

# The Status of Handwashing with Soap and its Convergent related Factors in Korean People ; based on Korea National Handwashing Observation Survey, 2013

Hye-Jeong Hwang<sup>\*</sup>, Moo-Sik Lee<sup>\*\*</sup>, Nam-Young Yang<sup>\*\*\*</sup>, SuJin Hong<sup>\*\*</sup>, Young-Taek Kim<sup>\*\*\*\*</sup>  
Department of Health, Welfare, and Business Administration, Konyang Cyber University<sup>\*</sup>  
Department of Preventive Medicine, College of Medicine, Konyang University<sup>\*\*</sup>  
Department of Nursing, College of Nursing, Konyang University<sup>\*\*\*</sup>  
Division of Infectious Disease Control, Korea Center for Disease Control and Prevention<sup>\*\*\*\*</sup>

## 한국인의 비누로 손씻기 실천율 및 융복합적 관련요인; 2013년 국민 손씻기 관찰조사

황혜정<sup>\*</sup>, 이무식<sup>\*\*</sup>, 양남영<sup>\*\*\*</sup>, 홍수진<sup>\*\*</sup>, 김영택<sup>\*\*\*\*</sup>  
건양사이버대학교 보건복지경영학과, 건양대학교 의과대학 예방의학교실<sup>\*\*</sup>,  
건양대학교 간호대학 간호학과<sup>\*\*\*</sup>, 질병관리본부 감염병관리과<sup>\*\*\*\*</sup>

### Abstract

#### OBJECTIVES

Handwashing rate of Korean people was lower than the rates of people in developed countries. The purpose of this study was to investigate handwashing rate, the factors influence people's handwashing behaviors during use of public restroom.

#### METHODS

This study used the data of '2013 Korea National Handwashing Survey'. The survey was done through direct observation on the user of subway and train station restroom from September 10 to 12, 2013.

#### RESULTS

Factors influencing handwashing with soap were administrative region(OR 0.490-2.255), purpose of toilet use(urination 1.000, defecation 2.505), drying method after handwashing(OR 0.497-3.107).

#### CONCLUSIONS

The results of this study will provide the evidence data of national handwashing promotion activities for preventing and controlling communicable diseases.

**Key Words** : handwashing with soap, handwashing behavior, convergent related factors, observation survey

### 요 약

#### OBJECTIVES

우리나라 국민들의 손씻기 실천율은 선진국에 비해서 매우 낮은 수준이다. 이 연구는 비누로 손씻기와 관련한 공공 화장실 이용시 행동 실태 및 관련요인을 분석하고자 하였다.

#### METHODS

2013년 9월 10일부터 9월 12일까지 우리나라 특·광역시 지하철역 및 기차역의 화장실 이용자를 대상으로 '2013년도 국민 손씻기 실태조사' 결과를 활용하였다.

#### RESULTS

비누로 손씻기에 영향을 미치는 요인으로 행정구역(OR 0.490-2.255), 용무유형(소변 1.000, 대변 2.505), 물기제거방법(OR 0.497-3.107) 등이 도출되었다.

#### CONCLUSIONS

연구의 결과는 감염성 질환을 예방하고, 관리하기 위한 국가 손씻기 증진 활동 및 사업의 기본적인 근거자료를 제공할 것이다.

**주제어** : 비누로 손씻기, 손씻기 행태, 융복합적 관련요인, 관찰조사

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Corresponding Author: Moo-Sik Lee(Dept. of Preventive Medicine, college of Medicine Konyang University)

Email: mslee@konyang.ac.kr

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## 1. Introduction

Worldwide, about 2 million children die from diarrheal diseases every year (World Health Organization, 2002)[1], and about 1.3 trillion KRW of losses occur (Park KJ, 2001)[2]. In the result of infectious disease epidemiological investigation published every year, waterborne foodborne diseases rapidly decreased after 2007 and especially in 2009 it showed the lowest rate of occurrence (It is expected that there is possibility that during the new influenza epidemic, personal hygiene was improved) and after it showed a state of lull but at this occurring throughout the year. Especially there is seasonal trend of the highest occurrence between May and September and it shows wide range of occurrence in group kitchens such as schools and training centers, as well as other places such as general restaurants. Also occurrences due to norovirus are continuing and there is continuous occurrence of such things as *E. coli* and *Vibrio parahaemolyticus*. Especially in 2012, among waterborne foodborne diseases epidemics where pathogens were confirmed, occurrences due to norovirus increased by 80.5% compared to the past year [3]. As above, diseases that were recent problems or are current problems in Korea such as SARS (severe acute respiratory syndrome), influenza, common cold, cholera, dysentery, and epidemic eye disease can largely be prevented by thorough handwashing [4]. According to study results, it was reported that just with increase of handwashing, pneumonia, impetigo, and diarrheal diseases were decreased by over 40 to 50% [5, 6, 7].

Until recently waterborne foodborne diseases within schools are showing continuous occurrence, food poisoning show continuous occurrence throughout the year, and it is continuously occurring every year (Food and Drug Safety, food poisoning statistics system, 2015) [8]. Especially in relation to movement of schoolchildren such as back-to-school periods,

vacations, and holidays there are group occurrences of hand foot mouth disease, epidemic conjunctivitis, and acute hemorrhagic conjunctivitis, which showed the need for handwashing. In July 2005, 25 related organizations including Korea Centers for Disease Control and Prevention, and Korean Medical Association installed a “nationwide handwashing movement headquarters” and conducted a ‘Handwashing survey of Koreans’ of 1,000 people over the age of 14 through phone surveys, and of 2,800 through observation survey of public toilet (airport, terminal, stations etc.) users of seven national cities. 77.6% of the responders responded that ‘handwashing aided disease prevention’ which showed high awareness but in the result of the observation survey it was found that while 74.3% washed their hands when people were around, only 49.7% washed their hands when there were no other people, and this difference was more prominent in males compared to females. Compared to the results of developed countries, it was found that handwashing practice rates of Korean citizens fell short of that of developed countries. Also the rate of response that one had received handwashing education was at only 14.9% [9] which expresses the need for handwashing education.

Handwashing in developed countries resulted in a decrease of respiratory and digestive diseases in the newborn unit, decrease of absences and schools, and decrease of morbidity, mortality, and spread of resistant bacteria and conservation of hospital resources and hospitals [10].

After the swine flu epidemic that swept the world in 2009, social interest about handwashing increased further. Also due to continuous occurrence of such things as respiratory infectious diseases like the recent new flu [11], waterborne and foodborne infectious diseases, norovirus, and MRSA(methicilline resistant *staphylococcus aureus*) [12](Sheree MS Smith et al., 2009), there is need for active research and promotion plans about related fields. Handwashing for prevention

of infectious diseases have become more important because human infection of aviary flows and the mass epidemic of swine flu that are currently worrying citizens were found to be sufficiently preventable through making handwashing a part of life.

This study is the '2013 national handwashing research' by Korea Centers for Disease Control and Prevention, and it was conducted with the purpose of obtaining national attitude and behavior data related to handwashing through figuring out behavior during use of public bathrooms by elementary, middle, high school students, and adult males and females.

## 2. Methods

### 2.1 Research subjects

This research was conducted following the related registrations about prevention and management of infectious diseases and as a part of the implementation of research service project by Korea Centers for Disease Control and Prevention, conducted observation survey of toilet users in subway and train stations of Seoul and six metropolitan cities from September 10 to 12, 2013. Excluding the subjects that had insufficient data, 840 people ( $\pm 1.3\%$  point from 95% confidence interval) were selected.

### 2.2 Research method

The research method used structured checklist, the something method used systematic sampling, and observation survey was done on every fifth toilet user.

The research content was divided into three items including 'toilet status', 'toilet use purpose and existence of handwashing', and 'handwashing behavior.' First the 'toilet status' item included handwashing facilities conditions, whether if there were other users in the toilet, second the 'toilet use purpose and existence of handwashing' item included defecation or urination, and handwashing after defecation, and third

the 'handwashing behavior' item included whether if the user used soap for handwashing, time it took to wash hands, hand drying method after handwashing, and manner of locking the tap after handwashing.

Research ethics review about this study received approval through review by Konyang University Hospital Institutional Review Board(IRB No. 13-70).

### 2.3 Analysis method

Analysis was done through SPSS statistical program (version 16.0) on a personal computer, univariate analysis applied chi-square test, and multiple logistic regression analysis was applied for convergent related factor analysis on dependent variate, existence of handwashing practice. Multivariate analysis was done on variables that showed significant differences of level of significance by 0.005 in the univariate analysis.

## 3. Research results

### 3.1 Rate of handwashing according to general characteristics

Among the 420 males, people who washed their hands were 268 (63.8%) and among the 420 females, 342 (81.4%) washed their hands ( $p < 0.01$ ). Among 55 subjects were in their teens, 37 (67.3%) washed their hands, among 294 in their 20s, 223 (75.9%) washed their hands, among 191 in their 30s 146 (76.4%) washed her hands, among 126 in their 40s 91 (72.2%) washed their hands, and among 174 in their 50s 113 (64.9%) washed her hands. However there was no statistical significance. Among 120 subjects from Seoul, 82 (68.3%) washed their hands, among 120 subjects from Busan, 81 (67.5 %) washed their hands, among 120 subjects from Daegu, 90 (75.0 %) washed their hands, among 120 subjects from Incheon, 86 (71.7 %) washed their hands, and among 120 subjects from Gwangju, 91 (75.8 %) washed their hands. However, there was no statistical significance <Table 1>.

<Table 1> The status of handwashing according to general characteristics

Variables	Total	People practiced handwashing and rate of practice		p-value*
		N	%	
<b>Gender</b>				
Male	420	268	(63.8)	<0.001
Female	420	342	(81.4)	
<b>Age range</b>				
Under 10s	55	37	(67.3)	0.064
20s	294	223	(75.9)	
30s	191	146	(76.4)	
40s	126	91	(72.2)	
Over 50s	174	113	(64.9)	
<b>Administrative region</b>				
Seoul	120	82	(68.3)	0.623
Busan	120	81	(67.5)	
Daegu	120	90	(75.0)	
Incheon	120	86	(71.7)	
Gwangju	120	91	(75.8)	
Daejeon	120	90	(75.0)	
Ulsan	120	90	(75.0)	
<b>Total</b>	<b>840</b>	<b>610</b>	<b>(72.6)</b>	

\* calculated by chi-square test

### 3.2 Rate of handwashing according to facility characteristics

Places where subjects conducted handwashing among places that had hand dryers were 610 places and among these the number of subjects that washed their hands with soap was 197 (32.3%). A total of 480 places had tissues and paper towels and the number of subjects that washed their hands with soap was 159 (33.1%) <Table 2>.

<Table 2> The status of handwashing with soap according to facility characteristics

Variable	Total (N=610)	People practiced handwashing with soap and rate of practice (N=197, 32.3%)	
		N	%
Soap	610	197	(32.3)
Hand Dryer	610	197	(32.3)
Tissue/Paper towel	480	159	(33.1)

### 3.3 Rate of handwashing according to surroundings

Among 473 people who washed their hands while

there were other users in the toilet, the number of subjects who washed their hands with soap was 155 (32.8%) and the number of subjects who washed their hands with soap while there was no other users in the toilet was found to be 42 (30.7%) but there was no statistical significance <Table 3>.

<Table 3> The status of handwashing with soap according to surroundings

Variable	Total (N=610)	People practiced handwashing with soap and rate of practice (N=197, 32.3%)		p-value*
		N	%	
Other user present	473	155	(32.8)	0.641
No other user	137	42	(30.7)	

\* calculated by chi-square test

### 3.4 Rate of handwashing with soap according to purpose of toilet use

Among subjects with the purpose of defecation, the number of subjects that washed their hands was 103 and 53 (51.5%) washed their hands with soap. Among subjects with the purpose of urination, the number of subjects that washed their hands was 507 and 144 (28.4%) washed their hands with soap (p<0.001)<Table 4>.

<Table 4> The status of handwashing with soap according to the purpose of toilet use

Variable	Total (N=610)	People practiced handwashing with soap and rate of practice (N=197, 32.3%)		p-value*
		N	%	
Defecation	103	53	(51.5)	<0.001
Urination	507	144	(28.4)	

\* calculated by chi-square test

### 3.5 The status of handwashing with soap according to hand dry methods and manner of locking the tap

Among 146 subjects who used hand dryers as a way to dry the hands, the number of subjects that practiced handwashing with soap was 60 (41.1%), among 86 subjects that used tissues (paper towels) the number of

subjects was 52 (60.5%), among six subjects that drive their hands with personal tissues, 4 (66.7%) practiced handwashing with soap, and among 19 subjects that used personal hand towels, 9 (47.4%) washed their hands with soap. Among 353 subjects, 72 (20.4%) subjects did not dry their hands ( $p<0.01$ ).

For manner of locking the tap, among 605 subjects that locked the tap with their bare hands, 197 (32.6%) subjects washed their hands with soap and among 5 people who did not lock the tap, 0 (0.0%) subjects washed their hands with soap. However, there was no statistical significance <Table 5>.

<Table 5> The status of handwashing with soap according to hand dry methods and manner of locking the tap

Variable	Total (N=610)	People practiced handwashing with soap and rate of practice (N=197, 32.3%)	p-value*
<b>Hand drying methods</b>			
Hand dryer	146	60 (41.1)	<0.001
Tissue (Paper towel)	86	52 (60.5)	
Personal tissue	6	4 (66.7)	
Personal hand towel	19	9 (47.4)	
No hand drying	353	72 (20.4)	
<b>Manner of locking the tap</b>			
Bare hands	605	197 (32.6)	0.121
Did not lock	5	0 (0.0)	

\* calculated by chi-square test

### 3.6 Factors that influence handwashing

There was 2.255 times the chance of subjects from Seoul washing their hands compared to subjects from Busan, and Gwangju showed 0.490 times, which was a rather low rate ( $p<0.05$ ). The region with lower probability of washing hands than Busan was Incheon, and regions with higher probability were Daegu, Ulsan, and Daejeon, but there was no statistical significance. There was 1.370 times probability of handwashing for defecation compared to urination ( $p<0.001$ ). Compared to subjects that used toilets with tissues (paper towels), subjects that used toilets with hand dryers had 0.695 times probability of washing their hands, subjects that

used personal tissues had 0.497 times probability of washing their hands, and subjects that used personal hand towels had 0.824 times probability of washing their hands, but there was no statistical significance.

Also subjects who did not dry their hands had 3.107 times probability of washing their hands compared to subjects that used tissues (paper towels) located in the toilets ( $p<0.001$ )<Table 6>.

<Table 6> Multiple logistic regression analysis on influencing factors of handwashing with soap

Variable	p-value	OR	95% CI of OR	
			Min	Max
<b>Administrative region</b>				
Busan (ref)		1.000		
Seoul	0.041	2.255	1.034	4.916
Daegu	0.170	1.658	0.806	3.410
Incheon	0.099	0.561	0.282	1.115
Gwangju	0.036	0.490	0.252	0.953
Daejeon	0.597	1.212	0.594	2.471
Ulsan	0.560	1.235	0.607	2.512
<b>Purpose of toilet use</b>				
Urination(ref)		1.000		
Defecation	0.000	2.505	1.546	4.058
<b>Hand drying method located in toilet</b>				
Tissue (Paper towel) located in toilet (ref)		1.000		
Hand dryer	0.247	0.695	0.376	1.286
Personal tissue	0.440	0.497	0.084	2.933
Personal hand towel	0.707	0.824	0.300	2.264
No drying	0.000	3.107	1.960	4.925
Constant term		0.105	0.582	

## 4. Discussion

This research was conducted to investigate the national attitude and rate of practice of behavior related to handwashing with soap by figuring out such things as behavior during usage of public bathrooms of citizens. As a result the rate of handwashing after use of public toilets was found to be 63.8% overall and this is a similar result [14] from the 63.4% in the study by Jung Jaeshim et al. (2007) [13] and although it was found to be lower than the 83% from the investigation in the United States in 2005, there was a handwashing

practice rate investigation that was done on only female students in an American university that showed 63% and it was similar to this study result [15]. In gender, among the total of 420 males, 268 (63.8%) subjects practiced handwashing and among 420 females, 342 (81.4%) subjects practiced handwashing and also in the study by Jung Jaeshim et al. (2007) [13] it was found that 72.1% of females and 54.6% of males practiced handwashing which showed that females practiced handwashing well.

The rate of handwashing was higher in the 20s (75.9%) than in the 40s (72.2%) and similar to the study by Jung Jaeshim et al. (2007) [13], it was found that subjects in their 30s (76.4%) most commonly practiced handwashing. It could be estimated that subjects in their 30s practice handwashing well because they have high awareness of the importance of handwashing as parents that have children who are in preschool or elementary school, but in the aspect that the handwashing practice rate is the lowest in the teens, it is determined that there needs to be systematic promotion using mass media and smart phone apps as well as school education.

The result of Ryu(2013) study indicates not enough a habituation of handwashing and a lack of hand washing education program. Therefore, this study suggest that it is a necessity for developing education programs and hospital systems and rules consistently to improve habituation of handwashing[16]. Handwashing could substantially can be prevented most of infectious diseases such as SARS, flu, food poisoning, epidemic eye disease that had been recently issued. Recently study indicate that handwashing with soap promotion could reduce pneumonia, diarrhoea, and shigellosis ranged from 40-50%[17]. 70% of most of the diseases can be prevented by washing hands, thus the importance of handwashing is emphasized[18].

Looking at it from the regional perspective, Seoul had the highest probability of handwashing but it was found that Busan, Gwangju, and Incheon had low

probability and it could be seen that the probability in the Busan region was still low as seen in the results of the study by Jung Jaeshim et al. conducted in 2007 [13]. It is determined that there is relation with promotion and education, and geological location that is close to the sea.

For ratio of handwashing after defecation, ratio of handwashing after the vacation was high and also in the study of using personal tissues among hand drying methods conducted in 2005 by Korea Centers for Disease Control and Prevention, similar results could be seen and the rate of practice of handwashing using soap was found to be the highest for subjects that used personal tissues [16].

## 5. Conclusion

Although the rate of handwashing after defecation was high, the rate of soap use was low, the rate of handwashing was higher when there was conscious awareness of other users in the toilet, and hand drying method used was also not proper. The significance of this study is that it is a basic data for a more systematic tailored training by age range, class, and region, promotion activity for expansion, and an effective and scientific handwashing manual for stopping national expansion of infectious diseases and preventing infectious diseases.

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## REFERENCES

- [1] World Health Organization. The World Health

- Report 2002: Reducing Risk, Promoting Healthy Life. World Health Organization. 2002.
- [2] Park KJ. The Development of Estimate Model of Social Economic Costs and Estimates Socioeconomic Effect of Foodborne Disease in Korea. Korea Health Industry Development Institute. 2001.
- [3] Korea Center for Disease Control & Prevention, 2013 Infectious disease management program guidelines. Korea Center for Disease Control & Prevention. 2013.
- [4] Boyce JM, Pittet D. Healthcare Infection Control Practices Advisory Committee; HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC /IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Professionals in Infection Control/ Infectious Diseases Society of America. *MMWR Recomm Rep*. Vol. 51, No. 16, pp. 1-45, 2002.
- [5] Luby SP, Agboatwalla M, Feikin DR, Painter J, Billhimer W, Altaf A, Hoekstra RM. Effect of handwashing on child health: A randomized controlled trial. *Lancet*, Vol. 366, No. 9481, pp. 225-233, 2005.
- [6] Luby SP, Agboatwalla M, Painter J, Altaf A, Billhimer WL, Hoekstra RM. Effect of intensive handwashing promotion on childhood diarrhea in high risk communities in Pakistan. *JAMA*, Vol. 291, No. 21, pp. 2547-2554, 2004.
- [7] Curtis V, Caimcross S. Effect of washing hands with soap on diarrhoea risk in the community: A systematic review. *Lancet Infect Dis*, Vol. 3, No. 5, pp. 275-281, 2003.
- [8] Food and Drug Safety, food poisoning statistics system. 2015. [cited 2015 Sep 15]. Available from: [http://www.foodsafetykorea.go.kr/portal/healthyfoodlife/foodPoisoningStat.do?menu\\_no=519&menu\\_grp=MENU\\_GRP02](http://www.foodsafetykorea.go.kr/portal/healthyfoodlife/foodPoisoningStat.do?menu_no=519&menu_grp=MENU_GRP02)
- [9] Korea Center for Disease Control & Prevention, Handwashing Survey of Koreans, 2005.
- [10] Pittet D. The Lowbury lecture: behaviour in infection control. *J Hosp Infect*. Vol. 58, pp. 1 -3, 2004.
- [11] Park JH, Cheong HK, Son DY, Kim SU, Ha CM. Perceptions and behaviors related to hand hygiene for the prevention of H1N1 influenza transmission among Korean university students during the peak pandemic period. *BMC Infectious Diseases*, Vol. 10, No. 222, pp. 1-8, 2010.
- [12] Sheree MS Smith. A review of hand-washing techniques in primary care and community settings, *Journal of Clinical Nursing*, Vol. 18, pp. 786 - 790, 2009.
- [13] Jeong JS, Choi JK, Jeong IS, Peck KR, In HK, Park KD. A Nationwide Survey on the Hand Washing Behavior and Awareness. *Journal of Preventive Medicine and Public Health*, Vol. 40, No. 3, pp. 197-204, 2007.
- [14] American Society for Microbiology and The Soap and Detergent Association. Hand Washing Survey Fact Sheet. [cited 2006 May 18]. Available from: URL: <http://www.cleaning101.com/newsroom/2005-survey/handhygiene/keyfindings.html>.
- [15] Drankiewicz D, DundesL, Maryland W, Handwashing among female college students. *Am J Infect Control*, Vol. 31, No. 2, pp. 67-71, 2003.
- [16] Ryu SM, Lim YJ. Knowledge, Attitude and Performance on the Hand Washing by Pre-practicum Nursing Students. *Journal of the Korea Academia-Industria*, Vol. 14, No. 11, pp. 5714 - 5722, 2013.
- [17] Curtis& Caimcross, "Effect of washing hands with soap on diarrhea risk in the community; A systematic review". *Lancet Infection of Disease*, 3(5):275-281,2003. DOI: [http://dx.doi.org/10.1016/S1473-3099\(03\)00606-6](http://dx.doi.org/10.1016/S1473-3099(03)00606-6)
- [18] Choi YS, Behaviors of hand washing practice Korean adolescents, 2011-2013: The Korea Youth

Risk Behavior Web-based Survey, Journal of the Korea Academia-Industria, Vol. 15, No. 7, pp. 4132 - 4138, 2014.

[19] Korea Center for Disease Control & Prevention, Hand washing and general public awareness survey Investigation Report, 2005.

### 황혜정(Hwang, Hye Jeong)



- 2010년 2월 : 건양대학교 대학원 (의학박사)
- 2011년 1월 ~ 현재 : 건양사이버대학교 보건복지경영학과 조교수
- 관심분야 : 예방의학, 보건교육, 보건정책
- E-Mail : hhj@kycu.ac.kr

### 이무식(Lee, Moo Sik)



- 1999년 2월 : 계명대학교 의학박사
- 1999년 3월 ~ 현재 : 건양대학교 의과대학 예방의학교실 교수
- 2008년 10월 ~ 2011년 7월 : 건양대병원 임상시험센터 소장
- 2011년 8월 ~ 2012년 7월 : 미국 미네소타 메이요 클리닉 객원교수
- 2009년 3월 ~ 현재 : 건양대학교 보건복지대학원 원장
- 관심분야 : 보건의료관리, 임상예방의학, 산업의학, 병원관리
- E-Mail : mslee@konyang.ac.kr

### 양남영(Yang, Nam Young)



- 1991년 2월 : 가톨릭대학교 간호학과(간호학사)
- 1999년 2월 : 이화여자대학교 간호대학(간호학석사)
- 2003년 2월 : 가톨릭대학교 간호대학(간호학박사)
- 2003년 3월 ~ 현재 : 건양대학교 간호학과 교수
- 관심분야 : 만성질환간호, 건강증진, 노인간호 preceptorship, 간호교육, 인적자원관리
- E-Mail : nyyang@konyang.ac.kr

### 홍수진(Hong, Su Jin)



- 2014년 3월 ~ 현재 : 건양대학교 보건복지대학원 보건학과(보건학 석사 재학)
- 관심분야 : 공중보건, 병원관리
- E-Mail : rosarial25@naver.com

### 김영택(Kim, Young Taek)



- 1998년 2월 : 경북대학교 의과대학원 예방의학전공(의학석사)
- 2002년 2월 : 경북대학교 의과대학원 예방의학전공(의학박사)
- 1996년 ~ 현재 : 질병관리본부 감염병센터 감염병관리과 과장
- 관심분야 : 지역사회공중보건, 만성질환예방관리, 감염병관리
- E-Mail : ruyoung@korea.kr