

# Essential components in developing public policy to control viral hepatitis: lessons from Taiwan

Jack Wallace<sup>1</sup> · Marian Pitts<sup>1</sup> · Stephen Locarnini<sup>2</sup> · Jeanne Ellard<sup>1</sup> · Marina Carman<sup>1</sup> · Ding-Shinn Chen<sup>3</sup>

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## Abstract

**Background** Over 500 million people are estimated to be infected with chronic viral hepatitis with an increasing burden resulting from the infections. In 2010, the World Health Organization recommended national governments develop effective strategies to reduce the global impact of viral hepatitis. Taiwan, to support the implementation of the world's first national vaccination program, developed the first of a series of 5-year national strategies in 1982. Our study sought to identify the essential constituents of

the strategic response to chronic viral hepatitis in Taiwan, which could then be used by other governments to inform best practice in strategy development.

**Methods** Semistructured qualitative interviews were conducted with key participants involved in the national response to viral hepatitis in Taiwan ( $n = 26$ ) and a review of the literature.

**Results** The development of a national strategic response is one of several factors in reducing the burden of viral hepatitis in Taiwan. Other critical factors are effective health services, a prioritization of disease prevention, government funding of science and technology, and sustained advocacy informed by a rigorous evidence base. While there has been significant policy, structural and financial commitment to reduce the burden of related to viral hepatitis, essential challenges remain.

**Conclusions** Taiwan's viral hepatitis policy response focuses on clinical interventions and would be strengthened by a broader involvement of interdisciplinary stakeholders, including people with viral hepatitis, and stronger coordination between the policy and government agencies responsible for their implementation.

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✉ Jack Wallace  
J.Wallace@latrobe.edu.au

Marian Pitts  
M.Pitts@latrobe.edu.au

Stephen Locarnini  
Stephen.Locarnini@mh.org.au

Jeanne Ellard  
J.Ellard@latrobe.edu.au

Marina Carman  
M.Carman@latrobe.edu.au

Ding-Shinn Chen  
chends@ntu.edu.tw

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<sup>1</sup> Australian Research Centre in Sex, Health and Society, La Trobe University, 215 Franklin Street, Melbourne, VIC 3000, Australia

<sup>2</sup> Research and Molecular Development, Victorian Infectious Diseases Reference Laboratory, WHO Regional Reference Laboratory for Hepatitis B, Doherty Institute, 792 Elizabeth Street, Melbourne, VIC 3000, Australia

<sup>3</sup> Department of Internal Medicine, Genomics Research Center, Academia Sinica, National Taiwan University Hospital and College of Medicine, Taipei, Taiwan

## Background

Viral hepatitis is recognized as a global disease requiring country-level interventions [1] to reduce its social, health and economic burden. The burden of chronic viral hepatitis lies disproportionately within the Asia Pacific region with an estimated 75 % of the over 500 million people chronically infected with hepatitis living in this region.

Despite the increasing mortality and morbidity arising from viral hepatitis and associated liver diseases, few national governments have developed a national policy response [2]. The reasons for this include limited surveillance, poor public awareness and a lack of advocacy in comparison with other infectious diseases [3] as well as a lack of knowledge and awareness about chronic viral hepatitis on the part of health care and social service providers [4].

In 2012, the World Health Organization (WHO) recommended that national governments “develop a written national strategy ... that focuses exclusively or primarily on viral hepatitis.” The WHO strategic response to reducing the global burden of viral hepatitis, *Prevention and Control of Viral Hepatitis Infection: Framework for Global Action* [5], uses four ‘axes’ to guide policy responses:

1. Raising awareness, promoting partnerships and mobilizing resources
2. Evidence-based policy and data for action
3. Prevention of transmission
4. Screening, care and treatment

Taiwan is recognized for its pioneering role in reducing the burden of viral hepatitis. Research from Taiwan identified the link between hepatitis B and cancer [6], hepatitis B transmission from mother to child [7], how this transmission can be reduced [8] and the success of a population-level vaccination program [9, 10]. Taiwan initiated viral hepatitis public policy in 1982 to support the world’s first national hepatitis B vaccination program.

In spite of this activity, significant challenges in the Taiwan response to viral hepatitis remain. The Taiwan Centers for Disease Control (CDC) report approximately 2.5 million people living with chronic hepatitis B (surface antigen positive) and 700,000 people with hepatitis C (RNA positive) [11] in a population of over 23 million people. Hepatitis B and hepatitis C virus infections are the major causes of cirrhosis, hepatocellular carcinoma (HCC) and other liver diseases, which together constituted the eighth leading cause of death in Taiwan in 2011. Hepatitis B accounts for 1 % of the total inpatient expenditure [12], with significant socioeconomic savings expected to result from its successful control [13]. People with viral hepatitis have a poor understanding of the infection, with only a minority accessing timely clinical management [14].

Taiwan was the focus of this study given its viral hepatitis prevalence, public policy experience, a civil society, a hepatitis policy and clinical infrastructure. The project sought to identify the various structures, enablers and barriers to the development of a strategic viral hepatitis

policy. Findings from this assessment are intended to inform the ongoing response within Taiwan and to support national government’s identification of components of effective public policy to reduce their burden of viral hepatitis.

## Materials and methods

The Coalition to Eradicate Viral Hepatitis in the Asia Pacific is a nongovernment organization aiming to reduce the burden of viral hepatitis, and commissioned the Australian Research Centre in Sex, Health and Society to conduct this research.

The research was conducted in two stages: qualitative semistructured interviews and a desk-based literature review.

Semistructured qualitative interviews were conducted with 26 key Taiwan-based participants (TW1–TW26) identified through their participation in the Taiwan Association for the Study of the Liver and after an Internet search of professionals working in public health, communicable diseases or public policy advocacy in Taiwan, or referral from another participant. Information was sought on the Taiwan health policy infrastructure including funding and policy arrangements; clinical organizations and structures and formal and informal participants in, and drivers of, hepatitis-related policy including academic and nongovernment organizations. Most interviews were held in English with a Mandarin-speaking interpreter available when required.

Interviews were audio recorded, transcribed, de-identified and verified with transcripts analyzed using Nvivo 10 (QSR International Pty., Ltd., VIC, Australia) by organizing data into codes in which main themes were identified.

Data gathered during stage two was desk-based and focused on publicly available policy responses, with documents translated when necessary. Most policy fell, although not exclusively, within the responsibility of health authorities and included:

- Primary prevention programs including public education campaigns, vaccination, needle and syringe distribution programs, blood supply safety and antenatal care
- Secondary prevention including testing, screening, diagnosis, notification and reporting of hepatitis B and hepatitis C
- Access to treatment, and coordinated and strategic activities seeking to improve access to treatment
- Links to other health, social and economic policy areas including maternal health, human rights and cancer prevention

## Results

These results are described by using the four axes of the WHO *Prevention and Control of Viral Hepatitis Infection: Framework for Global Action* [5]. These axes provide a framework in which achievements and key challenges in policy development and implementation can be assessed (Table 1).

### Raising awareness, promoting partnerships and mobilizing resources

The development and implementation of viral hepatitis strategies in Taiwan exist as much as a result of political and social factors as evidence-based medicine.

Viral hepatitis-related activity, including prevention and clinical management, is the responsibility of the Division of Acute Infectious Diseases and Immunization within the CDC. This division develops communicable disease control strategies and supervises, directs and evaluates programs conducted by local health authorities.

Informants identified several factors shaping the political context for the viral hepatitis response in Taiwan. These included the transition from a low to a high income country providing the economic resources to reduce the burden of viral hepatitis (*TW1*, *TW2*, *TW14*), political leaders being infected with hepatitis (*TW3*), recognition of prevention being more cost effective than treatment (*TW3*), and the pride associated with the pioneering role that Taiwan had

**Table 1** Essential components of an effective strategic policy response to viral hepatitis in Taiwan

WHO Axes	Achievements	Challenges
Raising awareness, promoting partnerships and mobilizing resources	<ul style="list-style-type: none"> <li>Effective health infrastructure</li> <li>A policy response is developed for viral hepatitis</li> <li>Regular awareness campaigns</li> <li>Sustained advocacy supported by government advisory structures</li> <li>Prevention is seen as essential</li> </ul>	<ul style="list-style-type: none"> <li>Involving people with viral hepatitis in advisory structures</li> <li>Lack of public awareness of the link between hepatitis and liver cancer</li> </ul>
Evidence based policy and data for action	<ul style="list-style-type: none"> <li>Research from Taiwan essentially changed understanding of hepatitis</li> <li>Effective surveillance systems exist</li> <li>5-year action plans since 1982 are revised in response to changes</li> <li>One authority is responsible for implementing the action plan</li> <li>Whole of government responses to viral hepatitis initiated</li> </ul>	<ul style="list-style-type: none"> <li>Lack of research looking at the social impact of viral hepatitis</li> <li>Lack of systematic research addressing barriers to screening and clinical management</li> <li>Incorporating perspectives of people with viral hepatitis in policy</li> <li>Government responses are effectively coordinated</li> </ul>
Prevention of transmission	<ul style="list-style-type: none"> <li>Taiwan was the first to implement a national hepatitis B vaccination program</li> <li>Pregnant females are screened</li> <li>Immunoglobulin for at-risk infants</li> <li>A secure blood supply</li> <li>Access to sterile injecting equipment</li> <li>Infection control guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Access of people who inject drugs to health services</li> <li>Infection control outside of health centers</li> <li>Duration of hepatitis B vaccine efficacy</li> <li>Lack of hepatitis C vaccine</li> </ul>
Screening, care and treatment	<ul style="list-style-type: none"> <li>Economic barriers to clinical services are minimal</li> <li>Screening for people over 45 years</li> <li>Funding for treatment improves access</li> <li>Appropriate hepatitis treatment criteria</li> </ul>	<ul style="list-style-type: none"> <li>Most people with viral hepatitis are not diagnosed</li> <li>Little information at diagnosis</li> <li>Copayments for hospital care</li> <li>All people with viral hepatitis and health care workers are aware of clinical management changes</li> <li>Treatment is primarily accessed through specialist services</li> <li>Most people with viral hepatitis are not clinically managed</li> <li>Limited access to clinical services for people who inject</li> </ul>

in eradicating malaria (TW3), and a political focus on biotechnology (TW2, TW3, TW5).

Several participants (TW5, TW9, TW12, TW21) described a staggered process in gaining policy support from the government for hepatitis with advocacy successes being described as a *struggle*. One informant reported that *we struggled maybe for more than 10 years until we convinced the government to reimburse the treatment for chronic hepatitis B and hepatitis C* (TW9), while another noted the progressive nature of expanding government policy that required advocacy that was *step by step progressive* (TW5).

A key strength supporting the Taiwan response to viral hepatitis is the existence of a comprehensive health system architecture (TW1, TW3, TW13, TW14). This infrastructure was established by the Japanese during their colonization and includes local community health centers located in *each county, each village* (TW1); the development of the Tropical Medicine Research Centre, the predecessor of the National Taiwan University, and policy focusing on the eradication of diseases such as malaria, plague and tuberculosis.

There are few economic barriers to the Taiwanese health system with a mandatory premium-financed health insurance system established in 1995 [15]. Copayments are required to access clinical services, and while limited, several participants noted that these payments could potentially reduce access (TW11, TW12, TW17, TW20, TW23, TW25).

Three participants were concerned about a developing complacency within the government in relation to viral hepatitis (TW2, TW5, TW12, TW14), particularly given the success of the hepatitis B immunization program, with one participant concerned that *people don't think (viral hepatitis is) an infectious disease* (TW1). The risk of this complacency for the viral hepatitis program was thought to include decreasing support and resources for the continued development of the program.

### Evidence-based policy and data for action

Several participants described the development of a national strategy and the national hepatitis B vaccination program occurring as a result of research led by Dr. Palmer Beasley in identifying liver cancer incidence among Taiwanese government employees (TW2, TW3, TW6, TW24, TW25) [8]. This, alongside research showing hepatitis B transmission from mother to child during birth, the role of hepatitis immunoglobulin and the development of a vaccine, was described as essential for implementing the vaccination program.

Government responses to reducing the burden of viral hepatitis infection and liver cancer have been detailed in sequential 5-yearly plans since 1982, aiming to reduce the

morbidity and mortality associated with hepatitis B [16, 17]. While originally seeking to prevent “perinatal transmission through immunization” [18, 19], more recently their priority has been:

- Improving the surveillance system for acute cases
- Severing hepatitis A infection paths
- Enhancing health education on liver disease control
- Improving blood transfusion management
- Raising hepatitis examination quality [20]

Initially focusing on implementing the hepatitis B vaccination program, the plans incorporated clinical treatment in 1992, viral hepatitis and liver cancer in 2002, with the most recent being incorporated within a broader communicable diseases plan. The plans are developed by the CDC on advice from a cabinet-level advisory committee originally established in 1981 and initially chaired by Prof. J.L. Sung [21]. Two participants were critical of the advisory structure with one describing its membership as limited to people from the National Taiwan University (TW10), with only clinical physicians providing advice (TW11).

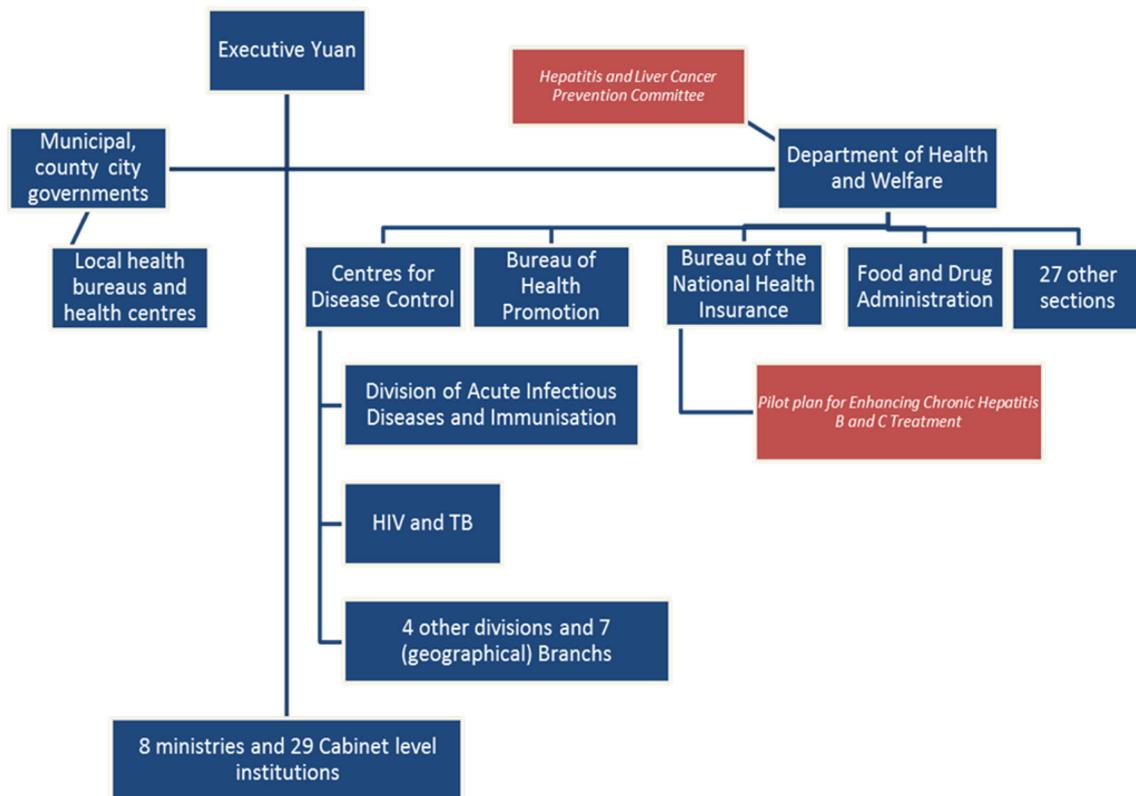
The programmatic structure includes a surveillance system, described as *very good* (TW8), where participants noted policy being developed at a national level and implemented at a local level. A regular exchange of individual staff from the national to the local level was recognized by two participants as benefitting both the development of national policy and its implementation at local levels (TW1, TW14).

Primary responsibility for the implementation of the Prevention and Treatment Plan for Chronic Viral Hepatitis occurs within the CDC and is reported upon by the immunization program. At a local level, responsibility for addressing viral hepatitis primarily lies with the hepatitis vaccination programs, with responses to chronic viral hepatitis such as clinical management including treatment defaulting to that of clinicians and the Bureau of National Health Insurance.

Figure 1 illustrates the national health and policy context for programs seeking to reduce the impact of viral hepatitis.

### Prevention of transmission

Taiwan was the first in the world to implement a national vaccination program [14, 18]. From July 1984 to June 1986, newborns of high-risk HBsAg-positive mothers were vaccinated [22], and this was extended to all newborns from July 1986, then to all preschool children from July 1987 to June 1988 who missed the scheduled vaccination. There are high rates of vaccine coverage [23], with hepatitis B immunization coverage for babies born in 2009



**Fig. 1** Hepatitis policy and service structure (Taiwan)

being 97.83 % for the first (within 24 h of birth), 99.8 % for the second (1 month after birth) and 99.55 % for the third dose (6 months after birth) among elementary school students [24].

As previously noted, the development and implementation of the vaccination program was staggered over time and seen by participants as being well planned (TW15). In the early years of implementation one participant noted community concerns of Taiwan being used by the USA as a guinea pig (TW1), with these concerns addressed in part by community education and regulatory structures. Martial law was described by participants (TW3, TW6, TW24) as supporting the implementation of the program as was a systematic government-funded science and technology program that included the very first computer system in the entire government (TW3).

The lack of a hepatitis C vaccine was an essential barrier (TW9, TW15) to hepatitis C prevention reported by participants. People at greatest risk of hepatitis C infection, people who inject drugs, were described as being socially stigmatized, often poorly educated and economically deprived (TW1, TW3, TW14). Injecting drug use was also identified as occurring within correctional settings (TW3).

## Screening, care and treatment

Screening for viral hepatitis in Taiwan commenced in 1984 with pregnant females and currently (2013) occurs through:

- Antenatal screening
- A national disease screening program for adults over 45 years
- Screening conducted by nongovernment organizations
- Entry into university and within some workplaces
- Blood donation
- Children at age 1, born to mothers at high risk

Hepatitis screening occurs in a context where general community surveys show reluctance to be screened for an infection where no symptoms exist. A survey from the Bureau of Health Promotion, the National Health Research Institutes and the Bureau of Controlled Drugs shows a significant number of people lack knowledge about screening services or of their eligibility to access these services [25].

While screening was perceived by participants as accessible (TW3, TW6, TW8, TW12, TW13, TW15, TW19, TW20, TW21, TW24), gaps were identified. Rather than about the screening process per se, these gaps related to the

information provided to people upon diagnosis (*TW17*) with one nongovernment organization survey finding up to 70 % of people diagnosed with viral hepatitis already knew they were infected, reflecting repeated and unnecessary screening.

The “National Health Insurance Chronic Hepatitis B and C Treatment Plan” was initiated in 2003 to improve access to treatment for people with viral hepatitis. Barriers to treatment include low awareness among people with chronic hepatitis B, particularly in their understanding of the need for regular monitoring of the infection, insufficient knowledge on the part of physicians of the importance of timely treatment and financial barriers [14].

The 2011 CDC Annual Report reports that the Hepatitis B and C Treatment Program treated 67,411 patients with hepatitis B and 36,641 patients with hepatitis C between October 2003 and December 2010 [26]. One informant noted while 15,000 people with hepatitis B and 6000 people with hepatitis C were treated each year, another reported that only 10 % of the million people who required treatment actually received treatment.

Studies show people who inject drugs experience barriers to health services in Taiwan [27, 28], with Lin et al. finding a minority of people who inject drugs and who were infected with HIV being under regular clinical management. The authors noted hepatitis C treatment access barriers include fear of police intervention near hospitals and the inability to afford hospital copayments.

## Discussion

The leadership, innovation and commitment to research as well as the health programs implemented within Taiwan have changed how the world responds to viral hepatitis. Taiwan led the world in implementing programs to reduce the transmission and impact of viral hepatitis. This assessment highlights the confluence of political, health, social and economic interactions that influenced the development of viral hepatitis policy in Taiwan. The structural government commitment to research provided Taiwan, and the rest of the world, with the scientific rationale for the development and implementation of interventions to reduce the individual and community burden of viral hepatitis.

The development and implementation of the National Health Insurance Program in Taiwan ensure that health care access is not limited by an individual’s capacity to pay, including for screening or for the direct costs of clinical management including pharmaceutical treatment. The establishment of the physical infrastructure of community-based health centers in Taiwan effectively provides

access to health services and enables the implementation of health interventions such as the hepatitis B vaccination program.

The regular detailed government statements through consecutive 5-year plans since 1982 describing the impact of viral hepatitis, and the government response, including the financial resourcing available for these responses, reflect the skilled advocacy by clinicians and researchers, and of the commitment of successive Taiwanese governments.

While the system-wide response to viral hepatitis in Taiwan has been effective, they lack formal or informal structures that engage with, or are informed by, people living with the viruses. Advocacy for establishing and improving the response to viral hepatitis has primarily been led by clinicians, as has policy advice provided to the government. This clinical leadership is imperative given the expertise and the day-to-day experiences of clinicians in treating people with end-stage liver disease. Expanding these advisory structures to incorporate other expertise, including the personal experience of living with the viruses, supports and broadens innovative discussion in these forums including a focus on patient-centered care, reducing the impact of the stigma and sustaining the national focus on the program.

A sizable proportion of the Taiwan population is infected with viral hepatitis, and they are an important underutilized resource. People with viral hepatitis provide a unique perspective on the lived experience including the barriers and enablers to prevention and management interventions. If systematically investigated, they could provide important data that could be used by policy planners and implementers in Taiwan and in other parts of the world where viral hepatitis is endemic. Broadening advisory structures to incorporate other expertise, including the personal experience of living with the viruses, supports and broadens innovative discussion in these forums including a focus on patient-centered care, reducing the impact of the stigma and sustaining the national focus on the program.

Primary responsibility for implementing the *Prevention and Treatment Plan for Chronic Viral Hepatitis* occurs within the CDC through the Bureau of the National Health Insurance, advised by the Hepatitis and Liver Cancer Prevention Committee and reported upon by the vaccination program. Implementation of the vaccination program requires specific skills, expertise and focus that are not the skills required for implementing a systematic clinical management program. Broadening the focus of the plan to incorporate clinical management, including reducing the barriers to treatment, has occurred without necessarily a concomitant adjustment to the agency with primary responsibility for implementing the plan.

The current advisory structure overseeing the implementation of programs in Taiwan focuses on clinical perspectives within a traditional public health model. Public health service delivery has changed over the past 30 years, particularly with the development and support of the Ottawa Charter for Health Promotion with its recognition that factors outside of the health sectors affect health, and with the development of the WHO, *Prevention and Control of Viral Hepatitis Infection: Framework for Global Action*. These models provide the opportunity for evaluating and reframing the current responses to viral hepatitis.

A comprehensive and standardized protocol for providing a positive diagnosis to a person with viral hepatitis provides the person with an understanding of their condition and information on how to respond effectively. The lack of the systematic provision of information to people with viral hepatitis at the point of diagnosis results in clinical specialists being obliged to provide this education. There is little evidence of resources available for people with viral hepatitis outside of the provision of information about pharmaceutical treatment.

Most people with chronic viral hepatitis do not require pharmaceutical treatment, and regular monitoring will be their primary form of clinical engagement. Viral hepatitis is a largely silent infection and requires a patient to be significantly motivated to continue to participate in this monitoring. Monitoring can be conducted outside of specialist services by family or community based physicians, with reference to specialists when these physicians require guidance.

There have been significant changes in the understanding of natural history and of treatment options for viral hepatitis over the past 10 years, with many being identified in Taiwan. Many people diagnosed over 10–15 years ago may not have been provided with information detailing clinical management options. The improvement in both treatment and the reduction of barriers to this treatment needs to be clearly communicated to people who have already been screened but who may not be in regular contact with clinical services.

The experience of Taiwan shows that while there has been significant government commitment to reduce the morbidity and mortality associated with viral hepatitis, gaps remain. A review of the policy framework highlights that a strengthened response would include the greater involvement of people with viral hepatitis and stronger coordination between policy and the government agencies responsible for their implementation.

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## Compliance with ethical standards

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**Conflict of interest** Jack Wallace, Marian Pitts, Stephen Locarnini, Jeanne Ellard, Marina Carman and Ding-Shinn Chen have no financial interest to declare in regards to this manuscript.

**Ethical standard** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Ethical support for the project came from the La Trobe University Faculty of Health Sciences (FHEC12/6) with all participants providing informed consent before contributing to the study.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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