

### Assessment and Perspective of BCG -Vaccination Policy in Taiwan

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#### Abstract

BCG-vaccination is an evidence-based, tuberculosis (TB) control policy endorsed by many countries and World Health Organization (WHO). Especially in high TB-burden countries, it protects unspecified population. BCG-vaccination reduces disability and death caused by TB and accompany with low risk and different types of adverse reaction. There is a history of controversial concern over its efficacy and impact.

This article describes Taiwan's current policy of BCG-vaccination and active surveillance mechanism. Since 1977, Taiwan's BCG vaccine was manufactured from Japanese Tokyo 172 strain. This strain was less virulent and caused less adverse events as revealed by published literature. The number of bacilli in single injection dose was  $7.5 \times 10^5$ , which was less than the dose in Japan. Follow recommendation of WHO, we complete BCG-vaccination in the infancy and choose intradermal injection. As a routine vaccination program, the TB incidence rate in the population younger than 5 years old was in accordance with other low-TB burden countries without routine BCG-vaccination. Moreover, continuous training of BCG-vaccination skill was provided to maintain good quality of inoculation. In accordance, a BCG-vaccination active surveillance was established since 2007. The birth cohort of 2008-9 reveals the incidence of severe BCG-related adverse events was 55 cases per million population which was under the estimated range by WHO.

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The current TB status in Taiwan did not fit to the criteria to terminate BCG-vaccination as recommended by the International Union against Tuberculosis and Lung Disease (IUATLD). After weighing the mortality and long-term side effects caused by TB meningitis, the TB experts' panel suggested to adopt recommendation of WHO and keep current BCG-vaccination policy as usual. In order to reduce the possible BCG-related harm, active surveillance mechanism was set up, strengthened providing comprehensive information and, follow up and personal care; furthermore, vaccine safety evaluation, health education and training, and to fast clarify the cause of adverse reaction. These would be the references for adjusting the policy of BCG-vaccination in the future.

**Keywords:** BCG ; tuberculosis ; vaccination ; tuberculosis meningitis

## A Tuberculosis Outbreak in a Work Place - Northern Taiwan, 2013

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### Abstract

A Vietnamese worker in northern region was notified as a confirmed case of tuberculosis in October 2012. Reviewing the chest X-ray of contacts, another Vietnamese worker who shared the same dormitory with the case was also diagnosed as tuberculosis infection with abnormal chest X-ray with cavity and smear positive of initial sputum specimen in November 2012. In addition, there was a Taiwanese contact showed pulmonary infiltration on chest X-ray radiograph. He has been notified in August 2011 and was registered in the Central TB System for Case Tracking and Management as an active tuberculosis based on bacteriological evidence and completed treatment in March 2012. Though the reporting interval between the Taiwanese case and the other two Vietnamese cases was more than one year, the possibility of a TB outbreak in the workplace can barely be ruled out. Therefore, the investigation was launched. The result indicated that these three cases worked in the same high-risk workplace and molecular typing showed they were all infected with the same *Mycobacterium tuberculosis* genotype, identifying this cluster was a tuberculosis outbreak in a workplace. Due to the incomplete contact investigation after the index case was notified, the onset of his contacts could not be detected as early as possible. It is recommended to implement on-site visits to TB cases, identifying potential infected people, and providing TB screening and health education for contacts. Moreover, evaluating and improving the high-risk environments is also the important issue in dealing with TB outbreaks.

**Keywords:** tuberculosis ; cluster infection ; environmental investigation ; workplace

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**week 6-8 (Feb. 8 - Feb.28, 2015)**

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## Weekly Data of Notifiable Infectious Diseases ( by week of diagnosis )

Classification	Case diagnosis week Disease Diagnosed <sup>1</sup>	Week 6		Week 1 – 6	
		2015	2014	2015	2014
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	1	0	3	5
	Acute Viral Hepatitis type A	0	4	12	21
	Amoebiasis	4	2	38	25
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	1	2
	Cholera	0	0	0	0
	Dengue Fever	14	5	126	76
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0
	Malaria	0	0	2	2
	Measles	0	1	0	2
	Meningococcal Meningitis	0	0	0	2
	Paratyphoid Fever	0	0	1	1
	Poliomyelitis	0	0	0	0
	Rubella	0	0	1	0
	Shigellosis	5	0	39	19
Typhoid fever	0	1	3	5	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	4	4	15	7
	Acute Viral Hepatitis type C <sup>5</sup>	5	0	25	1
	Acute Viral Hepatitis type D	0	0	0	0
	Acute Viral Hepatitis type E	0	0	1	3
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	1	0	1	1
	Haemophilus Influenza type b Infection	0	0	1	0
	Japanese Encephalitis	0	0	0	0
	Legionellosis	4	4	21	24
	Mumps <sup>2</sup>	13	15	83	78
	Neonatal Tetanus	0	0	0	0
	Pertussis	2	0	19	3
	Tetanus <sup>2</sup>	0	0	0	0
	Category IV	Botulism	0	0	1
Brucellosis		0	0	0	0
Complicated Influenza <sup>4</sup>		24	152	70	579
Complicated Varicella <sup>4</sup>		1	0	7	5
Endemic Typhus Fever		0	0	0	4
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		10	43	101	137
Leptospirosis		1	1	5	8
Lyme Disease		0	0	0	0
Melioidosis		0	0	3	1
Q Fever		0	0	1	9
Scrub Typhus		9	9	46	59
Toxoplasmosis		0	0	0	0
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.
4. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
5. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical **and** laboratory conditions" to "meet the clinical **or** laboratory conditions".
6. Since 2014/7/1, various subtypes of human cases of avian influenza changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

### Suspected Clusters

- Sixteen clusters were reported, including 8 tuberculosis clusters, 3 upper respiratory tract infection clusters, 2 diarrhea clusters, 2 influenza-like illness clusters, and 1 varicella cluster.

### Imported Infectious Diseases

- 10 confirmed cases were imported from 4 countries during week 6 of 2015.

Disease \ Country	Country				Total
	Indonesia	Malaysia	Maldives	Thailand	
Dengue Fever	3	1	1	1	6
Amoebiasis	4				4
<b>Total</b>	7	1	1	1	10

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 84 confirmed cases were imported from 19 countries in 2015.
- Top 3 imported diseases : Amoebiasis (27), Dengue fever (25), Shigellosis (15).
- Top 3 countries responsible for most imported cases : Indonesia (51), Vietnam (7), Philippines (4).

### Summary of Epidemic

- **Influenza** : The influenza activity was high. Since January 1, 2015, a total number of 68 cases of severe complicated influenza have been confirmed, including 56 cases infected by H3N2, 6 cases infected by H1N1, 3 cases infected by untyped influenza A and 3 cases infected by influenza B. Among these cases, 6 deaths were caused by infection with H3N2. Although the numbers of severe complicated influenza cases and emergency visits for influenza-like illness have all increased, they are all lower than those reported during the same period last year. At the moment, H3N2 is the dominant strain circulating in the community. In terms of viral surveillance, approximately 50% of the H3N2 isolates tested in January are considered as low reactors to the currently used influenza vaccine virus. Thus far, no resistant viruses have been detected.
- **Diarrhea** : The ongoing diarrhea outbreak has increased. Children under six years old are the high-risk population for diarrhea. As we have already entered the viral gastroenteritis season, the public is urged to practice good personal hygiene such as washing hands frequently and reminded to avoid eating raw food and consuming unboiled water to ward off infection.

### Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 7		Week 1—7	
Classification	Disease Diagnosed <sup>1</sup>	2015	2014	2015	2014
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	1	3	6
	Acute Viral Hepatitis type A	1	6	13	27
	Amoebiasis	5	2	43	27
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	1	2
	Cholera	0	0	0	0
	Dengue Fever	6	5	132	81
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0
	Malaria	0	1	2	3
	Measles	0	0	0	2
	Meningococcal Meningitis	0	0	0	2
	Paratyphoid Fever	0	1	1	2
	Poliomyelitis	0	0	0	0
	Rubella	0	0	1	0
	Shigellosis	1	2	40	21
Typhoid fever	0	0	3	5	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	0	1	15	8
	Acute Viral Hepatitis type C <sup>5</sup>	4	0	29	1
	Acute Viral Hepatitis type D	0	0	0	0
	Acute Viral Hepatitis type E	0	0	1	3
	Acute Viral Hepatitis untype	0	1	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	1	1
	Haemophilus Influenza type b Infection	0	0	1	0
	Japanese Encephalitis	0	0	0	0
	Legionellosis	6	2	27	26
	Mumps <sup>2</sup>	4	12	87	90
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	0	20	3
	Tetanus <sup>2</sup>	1	0	1	0
	Category IV	Botulism	0	0	1
Brucellosis		0	0	0	0
Complicated Influenza		18	119	88	698
Complicated Varicella <sup>4</sup>		0	12	7	17
Endemic Typhus Fever		0	0	0	4
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		12	24	113	161
Leptospirosis		0	0	5	8
Lyme Disease		0	0	0	0
Melioidosis		0	2	3	3
Q Fever		2	4	3	13
Scrub Typhus		3	3	49	62
Toxoplasmosis		0	1	0	1
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.  
2. Reported cases.  
3. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.  
4. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".  
5. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".  
6. Since 2014/7/1, various subtypes of human cases of avian influenza changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.

### Suspected Clusters

- Nine clusters were reported, including 3 diarrhea clusters, 2 tuberculosis clusters, 2 upper respiratory tract infection clusters, 1 influenza-like illness cluster, and 1 varicella cluster.

### Imported Infectious Diseases

- 6 confirmed cases were imported from 2 countries during week 7 of 2015.

Country Disease	Indonesia	Malaysia	Total
<b>Dengue Fever</b>	3	2	5
<b>Amoebiasis</b>	1		1
<b>Total</b>	4	2	6

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 90 confirmed cases were imported from 19 countries in 2015
- Top 3 imported diseases : Dengue fever (30), Amoebiasis (28), Shigellosis (15).
- Top 3 countries responsible for most imported cases : Indonesia (55), Vietnam (7), Malaysia (5).

### Summary of Epidemic

- **Influenza** : The influenza activity was high. Since January 1, 2015, a total number of 88 cases of severe complicated influenza have been confirmed, including 8 cases infected by H1N1, 72 cases infected by H3N2, 2 cases infected by untyped influenza A and 6 cases infected by influenza B. Among these cases, 9 deaths were caused by infection with H3N2 and 1 death was caused by infection with influenza B. During week 7, which coincided with the Chinese Lunar New Year holiday, the number of emergency visits for influenza-like illness increased significantly. At the moment, H3N2 is the dominant strain circulating in the community. In terms of viral surveillance, approximately 50% of the H3N2 isolates tested in January are considered as low reactors to the currently used influenza vaccine virus. Thus far, no resistant viruses have been detected.
- **Diarrhea** : The ongoing diarrhea outbreak has increased. Children under six years old are the high-risk population for diarrhea. The public is urged to practice good personal hygiene such as washing hands frequently and reminded to avoid eating raw food and consuming unboiled water to ward off infection.

### Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 8		Week 1—8	
Classification	Disease Diagnosed <sup>1</sup>	2015	2014	2015	2014
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	3	6
	Acute Viral Hepatitis type A	4	2	17	29
	Amoebiasis	4	3	47	30
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	1	2
	Cholera	0	0	0	0
	Dengue Fever	4	5	136	86
	Dengue Hemorrhagic Fever/Dengue Shock Syndrome	0	0	0	4
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	1	0	1
	Malaria	0	0	2	3
	Measles	0	2	0	4
	Meningococcal Meningitis	0	0	0	2
	Paratyphoid Fever	0	0	1	2
	Poliomyelitis	0	0	0	0
	Rubella	0	0	1	0
	Shigellosis	1	4	41	25
Typhoid fever	1	1	4	6	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	4	2	19	10
	Acute Viral Hepatitis type C <sup>5</sup>	3	3	31	4
	Acute Viral Hepatitis type D	0	0	0	0
	Acute Viral Hepatitis type E	0	0	1	3
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	1	1
	Haemophilus Influenza type b Infection	0	0	1	0
	Japanese Encephalitis	0	0	0	0
	Legionellosis	1	0	28	26
	Mumps <sup>2</sup>	10	18	97	108
	Neonatal Tetanus	0	0	0	0
	Pertussis <sup>2</sup>	2	0	22	3
	Tetanus <sup>2</sup>	0	0	1	0
Category IV	Botulism	0	0	1	0
	Brucellosis	0	0	0	0
	Complicated Influenza	16	142	104	840
	Complicated Varicella <sup>4</sup>	3	3	10	20
	Endemic Typhus Fever	0	0	0	4
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	17	8	130	169
	Leptospirosis	3	1	8	9
	Lyme Disease	0	0	0	0
	Melioidosis	0	1	3	4
	Q Fever	0	1	3	14
	Scrub Typhus	0	3	49	65
	Toxoplasmosis	0	0	0	1
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.  
2. Reported cases.  
3. The epidemiological week calendar established by the World Health Organization is adopted for calculating each week's cumulative total.  
4. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".  
5. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".  
6. Since 2014/7/1, various subtypes of human cases of avian influenza changed to the fifth class of infectious diseases "novel influenza A virus infections". The original "H5N1 flu" and "H7N9 flu" were removed on the same day.



### Suspected Clusters

- Twenty clusters were reported, including 4 tuberculosis clusters, 11 diarrhea clusters, 3 upper respiratory tract infection clusters, 1 influenza-like illness cluster, and 1 varicella cluster.

### Imported Infectious Diseases

- 12 confirmed cases were imported from 7 countries during week 8 of 2015.

Country Disease	Indonesia	Myanmar	India	Korea	Japan	China	Vietnam	Total
Dengue Fever	2						1	3
Hepatitis A		1	1	1				3
Amoebiasis	1	1						2
Typhoid fever	1							1
IPD					1			1
Shigellosis			1					1
Hepatitis B						1		1
<b>Total</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>12</b>

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 102 confirmed cases were imported from 19 countries in 2015.
- Top 3 imported diseases : Dengue fever (33), Amoebiasis (30), Shigellosis (16).
- Top 3 countries responsible for most imported cases : Indonesia (59), Vietnam (8), Malaysia (5).

### Summary of Epidemic

- **Influenza** : Although the epidemic has begun to reverse, the influenza activity still remained high. Since January 1, 2015, a total number of 102 cases of severe complicated influenza have been confirmed, including 9 cases infected by H1N1, 81 cases infected by H3N2, 3 cases infected by untyped influenza A and 9 cases infected by influenza B. Among these cases, 11 deaths were caused by infection with H3N2 and 1 death was caused by infection with influenza B. During week 8, H3N2 is the dominant strain circulating in the community.
- **Diarrhea** : The ongoing diarrhea outbreak has increased. Children under six years old are the high-risk population for diarrhea. The public is urged to practice good personal hygiene. More particularly, the food and beverage industry, hospitals, care facilities, schools and other densely populated places are urged to strengthen infection prevention and control measures. Individuals experiencing any suspicious symptoms are advised to seek immediate medical treatment and stay home to prevent further transmission of the disease.

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