Enga	Daru, Tabubil, Kikori, Port Moresby, Banz, Moro, Vanimo, Wewak, Lae, Goroka, Porgera	n=2890	Not reported	Convenience Sampling	15-60 years	Cross-sectional (analytical)	Pre-tested semi-structured quantitative and qualitative questionnaires
PNG Institute of Medical Research	The impact of age of sexual debut and sexual violence on STI burden: Findings from ten sites	2007	Rural, rural remote and urban	Morobe, National Capital, Gulf, Western, Western Highlands, Eastern Highlands, Enga, West Sepik, East Sepik, Southern Highlands	Lae, Daru, Tabubil, Moro, Kikori, Port Moresby, Goroka, Porgera, Vanimo, Banz, Wewak	n=2887	M=1586, F=1301	Convenience Sampling	15-60 years	Cross-sectional (analytical)	Semi-structured interviews and polymerase chain reaction (PCR)
Pomat, N.	Assessment of HIV/AIDS knowledge, attitudes and behaviour of high school students in PNG.	2007	Urban	Eastern Highlands, Western Highlands, Madang, National Capital, East New Britain, Morobe, East Sepik, Milne Bay	Goroka, Mt Hagen, Port Moresby, Rabaul, Lae, Wewak, Alatau	n=1811 (in 1995), n=1309 (in 2003)	M=1389, F=1724	Not reported	17-24 years	Cross-sectional (analytical)	Semi-structured interviews
PSI	Population Services International (PSI): Quarterly report: January 2008	2008	peri-urban, rural	Western Highlands, Oro, Madang, Morobe, Southern Highlands,	Mt Hagen, Lae, Popondetta, Madang, Yang Creek, Kainantu, Pimaga	Not reported	Not reported	Purposive selection	Not reported	Cross-sectional (descriptive)	Ethnographic assessments, key informant interviews, observation
Pusahai-Riman P,	A retrospective assessment of antibiotic susceptibility pattern of <i>Neisseria gonorrhoeae</i> and prevalence rate of gonorrhoea in Port Moresby General Hospital from 2005-2006	2008	Urban	National Capital Province	Port Moresby	n=532	M=388, F=144	Convenience Sampling	Not reported	Cross-sectional (analytical)	Antimicrobial testing by culture
Robert, I.	Knowledge, attitudes and practices of high/secondary school students on HIV/AIDS in PNG	2007	Rural and urban	East New Britain Province, East Sepik, Chimbu, Gulf, Central Province	Not reported	n=1653	M=844, F=809	Not reported	14-19 years	Cross sectional (descriptive)	Structured interviews, focus group discussions
Rupali, P	Prevention of mother to child transmission of HIV infection in Pacific countries	2007	Rural and urban	Not reported	Not reported	Not reported	Not reported	Purposive selection	Not reported	Cross-sectional (descriptive)	Document review, key informant interviews

First Author	Title of the Study	Publication Date	Setting (i.e. rural, remote, urban)	Provinces	Cities/towns	Sample Size	Sex Distribution	Type of Participant Selection	Age Range of sample	Study Design	Methods used (data collection tools)
Ryan, C.	The heterosexual HIV Type 1 epidemic in Papua New Guinea is dominated by Subtype C	2007	Rural, rural remote and urban	National Capital, Western, Gulf, Morobe, Southern Highlands, Enga, West Sepik, East Sepik	Port Moresby, Daru, Tabubil, Kikori, Lae, Goroka, Wewak, Banz, Moro, Porgera,	n=35	M=14, F=21	Convenience Sampling	16-53 years	Cross-sectional (analytical)	Blood sampling and analysis
SCIPNG	Barriers to Accessing STI clinics and VCT services among youth in the Eastern Highlands Province in Papua New Guinea.	2007	Rural and urban	Eastern Highlands Province	Goroka, Kainantu,	n=32	M=16, F=16	Convenience Sampling	15-28 years	Cross-sectional (analytical)	In-depth interviews and focus group discussion
SCIPNG	Youth Outreach Project, Knowledge, Attitude and Practice survey among youths in the Eastern Highlands and Madang Provinces of Papua New Guinea.	2007	Rural and urban	Eastern Highlands and Madang Province	Goroka, Kainantu, Madang	n=213	M=125, F=88	Random	15-25 years	Cross-sectional (analytical)	In-depth interviews and focus group discussions were used
Stewart, C	The effect of Law on Female sex workers and men who have sex with men	2007	Urban	National Capital Province	Port Moresby,	Not reported	Not reported	Not reported	Not reported	Cross-sectional (descriptive)	In-depth interviews
Tau, G.	Prevalence of HIV associated NCI and SSPN	2007	Urban	National Capital Province	Port Moresby	n=53 (33 cases, 20 controls)	M=18, F=15 (cases); M=17, F=3 (controls)	Not reported	Not reported	Cross-sectional (analytical)	Clinical tests for Neuro-psychological function
Temple, V	Assessment of dietary energy intake of PLHIV/AIDS attending Heduru clinic, Port Moresby, General Hospital: A 24-hour recall study	2007	Urban	National Capital Province	Port Moresby	n=50	M=21, F=29	Randomized sampling	25-60 years	Cross-sectional (analytical)	Semi-structured questionnaire
Thavung G	Evaluation of the Bethany Voluntary Counseling and Testing Center, Madang, PNG	2007	Urban	Madang Province	Madang	n=49	M=34, F=15	Not reported	<20-30+ years	Cross-sectional (descriptive)	Semi-structured interviews
USAID	Continuum of prevention to care and treatment (CoPCT) Site assessment; findings and recommendations, Papua New Guinea	2007	Urban	National Capital Province, Eastern Highlands Province, Madang Province	Port Moresby, Goroka, Kainantu, Madang	Not reported	Not reported	Purposive selection	Not reported	Cross-sectional (descriptive)	Document review, semi-structured interviews, site visits (observation)
Wai, K	A study of Christian churches response to HIV/AIDS epidemic in Papua New Guinea	2007	Urban and rural	Eastern Highlands, Western Highlands, Morobe, National Capital	Not reported	n=163	Not reported	Purposive selection	Not reported	Cross-sectional (analytical)	Key informant interviews. Focus group discussions
Wardlow, H.	Men's extramarital sexuality in rural Papua New Guinea	2007	Rural	Southern Highlands Province	Tari	n=65	M= 40, F=25	Convenience Sampling	Not reported	Cross-sectional (descriptive)	Participant observation, interviews with key informants, collection of media and official documents
Wardlow, H.	"You have to understand: Some of us are glad AIDS has arrived": Christianity and Condoms among the Huli, Papua New Guinea	2007	Rural	Southern Highlands	Tari, a rural station	n=40	M = 40, F= Not reported	Convenience Sampling	Not reported	Cross-sectional (descriptive)	In-depth interviews and observations
Wilde, C	Turning sex into a game': Gogodala men's response to AIDS epidemic and condom promotion in rural Papua New Guinea.	2007	Rural	Western Province	Balimo	n=114	M=114, F=0	Convenience Sampling	18-53 years	Cross-sectional (descriptive)	In-depth interviews and observations

## APPENDIX 8 QUALITY APPRAISAL RATINGS

<b>Quality Appraisal Ratings for Descriptive Studies</b>							
<b>Citation Reference #</b>	<b>Design</b>	<b>Sample</b>	<b>Data Collection</b>	<b>Analysis</b>	<b>Findings</b>	<b>Reporting</b>	<b>Reflexivity &amp; Neutrality</b>
5	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
6	Moderate	Moderate	Weak	Moderate	Moderate	Weak	Moderate
7	Moderate	Moderate	Strong	Moderate	Moderate	Moderate	Moderate
11	Strong	Moderate	Moderate	Moderate	Strong	Moderate	Moderate
10	Moderate	Moderate	Weak	Moderate	Moderate	Moderate	Moderate
12	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
13	Moderate	Weak	Moderate	Weak	Moderate	Weak	Moderate
14	Weak	Weak	Moderate	Moderate	Moderate	Moderate	Moderate
15	Moderate	Moderate	Moderate	Weak	Moderate	Moderate	Moderate
16	Moderate	Moderate	Moderate	Moderate	Strong	Strong	Moderate
17	Moderate	Weak	Moderate	Moderate	Moderate	Moderate	Moderate
18	Moderate	Moderate	Moderate	Moderate	Moderate	Weak	Moderate
19	Moderate	N/A	Moderate	Moderate	Moderate	Moderate	Moderate
20	Weak	Weak	Weak	Moderate	Moderate	Moderate	Moderate
21	Weak	Weak	Moderate	Weak	Weak	Moderate	Weak
24	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
23	Moderate	Moderate	Moderate	Weak	Moderate	Moderate	Moderate
30	Strong	Strong	Moderate	Strong	Moderate	Moderate	Moderate
27	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
28	Moderate	Moderate	Moderate	Moderate	Strong	Strong	Strong
32	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Strong
33	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Strong
31	Strong	Strong	Moderate	Strong	Moderate	Moderate	Moderate
37	Moderate	Moderate	Weak	Moderate	Moderate	Moderate	Moderate
38	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Strong
48	Moderate	Moderate	Weak	Weak	Moderate	Moderate	Weak
49	Moderate	Strong	Moderate	Weak	Moderate	Moderate	Weak
50	Weak	Weak	Moderate	Moderate	Moderate	Moderate	Weak
54	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
57	Moderate	Weak	Moderate	Weak	Moderate	Moderate	Weak
58	Weak	Moderate	Moderate	Weak	Moderate	Weak	Weak
61	Strong	Moderate	Strong	Strong	Strong	Moderate	Strong
60	Strong	Strong	Moderate	Strong	Strong	Strong	Strong
62	Moderate	Moderate	Moderate	Strong	Moderate	Strong	Moderate

**Quality Appraisal Ratings for Analytical Studies  
(not including intervention studies)**

<b>Citation Reference #</b>	<b>Design</b>	<b>Sample</b>	<b>Data Collection</b>	<b>Analysis</b>	<b>Findings</b>	<b>Reporting</b>
1	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
2	Weak	Moderate	Weak	Moderate	Moderate	Moderate
3	Moderate	Strong	Strong	Moderate	Moderate	Moderate
4	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
8	Moderate	Moderate	Moderate	Moderate	Strong	Strong
9	Weak	Moderate	Weak	Weak	Moderate	Weak
22	Moderate	Moderate	Weak	Moderate	Moderate	Moderate
25	Moderate	Weak	Moderate	Weak	Weak	Weak
26	Weak	Moderate	Moderate	Moderate	Moderate	Moderate
29	Strong	Moderate	Moderate	Strong	Strong	Moderate
35	Moderate	Weak	Moderate	Moderate	Moderate	Weak
36	Weak	Weak	Moderate	Weak	Weak	Moderate
39	Moderate	Strong	Moderate	Moderate	Moderate	Moderate
41	Weak	Moderate	Weak	Weak	Moderate	Moderate
42	Weak	Moderate	Weak	Weak	Moderate	Moderate
43	Weak	Moderate	Moderate	Weak	Weak	Moderate
45	Moderate	Strong	Moderate	Moderate	Moderate	Moderate
44	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
46	Moderate	Moderate	Weak	Moderate	Moderate	Weak
47	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
51	Moderate	Moderate	Weak	Moderate	Weak	Moderate
52	Moderate	Weak	Weak	Moderate	Moderate	Moderate
53	Strong	Strong	Strong	Moderate	Strong	Strong
55	Moderate	Weak	Moderate	Moderate	Moderate	Moderate
56	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
59	Moderate	Moderate	Weak	Moderate	Moderate	Weak

**Quality Appraisal Ratings for Interventional Studies**

<b>Citation Reference #</b>	<b>Validity</b>	<b>Bias</b>	<b>Confounding Factors</b>
34	Weak	Moderate	Moderate
40	Weak	Moderate	Weak



