



Analysis of Surgical Pathology Data in the HIRA Database: Emphasis on Current Status and Endoscopic Submucosal Dissection Specimens

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Background: In Korea, medical institutions make claims for insurance reimbursement to the Health Insurance Review and Assessment Service (HIRA). Thus, HIRA databases reflect the general medical services that are provided in Korea. We conducted two pathology-related studies using a HIRA national patient sample (NPS) data (selection probability, 0.03). First, we evaluated the current status of general pathologic examination in Korea. Second, we evaluated pathologic issues associated with endoscopic submucosal dissection (ESD). **Methods:** The sample data used in this study was HIRA-NPS-2013-0094. **Results:** In the NPS dataset, 163,372 pathologic examinations were performed in 103,528 patients during the year 2013. Considering sampling weight (33.3), it is estimated that 5,440,288 ($163,372 \times 33.3$) pathologic examinations were performed. Internal medicine and general surgery were the most common departments requesting pathologic examinations. The region performing pathologic examinations were different according to type of medical institution. In total, 490 patients underwent ESD, and 43.4% (213/490) underwent ESD due to gastric carcinoma. The results of the ESD led to a change in disease code for 10.5% (29/277) of non-gastric carcinoma patients. In addition, 21 patients (4.3%) underwent surgery following the ESD. The average period between ESD and surgery was 44 days. **Conclusions:** HIRA sample data provide the nation-wide landscape of specific procedure. However, in order to reduce the statistical error, further studies using entire HIRA data are needed.

Key Words: Statistics; Sample size; Pathology; Surgery

In Korea, all medical institutions claim insurance reimbursements for services to the Health Insurance Review and Assessment Service (HIRA). Thus, HIRA databases reflect the general medical services provided in Korea. Since the entire HIRA database is too big to analyze, HIRA provides a specific set of data according to researcher's requests. HIRA also provides some relatively small sized data sets (statistically extracted, anonymized, and annualized) for research and public purposes.¹ These sample data included national patient sample (NPS), a national inpatient sample, an adult patient sample (65 years or older), and a pediatric patient sample. To the best of our knowledge, this is the first pathology-related analysis using HIRA data.

We conducted two pathology-related studies using HIRA-NPS data. First, we analyzed the rate of surgical pathologic examinations in Korea. After Kamegoro Inamoto introduced pathology to Korea in 1914, pathologic examinations have played a major role in medical services for the improvement of overall care.² However, research on the frequency of pathologic examinations in this nation as a whole have not been performed due to a restriction on the sharing of personal medical records.

Next, we analyzed the pathologic results of endoscopic submucosal dissection (ESD) specimens. ESD is considered as an initial treatment modality for early and localized gastric carcinoma or benign epithelial neoplasm.³ We evaluated several ESD-related parameters. After ESD and pathologic examination, surgical treatment is called for in those cases that show tumor cells in the resection margins, endolymphatic tumor emboli, or submucosal invasion.⁴ Several papers have been published on this subject, but most of them are from a single institute and so do not incorporate the data of those patients who later went on to undergo additional surgery in different hospitals.^{5,6} One of the advantageous features of the HIRA database is that patients can be tracked through several medical institutions, thereby enabling the study of a more complete data set including those that received secondary treatment in one hospital after ESD in another hospital.

MATERIALS AND METHODS

The sample data used in this study was HIRA-NPS-2013-0094.

This sample was composed of 26 text files, and the total file size was 16.6 gigabytes (GB). The HIRA data tables were composed of five main tables (general specification, healthcare services, diagnosis information, prescriptions, and general information about the medical institutions). Each table was conjoined with proper claim numbers or medical institution numbers. The disease codes were based on the Korean Standard Classification of Disease (KCD). Specifications of the computer that was used to analyze

the data were as follows: central processing unit (CPU), i3-2120 3.30 GHz (Intel, Santa Clara, CA, USA); 32 GB main memory; operating system (OS), Ubuntu 14.04.3 long-term support (LTS); and R 3.2.2 analysis software. The pathologic examination codes used in this study are summarized in Table 1. The sample data contained 22,344,536 claims in 1,361,717 patients (selection probability, 0.03; sampling weight, 33.3).

Table 1. Pathologic examination claim codes using in this study

Histologic examination	Code
Biopsy: 1–3 pieces/4–6 pieces/7–9 pieces/10–12 pieces/more than 13 pieces	C5911/C5912/C5913/C5914/C5915
Resected specimen requiring gross sectioning (non-malignant): paraffin blocks ≤6/paraffin blocks ≥7	C5916/C5917
Resected specimen for malignant tumor requiring gross sectioning	
With lymph node dissection: paraffin blocks ≤20/paraffin blocks ≥21	C5918/C5919
Without lymph node dissection: paraffin blocks ≤15/paraffin blocks ≥16	C5500/C5504
Histologic mapping of tumor: with lymph node dissection/without lymph node dissection	C5505/C5508
Emergency histopathologic examination during surgery (frozen section): 1–2 specimens/3–6 specimens/more than 7 specimens	C5511/C5512/C5513
Tissue immunofluorescent microscopic examination: IgG/IgA/IgM/IgE/C3/C4/HbsAg/fibrinogen/others	C5541/C5542/C5543/C5544/C5545/C5549/C5546/C5547/C5548
Tissue electron microscopy	C5550
Enzyme histochemistry: ATPase-pH 9.4/ATPase-pH 4.9/NADH/acytylcholinesterase/chloroacetate esterase/others	C5561/C5562/C5563/C5564/C5565/C5566
Immunohisto(cyto)chemistry	C5575/C5575006
Cervicovaginal smear/Liquid-based cervicovaginal cytology	C5920/CX541
Body fluid: general/cytospin/cell block after cytopathologic examination/liquid-based body fluid cytopathology	C5930/C5931/C5940/CZ521
Aspiration/Aspiration and cell block	C5941/C5942
Liquid-based aspiration cytopathology/Liquid-based aspiration cytopathology and Cell block	C5943/C5944
Fluorescence <i>in situ</i> hybridization: <i>HER2</i> gene	C5967/C5967006
Silver <i>in situ</i> hybridization: <i>HER2</i> gene	CZ968/CZ968006

HBsAg, hepatitis B surface antigen.

Table 2. Pathologic examinations claims and requesting medical institutions according to administrative districts (sort based on the total number of claims)

Administrative district	Tertiary hospital	General hospital	Other institutions	Total	Total estimates
Seoul	25,547	16,164	12,000	53,711	1,788,576
Gyeonggi-do	1,632	16,203	10,905	28,740	957,042
Busan	3,276	4,877	5,135	13,288	442,490
Daegu	1,164	5,933	5,185	12,282	408,991
Incheon	2,545	2,377	2,465	7,387	245,987
Gyeongsangnam-do	760	3,561	3,053	7,374	245,554
Gwangju	1,211	2,438	1,910	5,559	185,115
Daejeon	970	2,300	1,781	5,051	168,198
Jeollabuk-do	857	1,935	2,162	4,954	164,968
Gyeongsangbuk-do	-	2,252	2,638	4,890	162,837
Jeollanam-do	-	2,655	1,621	4,276	142,391
Chungcheongnam-do	-	2,024	1,861	3,885	129,371
Gangwon-do	850	1,791	1,046	3,687	122,777
Chungcheongbuk-do	573	1,178	1,611	3,362	111,955
Ulsan	-	1,561	1,799	3,360	111,888
Jeju	-	1,135	380	1,515	50,450
Sejong-si	-	-	51	51	1,698
Total	39,385	68,384	55,603	163,372	5,440,288

Table 3. Pathologic examinations requests statuses according to medical departments (sort based on the total number of claims)

Department code	Biopsy	Resection, non-malignant (LN/non-LN)	Resection, malignant (LN/non-LN)	Histologic mapping (LN/non-LN)	Frozen sections	IF	EM	Enzyme	IHC	Uterine cervical examinations (smear/liquid)	Body fluid (conventional/liquid)	Aspiration (conventional/liquid)	HER2 (FISH/SISH)	Total	Total estimates
Internal medicine	40,683	12,463	120 (62/58)	636 (2/634)	85	1,329	184	12	5,248	189 (89/100)	8,219 (5,531/2,688)	5,053 (4,752/301)	11 (6/5)	74,232	2,471,926
General surgery	8,066	9,614	2,893 (2,466/427)	335 (292/43)	1,870	178	31	0	7,495	49 (18/31)	722 (519/203)	3,533 (3,457/76)	22 (3/19)	34,808	1,159,106
Obstetrics and gynecology	5,042	6,090	263 (172/91)	27 (10/17)	236	0	1	0	754	6,413 (1,090/5,323)	351 (198/153)	205 (196/9)	0 (0/0)	19,382	645,421
Urology	1,586	1,245	337 (86/251)	112 (52/60)	148	8	4	0	1,176	108 (26/82)	5,056 (3,030/2,026)	171 (167/4)	0 (0/0)	9,951	331,368
Otorhinolaryngology	721	2,283	333 (229/104)	1 (1/0)	299	0	4	0	686	1 (0/1)	61 (39/22)	709 (667/42)	0 (0/0)	5,098	169,763
Dermatology	2,156	1,270	21 (1/20)	2 (0/2)	28	203	0	2	436	3 (1/2)	20 (20/0)	21 (20/1)	0 (0/0)	4,162	138,595
Orthopedic surgery	750	2,672	44 (5/39)	1 (0/1)	77	5	1	0	193	24 (11/13)	261 (226/35)	63 (61/2)	0 (0/0)	4,091	136,230
Neurosurgery	330	1,062	75 (1/74)	0 (0/0)	183	0	16	0	645	9 (3/6)	207 (124/83)	27 (25/2)	0 (0/0)	2,554	85,048
Thoracic surgery	161	589	251 (199/52)	14 (13/1)	277	0	1	0	502	1 (1/0)	324 (233/91)	35 (26/9)	0 (0/0)	2,155	71,762
Family medicine	905	307	0 (0/0)	0 (0/0)	0	0	0	0	23	16 (5/11)	106 (91/15)	110 (109/1)	0 (0/0)	1,467	48,851
Radiology	541	49	0 (0/0)	0 (0/0)	0	0	0	0	207	5 (3/2)	17 (15/2)	306 (260/46)	0 (0/0)	1,125	37,463
Plastic surgery	50	680	46 (6/40)	9 (7/2)	84	0	0	0	117	0 (0/0)	3 (2/1)	3 (2/1)	0 (0/0)	992	33,034
Pediatrics	227	56	0 (0/0)	0 (0/0)	2	132	24	5	193	0 (0/0)	245 (132/113)	4 (4/0)	0 (0/0)	888	29,570
Neurology	171	58	1 (0/1)	0 (0/0)	5	11	7	18	40	11 (7/4)	337 (225/112)	23 (23/0)	0 (0/0)	682	22,711
Dental department	123	333	8 (4/4)	0 (0/0)	15	17	0	0	27	0 (0/0)	17 (15/2)	2 (2/0)	0 (0/0)	542	18,049
Emergency medicine	74	42	1 (0/1)	0 (0/0)	1	13	3	0	20	9 (1/8)	203 (160/43)	5 (4/1)	0 (0/0)	371	12,354
Ophthalmology	140	123	5 (1/4)	0 (0/0)	10	0	0	0	51	0 (0/0)	10 (6/4)	8 (8/0)	0 (0/0)	347	11,555
Rehabilitation medicine	51	17	0 (0/0)	0 (0/0)	1	12	2	3	5	7 (2/5)	46 (38/8)	2 (2/0)	0 (0/0)	146	4,862
Laboratory medicine	5	-	0 (0/0)	0 (0/0)	0	0	0	0	71	1 (0/1)	0 (0/0)	0 (0/0)	0 (0/0)	77	2,564
Psychiatry	43	13	0 (0/0)	0 (0/0)	0	0	0	0	1	3 (2/1)	15 (10/5)	2 (2/0)	0 (0/0)	77	2,564
Pathology	2	-	0 (0/0)	0 (0/0)	0	0	0	0	0	0 (0/0)	5 (5/0)	45 (45/0)	0 (0/0)	52	1,732
General (NOS)	12	16	0 (0/0)	0 (0/0)	0	0	0	0	0	1 (0/1)	6 (6/0)	10 (10/0)	0 (0/0)	45	1,499
Radiation oncology	16	-	0 (0/0)	0 (0/0)	0	0	0	0	0	20 (0/20)	1 (0/1)	6 (6/0)	0 (0/0)	43	1,432
Preventive medicine	4	25	0 (0/0)	0 (0/0)	0	0	0	0	0	0 (0/0)	0 (0/0)	0 (0/0)	0 (0/0)	29	966
Nuclear medicine	-	-	0 (0/0)	0 (0/0)	0	0	0	0	0	0 (0/0)	0 (0/0)	26 (24/2)	0 (0/0)	26	866
Anesthesiology	6	8	1 (1/0)	0 (0/0)	1	0	0	0	1	0 (0/0)	1 (1/0)	0 (0/0)	0 (0/0)	18	599
Occupational and environmental medicine	9	-	0 (0/0)	0 (0/0)	0	0	0	0	1	0 (0/0)	1 (1/0)	0 (0/0)	0 (0/0)	11	366
Tuberculosis	1	-	0 (0/0)	0 (0/0)	0	0	0	0	0	0 (0/0)	0 (0/0)	0 (0/0)	0 (0/0)	1	33
Total	61,875	39,015	4,399 (3,233/1,166)	1,137 (377/760)	3,322	1,908	278	40	17,892	6,870 (1,259/5,611)	16,234 (10,627/5,607)	10,369 (9,872/497)	33 (9/24)	163,372	5,440,288

LN, with lymph node dissection; non-LN, without lymph node dissection; IF, immunofluorescent; EM, electron microscopy; IHC, immunohisto(cyto)chemistry; FISH, fluorescence *in situ* hybridization; SISH, silver *in situ* hybridization; NOS, not otherwise specified.

RESULTS

Pathologic examination statistics in Korea

In the year 2013, 163,372 pathologic examinations were performed in 103,528 patients (45,897 men and 57,631 women). The mean and median ages of the patients were 51.8 and 53 years, respectively. The skewness and kurtosis of patient age were -0.251 and 2.775 , respectively. The pathologic examination data and medical institutions according to administrative district are summarized in Table 2. The total numbers of medical institutions according to administrative district are summarized in Appendix 1. In total, 43.5% of the tertiary hospitals (10/23), 15.6% of the general hospitals (48/307), and 23.8% of the other institutions (12,090/50,868) were located in Seoul. In addition, 32.9% of the surgical pathologic examinations (53,711/163,372) were requested in medical institutions located in Seoul.

Almost all medical and dental departments requested pathologic examinations (Table 3). Internal medicine (74,232, 45.4%), general surgery (34,808, 21.3%), obstetrics and gynecology (19,382, 11.9%), and urology (9,951, 6.1%) were the most common medical departments (84.7%) requesting pathology examinations. A small subset (38/17,892, 0.2%) of immunohistochemical (IHC) stains were not interpreted by qualified doctors (not claimed as "C5575006") (data not shown). Claims for ace-

tylcholinesterase (C5564) and chloroacetate esterase (C5565) examinations were not found in our data.

Among pathologic examination-associated claims, 162,002 examinations (99.2%) had proper claim codes (examination codes 09 and sub-code 01 (performed in their own institutions) or 02 (performed in outside institutions)). Among pathologic examinations, 65.8% were performed in tertiary or general hospitals (39,385 and 67,225 cases, respectively) (Table 4). Almost all examinations claimed by tertiary hospitals were performed in their institute (39,349/39,385, 99.9%), and 85% of examinations claimed by general hospitals were performed (57,163/67,225) in their institute. The other medical institutions claimed considerable pathologic examinations performed by outside services (52,214/55,392, 94.3%).

According to the claims, 76,016 pathologic examinations (44.7%) were performed due to malignancy (disease code "C") or non-malignant tumorous conditions (disease code "D00-D48") (Table 5). IHC stains were more frequently performed in tumorous conditions (15,336/17,892, 85.7%). Pathologic examination of biopsy specimens was performed more frequently in non-tumorous conditions (42,661/61,875, 68.9%).

ESD-related statistics

In total, 509 ESDs were performed in 490 patients (341 males

Table 4. Pathologic examination performing places according to medical institutions

Institution	Tertiary hospital	General hospital	Other medical institutions	Total
In own hospital	39,349 (99.9)	57,163 (85.0)	3,178 (5.7)	99,690 (61.5)
Outside services	36 (0.1)	10,062 (15.0)	52,214 (94.3)	62,312 (38.5)
Total	39,385 (100)	67,225 (100)	55,392 (100)	162,002 (100)

Values are presented as number (%).

Table 5. Disease codes of patients at time of pathologic examinations requests

	Tumorous condition	Non-tumorous condition	Total
Biopsy	19,214	42,661	61,875
Resection, non-malignant	14,900	24,115	39,015
Resection, malignant (LN/non-LN)	4,333 (3,203/1,130)	66 (30/36)	4,399 (3,233/1,166)
Histologic mapping (LN/non-LN)	1,045 (377/668)	92 (0/92)	1,137 (377/760)
Frozen sections	3,041	281	3,322
IF	213	1,695	1,908
EM	51	227	278
Enzyme	0	40	40
IHC	15,336	2,556	17,892
Uterine cervical examinations (smear/liquid)	3,199 (554/2,645)	3,671 (705/2,966)	6,870 (1,259/5,611)
Body fluid (conventional/liquid)	7,137 (4,118/3,019)	9,097 (6,509/2,588)	16,234 (10,627/5,607)
Aspiration (conventional/liquid)	4,514 (4,234/280)	5,855 (5,638/217)	10,369 (9,872/497)
HER2 (FISH/SISH)	33 (9/24)	0 (0/0)	33 (9/24)
Total	73,016	90,356	163,372

LN, with lymph node dissection; non-LN, without lymph node dissection; IF, immunofluorescent; EM, electron microscopy; IHC, immunohisto(cyto)chemistry; FISH, fluorescence *in situ* hybridization; SISH, silver *in situ* hybridization.

and 149 females) in 109 medical institutions. The median age of the patients was 66 years (age, 29 to 89 years; 1st quantile, 58 years; 3rd quantile, 71.75 years). The majority of patients (n=472) underwent one ESD; 17 patients underwent two ESDs (10 patients underwent simultaneous ESD, while seven patients underwent ESDs at different times), and one patient underwent three ESDs (two ESDs at the same time).

The disease codes noted when patients underwent ESD were as follows: C16 (malignant neoplasm of stomach), 213 patients (43.5%); non-C16, 277 patients (56.5%); D00.2 (carcinoma *in situ* of stomach), 17 patients; D13.1 (benign neoplasm of stomach), 226 patients; D13.9 (benign neoplasm of ill-defined site within the digestive system), one patient; and other, 33 patients. Disease codes changed after the ESD in 10.5% of the non-C16 patients (29/277): D00.2 to C16, seven patients; D13.1 to D00.2, three patients; D13.1 to C16, 18 patients; and D13.9 to C16, one patient (Table 6).

Twenty-one patients (21/490, 4.3%) underwent gastrectomy following ESD, and all of these patients underwent ESD for only once. Fifteen patients received surgery at the same medical insti-

tution where ESD was performed, and six patients received surgery at different medical institutions. The mean time between ESD and surgery was 44 days. Two patients changed diagnosis (benign to malignant) after ESD. One patient underwent ESD and surgery during the same hospitalization period.

For further analysis, 472 patients who underwent ESD for only once were selected (Table 7) (C16, 202 patients; D00.2, 17 patients; D13.1, 220 patients; D13.9, one patient; other, 32 patients). In total, 70.0% of these pathologic examinations (329/472) were requested for histologic mapping (C5508). IHC studies were performed in 22.5% of ESDs (106/472). Approximately one-third of the gastric cancer specimens (66/202, 32.7%) and 15.0% of the gastric benign neoplasm specimens (33/220) were subject to IHC studies.

DISCUSSION

In this study, we examined nation-wide statistics regarding surgical pathologic examination. Considering sampling weight, we estimate that 5,440,288 (163,372×33.3) pathologic examinations were performed in Korea in 2013. We also surveyed pathologic examinations according to administrative district, requesting department, type of medical institutions, and patient conditions. These data will be useful for future planning and allocation of resources in the field of pathology and for the Korean Society of Pathologists.

There have been several reports regarding diagnostic discrepancies between endoscopic forceps biopsy and ESD, as well as between ESD and surgery. Recently, two large, single-center, retrospective studies revealed that 22.8% (465/2,041) and 31.7%

Table 6. Changes of disease codes after endoscopic submucosal dissections

Disease code at ESD	Disease code after ESD		
	Unchanged	Changed to C16	Changed to D00.2
D00.2	10	7	-
D13.1	205	18	3
D13.9	0	1	0
Others	33	0	0
Total	248	26	3

ESD, endoscopic submucosal dissections.

Table 7. Pathologic examination codes and number of immunohistochemical stains according to diseases codes at endoscopic submucosal dissections

	C16	D00.2	D13.1	D13.9	Others	Total
Pathologic examination codes						
C5500	6	0	5	0	0	11
C5508	158	3	139	1	28	329
C5916	16	3	51	0	2	72
C5917	22	11	25	0	2	60
Total	202	17	220	1	32	472
No. of immunohistochemical stains						
0	136	14	187	1	28	366
1	42	1	25	0	1	69
2	12	0	5	0	2	19
3	2	1	3	0	1	7
4	2	1	0	0	0	3
5	3	0	0	0	0	3
6	5	0	0	0	0	5
Total	202	17	220	1	32	472

(587/1,850) of cases changed diagnosis after endoscopic resection in Asan Medical Center (Seoul, Korea) and Samsung Medical Center (Seoul, Korea), respectively.^{5,6} Our HIRA-NPS data revealed that only 10.9% of nation-wide cases experienced a change of diagnosis after ESD. HIRA-NPS data does not include detailed pathologic diagnosis information such as tumor size, tumor differentiations, dysplastic degrees, etc., so further analysis for clarifying such differences was limited. Shin *et al.*⁷ reported that complete resection rates were not different according to absolute or expanded ESD indications, though their data were not HIRA data. Although HIRA-NPS data was not available for a sufficient number of ESD patients (509 ESDs in 490 patients) to allow for an accurate assessment, and only limited clinicopathological information was available, the problems associated with the relatively few number of patients can be overcome through further research using the raw HIRA data.

Histologic mapping of ESD specimens is recommended by The Gastrointestinal Pathology Study Group of the Korean Society of Pathologists.⁸ However, 30.2% (143/472) of ESD specimens were not claimed as “C5508” (histologic mapping without lymph node dissection). Because precise histologic diagnosis of the ESD specimen is essential to treat patients, we suggest that nationwide surveys be conducted in order to assure quality of pathologic examination of ESD specimens. IHC staining was performed in 22.5% (106/472) of ESD cases. Unlike tissue immunofluorescent microscopic examinations or enzyme histochemistries, HIRA data does not list the specific antibodies used for IHC stains. Thus, further analysis of IHC studies using HIRA data was limited.

The main limitations of our analysis are statistical issues based on probability sampling. Our estimates were calculated from statistically extracted data from one year. Further analysis using HIRA raw data will be needed to decrease the statistical errors and bias and to evaluate changes over time. During our analysis, we experienced many challenges; therefore, we provide advice and guidance for other researchers who would like to analyze the HIRA database.

(1) It is essential to understand the framework of the HIRA database.⁹ The HIRA data is intended for insurance claims and not for research. Detailed clinicopathological data are not provided. (2) Sample data are not appropriate for analyses requiring

long-term follow-up. (3) Some claim codes have sub-codes (in most cases, additional charges by experts). (4) Disease codes and claims are not always accurate. (5) The analysis system should have at least 32 GB of main memory. (6) It is helpful to create relatively small data tables to decrease operation time. In the usual setting, R should use only one CPU core during calculation.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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Appendix 1. Numbers of medical institutions according to administrative districts

Administrative district	Tertiary hospital	General hospital	Other institutions (clinic)
Seoul	10	48	12,090 (6,952)
Busan	3	24	3,567 (2,048)
Incheon	2	15	2,376 (1,388)
Daegu	1	11	2,542 (1,538)
Gwangju	1	22	1,584 (862)
Daejeon	1	8	1,599 (981)
Ulsan	0	4	1,012 (546)
Gyeonggi-do	1	55	10,424 (5,883)
Gangwon-do	1	14	1,377 (707)
Chungcheongbuk-do	1	10	1,488 (791)
Chungcheongnam-do	0	12	2,019 (1,013)
Jeollabuk-do	1	11	2,197 (1,110)
Jeollanam-do	0	22	2,048 (913)
Gyeongsangbuk-do	0	19	2,558 (1,206)
Gyeongsangnam-do	1	25	2,977 (1,521)
Jeju	0	7	575 (330)
Sejong-si	0	0	105 (57)
Total	23	307	50,868 (27,846)