VIRAL HEPATITIS SITUATION AND RESPONSE IN KIRIBATI

2015

World Health Organization
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ABBREVIATIONS

anti-HBs	hepatitis B surface antibody
anti-HBc	hepatitis B core antibody (Total)
APRI	aspartate aminotransferase-to-platelet ratio index
AST	aspartate aminotransferase
CI	95% Confidence interval
DHS	Demographic and Health Survey
EPI	Expanded Programme on Immunization
FBC	full blood count (haemoglobin, white blood cells and platelets)
HBcAb	hepatitis B core antibody
HBeAG	hepatitis B e-antigen
HBeAG	hepatitis B e-antigen
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HCV	hepatitis C virus
HDV	hepatitis D virus
HDV RNA	hepatitis D RNA viral load
HIS	Health Information Service
KFHA	Kiribati Family Health Association
MSM	men who have sex with men
MTC	Marine Training Centre
NCD	noncommunicable disease
NMTC	National Medicines and Therapeutics Committee
PEN	WHO Package of Essential Noncommunicable Disease Interventions for Primary Health Care in Low-Resource Settings
STEPS	STEPwise approach to surveillance
STI	sexually transmitted infection
TCH	Tungaru Central Hospital
VCCT	voluntary confidential counselling and testing
VH	viral hepatitis
VIDRL	Victorian Infectious Diseases Reference Laboratory
WHO	World Health Organization

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The report was written by Julia Scott, consultant, and Nick Walsh, former Medical Officer (Viral Hepatitis), WHO Regional Office for the Western Pacific.

EXECUTIVE SUMMARY

A review of the viral hepatitis situation and response in Kiribati was carried out by a team from the World Health Organization (WHO) Regional Office for the Western Pacific in collaboration with the WHO Kiribati Country Liaison Office and the Kiribati Ministry of Health and Medical Services. The review took place from 24 August to 3 September 2015. The review team visited public hospitals, clinics and other services involved in viral hepatitis in South Tarawa and North Tarawa. The team reviewed infection control policies and practices in these settings, and met with health-care workers and community members. A technical meeting of key stakeholders was held on 26 August 2015 to discuss the burden of viral hepatitis and related liver disease, and strategies to achieve access to hepatitis B treatment in Kiribati.

Hepatitis B is highly endemic in Kiribati. Studies from past decades and recent laboratory data have indicated an adult prevalence of at least 15%. Hepatitis B immunization has resulted in a much lower childhood prevalence of hepatitis B surface antigen (HBsAg) at 3.3% among children 5–9 years old. However, this remains above the regional target. Hepatitis C prevalence in Kiribati is low, and as is incidence of hepatitis A and E and prevalence of hepatitis D, although data from the 1990s indicate that hepatitis D virus (HDV) is present. Transmission of hepatitis B has been predominantly mother-to-child and early horizontal, but other possible mechanisms for transmission exist, including sexual transmission and transmission in health-care settings.

There is low community awareness of hepatitis, and there is neither a specific national policy nor focal point for hepatitis. Data collection is very limited and the hepatitis treatment burden is unknown. There are limited data on cirrhosis and hepatocellular carcinoma. The hepatitis B infant immunization programme has shown success, though birth-dose coverage remains insufficient, and there have been limited catch-up vaccination initiatives to older groups. Policies for vaccinating close contacts of people with hepatitis B virus (HBV) and health-care workers do exist, though implementation is limited. Adult HBV vaccination is provided to some health-care workers and seafarers during vocational training. Infection prevention and control policies exist, but a lack of training and implementation have hampered the effectiveness of these policies.

Testing for hepatitis B is available and a relatively large number of tests are performed at a limited number of sites. However, there is very limited staging of liver disease and no follow-up care or antiviral treatment, beyond that of acute hospitalizations from complications of chronic liver disease. There are severe constraints in laboratory capacity and the medical workforce, particularly on the outer islands, which present challenges to staging, care and treatment.

This report presents findings from the review and 25 recommendations to address the high burden of viral hepatitis in Kiribati in line with priority action areas in the WHO *Regional Action Plan for Viral Hepatitis in the Western Pacific 2016–2020.*

The following are key recommendations for addressing viral hepatitis in Kiribati:

- There is a need to raise awareness about hepatitis transmission and prevention among health professionals and community members.
- A national focal point for hepatitis should be established.
- A national hepatitis action plan should be developed based on the *Regional Action Plan for Viral Hepatitis in the Western Pacific 2016–2020.* The national action plan should be incorporated into the *National HIV and STI Strategic Plan.*
- There is an urgent need to collate existing hepatitis data and improve data collection systems.
- Existing policies to prevent transmission of hepatitis should be implemented and enforced.
- Hepatitis B surface antigen (HBsAg) positive patients should be linked to care and treatment.
- As a priority, WHO-recommended hepatitis B antiviral medicine, such as tenofovir, should be included on the national Essential Medicines List and an affordable supply sourced.
- Implementation of hepatitis B treatment should commence at Tungaru Central Hospital (TCH), then be rolled out in a phased manner to other health facilities and islands.

1. INTRODUCTION

Kiribati has high hepatitis B endemicity. Hepatitis B immunization was introduced into the routine schedule in 1989 *(1)*. Prevalence in children has since steadily decreased *(1)*, but there remains a high adult prevalence of hepatitis B. To support Kiribati to address the high burden of viral hepatitis, a review of the situation and response was carried out by the World Health Organization (WHO) Regional Office for the Western Pacific in collaboration with the WHO Kiribati Country Liaison Office in Kirabati and the Kiribati Ministry of Health and Medical Services. The review team visited public hospitals, clinics and other services involved in viral hepatitis in South and North Tarawa. They assessed infection control policies and practices in these settings, and met with health-care workers and community members. A technical meeting of key stakeholders was held on 26 August 2015 to discuss the burden of viral hepatitis and related liver disease, and strategies to achieve access to hepatitis B treatment in Kiribati.

This report presents background information on Kiribati, its health-care system and the national epidemiology of hepatitis. It then details review findings and recommendations under each priority area of action of the *Regional Action Plan for Viral Hepatitis in the Western Pacific 2016–2020*: broad-based advocacy and awareness, evidence-based policy guiding comprehensive hepatitis action, data supporting the hepatitis response, stopping transmission, and an accessible and effective treatment cascade *(2)*.

1.1 Country background

Kiribati is located in the Pacific and consists of 33 islands in three groups, the Gilbert, Phoenix and Line Islands. It is spread over 5 million square kilometres of ocean, but has a total land area of only 811 square kilometres *(3)*. Kiribati is low-lying, with most islands less than two kilometres wide and less than two metres above sea level, making it extremely vulnerable to natural hazards and climate change *(4)*.

In the national census of 2010, Kiribati's population stood at 103 058 *(3)* with 49% of the population living in the densely populated capital, South Tarawa, in the Gilbert Islands group. The population is young, with 36% aged under 15 and only 5% aged 60 and over in 2010 *(3)*. Kiribati is classified as a lower-middle-income country, with a gross national income per capita of US$ 2280 in 2014 *(5)*. Development indicators in Kiribati are among the poorest in the Pacific. Life expectancy in 2010 was 60 years for men and 68 years for women *(3)*. According to the 2010 census, 56% of males and 57% of females had attained a secondary level education *(3)*. Only 30% of people of working age were in paid employment *(3)*. Safe drinking water was available to 63.8% of all dwelling units and 40% had no access to any toilet facility *(3)*. There are high rates of communicable diseases, while in recent years noncommunicable disease (NCD) rates have risen dramatically, with circulatory diseases now among the leading causes of mortality *(6)*.

1.2 Epidemiology

1.2.1 Hepatitis B

There is a very high adult prevalence of hepatitis B in Kiribati. A 1998 study conducted among a number of Pacific island countries reported that Kiribati had a hepatitis B surface antigen (HBsAg) prevalence of 3.8% in 156 children aged 12–24 months, 27.4% in 135 children aged 10–13 years, and 15.1% in 176 mothers of preschool children *(1)*. A study focusing on HIV and sexually transmitted infections (STIs) conducted in 2002 and 2003 found an HBsAg prevalence of 22.7% (confidence interval: 18–27%) in 386 seafarers and 9.2% (C1 4–15%) in 269 pregnant women in Tarawa *(7)*. A survey of health-care workers in 2007 found HBsAg prevalence of 15.6%. Recent laboratory data show similarly high prevalence.

The referral laboratory at Tungaru Central Hospital (TCH) in South Tarawa, the largest hospital in the country, has performed an average of 10 062 HBsAg tests per year since 2012, with 14% of tests being positive. It is not known how many of these results were from repeat testing, and they are not categorized by age. These figures exclude testing done by the Kiribati Family Health Association (KFHA), the Marine Training Centre (MTC) and other hospitals. Details are shown in Table 1 and Figure 1.

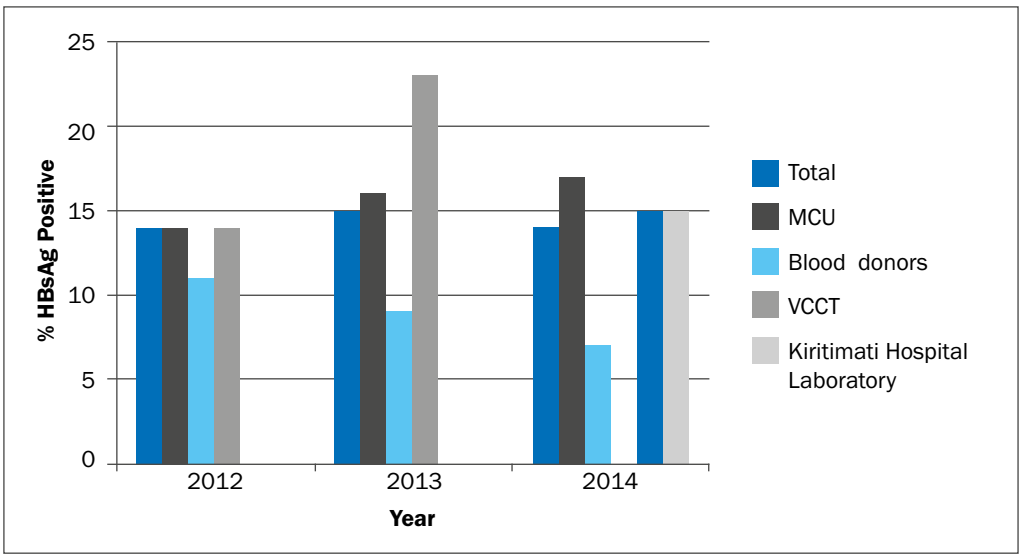
Table 1. HBsAg test origin and results in Kiribati, 2012–2014

Source	2012		2013		2014	
	Tested	HBsAg+ (%)	Tested	HBsAg+ (%)	Tested	HBsAg+ (%)
MCU	4816	689 (14)	3956	639 (16)	3380	559 (17)
Blood donors	1556	176 (11)	1553	134 (9)	1287	85 (7)
VCCT	79	11 (14)	316	73 (23)	Data unavailable	
Total	6451	876 (14)	5825	846 (15)	Data unavailable	

MCU= Medical check-up, VCCT= voluntary confidential couselling and testing

Source: Tungaru Central Hospital Laboratory

Figure 1. HBsAg test positivity rate at TCH Laboratory, South Tarawa and other key laboratories, 2012–2014, by source of test



MCU= medical check-up, VCCT= voluntary confidential counselling and testing

Source: Tungaru Central Hospital Laboratory

Kiritimati Hospital Laboratory conducted 474 HBsAg tests in 2014, of which 72 (15%) were positive.[1] Southern Kiribati Hospital in North Tabiteuea conducted 157 HBsAg tests from January 2014 to August 2015, of which 24 (15%) were positive.[2]

When hepatitis B immunization began in Kiribati in 1989, supply was initially inadequate and inconsistent *(1)*. Coverage improved substantially after the commencement of the Control of Hepatitis B Infection in Pacific Island Countries Project, managed by the United Nations Children's Fund (UNICEF) and WHO, in 1995 *(1)*. It was among children 5–9 years. The regional target is 1%, with the interim milestone of 1%.[3]

1.2.2 Hepatitis C

Hepatitis C prevalence in Kiribati is low. A total of 657 blood samples collected in North Tarawa and North Tabiteuea from 2003 to 2005 for a study of the molecular epidemiology of hepatitis B were all negative for anti-hepatitis C virus (HCV) antibody *(8)*. Analysis of 1176 blood donor samples from the South Tarawa Laboratory in 2014 found one positive anti-HCV ab result (0.1%). Analysis of 97 blood donor samples at Kiritimati Hospital Laboratory found no positive results.

1.2.3 Hepatitis D, A and E

Hepatitis D testing is not currently available in Kiribati; however, a study tested 54 HBsAg-positive serum samples from a 1998 study for hepatitis D virus (HDV) RNA of which 20 were positive (37%) *(9)*.

[1] Kiaman Raurenti, Kiritimati Laboratory technician, personal communication, 2015
[2] Maango Tara, Southern Kiribati Hospital Laboratory technician, personal communication, 2015
[3] WHO Regional Office for the Western Pacific Expanded Programme on Immunization, unpublished data, 2015

1.2.4 Hepatitis A and E

Incidence of hepatitis A and E in Kiribati is unknown.

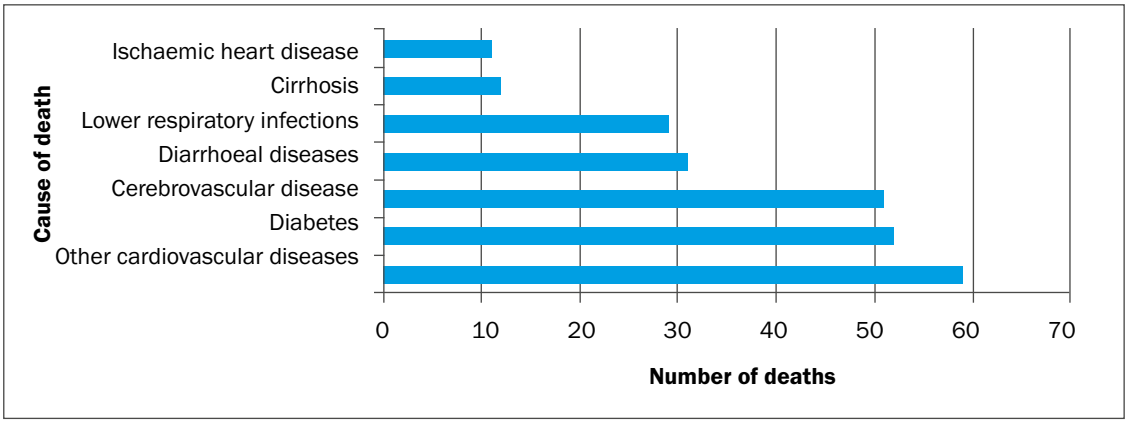
1.2.5 HIV

There is a low level of HIV in Kiribati. Sixty people have been diagnosed since 1991, and 28 have died *(10)*. There are currently eight people receiving treatment for HIV.[4] The prevalence of co-infection with HBsAg is unknown.

1.2.6 Severity of liver disease

According to the Ministry of Health and Medical Services Health Information Service (HIS), the top causes of mortality in 2014 after deaths recorded as the result of "ill-defined diseases" were "other cardiovascular diseases" accounting for 59 deaths (9.1% of all deaths), followed by diabetes (52 deaths, 8%), and cerebrovascular disease (51 cases, 7.8%). Cirrhosis was the 11th leading cause of death in 2014, with 12 cases accounting for 1.8% of mortality.[5] This information is shown in Figure 2. In 2010, five deaths from liver cancer were recorded.[6] Neither cirrhosis nor liver cancer was listed as one of the 15 leading causes of death in 2012 and 2013, and the exact number of deaths from these conditions was unavailable for these years. No mortality data were available from 2011.

Figure 2. Leading causes of mortality in Kiribati, 2014 (HIS 2015)



Source: Tungaru Central Hospital

Discharge diagnosis from TCH collected by HIS provides the only available data on cirrhosis and liver cancer in Kiribati. This is presented in Table 2. Only demographic details and diagnosis are recorded while causes of cirrhosis, liver disease and liver cancer cases are unknown.

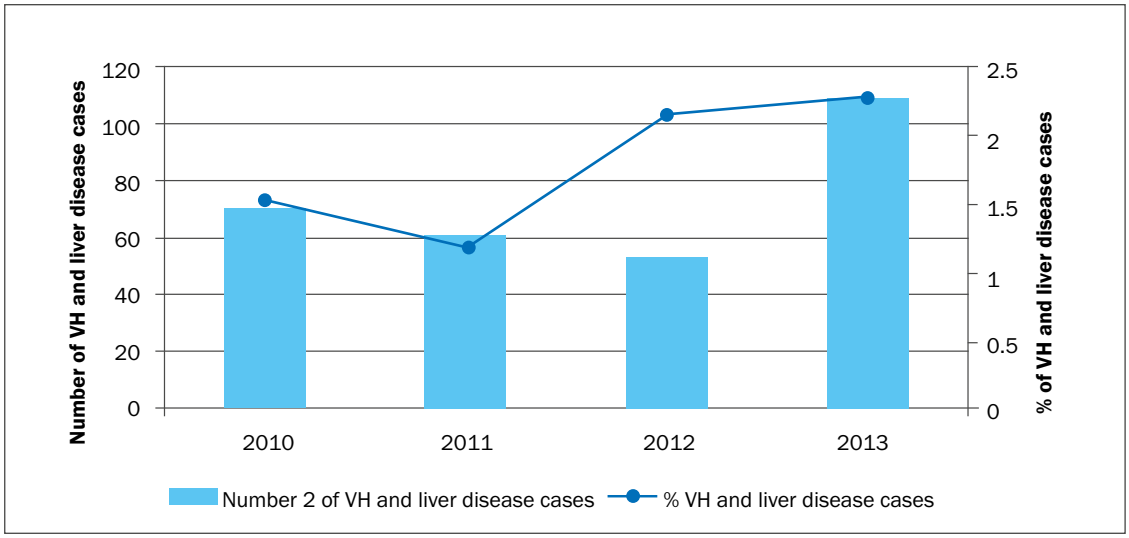
[4] Kiribati Ministry of Health and Medical Services, unpublished data, 2015
[5] Ministry of Health and Medical Services, HIS Kiribati, unpublished data, 2015
[6] Ministry of Health and Medical Services, HIS Kiribati, unpublished data, 2015

Table 2. TCH admissions for viral hepatitis (VH) and liver diseases, 2010–2013

Year	Hepatitis B	Hepatitis (NOS)	Chronic liver disease	Cirrhosis	Liver failure	Liver disease (NOS)	Liver cancer
2010	5	6	4	5	5	3	9
2011	6	4	4	4	4	2	0
2012	2	2	6	5	2	1	2
2013	11	2	15	7	0	1	2

Source: Tungaru Central Hospital

Figure 3. TCH admissions for viral hepatitis (VH) and liver diseases, 2010–2013 (adapted from Table 2)



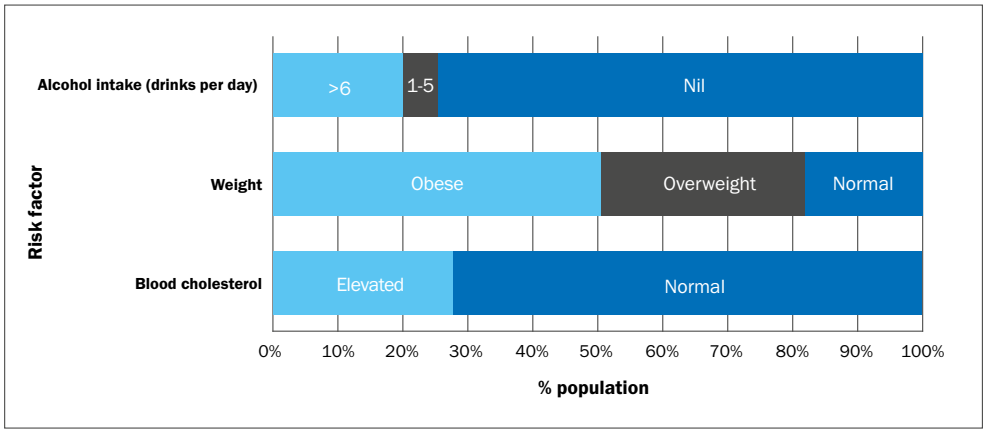
Source: Tungaru Central Hospital, VH viral hepatitis

1.2.7 Other contributors to liver disease

Chronic alcohol consumption can cause chronic liver disease. Its onset and severity varies greatly among individuals and is influenced by other conditions, including obesity and viral hepatitis. Non-alcoholic fatty liver disease covers a spectrum of liver damage, including steatohepatitis, fibrosis and cirrhosis in patients who do not consume large amounts of alcohol. Non-alcoholic fatty liver disease is a significant risk factor for serious liver disease and commonly occurs in patients with obesity, diabetes and hyperlipidaemia *(11)*.

There is a high prevalence of obesity and hyperlipidaemia in Kiribati, and heavy alcohol consumption among those who drink. The 2004–2006 WHO STEPwise approach to NCD risk factor surveillance (STEPS) survey found that 25.5% of the adult population had consumed alcohol in the past 12 months *(12)*. Of those who reported alcohol consumption, more than 70% of men in every age group and 65% of women aged 25–34 reported consuming six or more drinks on any one day *(12)*. The STEPS survey also found that the majority of adults (81.5%) were overweight or obese *(12)*. Elevated blood cholesterol levels were found in 27.7% of the population. These cofactors could increase the risk of cirrhosis in people with hepatitis B, but the extent of their impact is currently unknown.

Figure 4. Non-VH risk factors for chronic liver disease in Kiribati



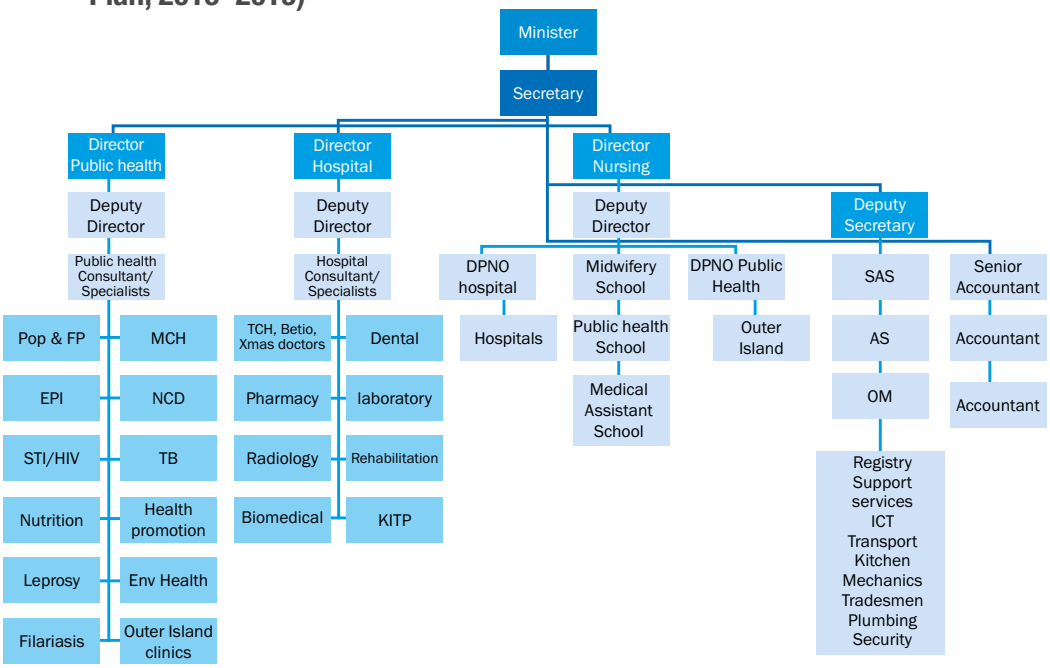
Source: Tungaru Central Hospital

1.2.8 Transmission

Hepatitis B transmission is predominantly mother-to-child and early childhood horizontal. Other mechanisms may include sexual contact, non-professional tattooing and transmission in health-care settings. However there is no evidence, in favour or against, other modes of hepatitis B transmission in Kiribati.

1.3 Health system structure

Figure 5. Ministry of Health and Medical Services structure (Kiribati Strategic Plan, 2016–2019)

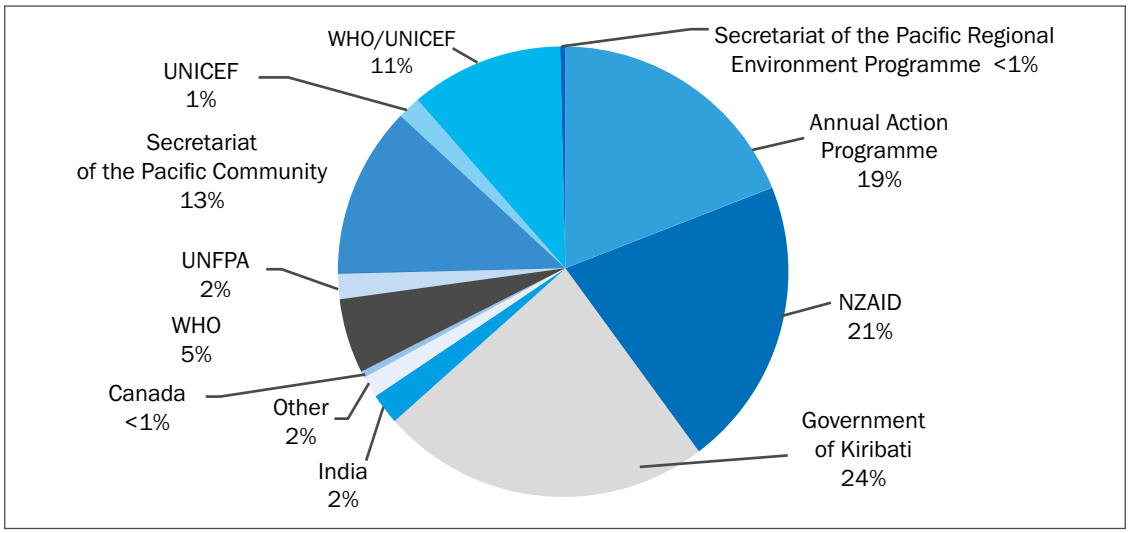


Pop and FP = population and family planning, EPI = Expanded Programme on Immunization, STI = sexually transmitted infections, MCH = maternal and child health, NCD = noncommunicable disease, TB = tuberculosis, ENV health = environmental health, TCH = Tungaru Central Hospital, KITP = Kiribati internship training programme, DPNO = District Principal Nursing Officer, SAS = senior assistant secretary, AS = assistant secretary, OM = office manager, ICT = information and communications technology

Source: Ministry of Health and Medical Services

The Government is the main provider of health services in Kiribati, with a publicly funded health system administered by the Ministry of Health and Medical Services *(6)*. The structure is indicated in Figure 5. The Government budget for health in 2015 was Aus$ 14.9 million, with Aus$ 5.6 million supplied to the Ministry of Health and Medical Services in the first six months of 2015 by donors, as shown in Figure 6.[7]

Figure 6. Kiribati health system funding: external donor and Kiribati Ministry of Health and Medical Services funding by source, January–July 2015



NZAID = New Zealand Aid Programme; UNFPA = united Nations Population Fund, UNICEF = United Nations Children's Fund
Source: Ministry of Health and Medical Services

1.3.1 Hospitals and health clinics

TCH in South Tarawa is the national referral hospital and the largest hospital in the country. It has 120 beds and provides a range of secondary services. There is an 18-bed hospital in Betio, South Tarawa, providing basic services. Two small hospitals on Kiritimati (Christmas) Island and North Tabiteuea provide basic medical, surgical and maternity services (*13*). In August 2015 there were 386 nurses in Kiribati, of whom 180 worked at TCH. There were 50 doctors, 39 of whom were based at TCH. There were four dentists and four pharmacists in Kiribati.

There are 105 health clinics throughout Kiribati, staffed by nurses and medical assistants (nurses with 18 months of additional training).[8] Each clinic in South Tarawa has one medical assistant, one to two nurses, and one to two nurse aides or volunteers. Clinics provide antenatal and postnatal care, family planning, NCD clinics for hypertension and diabetes, counselling for HIV testing, child immunizations and school visits. Most clinics on the outer islands are staffed by nurses and nurse aides only, with one medical assistant per island. Outer island clinics provide a similar comprehensive range of primary care services, but do not do blood testing. Medical assistants or nurses speak to doctors based at the nearest hospital for advice, and can refer patients to hospital for further investigation or treatment.

[7] Kiribati Ministry of Health and Medical Service, unpublished data, 2015
[8] Kiribati Ministry of Health and Medical Services, unpublished data, August 2015.

There are no private health-care providers in Kiribati. There are several private rooms available at TCH at a cost of Aus$ 30 per day, and several dental procedures which involve an out-of-pocket payment (Aus$ 6.50 for partial and Aus$ 25 for full dentures).[9] Otherwise all heath-care services, including medications, are provided free to Kiribati residents by the Government *(13)*. People referred to hospital from outer islands are transported by speed boat, and after discharge are housed in health-care designated *maneaba* (meeting houses) until able to travel home. This transport and accommodation is also funded by the Government. People requiring tertiary services and who meet the Ministry of Health and Medical Services criteria are referred overseas for treatment *(6)*.

1.3.2 Local healers

A traditional health system is provided by local healers, and many people use a combination of traditional and formal health services. Healers use massage and juice produced from local plants to treat injuries and disease, including hepatitis B and cirrhosis. They also act as traditional birth assistants and provide postnatal care. The largest of three groups of healers is known as Mauri Kiribati and has 15 members. Each group uses slightly different practices, but none use injections in therapy.[10]

1.3.3 Training and staff retention

Local nurses do three years of training based at TCH, and postgraduate training is available in midwifery and public health. Medical assistants do a further 18 months of hospital-based training at TCH. Locally recruited medical students, pharmacists and laboratory scientists usually train in Fiji. Since 2008 there has been an exchange agreement in place with Cuba, whereby Kiribati medical students train in Cuba, and Cuban interns work in Kiribati *(6)*. There are four consultant-level doctors employed at TCH: a surgeon, a paediatrician, an obstetrician and a locum physician. The Ministry of Health and Medical Services obtained funding for three more consultants in 2015, but has been unable to fill any position. Once graduated, local doctors and nurses receive intermittent additional training through short courses and workshops. Medical support staff, including nurse aides and pharmacy assistants, receive no formal training.

[9] Kiribati Dental Clinic, unpublished data, 2015
[10] Mauri Kiribati, personal communication, 2015

2. FINDINGS

2.1 Broad-based advocacy and awareness

All health-care workers consulted during the mission were aware of hepatitis. Doctors, nurses and medical assistants are provided with hepatitis training during undergraduate study. The only routine postgraduate training on hepatitis in Kiribati focuses on immunization, and in 2015 nurses took part in training on birth-dose administration. In a survey of 14 health-care workers during the Kiribati Birth Dose Project in 2014, all knew that hepatitis B vaccine should be given at birth, and 13 of 14 (93%) knew hepatitis B causes liver disease; however, fewer were aware of its links with cancer (36%) and cirrhosis (57%).[11]

In general, there is low community awareness of hepatitis, its transmission and complications. One doctor commented on giving a diagnosis of hepatitis B: "It's like I've just told them they have the flu." In the survey of caretakers of children aged under 1 (surveyed after delivery) undertaken during the Kiribati Birth Dose Project in 2014, 73% had heard of hepatitis B at baseline, but only 7% knew it could cause liver disease, 2% knew it could cause cancer, and 9% knew it could be transmitted from mother to child.[11]

There are no hepatitis community or support groups in Kiribati. Staff at KFHA, a nongovernmental organization involved in screening antenatal patients and young people and treating STIs, report that many people decline hepatitis testing. Health-care workers and community members report there is no stigma associated with hepatitis B, although there is still much stigma around HIV. Entry to the MTC seafarer training programme is denied for those who are HBsAg positive, but there is no other exclusion from education or employment in Kiribati on the basis of HBsAg status.

Junior secondary school science and home economics curricula cover transmission of disease and basic hygiene. However, there is no specific teaching about hepatitis. Public health campaigns in Kiribati related to hepatitis have previously focused on preventing transmission to children. Some activities were carried out on World Hepatitis Day in 2015, including radio and community announcements focusing on immunization.

[11] Kiribati Birth Dose Project Draft Report, WHO Regional Office for the Western Pacific, unpublished data, September 2015

2.2 Evidence-informed policy guiding comprehensive hepatitis action

2.2.1 Viral hepatitis policy and governance

There is no focal person or team responsible for hepatitis in Kiribati. Medical officer Alfred Tonganibeia is in charge of infectious diseases, including HIV and STIs, and at the Ministry of Health and Medical Services, Beia Tapwaia, Manager of the Expanded Programme on Immunization (EPI), is responsible for hepatitis B immunization. The hepatitis B immunization programme is completely funded by the Government of Kiribati, having previously been funded by Gavi, the Vaccine Alliance, and UNICEF. This funding is supplied for childhood immunization only.

The key stakeholders in viral hepatitis in Kiribati are:

- Medical and nursing staff
- Health promotion staff
- EPI and other Ministry of Health and Medical Services staff
- KFHA
- Red Cross
- MTC
- Church and community groups
- WHO

There is no national policy or plan for viral hepatitis. Relevant existing plans include the *National Health Strategic Plan 2012–2015* (and 2016–2019), the *Kiribati Antibiotic Guide 2013* and the *Kiribati National HIV and STI Strategic Plan 2013–2016*. The *National Health Strategic Plan 2012–2015* Objective 3 was to prevent the introduction and spread of communicable diseases, strengthen existing control programmes and ensure Kiribati is prepared for any future outbreaks. The single indicator related to hepatitis within this objective was: number of tests conducted for Hepatitis B and percentage of positive cases, with a target of 12% population tested, but no target for percentage of positive cases *(14)*.

This indicator has been retained in the 2016–2019 strategic plan, with the target raised to 40% of the population tested for 2019 *(15)*.

The *Kiribati Antibiotic Guide 2013* provides guidelines on pre- and post-exposure immunization for hepatitis B. It states that all newborns, health-care workers and sexual partners of HBsAg-positive individuals should receive a full course of the vaccine. Guidelines for testing and immunization after a needle-stick injury based on serology of the health-care worker and patient are also provided *(16)*. The *Infection Control Policy Guidelines 2008* cover prevention of HBV transmission in health-care settings. They state HBV immunization should be offered to all health-care workers who have contact with blood and body fluids, with post-immunization testing for hepatitis B surface antibody (anti-HBs). They provide guidelines for management of blood and body substance exposure, which include blood testing of both health-care workers and patients for HBV and HCV, and additional precautions while working and awaiting serology results. They also cover recommended sterilization procedures for reusable equipment, including autoclaving where available and intermittent boiling where autoclaving is unavailable *(17)*.

2.2.2 Policy implementation

The capacity of the Ministry of Health and Medical Services to implement, enforce and monitor these policies and guidelines varies *(4)*. Many health-care workers are not vaccinated, and there is no testing or vaccination of partners of HBsAg-positive individuals. Visits were made to 10 health facilities to review infection prevention and control practices. To date there has been little, if any, general staff training in infection control guidelines and little enforcement of guidelines. There is one infection control nurse at TCH. In 2013 the hospital began training infection control "link nurses" for each ward to educate other staff. Unfortunately this process was not completed, and many health-care workers interviewed by the review team inside and outside the hospital were not familiar with the infection control policy. There was very limited knowledge of management of a needle-stick injury. Many health-care workers reported they would clean the wound with tap water and then return to work.

Medical staff use single-use needles and vacutainers to collect blood. Sharps and medical waste are disposed of in an appropriate and consistent manner in South Tarawa, with designated collection bags and sharps bins incinerated at TCH. In North Tarawa, this waste is burned in pits behind health clinics. There is a quality-controlled autoclaving system in place for reusable equipment in South Tarawa. The dental clinic reports that strict infection control is maintained with gloves, gowns, masks and eyewear for each procedure. Appropriate sterilizing equipment is lacking on the outer islands. Most staff reported boiling implements in pressure cookers, but others left implements in the sun to dry after soaking them in cold water.

2.3 Data supporting the hepatitis response

2.3.1 Epidemiology and surveillance

Data collection for hepatitis is a major gap. There is no viral hepatitis register or collection of data about HBsAg-positive patients, apart from that collected by the TCH laboratory which collects and tabulates HBsAg results by gender. The TCH Laboratory data include testing from hospital wards, outpatient clinics and health clinics in South Tarawa, voluntary confidential counselling and testing (VCCT) clinics and blood donors. However, testing that takes place at KFHA, MTC and the two hospitals outside South Tarawa is not included. Biochemistry (e.g. liver function tests) and haematology (e.g. full/complete blood count) are not linked. For example, separate request forms are required for liver function and platelet counts. Tests are processed in separate laboratories and returned to clinicians separately. The TCH laboratory data collection is almost completely paper-based. There has been a database for blood donor results since 2014, but limited results have been entered into it. Computer and database performance issues have limited its use.

Data from clinical diagnoses of hepatitis and cirrhosis are also extremely limited. The Ministry of Health and Medical Services HIS collects and analyses health data. There are two separate systems in use, one for hospital discharge data and the other for community data. Each community health clinic and outpatient hospital clinic completes monthly reporting MS1 forms which are returned by car or boat to the HIS. These forms detail births, deaths, diagnoses, and numbers and types of clinic visits. A limited number of possible diagnoses are provided and information is requested for a limited number of chronic conditions (tuberculosis, diabetes and hypertension). There is no category for reporting viral hepatitis, cirrhosis or liver disease on these forms. Very limited information

is collected from ward discharge forms. Patient demographic details, ward discharge dates and diagnoses are entered into an electronic database by medical records coders, and can be viewed and extracted by HIS. There is no reporting or investigation of hepatitis outbreaks.

2.3.2 Laboratory capacity and quality control

The main laboratory in Kiribati is at TCH. There are smaller laboratories at the hospitals on Kiritimati Island and North Tabiteuea and the MTC. Another small laboratory is under construction at Betio Hospital and was due for completion at the end of 2015. HBsAg testing is done at all these laboratories, while anti-HCV antibody testing is carried out at TCH, Kiritimati and MTC. The TCH Laboratory provides HBsAg and anti-HCV antibody rapid test kits to other Laboratories and to KFHA. No other hepatitis serology is available in Kiribati. There are significant resource constraints at the TCH laboratory. For example, there is a single biochemical analyser which can be operated by three of the 18 laboratory staff, and requires maintenance twice per week. A second biochemistry analyser was to arrive in October. There are two haematology analysers, of which only one is functioning, which can be operated by around half the staff. There are several biomedical technicians at the hospital who do maintenance with online support from manufacturers. Tests are referred to other external laboratories as detailed in Table 3.

Table 3. Tests referred outside Kiribati

Test referred	Laboratory
HBeAg (anti-HBs, anti-HBc)	Suva Private (Fiji)
HBV DNA, HCV RNA	Mataika House (Fiji)
Pathology samples	Queensland Health (Australia)
HIV confirmation tests	Victorian Infectious Diseases Reference Laboratory (VIDRL) (Melbourne, Australia)

Source: Ministry of Health and Medical Services

Laboratory supplies are ordered electronically and delivered by air freight. Staff report occasional stock-outs but records are not kept. The laboratory has a written policy on quality control, with many aspects implemented. Every quarter they receive and run control specimens from manufacturers. Rapid tests have built-in quality control. The Pacific Paramedical Training Centre provides remote assistance to the laboratory, and does annual quality control checks on-site, while VIDRL is the official reference laboratory for serology. The quality of refrigeration for specimens has been an issue. A refrigerator donated by UNICEF works well, but others frequently break down. The quality-control policy states that refrigerator temperatures should be checked and recorded daily, but this is inconsistently implemented. Referred specimens are packed and shipped according to International Air Transport Association protocols in boxes provided by the HIV programme. Please refer to Table 3 above for the specific referral laboratories. One to two staff members are certified in this process for a period of two years at a time.

2.3.3 Research

There is no ongoing viral hepatitis research in Kiribati. Several serosurveys in children have been carried to verify hepatitis B immunization targets, most recently in 2014, but no adult serosurveys have been completed since the early 2000s.

2.4 Stopping transmission

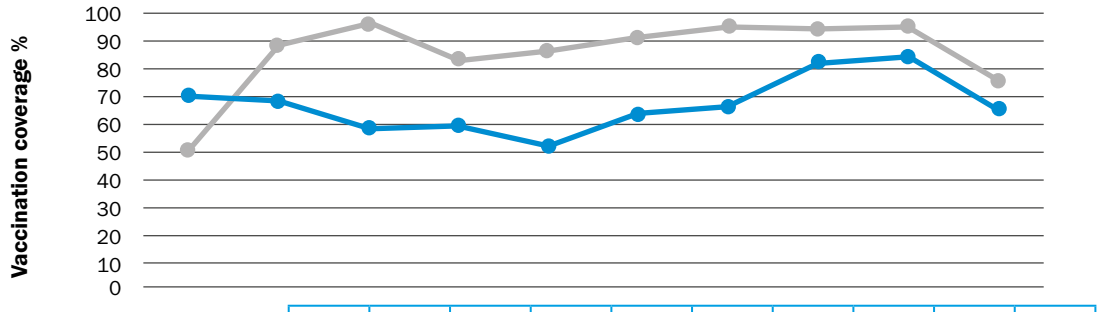
2.4.1 Prevention of mother-to-child transmission

Antenatal care in Kiribati is provided by nurses, midwives and medical assistants through health clinics, with referral to the TCH obstetric clinic for complicated pregnancies. According to the 2009 Demographic and Health Survey (DHS), 70% of women are seen by a skilled health attendant at least four times during their pregnancy, with only 36% seen before their fourth month *(18)*. When pregnant women book to deliver in South Tarawa they are offered blood tests including full blood count (haemoglobin, white blood cells and platelets) (FBC), HIV, syphilis and HBV. Some women do decline HBV testing. Women with HBV are encouraged to deliver in a hospital to facilitate administration of birth dose vaccine within 24 hours. There is no HBV immunoglobulin in Kiribati. Clinics do not keep a record of mothers with HBV, but some were aware of their numbers, with Bairiki Clinic reporting three of 34 pregnant women known to have hepatitis B.

2.4.2 Immunization

The national immunization schedule stipulates children should be routinely immunized for hepatitis B at birth, six weeks, 10 weeks and 14 weeks *(16)*. Vaccines are given at clinics or community *maneaba*. In 2013, the nationally reported three-dose immunization coverage was 95% and the timely birth-dose coverage (less than 24 hours) was 84%.[12]

Figure 7. Hepatitis B infant vaccination programming in Kiribati, birth dose and three-dose coverage 2005–2014



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
hepatitis B birth dose	70	68	58	59	52	63	66	82	84	66
hepatitis B three-dose	50	88	96	83	86	91	95	94	95	75

Source: WHO/UNICEF estimate for immunization coverage 2015

[12] Kiribati Birth Dose Project Draft Report, WHO Regional Office for the Western Pacific, unpublished data, September 2015

There is no recall system. Paper notes for each child are kept and opportunities for delivery of catch-up vaccines are built into weekly timetables. There are gaps in this service including mothers who deliver at home and families without contact with the health service.

Mothers who deliver at home

The 2009 DHS found that 66% of women delivered in a health facility *(18)*. In 2014 it was estimated that 82% of deliveries occurred in a health facility. Delivery at home is more common in outer islands. For example during the Kiribati Birth Dose Project in 2014, 12% (36 out of 306) of infants in South Tarawa were born at home, while 42% (37 out of 88) of infants in the outer islands were born at home.[13] The reasons for home delivery vary. For example it is more common in North Tarawa due to fear and embarrassment. In South Tarawa it is less common but still occurs due to maternal choice or lack of transport to hospital.

If local clinic staff are aware of the delivery, they attend to administer the birth doses as soon as possible, but in many cases this is delayed by several days. In the Kiribati Birth Dose Project, coverage increased from 70% to 84% in South Tarawa, and from 49% to 75% in the outer islands.

Families and individuals who do not attend a clinic, or do not attend on time

Nurses can be reluctant to administer vaccines outside recommended intervals, for example, if a child presents at 6 months it is not given hepatitis vaccine.

In order to increase three-dose immunization and birth-dose coverage, WHO undertook a project in 2014 with 16 health clinics across Kiribati to increase supply and demand for hepatitis B birth dose (Box 1).

Box 1. Kiribati Birth Dose Project

The WHO Regional Office for the Western Pacific undertook a project in 2014 with 16 health clinics across Kiribati to increase supply and demand for hepatitis B birth dose.

The project involved training workshops with health-care workers who then conducted monthly education sessions with pregnant women on hepatitis B birth dose and meetings to increase links between health facilities and communities including with traditional birth assistants and volunteers. Surveys of knowledge and behaviour were conducted before and after the interventions, and immunization coverage was calculated from the surveys. A total of 759 caretakers were interviewed at baseline and 394 at follow-up.

The project resulted in an increase in timely birth dose from 81% at baseline to 93% at follow-up. The timely birth dose coverage increased from 89% to 95% in South Tarawa from 57% to 83% in the outer islands.

Many health-care workers have not been immunized for hepatitis B. In 2007, a survey of hepatitis B prevalence was done of health-care workers in Kiribati. Of 366 tested, 15.6% were found to be HBsAg positive. Health-care workers who tested negative were subsequently offered immunization, but coverage with the full course of three immunizations was low (31%). The results of this survey are presented in Table 4.

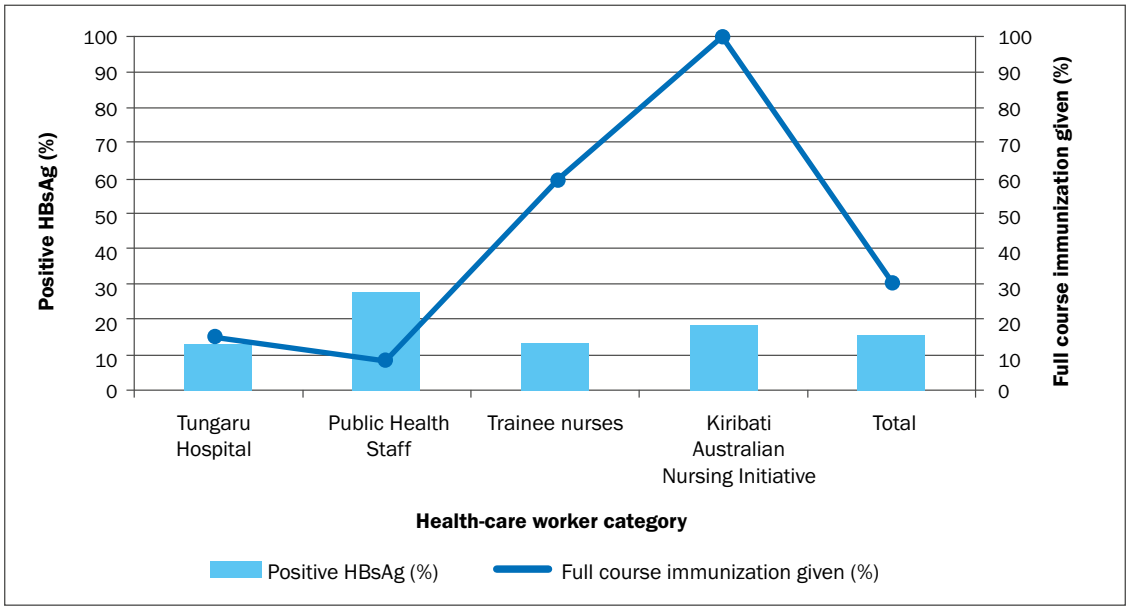
[13] Kiribati Birth Dose Project Draft Report, WHO Regional Office for the Western Pacific, unpublished data, September 2015

Table 4. Kiribati health-care worker HBsAg survey, 2007

Health-care worker category	Number employed	Number tested	Positive HBsAg % (n)	Negative HBsAg (n)	Full course immunization given (%)
Tungaru Hospital	291	210	12.9% (27)	183	14.5% (25/174*)
Public health staff	51	51	27.5% (14)	37	8.1% (3/37)
Trainee nurses	96	67	13.4% (9)	58	58.6% (34/58)
Kiribati Australian Nursing Initiative	40	38	18.4% (7)	31	100% (31/31)
Total	478	366	15.6% (57)	309	31% (93/300)

*Of those 183 negative, five were deemed low risk and four had hepetitis B surface antibody (HBsAb)
Source: Ministry of Health and Medical Services

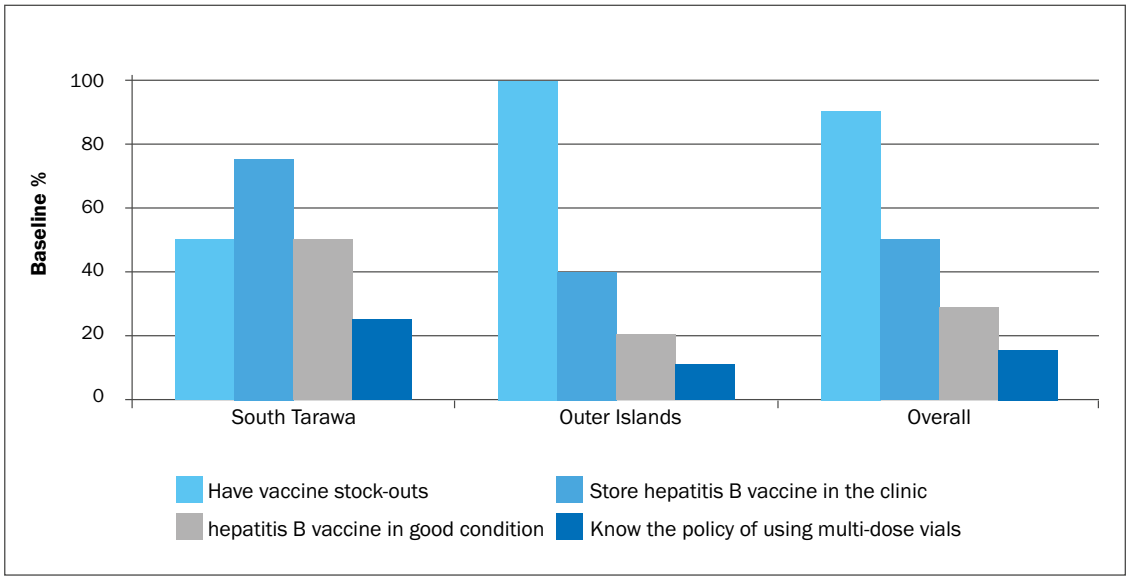
Figure 8. Kiribati health-care worker HBsAg survey 2007



Source: Ministry of Health and Medical Services

There is no testing or immunization of partners of HBsAg-positive people. MTC trainees are tested for HBsAg on admission, and immunized if negative, but HBsAg-negative seafarers are not routinely offered immunization. There are difficulties with vaccine transport and storage. Of 105 health clinics in Kiribati, only 40 have functioning vaccine refrigerators. Some refrigerators do not have thermometers, or their temperature is not regularly checked. Others frequently break down. Bairiki Clinic in South Tarawa has a functioning refrigerator, but has recently been subject to three days of power cuts. Some larger clinics have back-up generators for such situations, for example Temanoku Clinic in South Tarawa. Vaccine stock-outs were reported by several clinics, but not documented.

Figure 9. Vaccine management at health facilities (Kiribati Birth Dose Project 2014)



Source: Kiribati Birth Dose Project Draft Report, WHO Regional Office for the Western Pacific, unpublished data, September 2015

Hepatitis testing in the private sector is common. For example, the MTC trains seafarers, cooks and shipmates for international employment. It receives funding from the Government, aid organizations and industry partners (Box 2).

Box 2. Kiribati Marine Training Centre (MTC)

The MTC trains seafarers, cooks and shipmates for international employment. It receives funding from the Government, aid organizations and industry partners. There are currently 130 trainees. There has been a medical clinic on-site since 2008 with a small laboratory and X-ray facilities. Prospective trainees undergo medical assessment including HIV, HBV and syphilis tests. If positive for HBV they are not permitted to train. If negative, they receive a course of HBV vaccination.

The clinic also sees trained seafarers who require visas before overseas deployment. If a seafarer tests HBsAg positive, they have liver function tests. HBsAg-positive seafarers can continue working unless they have abnormal liver function tests. No further referral or follow-up is arranged, and the clinic does not record HBsAg-positive seafarers. HBsAg-negative seafarers are not routinely offered immunization. The laboratory keeps records of numbers of HBsAg tests, as required by HIS.

2.4.3 Blood safety

The TCH Laboratory screens blood from potential donors for HBV, HCV, HIV and syphilis before blood donation. HIV-positive patients are referred for counselling, but those with hepatitis are not. Blood is stored at the TCH laboratory but transfused “vein-to-vein” in the outer island hospitals after screening. The Kiritimati laboratory does the same screening as TCH, but the Southern Kiribati laboratory has no HCV test kits, and therefore does not screen blood donors for HCV.

2.4.4 Tattooing

Non-professional tattooing is common in the community, prisons and also among school students who tattoo each other with school names and emblems. This could be an ongoing source of hepatitis transmission.

2.4.5 Safe sexual practices

Limited reported condom use and the high prevalence of STIs suggest that sexual transmission could be a source of hepatitis transmission. In the DHS, of those people who reported having two or more sexual partners, 29% of males and 4% of females reported condom use *(18)*, while 11% of women and 6% of men aged 15–49 reported having had an STI in the past 12 months. People with HBV are not routinely provided with advice about safe sexual practices.

2.5 An accessible and effective treatment cascade

While there is a substantial amount of HBsAg testing carried out, there is a lack of coordination in collating results and no link to further evaluation of liver disease, including staging. There are no routine checks for adults. In general, those seeking care for hepatitis present late with liver-related complications of chronic hepatitis infection.

2.5.1 Testing

HBsAg testing takes place at hospital laboratories, KHFA and the MTC. All testing is performed with Alere Determine rapid test kits. Indications for testing include: MTC entry and subsequent seafarer travel, antenatal screening, visas, patient concern, and liver-related symptoms. Hepatitis C testing with Standard Diagnostics Bioline rapid test kits is carried out at TCH and Kiritimati hospital laboratories. MTC tests for blood donor screening and visa purposes only. There is no hepatitis A or D testing at this time. Testing for HIV, HBV and syphilis is performed on a confidential basis for antenatal women and anyone else who requests testing at VCCT services. It is offered by trained nurses at a number of clinics in South Tarawa. Counselling provided around hepatitis B is minimal, as this service focuses primarily on HIV.

There is no blood testing performed in North Tarawa. Laboratory and clinical staff report that this is also the situation in the outer islands. Limited point-of-care testing is available for other conditions. For example, diabetes is diagnosed and monitored with health centre capillary glucose measurements. People needing blood tests from the outer islands are required to travel by boat to the nearest hospital laboratory for testing. There are also transport issues in South Tarawa. There is no official transport for samples to be taken from Betio Hospital to TCH for example, and there is therefore no control of how samples are kept during transit to TCH.

2.5.2 Key populations in Kiribati

There is very limited screening carried out in high-risk groups. No testing for hepatitis is carried out for prisoners, men who have sex with men (MSM) or sex workers.

While testing is available, linkage to care remains poor, discouraging people from seeking testing. Box 3 provides an example from the Kiribati Family Health Association.

Box 3. Kiribati Family Health Association (KFHA)

KFHA is part of the International Planned Parenthood Federation. It is a nongovernmental organization with one clinic in South Tarawa and several groups of volunteers on the outer islands. It conducts education and awareness programmes on HIV, STIs and teen pregnancy; distributes condoms; and provides STI testing, cervical screening and first antenatal visits. It runs a number of programmes funded by different donors, including the New Zealand Aid Programme, Annual Action Programme and the Pacific Community. Many young people attend this clinic rather than the village public health clinics. HIV, syphilis and HBsAg testing is done on-site by a laboratory scientist using rapid test kits supplied by TCH. Many people opt not to have HBsAg testing as there is no available treatment. At the KFHA clinic in July 2015 there were four positive sample of 24 HBsAg tests conducted in that month (17% positivity rate), while in August there were three positive samples of 17 test conducted (18% positivity rate). No follow-up is arranged for these patients.

Prisoners

Four prisons in Kiribati, three for men and one for women, hold a total of 120 prisoners. Betio Prison is the largest of these, with 60 prisoners, most of whom are serving life sentences. Prisoners are housed in two large dormitories. There is no medical service, screening or vaccination for prisoners or staff. Staff were not aware of their own or prisoners' hepatitis status.

Men who have sex with men

There are no specific services for MSM, and very little data is available on this group *(10, 19)*. Sex between males is prohibited by the Kiribati Penal Code, but not enforced *(20)*. In a non-representative UNICEF survey of 363 "high-risk" young people aged 15–24 years in 2008–2009, 35% of sexually active males reported ever engaging in sex with another male, and 83.4% unprotected *(21)*. KHFA is reported to have identified a small number of MSM and provided education, condoms and HIV testing (30 identified and 12 tested for HIV) *(10)*.

Sex workers

There is no organized sex industry in Kiribati. Sex work itself is not illegal, but soliciting in public, keeping a brothel and living on prostitution earnings are criminal offences *(20)*. In the DHS, 5% of men aged 15–49 years had paid for sex in the past year *(18)*, and in a 2008 survey of Betio youth, 27% reported having participated in sex involving exchange of cash or goods in the past year *(22)*. Young women engage in sex work at nightclubs and kava bars, and a group known as *ainen matawa* board foreign fishing vessels and engage in sex with foreign seafarers for money and goods. There are estimated to be 80 *ainen matawa* in South Tarawa and 50 on Kiritimati Island *(23)*. These women have been identified as a high-risk group for HIV *(23)*. KFHA outreach activities, including education, condom promotion and HIV and STI testing, reach some sex workers in South Tarawa.

People who inject drugs

Injection drug use is not considered to be an issue in Kiribati. The *Global AIDS Response Progress: Kiribati Country Progress Report 2014* states that there are no reported or visible cases of injecting drug use in Kiribati *(10)*. However, UNICEF's survey found that some *ainen matawa* used injection drugs while working on ships *(21)*.

2.5.3 Staging and linkage to care

There is very little liver disease staging of patients with hepatitis B in Kiribati. Laboratory staff report that HBeAg and HBV DNA tests are ordered infrequently, but records of each referred test were not available. Liver function tests and FBCs are not routinely ordered for patients with HBV. Patients are advised of their diagnosis, given basic advice and the suggestion to see a local healer. They are not routinely followed up, with medical care confined to symptomatic patients when they present to a clinic or hospital with liver-related complications of chronic hepatitis infection.

Health clinics manage a range of acute and chronic medical presentations. The most common chronic conditions are diabetes and hypertension. These patients are seen monthly for review and medications if well, or more often if there are problems. The health clinic staff adhere to the WHO Package of Essential Noncommunicable Disease Interventions for Primary Health Care in Low-Resource Settings (PEN) algorithms. Chronic hepatitis care could be managed in this way; however, medical facility resources are already stretched to capacity. The TCH outpatient clinic is staffed by one medical assistant who sees 200 patients per day. Approximately 50 of these people are referred to see the single doctor. Temanoku and Takoronga clinics in South Tarawa provide care for around 4800 and 5700 people respectively per year , with a single medical assistant and two nurses seeing more than 100 patients per day in each clinic. The medical inpatient ward at TCH has 22 beds, with any overflow staying in or outside the emergency department.

2.5.4 Treatment

There is no antiviral treatment for chronic hepatitis B or C available in Kiribati at this time. During the mission, a medical assistant in South Tarawa commented to the review team: "Hepatitis B is a death sentence in our country."

2.5.5 Medicines procurement

An official National Medicines Policy was created in 2010 but has not yet been launched *(24)*. Kiribati is not a member of the World Trade Organization, but legal provisions granting patents to manufacturers of pharmaceuticals and supplies do exist *(24)*. The Pharmacy Department at the Ministry of Health and Medical Services is the sole importer of medicines. Procurement is based on prequalification of suppliers and the WHO Certification Scheme on the Quality of Pharmaceutical Products Moving in International Commerce *(24)*. Medications are procured via tender from medical wholesale organizations and distributors rather than directly from manufacturers. Current distributors to Kiribati are Imres (Netherlands), South Austral, Anspec and Boucher Muir (Australia), and Makan (Fiji). The Global Fund to Fight AIDS, Tuberculosis and Malaria finances HIV medications, the Global Drug Facility funds tubercolosis medications, and the United Nations Population Fund contributes funding for contraceptives. The remainder of medication funding is supplied by the Kiribati Government. The National Medicines and Therapeutics Committee (NMTC) selects medications for the National Essential Medicines List. Medications listed in the essential medicines list are provided free of charge to patients.

2.5.6 Medicines stock management

The Pharmacy Department has a central medical store at TCH that supplies most of South Tarawa and all outer islands. A smaller pharmacy in Betio Hospital distributes to Betio Hospital and clinics. There are no private retail pharmacies, and all medications are dispensed by hospital pharmacies and health clinics. Medications are managed in clinics by medical assistants and nurses, who receive little formal medication management instruction during their training. While there is no mandatory continuing education in medicines for health staff, the Pharmacy Department does provide some training and has produced guidelines to assist staff with medication management *(24)*.

Medications are ordered by email each month and shipped to South Tarawa. Small orders and vaccines are airfreighted. Medications are ordered using paper forms from Tarawa or via radio from the outer islands, and delivered by car or boat. There are several challenges in the delivery and distribution of medications. Late shipments and unpredictable variations in consumption lead to stock-outs, and human resources for pharmacy services are stretched.

There are four pharmacists in Kiribati, all in South Tarawa, six pharmacy assistants at TCH, and two in the outer island hospitals. The Pharmacy Department suspects that medication guidelines are inconsistently followed, but given resource constraints further education and training on guideline adherence are not possible.

2.5.7 Ensuring access to hepatitis B medicines

The key steps for introducing effective hepatitis B medications to Kiribati were discussed at the technical meeting on 26 August 2015. They are:

1. Medicines
   a) A new medication must be approved by the NMTC, which includes the Director of Health Services, the chief pharmacist, the accountant and the relevant medical specialist.
   b) A proposal to introduce a new medication, including rationale and economic analysis, is submitted to the NMTC for review by the relevant department.
   c) The NMTC endorses a new medication and approves the budget for it.
   d) The pharmacy calculates how much to order. The proposed order is taken to the Senior Management Committee for review and final endorsement.
2. Workforce
   a) Prescribers and nurses need education about the medication.
   b) Participants suggested that medications should initially be prescribed only by the infectious diseases consultant at the referral hospital. Once this system is in place and functioning, treatment could be rolled out to other centres.
3. Guidelines
   a) Hepatitis B treatment guidelines could be incorporated into guidelines for HBV within the Kiribati Antibiotic Guidelines 2013, in parallel with the medication approval process.

The outer islands provide specific challenges to delivering hepatitis prevention, care and treatment. These are discussed in Box 4.

Box 4. Challenges to hepatitis prevention, care and treatment in the outer islands

Some 50% of Kiribati's population lives on the outer islands. Although separated only by a lagoon, North Tarawa is generally considered one of the outer islands. The review team visited three North Tarawa clinics. More than 6000 people live in North Tarawa. There are four health clinics, each staffed by one nurse and one nurse aide, with one medical assistant based at the largest health clinic in the capital Abaokoro. This clinic serves 1085 people covering four villages. Clinics provide general medical services, antenatal and postnatal care, childhood immunizations and education programmes. The most common conditions are diabetes and hypertension, managed according to PEN protocols including capillary glucose testing for diagnosis and monitoring of diabetics. MS1 forms reporting on diagnoses, deliveries, programmes and immunizations are delivered monthly by boat to the Ministry of Health and Medical Services.

Key challenges to hepatitis prevention care and treatment in this setting are:

- there is only one solar-powered refrigerator for vaccines at Abaokoro;
- no blood testing is performed on the island, so patients must travel to South Tarawa;
- antenatal care includes clinical assessment only;
- most women give birth at home; and
- there is no running water in the health clinics.

Staging and monitoring patients with hepatitis would require access to medical and laboratory services, which is not possible on-site in North Tarawa.

3. RECOMMENDATIONS

3.1 Broad-based advocacy and awareness

1. There is a need to raise awareness on hepatitis transmission and prevention among health professionals and community members.

2. The support of church groups and community leaders is needed to encourage comprehensive action on hepatitis. This could be facilitated by involving members as key stakeholders in discussions on hepatitis action.

3. Activities on World Hepatitis Day should be expanded to include information on seeking testing and follow-up for adults.

3.2 Evidence-informed policy guiding comprehensive hepatitis action

1. A national focal point for hepatitis should be established.

2. A national hepatitis action plan should be developed based on the *Regional Action Plan for Viral Hepatitis in the Western Pacific 2016–2020*. This should be incorporated into the National HIV and STI Strategic Plan. Technical assistance from WHO will be required to support this process.

3. The national action plan should include targets for the proportion of HBsAg-positive individuals linked to staging, follow-up and treatment, as well as numbers tested (hepatitis B treatment cascade).

4. The national action plan should be implemented in a phased manner beginning with South Tarawa.

5. Existing policies and guidelines to reduce hepatitis transmission should be implemented, enforced and monitored.

3.3 Data supporting the hepatitis response

1. There is an urgent need to collate existing hepatitis testing data. Technical assistance from WHO will be needed.

2. Coordination of biochemistry, haematology and serology results at the laboratory level is needed to facilitate staging, follow-up and reporting data for estimating the hepatitis B treatment burden.

3. Positive HBsAg testing should trigger reflex testing of aspartate aminotransferase (AST) and platelets for aspartate aminotransferase-to-platelet ratio index (APRI) calculation.

4. Improvements to data collection should be made by building on existing reporting systems. This could include:

    a) expansion of the MS1 form to include hepatitis and cirrhosis;
    b) reporting of positive and negative hepatitis tests from all laboratories to HIS; and
    c) requirement for laboratories or clinicians to report age, stage and gender of HBsAg-positive individuals to HIS.

3.4 Stopping transmission

1. Existing policies on immunization of health-care workers and close contacts of patients who are known to have hepatitis B should be implemented.

2. Existing infection control policies for health clinics should be implemented and enforced.

3. People who test negative for HBsAg should be offered immunization. In particular, HBsAg-negative seafarers should be offered immunization.

4. All blood donations should be screened for anti-HCV antibody. HCV test kits should be provided to all hospitals involved in blood donation.

5. Education on the risks of non-professional or traditional tattooing should be provided to the community.

3.5 An accessible and effective treatment cascade

Screening

1. Consideration should be given to identifying and screening high-risk groups including MSM, sex workers and prisoners for hepatitis. KFHA reaches some members of these communities and could expand services to offer hepatitis B testing and vaccination.

2. There is a need to introduce hepatitis screening and follow-up to the outer islands.

3. High prevalence of obesity and hyperlipidaemia could be important cofactors in liver disease progression. Screening for non-alcoholic steatohepatitis and non-alcoholic fatty liver disease could be introduced to understand the disease burden contribution, given high levels of obesity in Kiribati.

Treatment

1. HBsAg-positive patients should be linked to care and treatment.

2. As a priority, tenofovir with or without entecavir should be included in the national Essential Medicines List through approval by the National Medicines and Therapeutics Committee. WHO should support this process.

3. An affordable supply of generic tenofovir with or without entecavir should be sourced, including through existing distributors.

4. Guidelines for the treatment of hepatitis, based on WHO guidelines, should be developed and could be included in the HBV section of the *Kiribati Antibiotic Guidelines 2013*.

5. Phased implementation of HBV treatment with WHO-recommended antivirals could initially commence at TCH, then be rolled out in a phased manner to other health facilities and islands. A costing of this initiative will be necessary.

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