

# Sustainable Immunization Financing in Asia Pacific

August 2017

BREAKING NEW GROUND





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#### Authors:

This report was prepared by Jessica Gergen, Martha Coe, and Michaela Mallow.

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## ACRONYMS

ACIP	Advisory Committee on Immunization Practices	NHI	National Health Insurance
BCG	Bacille Calmette-Guerin	NHIA	National Health Insurance Administration
CDC	Center for Disease Control	NIP	National Immunization Program
DTP	Diphtheria-Tetanus-Pertussis	NTD/\$	New Taiwanese Dollar
EPI	Expanded Program on Immunization	NUVI	New and Underutilized Vaccines and Immunizations
GDP	Gross Domestic Product	NVF	National Vaccine Fund
HepA	Hepatitis A	OECD	Organization for Economic Cooperation and Development
HepB	Hepatitis B	OOP	Out of Pocket
Hib		OPV	Oral Polio Vaccine
HMIS	Health Management Information System	PCV	Pneumococcal Conjugate Vaccine
HPA	Health Promotion Administration	PPP	Purchasing Power Parity
HPV	Human Papilloma Virus	SARS	Severe Acute Respiratory Syndrome
HTA	Health Technology Assessment	SHI	Social Health Insurance
IPV	Inactivated Polio Virus	TD	Tetanus-Diphtheria
IT	Information Technology	TFDA	Taiwan Food and Drug Administration
JE	Japanese Encephalitis	TIVS	Taiwan Immunization Vision and Strategy
LGU	Local Government Unit	TT	Tetanus Toxoid
MMR	Measles-Mumps-Rubella	UHC	Universal Health Coverage
MOHW	Ministry of Health and Welfare	WHO	World Health Organization
NCD	Non-Communicable Disease		

## KEY MESSAGES

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### Context

- Taiwan has one of the most robust and comprehensive national health insurance models in the region.
- Taiwan is undergoing a demographic transition, with fertility rates below replacement level and a 'super' aging population, sets expectations for stable routine childhood vaccination and provides growth opportunities for lifespan and new vaccines.
- Vaccine-preventable disease morbidity and mortality remains low, owing to national immunization coverage exceeding 95% and comprehensive immunization surveillance (e.g. at hospitals, health centers and schools).

### Immunization Financing

- All Taiwanese are entitled to publicly funded routine immunization services in both private and public health facilities, free of charge.
- Taiwan has one of the few dedicated public funding streams for immunization through the National Vaccine Fund (NVF).
- The NVF has been running at a deficit since 2013, and increasingly depleting the Fund reserves each year. External advocacy organizations have suggested that the immunization program be assumed back into the MOHW budget as a line item in hopes that the allocation and spending will be less variable year-to-year.

### Key Findings

- Taiwan remains politically centralized, although local government units have fiscal and administrative autonomy of the health program and can influence services to fit local priorities.
  - Taiwan has one of the most comprehensive national health insurance programs, but the NHI law stipulates that the program cannot include immunization services. Discussion of incorporation into the benefits package are nascent.
  - The Advisory Committee on Immunization Practices is the key player in generating a list of vaccines to be prioritized by the CDC using evidence and scientific support. The CDC uses a comprehensive set of criteria including budget forecasting, CEA and epidemiological studies from the affected regions of Taiwan.
  - Taiwan has successfully implemented a tobacco and alcohol tax that is earmarked for health, and specifically for immunization. Approximately, 35% of the total NVF budget is supplied by the tobacco surcharge.
  - The NVF can accept private funding and non-monetary philanthropic contributions. In 2014, the NVF accepted a donation to provide the pneumococcal vaccine for the elderly from the Formosa Foundation.
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## INTRODUCTION

Taiwan, a semi-presidential republic of 24 million inhabitants off the southeastern coast of China, represents one of the most remarkable universal health care coverage (UHC) success stories in recent history. This achievement was garnered through Taiwan's National Health Insurance (NHI) program, which has achieved 99% coverage. Though the immunization program is externally funded and managed outside the NHI program, it has been equally successful, with coverage rates above 90% for all routine vaccines. All Taiwanese are entitled to publicly funded routine immunization services in both private and public health facilities, free of charge. Taiwan has one of the few dedicated public funding streams for immunization through the National Vaccine Fund (NVF) to offer these services. The fund pools revenues from various sources including tobacco surcharge, fees for elective vaccines, and public budget allocation, exclusively for vaccine procurement and immunization program activities. However, the sustainability of the funding sources for the NVF are currently being evaluated, and the budget implications of new vaccine adoptions remains one of the key drivers of prioritization in Taiwan.

This brief is one of six in a series that analyzes how countries in Asia Pacific, undergoing financial and/or political transitions, prioritize and fund their immunization programs. The brief contains valuable information for all stakeholders interested in promoting sustainable and robust immunization programs and illustrates a variety of ways to engage in realizing this outcome.

## CONTEXT

### ECONOMIC TRENDS

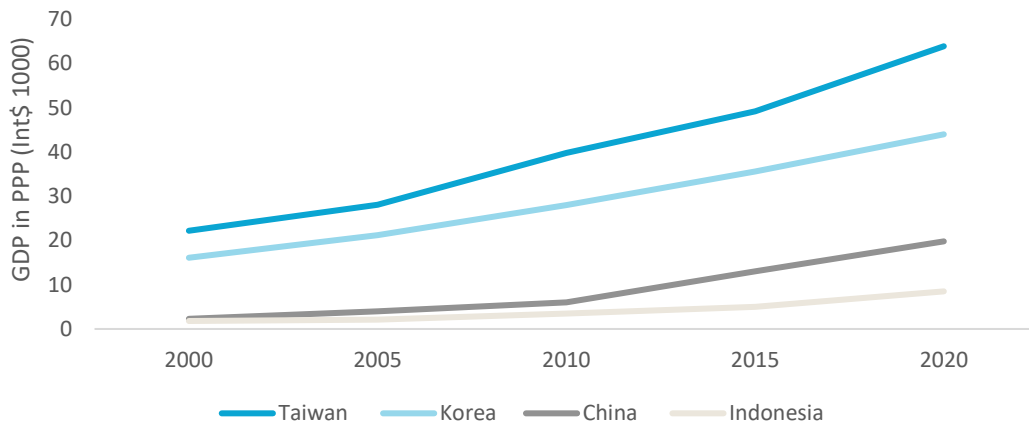
**Taiwan's economic growth is expected to remain strong due to strategic investments in national infrastructure, services, and the manufacturing sector.** Taiwan is considered an advanced economy with a GDP of over US\$1 trillion and a per capita income of US\$47,000 (PPP) in 2016, a figure that has doubled since the turn of the century (Figure 1).<sup>1</sup> The nation's recent economic slowdown, expressed by an average growth rate of 2.07% for 2012-2016 compared to 3.73% for 2009-2012 and explained, in large part, by the economic setbacks in China, is balanced by stable growth over the past year due to strong manufacturing, exports, and investments.<sup>2</sup> In 2015, Taiwan was ranked as the United States' 9<sup>th</sup> largest trading partner in goods, placing it ahead of markets such as India and Brazil. It was also the 14<sup>th</sup> largest U.S. export market overall and the 7<sup>th</sup> largest export market for agricultural and livestock products.

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<sup>1</sup> World Data Atlas: Taiwan Province of China. (2016)

<sup>2</sup> Lee W. (2017)

**Figure 1. GDP Per Capita Over Time**



Note: PPP, Purchasing Power Parity  
Source: Hsiao, 2016.

**Taiwan's average wealth level is well above that of most countries in the Asia Pacific region, with a large middle class that continues to demand increased health care quality and options.**<sup>3</sup> Taiwan's middle class has grown to reach 29.5% of the population, with a GDP per capita rate of \$22,540 US\$.<sup>4,5,6</sup> Per capita NHE increased from NT\$10,555 (US\$ 351) in 1991 to NT\$42,538 (US\$1,518) in 2014.<sup>7</sup> Low-income to low-to-middle income households account for a meager 3.1% of household and 3% of the population.

## DEMOGRAPHIC TRENDS

**Taiwan is undergoing a demographic transition with an aging population, which provides growth opportunities for integration of more lifespan vaccines.** Alongside other advanced economies in the region, Taiwan has a very low total fertility rate at 1.12 children per woman and stable youth population, allowing for increased predictability of immunization needs.<sup>8</sup> An important consideration for public sector decision-makers, including Nation Health Insurance Agency (NHIA) and Ministry of Health and Welfare (MOHW), will be the rapidly growing aged population as this nation is expected to become a "super-aged" population by 2025 with 49% of the population aged over 65 years (Figure 2). The Taiwanese have a life expectancy of 80.1 years, ranking 40<sup>th</sup> globally, and puts the country above others in the region (Figure 3). The leading causes of premature death in Taiwan are all associated with NCDs and include stroke, ischemic heart disease, respiratory infection and liver cancer. A number of new and emerging vaccines are targeted at an aging population and pose a critical preventative health care measure that is well suited for the changes in disease burden of Taiwan.

<sup>3</sup> Alemdar D. (2017)

<sup>4</sup> Taiwan Today. (2016)

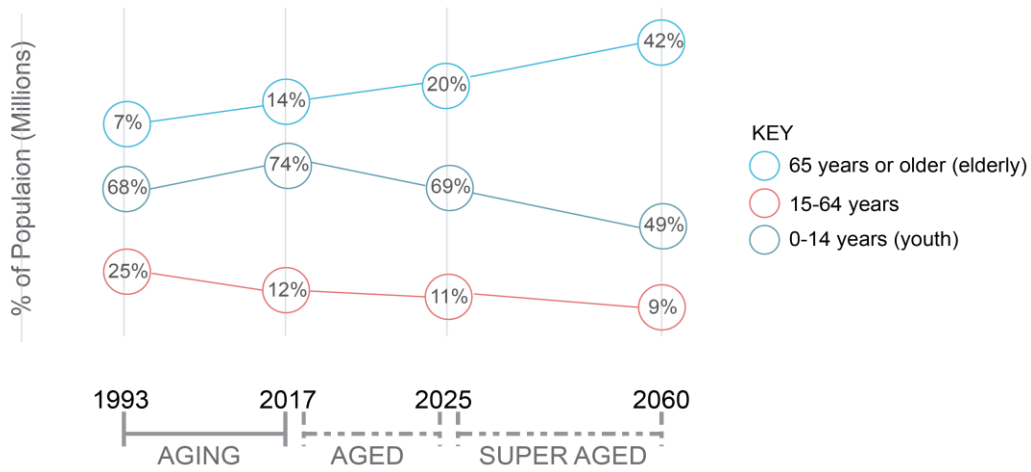
<sup>5</sup> Sanger-Katz M. (2015)

<sup>6</sup> Euromoney Institutional Investor Company. (2016).

<sup>7</sup> Taiwan Health and Welfare Annual Report. (2016)

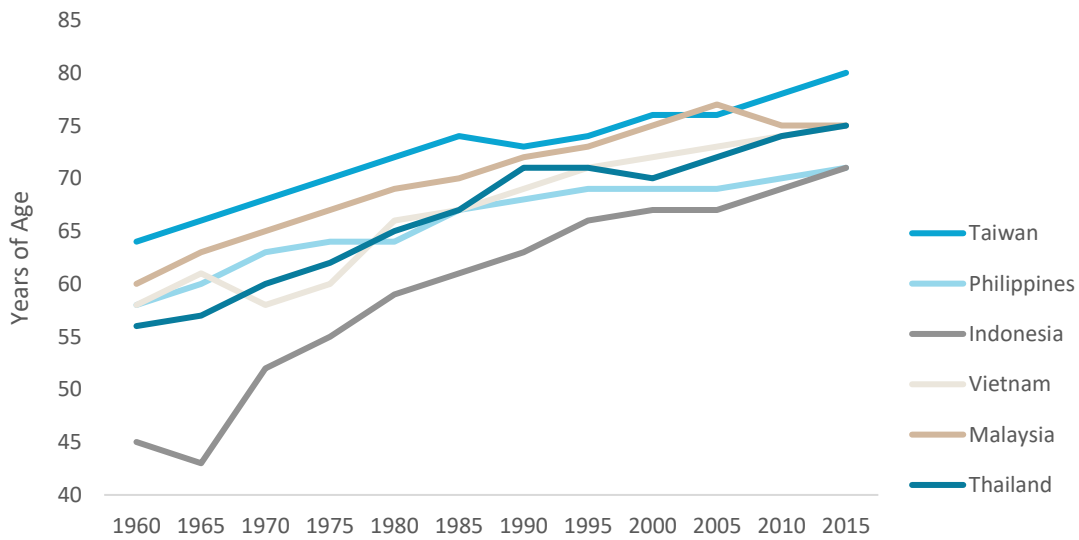
<sup>8</sup> CIA: The World Factbook. (2017)

**Figure 2. Taiwan's Aging Population**



Source: American Chamber of Commerce Annual Report (2015)

**Figure 3. Life Expectancy Trends Over Time in Six Asian Countries**



Source: gapminder.org (2017)

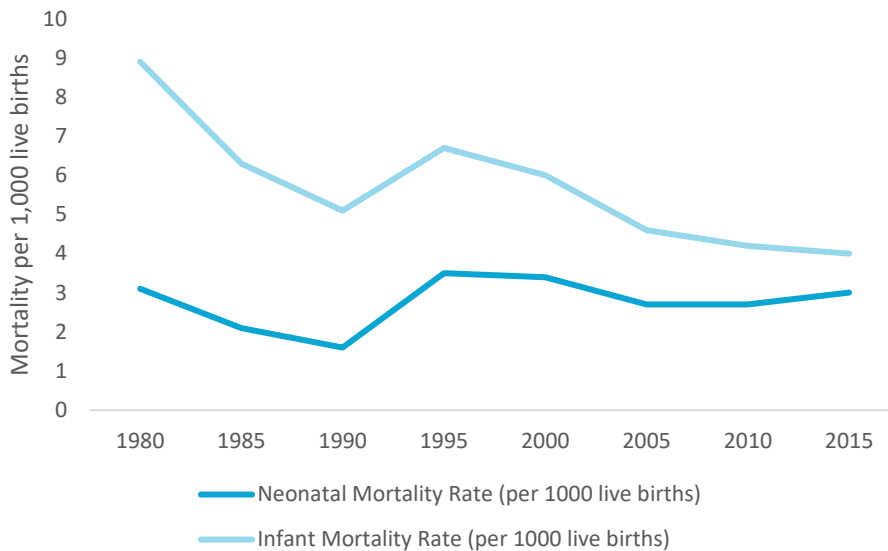
## HEALTH OUTCOMES

**Health outcomes in Taiwan are among the best regionally, in part due to universal health care (UHC) policies.** In 2015, the Infant mortality rate was 4 deaths per 1,000 live births. The maternal mortality rate



increased from 7 deaths per 100,000 live births in 2014 to 12 in 2016, which is on par with other developed countries including Canada and the United Kingdom.<sup>9,10</sup>

**Figure 3. Newborn and Child Health Indicators**



Source: MOHW Annual Report, 2015

## STRUCTURAL AND POLITICAL TRENDS FOR HEALTH

**In Taiwan, the UHC agenda and subsequent adoption of the national health insurance (NHI) policy was driven by a political champion.** President Lee Teng-hui wanted to do something concrete and visible for all the citizens. In his campaign for re-election in 1996, he was vocal about wanting to “touch the lives of each Taiwanese” by introducing national health insurance.<sup>11</sup> This effort was an important part of his political platform, which was guided by discourse around every Taiwanese right to equal and accessible healthcare. This message resonated with the general public, as 65% of the population was uninsured prior to 1995. Informants reported that the MOHW and Parliament formed a technical advisory group of national and international experts that conducted a cross country comparison of health systems and held various closed and public sessions to discuss possible SHI models. This expert group recommended a single-payer system similar to the Canadian system.

**Taiwan has one of the most comprehensive national insurance benefits packages in the region, but does not cover immunization services.** NHI benefits are uniform and comprehensive. They include inpatient and outpatient care, primary and specialist care, prescription drugs, dental care (excluding orthodontics and prosthodontics), traditional Chinese medicine, child birth care, physical rehabilitation, home care, chronic mental health care, and end-of-life care. However, NHIA does not include immunization services in the benefits package. The staffing costs associated with delivering immunizations is paid for by NIHA, but the vaccine procurement, immunization information system, and awareness campaigns are all paid by the National Vaccine Fund (NVF). Staffing reimbursement costs for the private sector providers delivering routine vaccines is often too low, so patients often incur an administrative service fee when accessing

<sup>9</sup> CIA: The World Factbook. (2017)

<sup>10</sup> Executive Yuan RoC. Statistical Yearbook. (2016)

routine immunizations in the private sector. Private pediatricians can gain significant fiscal benefits from the sale of non-routine vaccines as those are paid for completely out of pocket.

### Box 1. National Health Insurance and UHC in Taiwan

Taiwan has a single-payer, government-administered national insurance system with ample built-in protections for the poor and most vulnerable. The NHI is administered by the NHIA under the MOHW through six regional offices supported by a sophisticated health information infrastructure. The National Health Insurance Act, stipulating that national health insurance is compulsory, has propelled Taiwan to its 99.9% coverage as of 2016.

NHI has one of the most comprehensive benefits packages in the region at very low cost to patients. Copayments for both preventative and curative care are enforced in both the public and private sectors ranging from US\$5 to US\$15 in the public sector, depending on the services. IN the private sector the copay and administrative fees are higher and less standard across service providers.

The NHI also provides generous safety nets for the poor and most vulnerable. Co-payments are reduced (<USD 2) for people with disabilities, elderly adults with chronic diseases, and patients with catastrophic diseases and conditions. Those living in remote and mountainous areas and off-shore islands also have access to needed services through the Integrated Delivery System. The NHIA also provides insurance premium subsidies. For example, it pays 100% of premiums for low-income households, military personnel, veterans, civil servants (including public school teachers), and convicts; 70% for dependents of veterans and members of farmer, fishermen, and irrigation associations; and 35% for private school teachers.

**Though Taiwan remains politically centralized, local government units have fiscal and administrative autonomy which allows them to influence healthcare delivery to fit local priorities.** Municipal and district governments may offer additional benefits for residents within their jurisdiction, such as subsidies for out-of-pocket costs for poor residents or supplementary health promotion campaigns. With the Local Government Act of 1999, Taiwan's health administration became a two-level system: central and local. This fiscal and administrative decentralization of healthcare is built on a market-driven delivery system with a mix of public and private providers; a majority belonging to the latter group. Nine local government units, including the Mayoral office of Taipei, have supported piloting of the HPV vaccines from multiple manufactures, under the local government units (Box 2).

## Box 2. Introducing HPV through Local Government Units with Funding from Health Promotion Administration (HPA)

HPV vaccines have been introduced in nine municipalities and cities in Taiwan's urban and peri-urban areas under local government unit (LGU) initiatives. Currently, HPV is not included in the NIP schedule, but it is on the ACIP priority list.

Taipei City was the first to adopt the HPV vaccine in 2008 for a pilot in girls nine years of age. It maintained budget support for several years through the LGU and Health Promotion Administration (HPA), which is a parallel unit to CDC under the MOHW. The rollout and logistics of the HPV pilot proved to be challenging for the HPA unit and the pilot was eventually discontinued in hopes that the MOHW and CDC would adopt HPV into the national immunization schedule. The HPV vaccine was also introduced in Kinmen County by the local Health Bureau in 2008. Vaccination of female residents aged 16-18 began through a phased school-based program in 2008-2011.

Source: Informant interviews.

**The Advisory Committee on Immunization Practices (ACIP) is a governing committee that makes recommendations about new and underutilized vaccine introduction (NUVI) adoption and vaccine program delivery.** ACIP members are nominated by CDC and approved by the MOHW. The advisory committee is composed of 17-20 members (Table 2). Most members are clinicians, active in policy dialogues, and some are members of Taiwan Immunization Vision and Strategy (TIVS). The advisory committee meets bi-annually. CDC submits a list of vaccines to ACIP for evaluation and recommendations, driving decision-making around new vaccine introductions. ACIP members review economic costs and benefits and then rank vaccines in order of priority of adoption based on their expert opinion. ACIP members maintain good relations with CDC and are often seen as an extension to CDC's work.

## DEMAND AND ACCESS TO HEALTH SERVICES

**High demand for health services is expected to continue to grow in the coming years due to public expectations and a rapidly aging population.**<sup>12</sup> Health care is affordable and accessible in Taiwan. Access to care has generally been convenient: 85% of patients reach a hospital or clinic in less than 30 minutes, and 83% of patients wait 30 minutes or less before being seen by a doctor.<sup>13</sup> Estimates on healthcare utilization vary but there was a clear upward trend in utilization of services since the induction of the NHI. The OECD estimate for healthcare utilization in Taiwan is 12.4 consultations per person per year.<sup>14</sup> For comparison, other nearby countries like Malaysia, Japan, and China have a utilization rate between 3-8 consultations per person per year.<sup>15</sup> However, individuals aged 65 years or older have significantly higher utilization rates and are placing increasing strain on the healthcare system. A study in 2016 suggests that older people average 26.7 outpatient clinic visits per year, which is twice that of general population.<sup>16</sup> Data from the Taiwan's NHIA reported that people aged 65 years or older accounted for 21% of outpatient visits and 39% of total medical expenditure.<sup>17</sup> The annual medical expenditure per elderly individual tripled that of the

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<sup>12</sup> Cheng TM. (2016)

<sup>13</sup> Cheng TM. (2009)

<sup>14</sup> Hsu WC, Hsu YP. (2016)

<sup>15</sup> Ibid

<sup>16</sup> Wu WH, Lee, W. J., Chen, L. K., & Hsiao, F. Y. (2016)

<sup>17</sup> Hsu SW, Lin JD, Chiang PH, Chang YC, Tung HJ. (2012)

general population (elderly US\$1846 vs. US\$554). Multi-comorbidities and associated drug consumption in the elderly are believed to be the main cost drivers.<sup>18</sup>

## IMMUNIZATION ACCESS AND COVERAGE

**All Taiwanese are entitled to publicly funded routine immunization services in both private and public health facilities, free of charge.** Immunization services are provided by both public and private health facilities as they are both entitled to receive free NIP vaccines from the government. At public and private facilities, anyone with a NHIA card can access vaccines. Though immunization services are free of charge, there will likely be a small co-pay for infant vaccines if the patient is over six years of age. Private sector facilities may also choose to purchase vaccines — those included in the schedule and not — on their own. Prior to 2012, the NIP was administered in schools, but school-based immunization programs were terminated in 2012 due to the wide access of immunization services in facilities. Furthermore, the dependable National Immunization Information System (NIIS) allows for better monitoring and follow-up and obviated the need for NIP school vaccination programs.<sup>19</sup> Today, children can receive vaccinations at 373 health stations and more than 1,600 contracted hospitals and clinics across Taiwan.<sup>20</sup>

**Table 1. Taiwan National Immunization Schedule (2017, CDC)**

Antigens (Vaccines)	Schedule
1 HepB	at birth, 1,6 months
2 BCG	5 months
3 DTP-Hib-IPV	2, 4, 6, 18 months, 5 years
4 Pneumococcal (PCV)	2, 4, 12-15 months
5 Influenza	6 months and then yearly
6 Varicella	12 months
7 MMR	12 months, 5 years
8 JE	15, 27 months
9 HepA	12, 18 months

**Taiwan includes 9 vaccines in its immunization schedule.** The national immunization schedule includes: BCG, hepatitis B, diphtheria, tetanus, pertussis, Hib, polio, pneumococcal conjugate, varicella, MMR, Japanese encephalitis, and influenza for children up to 6 years of age, as well as yearly influenza immunizations for primary school students (first - sixth grade) and adults over the age of 65 (Table 1). Of these vaccines, BCG, influenza, tetanus and Japanese encephalitis vaccines are locally sourced. In addition, the hepatitis A vaccine is offered in select areas.

**Taiwan has some of the highest coverage rates (90%) in the region for all routine vaccines.** Age appropriate coverage of infant and young children vaccines all exceed 95% (Figure 5). Regionally, Taiwan's immunization program is one of the highest performers, even when compared to regional leaders like Japan and China, which have comparable immunization coverage rates. CDC reports little variance in coverage

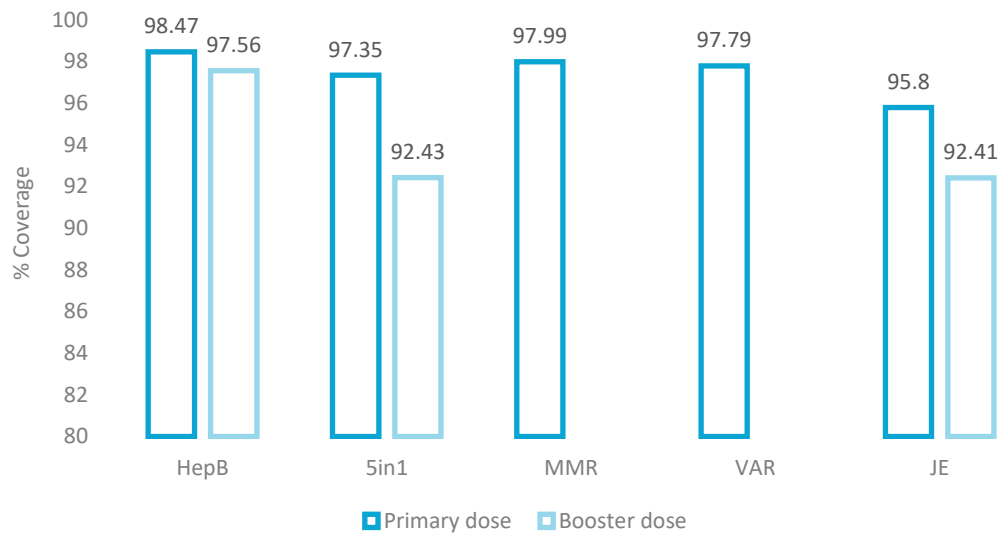
<sup>18</sup> Hsu WC, Hsu YP. (2016)

<sup>19</sup> Su WJ. (2016)

<sup>20</sup> CDC Annual Report. (2016)

rates of NIP vaccines by socioeconomic status or geography, however requested data to verify these claims remains pending.

**Figure 5: National Immunization Coverage (2015)**



Source: Taiwan CDC Annual Reports (2015)

**Taiwan is a highly privatized health care providers’ market with the majority of patients preferring to access healthcare through private providers, including for immunization services.** Approximately 80% of health services are accessed in private facilities, for both preventative and curative services.<sup>21</sup> Private sector hospitals account for 83.9% of all hospitals in Taiwan.<sup>22</sup> There are over 20,000 primary and 500 secondary care units in Taiwan, many of which are small, privately owned clinics.

**A majority of vaccines available in Taiwan, both in and out of the NIP, are manufactured by international pharmaceutical companies (Table 3).** Domestic manufacturing of vaccines is hindered by capacity constraints and limited push from the government. Informants stated that because the central government remains neutral and does not preferentially support domestically manufactured vaccines, the competitive global market makes it very difficult for the few Taiwanese companies that do manufacture vaccines domestically to secure procurement for the national immunization schedule which are widely represented on the island.

**Table 3. Taiwan’s Manufacturing Landscape of Approved Vaccines (NIP and non-NIP)**

<b>DOMESTIC</b>	Bacille Calmette-Guerin vaccine (BCG)
	Mouse brain-derived JE vaccine
	Seasonal flu vaccine
	Tetanus toxoid
<b>IMPORT</b>	Hepatitis B Vaccine (HepB)
	DTaP-Hib-IPV 5 in 1
	DTaP

<sup>21</sup> Cheng TM. Commonwealth Fund . 2017

<sup>22</sup> Taiwan Health System and National Health Insurance Study Report. (2011)

<b>Vaccinations for The Expanded Program for Immunization (EPI)</b>	Inactivated polio vaccine (IPV)	Source: Lin Source; FDA, 2017
	Pneumococcal vaccine (PV)	
	Varicella vaccine (Varicella)	
	Measles, mumps and rubella vaccine (MMR)	
	Cell-based JE vaccine	
	Seasonal flu vaccine	
<b>NUVIs (Not included in NIP)</b>	Rotavirus vaccine (Rotavirus)	
	Hepatitis A vaccine (HepA)	
	DTaP-IPV-HepB-Hib 6 in 1	
	DTaP-IPV 4 in 1	
	Rabies vaccine (Rabies)	
	Human Papillomavirus vaccine (Type 16 and 18)	
	Quadrivalent Human Papillomavirus (Types 6,11,16,18)	
	Human Papillomavirus 9-valent vaccine, Recombinant	

## DEMAND FOR IMMUNIZATION SERVICES

**Media coverage of the immunization program has strong influence in the country.** Epidemics reported in the media can create uncertainty and fear, but in often may drive up vaccine coverage. According to WHO, a total of 8,098 people worldwide became sick with Severe Acute Respiratory Syndrome (SARS) during the 2003 outbreak.<sup>23</sup> Between March and July 2003, there were 668 probable cases of SARS reported in Taiwan.<sup>24</sup> Due to these cases, and to Taiwan’s proximity to the SARS epicenters of Guangdong and Hong Kong, population support of preventative vaccines grew. Support of preventative vaccines was bolstered once again during the H1N1 pandemic of 2009.<sup>25</sup>

### Box 3. Vaccine Adverse Event Compensation Fund Fosters Public Trust in Taiwan

Taiwan was one of the first countries to establish a compensation fund for adverse vaccine events. In response to an adverse event in 1986, the former Department of Health started the Vaccine Injury Compensation Program (VICP). It is funded from the premium of NT\$1.5 imposed on each vaccine purchased by the government through the NVF. The premium is paid by vaccine manufacturers or importers after purchased vaccines are approved and certified by Taiwan Food and Drug Administration (TFDA). However, the premium rate can be adjusted when the amount of the Fund either exceeds NT\$2 hundred million or is less than NT\$1.5 hundred million. Moreover, the Compensation Relief Fund is not restricted to compensation payouts. It also provides funding for operating expenses and research on adverse events following vaccination. As of 2015, over 1500 claims were reviewed and about a third of the claims determined as compensable.

<sup>23</sup> CDC. SARS Basics Fact Sheet. (2012)

<sup>24</sup> Chen KT, Twu SJ, Chang HL, Wu YC, Chen CT, Lin TH, et al. (2004)

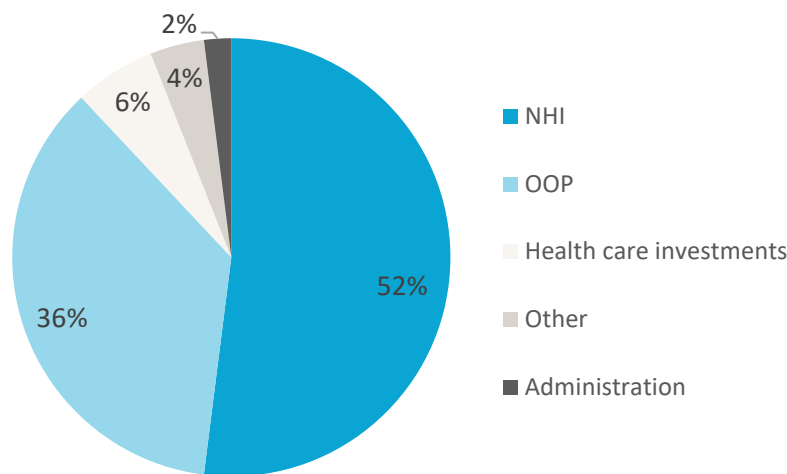
<sup>25</sup> Chen CJ, Lee PI, Chang SC, Huang YC, Chiu CH, Hsieh YC, et al/ (2011)

## HEALTH FINANCING AND IMMUNIZATION

### Health Financing

**Revenue for the health system comes from five main sources, with out-of-pocket expenditures and SHI providing the majority of the funding (Figure 6).** The revenue for the NHI program comes from several sources: employees, employers, and government, both national and local. NHI is a premium-based SHI, of which 68% comes from payroll taxes, 27% from supplementary premiums levied on non-payroll premiums (large bonuses, professional fees, wages from second and third jobs, luxury taxes), and 5% from tobacco and lottery tax revenue earmarked for health. For payroll taxes, government contributes 23%, households 38%, and employers 38%. The total insurance premium for employed workers is 5.2% of wages. That's much lower than in the United States, where the average is 12-20% of wages for those who are covered by their employers. Premiums are paid monthly, with nearly everyone paying on time.<sup>26</sup>

Figure 6. Health System Expenditure, by Source, 2016



**Mature capacity to collect premiums from employers and citizens means that the NHIA is generating adequate revenues.** During most of the period between 1998 and 2010, NHI expenditures nearly always exceeded revenues. However, by raising the premium rate from 4.55% to 5.17% of payroll income in 2010 — the second increase in its then 15-year history — the NHIA began to accumulate surpluses starting in 2012 and has continued to do so.<sup>27</sup>

**Despite nearly full coverage by NHI, OOP payments remain a major source of funding for healthcare.** OOP expenditures account for 36% of total health expenditure. Two drivers of the high percentage may be the compulsory co-payments on all visits and pharmaceutical costs. However, this OOP estimate is considered inflated because it includes spending on items not included in the OCED definition of OOP payment such as infant formula, baby diapers, dietary supplements, health foods, Chinese herbal medicine, private hospital rooms, cosmetic surgery, and high-tech surgical procedures. The Taiwanese have moderate willingness to pay OOP for health services. According to a 2012 survey, two thirds of patients have some level of

<sup>26</sup> Yeh CY, Schafferer C, Lee JM, Hsieh CJ. (2016)

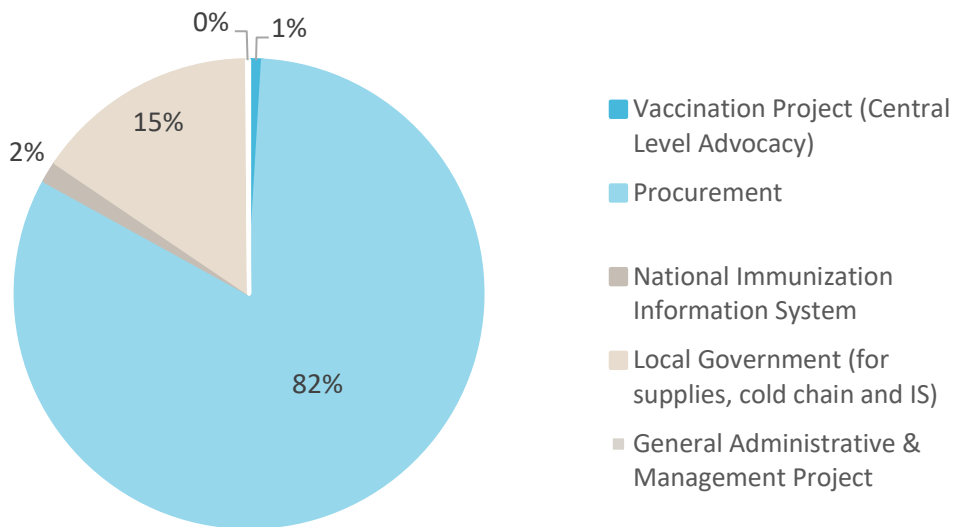
<sup>27</sup> Cheng TM; Commonwealth Fund.(2017)

willingness to pay OOP for upgrades in care for themselves and their families including for elective or new vaccinations.<sup>28</sup>

### Immunization Costs

**The NVF procures all vaccines and covers some program costs for routine vaccines.** The total NVF budget for 2016 was NT\$1,891,504,000 (US\$63,050,000) (temporal overall budget trends are displayed in Figure 10 below). In 2016, 82% of immunization program expenditures were used to procure vaccines (Figure 7), whereas in 2015, vaccine procurement was 86% of the immunization program expenditures.<sup>29</sup> The NVF covers the costs for central campaigns, print materials, and a small fee to the ACIP under the vaccine project cost category, but does not cover salary or personnel delivery costs of immunizations. The NVF allocates 11% of its budget to city and county governments to purchase hardware equipment for national vaccine information management system, equipment for vaccine cold storage, and temperature monitoring, and to implement vaccine advocacy activities at the local level. The expenses for the administrative process of this fund account for less than 1%. The NVF pays primarily for vaccine procurement, thus it is vulnerable to large increases, as observed in 2015, when adopting new vaccines or the price of a vaccine is inflated (Figure 8). The costs of the NIP procurement has increased every year, except in 2016 where it dropped from the previous year due to the reduction in procurement costs.

**Figure 7. Immunization Program Cost Profile, 2016**



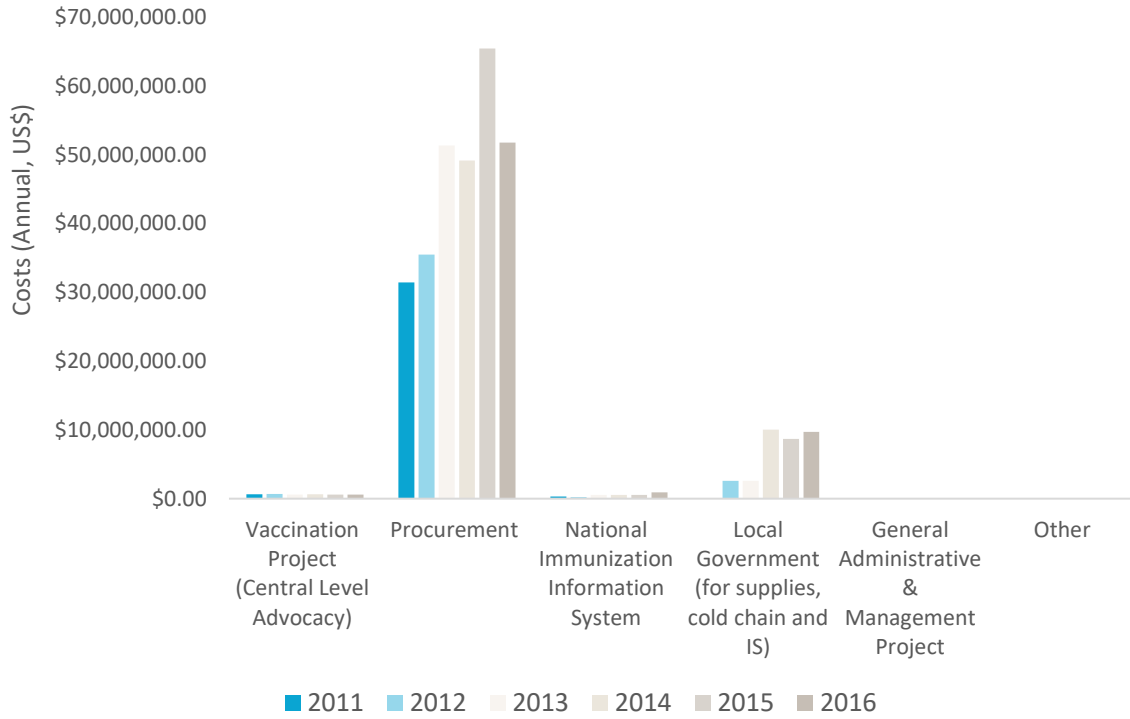
Source: National Vaccine Fund Budget Document. (2016)

<sup>28</sup> Lee YH, Ang TF, Chiang TC, Kaplan WA. 2016

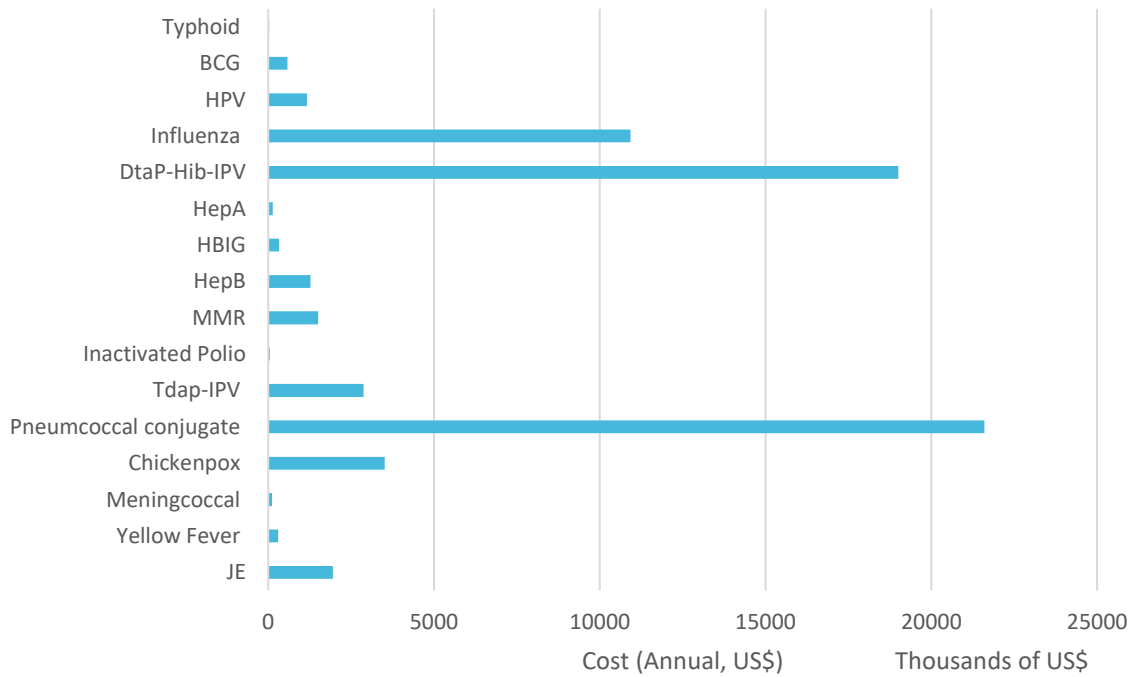
<sup>29</sup> National Vaccine Fund Budget. (2015)



**Figure 8. Immunization Program Costs, Temporal Trends (2011-2016)**



**Figure 9. Cost per NIP Vaccine, (except Typhoid and Yellow Fever) (2015)**



Source: CDC NVF Annual Budget Report.

**The price of vaccines remains highly variable, with annual fluctuations and concerns about supply key issues for the NVF.** Figure 9 shows the total procurement cost per vaccines purchased by the NVF in 2015. The annual costs are determined by the required supply and price, which can both fluctuate annually, as reported by the NVF. Budgeting properly for vaccine procurement and the ability of the fund to absorb more vaccines or increased volumes of vaccines is minimal given the present budget constraints.

## GENERATION

**Immunization services are exempt from co-payments, but often patients must still pay the medical registration fee.** Immunization services for patients under the age of six or over the age of 65 for vaccines in the routine immunization schedule are free and no co-payment is required. However, it is common practice for providers in Taiwan to collect a medical registration fee for every patient at each visit, including for immunization services. The registration fee is an administrative fee set by each provider with a limit approved by the local health department, typically NT\$0-150 (US\$0-\$5) for office visits and NT\$0-450 (US\$0-15) for emergency or hospital care. Informants confirm that the registration fee is used to cover administrative costs of the health facility.

**With the growth of the national immunization schedule and a shift in demographics, the CDC set up the NVF to address the issue of sustainable financing for immunizations.** The NVF received initial funding from government subsidies (35%), philanthropic donations (5%), and sin tax surcharges from tobacco and alcohol (60%). According to data, the yearly fluctuations in the amount of the surcharge creates a degree of instability in the fund and has been reported to delay implementation of certain immunization programs. While in 2015, the tobacco taxation accounted for nearly 60% of the NVF's total US\$63 million, in 2016, the reported total amount was US\$20 million less due to a drop in the tobacco surcharge allocation. However, since its inception, the fund has grown each year to accommodate the expanding immunization schedule and increasing number of patients utilizing immunization services.

### Box 3. Taiwan's National Vaccine Fund, Origins and Ways Forward

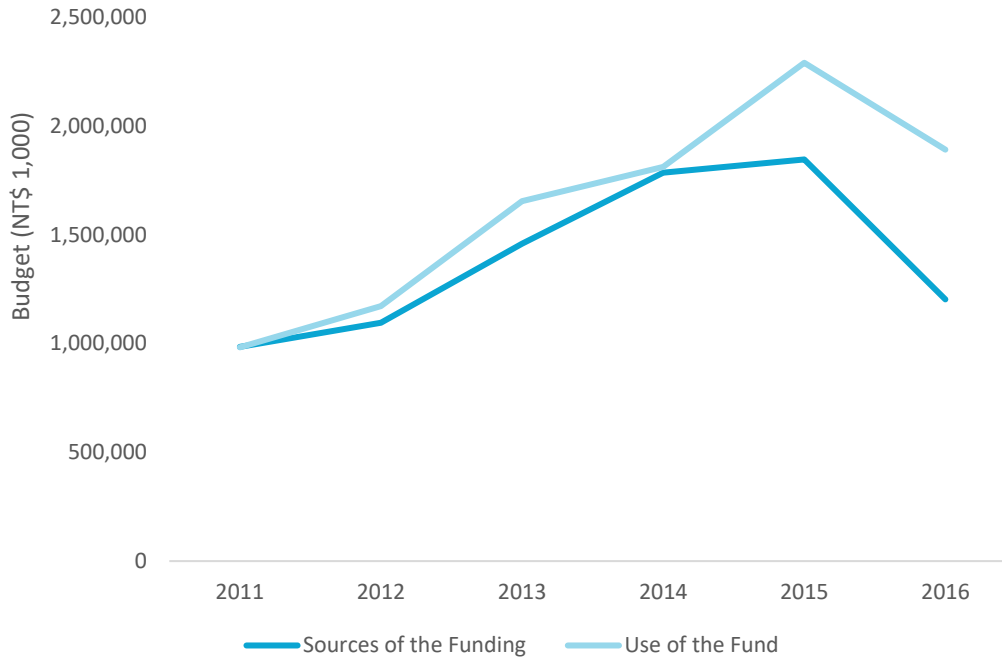
The National Vaccine Fund (NVF) is the national purchaser of vaccines, funds some central level advocacy activities, including small fees to the ACIP, and assists local government units to purchase or repair cold chain equipment and conduct advocacy campaigns at the local level.

The NVF was born from the Director of CDC managing immunization budget deficits from the MOHW in the mid-2000s. His vision for the fund was to raise both public and private funds through revenue generation activities to secure immunization financing in the long-term. The sin tax reform and allocation to immunization vis-à-vis the fund was a success, but fundraising efforts for private funds has been minimal and at present accounts for less than 1% of overall fund revenues per year. The NVF is the sole purchaser of vaccines and vaccine distribution. Since its inception, the fund has grown each year, with the exception of 2016, to accommodate the expanding immunization schedule and increasing number of patients utilizing immunization services.

The Fund does not currently receive significant funding from private funds or philanthropic contributions. It's clear to those closely working with the NVF that it is not sustainable if it continues with the status quo. There were two options that surfaced as a part of recent discussion. The American Chamber of Commerce recently released their annual report where the Council on Public Health has recommended that the NVF be reabsorbed by the MOHW into their itemized budget and not managed separately. The second option recommends the NVF begin a coordinated advocacy effort to attract more investment, both from the private sector, but also from other Ministries and sub-units where lifespan and adolescent vaccines align with their goals and objectives, such as HPA's fiscal support for HPV vaccine.

**The NVF has been running at a deficit for the past four years, depleting the fund's reserves.** When the fund was initiated in 2009-2010 budget cycle, the original fund's value exceeded its costs so the funds remaining balance was kept and intended to manage overages from other years. Since 2012 the fund has been running at a deficit, on average, approximately a sixth of the budget (250,000,000 NT\$, 8 Million US\$). The deficit is growing each year, jumping from 76,000,000 NT\$ in 2012 to 688,629,000 NT\$ in 2016, with some variance in the years in-between (Figure 10). The NVF's growing deficits have called into question for many informants the ability of the fund to manage the current NIP costs, in addition to the pressure to adopt new vaccines (Box 3).

**Figure 10. Overall NVF Budget (Spent v. Secured), 2011-2016**



Note. Use of the Fund is the amount spent each year; Sources of Funding is the amount of funding secured each year.  
Source: NVF Annual Budget Sheets (2011-2016)

**In 2017, the Department of Health raised the tobacco tax to cover the cost of their revamped Long-Term Care Program.** The amendment proposed an increase in the tobacco tax from TW\$590 to TW\$1,590 (about US\$19-\$52) per 1,000 cigarettes or per kilogram of other tobacco products. The tax raise came into effect in June of 2017. The Ministry of Finance is projecting income from its annual tobacco tax and surcharge to exceed NT\$23.3 billion the following year. Informants reported that the annual cigarette tax, estate tax, and gift tax combined will add up to approximately NT\$30 billion, which the MoHW believes can sustain the long-term care program over the next five years. The Confederation of Trade Unions of the Taiwan Tobacco and Liquor Company condemned a government proposal to double the tobacco surcharge because nearly half of revenues from tobacco sales already go into paying taxes and surcharges.

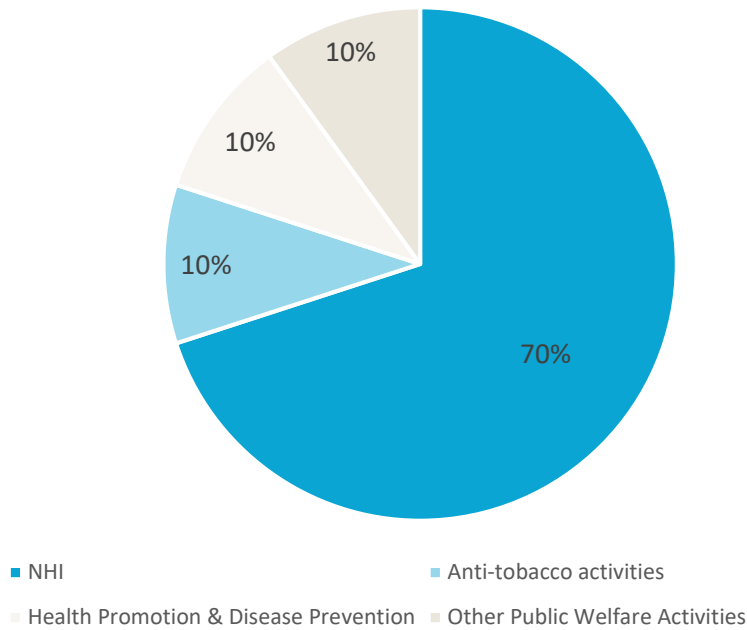
**Taiwan's sin tax and surcharge on tobacco has been a great success in generating domestic revenue for immunization and has both political and public support.** On January 1, 2002, the Taiwan government imposed a NT\$5 per 20 cigarettes tax earmarked for tobacco control programming and health.<sup>30</sup> The tax comprises 48% of the tobacco price, falling short of the 70% that is recommended by the WHO.<sup>31</sup> About 70% of the tax revenues go to the NHI, 10% to anti-tobacco activities, 10% to health promotion and disease prevention, and 10% to other public welfare activities (Figure 11).<sup>32</sup> A study conducted in 2003, shortly after the introduction of the tax, found that a little more than half of the population in Taiwan (53.3%) expressed a favorable attitude toward the cigarette tax. Reports from informants support that this favorable attitude, by both the general public and political parties, has been sustained.

<sup>30</sup> Tsai YW, Yen LL, Yang CL, Chen PF. (2003)

<sup>31</sup> WHO. Tobacco Free Initiative: Taxation. (2017)

<sup>32</sup> Tobacco and Alcohol Tax Act. (2010)

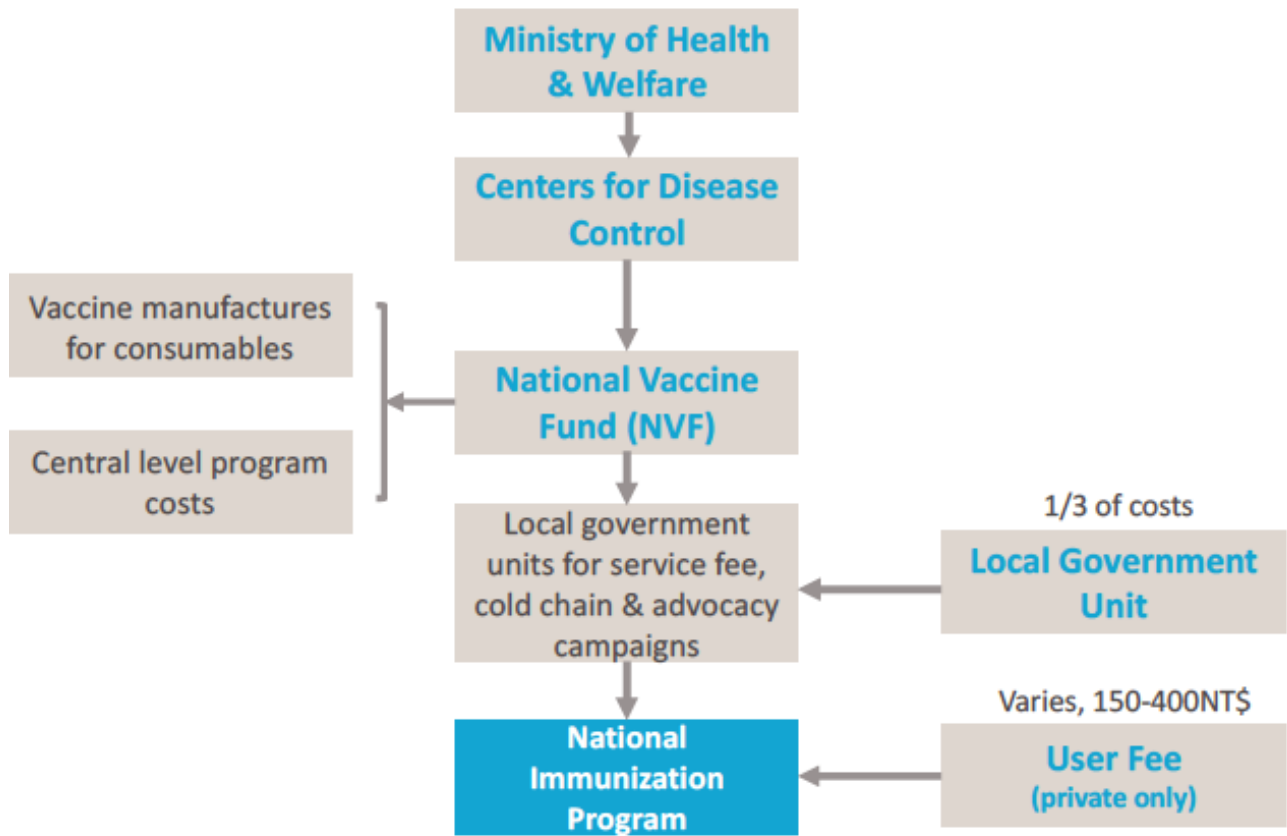
Figure 11. Sin Tax Allocation



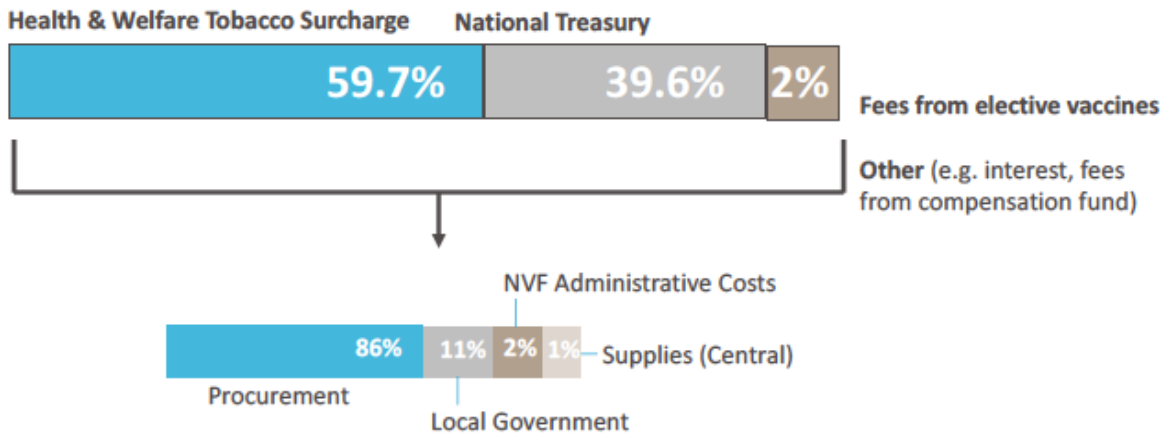
#### ALLOCATION

**The Centers for Disease Control govern the National Vaccine Fund, including the budget allocation and spending.** Although NVF is a fund, it operates similarly to a line item budget of the MoHW, which requires the CDC to submit a budget proposal to the MoF vis-à-vis the MoHW for approval. Local government are mandated to contribute one third of the annual budget for the NIP, which is calculated and pooled at the central level. The CDC offers a small subsidy for personnel costs, but private providers cover their personnel costs through the NHIA reimbursements.

**Figure 6. Who Pays for Immunization?  
ACTORS.**



**SOURCES.**



Source: National Vaccine Fund Budget. 2016

## NEW AND UNDER-UTILIZED VACCINES SCALE UP IN COUNTRY

**The Taiwanese are pushing for NUVIs and are willing to pay OOP for priority immunizations.** The MOHW and CDC are considering the adoption of 4-5 new and underutilized vaccines. Currently, patients must pay OOP to access vaccines not included in the schedule. The OOP cost for these vaccines has been reported by private provider to vary between US\$28-\$133. Recent survey results reported that of 535 respondents, most parents (92%) did not think the current vaccination program included enough vaccines.<sup>33</sup> One-half of parents considered the new vaccines to be expensive. Regarding parental awareness of possible side effects of vaccination, fever was the most well-known and of greatest concern (91%).

**ACIP's recommendations are highly regarded during the prioritization and adoption process.** Based on the prioritization of the ACIP committee for 2015-2020, their top three priority vaccines for specified populations have been adopted. The ACIP committee is reportedly quite close to the CDC, as the members are appointed and the communication and trust among the institution is high. ACIP recommendations seem to be the guiding light of the NIP.

### Box 4. Prioritization Factors as Defined in the CDC Strategy Document

The current CDC 5-year strategic document lays out five specific prioritization criteria for adopting the priority list of vaccines provided by the ACIP into the NIP:

- the severity of the disease, sequelae, epidemiological trends, and other monitoring nodes;
- social costs of public health, medical costs;
- the protective effect of the vaccine;
- safety and stability of the supply sources;
- government budget funds (including forecasting).

Based on the ACIP prioritization process, it is suggested that the Government adopt the following in preferential order:

- 1 Infantile-type Streptococcus pneumoniae vaccine under the age of 5 (Pneumococcal Conjugate Vaccine; PCV), for children aged 1-2 years, 2015 included in the regular child vaccination program.
- 2 Elderly people over the age of 65 vaccinated against Streptococcus pneumoniae vaccine.
- 3 Japanese encephalitis vaccine with cell culture, to replace the current Japanese brain production of Japanese encephalitis vaccine.
- 4 Young people vaccinated human papilloma virus (human papilloma virus vaccine; HPV)
- 5 Routine vaccination of rotavirus vaccine

Source: CDC Strategic Planning 2015-2020

**There are several vaccines the Advisory Committee on Immunization Practices (ACIP) is still waiting to be covered in the national immunization schedule because of budget constraints.** These include pneumococcal vaccines for senior citizens, human papillomavirus vaccines, and rotavirus vaccines<sup>34</sup>. If these were to be implemented, the necessary incremental budget would be NT\$1.4-1.5 billion according to the American Chamber of Commerce estimates. Informants stated that given the running deficit, both CDC and MOHW have a number of budgeting concerns with regards to introducing the new recommended vaccines. However, vocal advocates remind the Taiwanese government that investing in the immunization program is not only a matter of health care, but also increases the chances for economic growth. The CDC has

<sup>33</sup> Tang CW, Huang SH, Weng KP, Ger LP, Hsieh KS. (2011)

<sup>34</sup> CDC Strategic Planning 2015-2020

estimated that every dollar spent on childhood immunizations brings ten dollars in savings in terms of medical and societal costs.

## IMMUNIZATION IN TRANSITION, KEY TRENDS AND TAKEAWAYS

**The NVF is running an annual deficit, requiring a diversification of funding sources in order to cover costs of NUVIs.** NVF's tobacco surcharge allocation is decreasing annually due to the decrease in revenues. In addition, there is a greater proportion of the surcharges are being diverted to the new Long-Term Care program, which direct evidence of the tension between NCDs and communicable disease prevention. NVF is unique in its ability to accept private resources as a source of funding for immunizations. There is precedent for private resource influx in support of the PPV vaccine for the elderly, however, the private resources have not been supplemented by MOHW or other NVF funding commitments and thus the resources were discontinued due to lack of commitment and long-term fiscal planning by the NVF and CDC. Dialogue and knowledge transfer of the types of private funding and public-private partnership models that could help stabilize NVF funding and open fiscal space for NUVIs is the first step in aiding CDC in NUVI adoption. In the annual report of the Taiwan Chapter of American Chamber of Commerce (2016), the public health sub-committee made a recommendation, based on the NVF fiscal instability, that the MOHW absorb the EPI program under its line item budget instead of having it be a separately managed fund. Other advocates are pushing for a mixed of increase MOHW allocation, additional sin taxes, such as sugar to help increase the declining surcharge revenues (tobacco and alcohol), and private contributions.

**Taiwan's NHI scheme is one of the most robust in the region, making it a good candidate for absorbing immunization into the benefits package.** The current NHIA law explicitly prohibits the integration of immunization services into the benefits package. This was included in the original provision of the NHI bill because strong advocates within CDC and MoHW wanted to protect the strength and autonomy of the EPI program with the MoHW. However, given the current fiscal constraints and continued expansion of the benefits package under NHI, it has been proposed as a possible solution to sustain financing and maintain efficiency. However, ACIP members and advocates warn that the adoption of NUVIs into the NIP schedule if controlled by NHIA is a much more bureaucratic (multiple review mechanisms and agencies) and laborious (requiring formal proposals including CEAs, economic projections and approvals of multiple boards) than the current ACIP and CDC prioritization process.

**LGUs and mayors have autonomy to initiate NUVIs and can be considered an entry point once a vaccine is prioritized by the CDC and ACIP.** A number of LGUs have piloted HPV vaccines, and published positive results on the implementation, patient receptivity and efficacy of the vaccines, paving the way for an anticipated inclusion in the NIP in 2018.

**The gatekeepers for vaccine introduction are political, active, and well informed.** Taiwan's prioritization process remains inherently political. However, the ACIP and its members are active political players that partake in advocacy around prioritization of NUVIs, in addition to being researchers and practitioners that generate relevant and credible research concerning epidemiological need, costing studies, and document implementation challenges. The role of ACIP advocates in the adoption of vaccines is paramount in influencing the decisions around which products and what schedule will be introduced by the CDC.



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