

Tele-medicine utilization in Japanese healthcare market

Toward the effective introduction of ECHO in Japan

Presented as ECHO ambassadorial report #2

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Agenda

1. Understanding present status (prevalence) of tele-medicine in Japanese medical environment
2. Revealing personal recognition or preference of physician and other co-medicals for the utilization of tele-medicine
3. Seeking next tactics in order to introduce ECHO in Japan

1. Understanding prevalence of tele-medicine in Japan

Historic background in Japanese tele medicine

First encounter :1971 in Wakayama (southern part of kansai area) for providing health care to the deep rural area (national trial)

- using analogue tele network and CCTV

Applications : in 1974, first successful trial of tele meeting in Nagasaki, and first transmission of static X-ray image among rural community hospitals in Okinawa

Over 2,200 medical facilities had introduced tele-image system, tele-diagnosis system, and tele-support system for home care in 2008

Conceptual model of tele-medicine

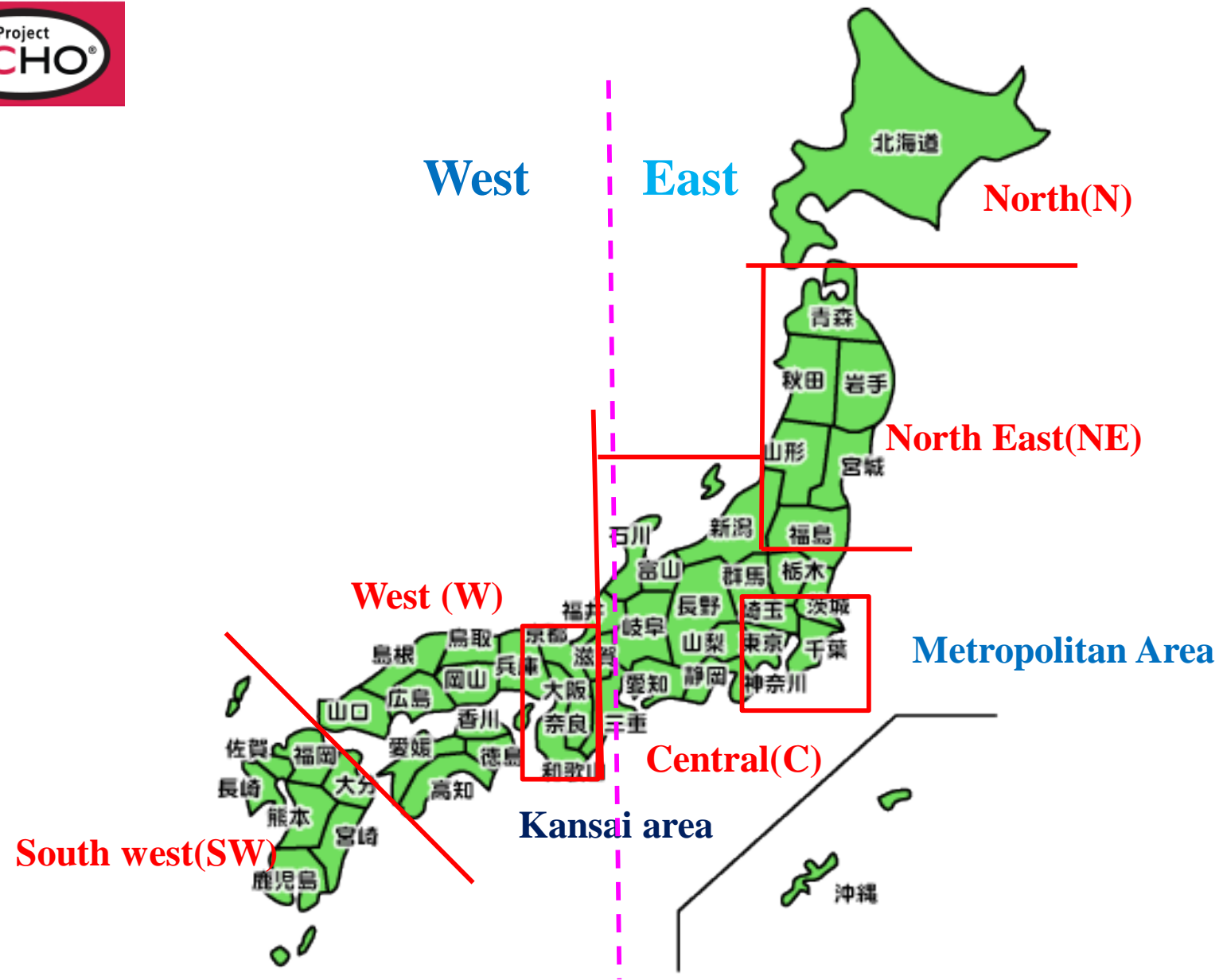
D to D \Rightarrow Diagnosis support, Pathology diagnosis, Image diagnosis

D to P \Rightarrow Examination, Health promotion, Tele-health consultation

D to N \Rightarrow Visiting nurse, Care support, Home health management

Example of active tele medicine program in Japan

Format of tele-medicine	Responsible body(ies)	Background of introduction	Contents	Costs
tele image diagnosis	Mogami town (Yamagata pref. NE)	making up shortage of physician specialist	E&M of CT image between two hospitals	initial : \$450 thousand running : \$20 thousand/year
	Kagawa prefecture society of physician (Kagawa pref, W)	rectification of resource allocation gap among rural area and islands	E&M of CT image among 107 facilities	initial : \$300 thousand running : \$60 thousand/year
tele pathology diagnosis	Iwate medical university / Iwate central hospital (Iwate pref. NE)	making up shortage of pathologist in community	E&M of specimena samples among more than 10 facilities via information highway	initial : \$150 thousand running : \$60/month
tele consultation, conference	Asahikawa medical university (Hokkaido pref. N)	improving difficulty in medical treatment caused by depopulation in large rural area and mobility limitation in winter season	Communication among 14 facilities via tele conference system (ophthalmology only)	initial : \$950 thousand running : \$350 thousand/year
	Nanto city / Toyama university (Toyama pref. C)	reforming public hospital management by making information network among facilities	Consultation among 3 facilities, conference among 6 facilities via EMR networking	initial : \$300 thousand running : \$10 thousand/year
tele examination	Niimi city (Okayama pref. W)	supporting home care in rural area	Communication among 4 hospitals, 2 visiting nurse station and 8 nursing home via PC monitor system	initial : \$130 thousand running : \$70 thousand/year
tele health management	Hakodate city(Hokkaido pref. N)	making up shortage of obstetrician in island	E&M of perinatal data among 3 facilities internet and tele conference system	initial : \$200 thousand running : \$7 thousand/year
	Tohno city (Iwate pref. NE)	encouraging health support for pregnant woman and aged people	Communication among about 20 facilities via tele conference system (support facility located in Tokyo and Yokohama)	initial : \$770 thousand running : \$35 thousand/year
	Nishi-Aizu city (Fukushima pref.NE)	encouraging health check up for HBP patients in community	Communication among public health center and 400 residents via CATV	initial : \$950 thousand running : \$17 thousand/year



Snapshot of Japanese programs

Typically small size network/interchange

Few “borderless” model

High initial and running costs

Medical information based communication

Focusing “diagnostic support” rather than “teaching effects”

Less involvement of co-medical workforce into network

Less commitment to “outcome evaluation”

2.Revealed recognition/preference for the utilization of tele-medicine

We tried to investigate;

- how much physicians are familiar / involved to tele-medicine,
- how they recognize advantage of tele-medicine using,
and
- what political action should be needed for extending tele-medicine utilization.

via originally designed internet survey.

Survey outline

Research objects : 1)medical doctors working both at hospitals and clinics
2)certified co-medicals (RN, LPN, Pharmacists, clinical technicians)

Number of survey requested: 1519

Number of response : 432 medical doctors
478 co-medicals

*response ratio 59.9%

Period of survey : March 11 - 14, 2016

#1: Simple tabulation

Q1. Are you commonly involved in and/or manipulate tele-medicine in your treatment?

	MD		Co-med	
TOTAL	432	100.0(%)	478	100.0(%)
Never (1)	307	71.1	408	85.4
Fairly infrequent (2)	79	18.3	42	8.8
Relatively frequent (3)	32	7.4	15	3.1
Almost daily (4)	14	3.2	13	2.7

Q2. Are you feel any problems when you manipulate tele-medicine?

*Those who answered 2 to 4 at Q1 and MD only

	never	quite few	sometimes	always
1) Technical problems like connections	5 (%) 4.0	48 38.4	66 52.8	6 4.8
2) Technical limitation in exchanging information	1 0.8	45 36.0	72 57.6	7 5.6
3) Communication gap between parties	3 2.4	47 37.6	65 52.0	10 8.0
4) Recognized outcome through telemedicine	5 4.0	50 40.0	63 50.4	7 5.6
5) Time loss in telemedicine and its adverse effect	1 0.8	59 47.2	59 47.2	6 4.8

Q3. How do you think about the advantage of tele-medicine?

MD	Never	Quite a few	Fairly	Exactly
1)Provision of high quality medicine to rural residents	14	78	294	46
2)Availability of on-site training for obtaining new knowledge	3.2	18.1	68.1	10.6
3)Encouragement of medical team by sufficient communication	9	99	283	41
4)Creation of confidence in treating out of their specialty	2.1	22.9	65.5	9.5
5)Creation of confidence as a specialist by advising to others	12	95	290	35
6)Anchorage of relief against unfamiliar situation of medical care	2.8	22.0	67.1	8.1
	8	112	280	32
	1.9	25.9	64.8	7.4
	12	121	274	25
	2.8	28.0	63.4	5.8
	11	63	316	42
	2.5	14.6	73.1	9.7

Co-medical	Never	Quite a few	Fairly	Exactly
1)Provision of high quality medicine to rural residents	8 1.7	78 16.3	319 66.7	73 15.3
2)Availability of on-site training for obtaining new knowledge	12 2.5	89 18.6	312 65.3	65 13.6
3)Encouragement of medical team by sufficient communication	7 1.5	95 19.9	320 66.9	56 11.7
4)Creation of confidence in treating out of their specialty	8 1.7	115 24.1	306 64.0	49 10.3

Q4.How do you think what political action should be required for extending tele-medicine utilization ?

MD	Never required	Less required	Fairly required	Exactly required
	6	47	302	77
1)Introduction of higher technology of imaging and ergonomics	1.4	10.9	69.9	17.8
	7	81	291	53
2)Construction of multi information sharing among community	1.6	18.8	67.4	12.3
	7	77	289	59
3)Construction of routine education system by supervisor	1.6	17.8	66.9	13.7
	6	83	290	53
4)Encouragement of mutual relationship among professions	1.4	19.2	67.1	12.3
	5	72	276	79
5)Simplification of system usability in telemedicine	1.2	16.7	63.9	18.3
	5	39	269	119
6)Cost reduction of system for small facilities	1.2	9	62.3	27.5
	10	89	271	62
7)Introduction of outcome-base reimbursement scheme	2.3	20.6	62.7	14.4
	6	66	305	55
8)Operation of continuous training for medical treatment	1.4	15.3	70.6	12.7

Co-medical

	Never required	Less required	Fairly required	Exactly required
1)Introduction of higher technology of imaging and ergonomics	4 0.8	48 10.0	343 71.8	83 17.4
2)Construction of multi information sharing among community	3 0.6	66 13.8	328 68.6	81 16.9
3)Construction of routine education system by supervisor	4 0.8	68 14.2	324 67.8	82 17.2
4)Encouragement of mutual relationship among professions	4 0.8	57 11.9	327 68.4	90 18.8
5)Simplification of system usability in telemedicine	6 1.3	65 13.6	316 66.1	91 19.0

#2: Analytical results in clinical categories

1) Analyzing relationship between respondents' opinion and their specialty

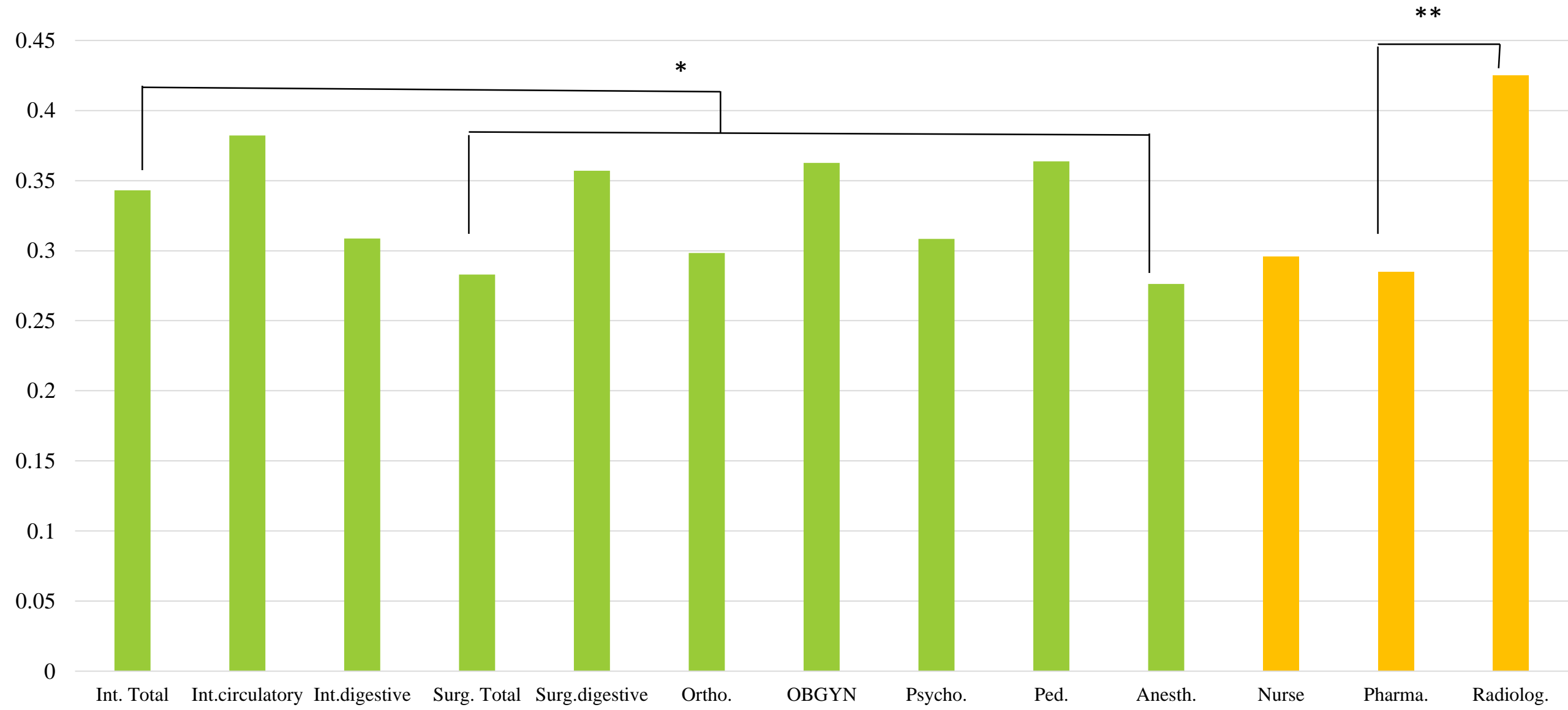
MD

Internal medicine(total)
Internal medicine- circulatory
Internal medicine- digestive
Surgery(total)
Surgery- digestive
Orthopedics
OBGYN
Psychiatrics
Pediatrics
Anesthesia

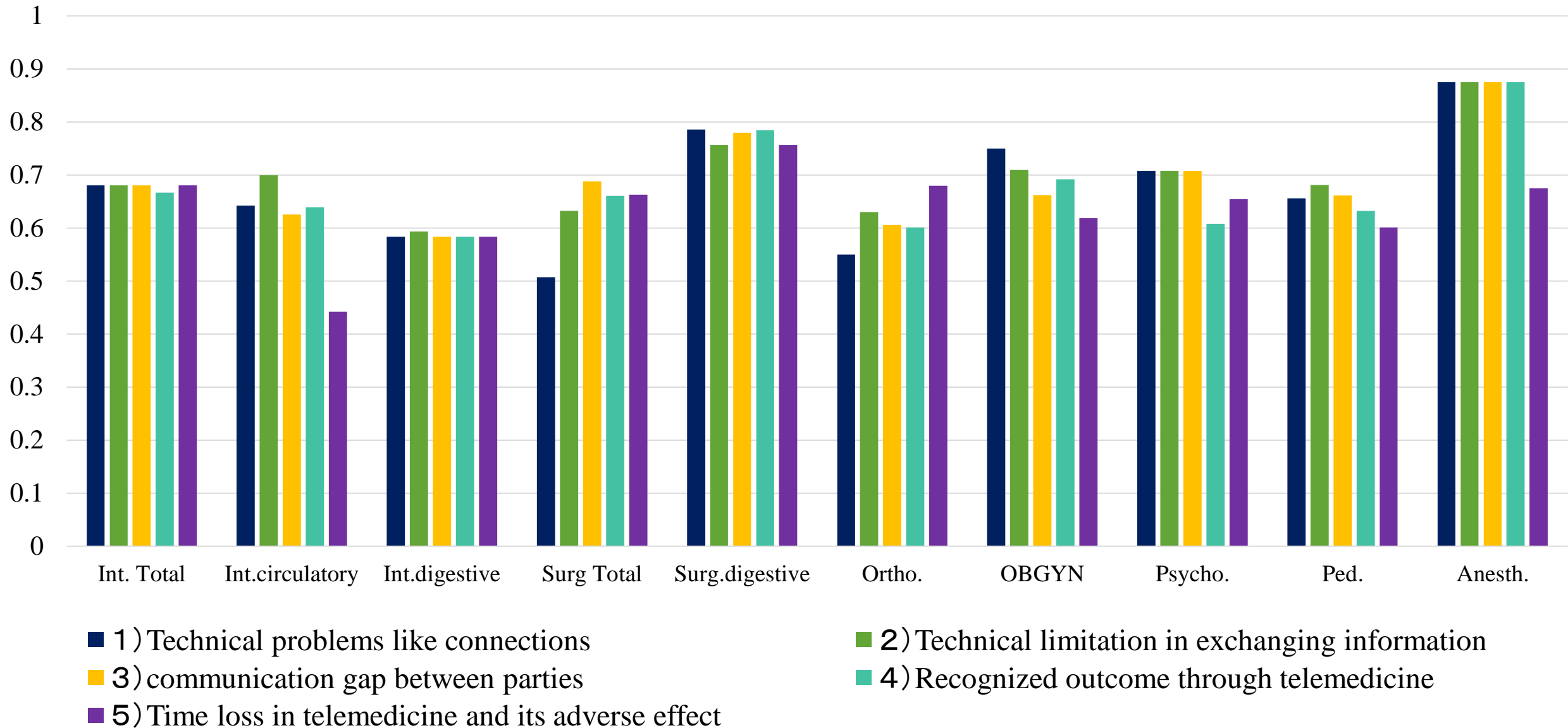
Co-medical

Nurse
Pharmacist
Radiologist

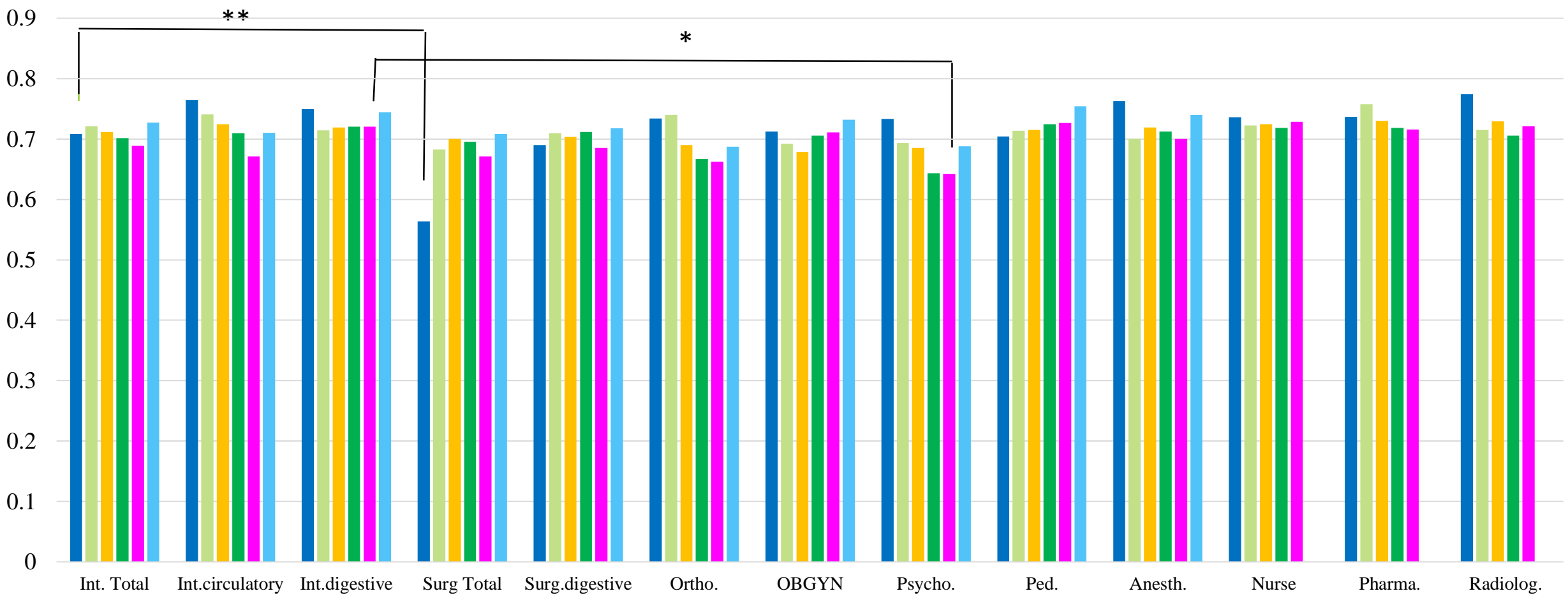
Graph1 The extent of common involvement in Telemedicine



Graph2 Recognized problems in operating Telemedicine



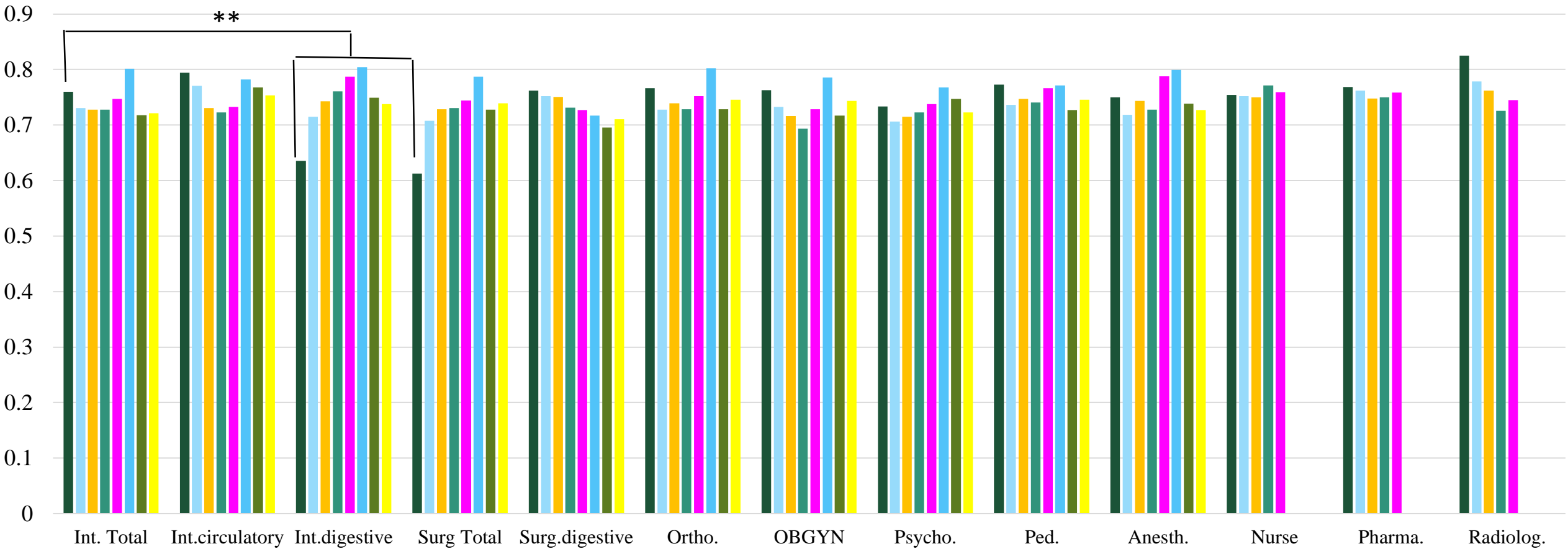
Graph3 Expected advantage of Telemedicine



- 1) Provision of high quality medicine to rural residents
- 3) Encouragement of medical team by sufficient communication
- 5) Creation of confidence as a specialist by advising to others

- 2) Availability of on-site training for obtaining new knowledge
- 4) Creation of confidence in treating out of their specialty
- 6) Anchorage of relief against unfamiliar situation of medical care

Graph4 Required policies for expanding practical use of Telemedicine



- 1) Introduction of higher technology of imaging and ergonomics
- 3) Construction of routine education system by supervisor
- 5) Simplification of system usability in telemedicine
- 7) Introduction of outcome-base reimbursement scheme

- 2) Construction of multi information sharing among community
- 4) Encouragement of mutual relationship among professions
- 6) Cost reduction of system for small facilities
- 8) Operation of continuous training for medical treatment

1)- Summary of result

- Co-medicals (nurses, pharmacists) are less familiar to tele-medicine than MD.



But they recognize strong advantage in tele-medicine using.

- Those who belong to the clinical area in which higher technology is needed tend to feel more problem in tele-medicine.
- Almost all of medical professions agree that tele-medicine may
 - induce quality improvement of rural medical care.
 - be helpful for being positive when they face unfamiliar patients.
- Cost reduction for using tele-medicine is one of the prior interest for all.

2) Metric analysis - the relationship between respondents' opinion and personal characteristics, health care market, and clinical categories.

Respondents' fourth grade evaluation as dependent variable for
Expected advantage of tele-medicine
Required policy for expanding practical use of tele-medicine
with independent personal and environmental factors as below are estimated by
ordered probit function.

Personal factors

Sex

Age

Working status - working in facilities
working in university hospital
working in Private hospital

Clinical career

Clinical area - Internal Medicine, Surgery, OBGYN,
Orthopedics, Psychiatrics, Pediatrics, Anesthesia

Environmental factors

Region - Hokkaido

Tohoku(Tsunami area)

Metropolitan area

Kansai area

East Japan

West Japan

Result : Expected advantage of telemedicine

Independent Variables	Provision of high quality medicine to rural residents		Availability of on-site training for obtaining new knowledge		Encouragement of medical team by sufficient communication		Creation of confidence in treating out of their specialty		Creation of confidence as a specialist by advising to others		Anchorage of relief against unfamiliar situation of medical care	
	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio
Male D	-0.1361	0.8728	0.0054	1.0054	-0.1442	0.8657	-0.1366	0.8723	-0.4058	0.6665	-0.3839	0.6812
Age	0.0143	1.0144	0.0009	1.0009	0.0049	1.0049	0.0218	1.0221**	-0.0054	0.9946	0.0162	1.0163
Physician in facilities D	0.0491	1.0504	0.4371	1.5483*	0.7061	2.0260**	0.1587	1.1720	0.1778	1.1946	0.3458	1.4131
Hokkaido D	-0.3111	0.7326	0.4542	1.5749	0.1593	1.1727	0.4023	1.4953	0.0515	1.0529	0.1265	1.1348
Tohoku(Tsunami area) D	-0.5753	0.5625	-0.8342	0.4342	-0.3247	0.7228	-0.0367	0.9640	-0.2901	0.7482	-0.2541	0.7756
Metropolitan area D	0.6473	1.9104**	0.1780	1.1948	0.2117	1.2358	-0.0031	0.9969	0.3771	1.4580	0.6297	1.8770**
Kansai area D	-0.2894	0.7487	0.0910	1.0953	-0.1909	0.8262	-0.0554	0.9461	0.1398	1.1500	-0.0732	0.9294
East Japan D	0.3767	1.4575	0.2285	1.2567	0.2300	1.2585	0.0436	1.0446	0.0389	1.0397	0.4144	1.5134
West Japan D	-0.3767	0.6861	-0.2285	0.7958	-0.2300	0.7946	-0.0436	0.9573	-0.0389	0.9618	-0.4144	0.6608
University hospital D	0.7185	2.0514*	0.4592	1.5828	1.0201	2.7735**	0.7012	2.0161*	0.5764	1.7795	0.7065	2.0268
Private hospital D	-0.0430	0.9579	0.0275	1.0279	0.1209	1.1285	0.0478	1.0490	-0.0042	0.9958	0.1365	1.1463
Clinical career	0.0185	1.0187	0.0586	1.0604	0.0299	1.0304	0.0481	1.0493	0.0469	1.0480	0.0675	1.0699
Internal Medicine total D	-0.0162	0.9839	0.0798	1.0831	0.4498	1.5680*	0.2507	1.2850	0.1081	1.1141	0.0159	1.0160
Surgery total D	-0.1525	0.8586	0.1580	1.1712	-0.0121	0.9880	0.0472	1.0483	-0.2098	0.8108	-0.0506	0.9506
Digestive Int.med D	0.4311	1.5390	0.0190	1.0192	0.1731	1.1889	0.3345	1.3972	0.5429	1.7210	0.3151	1.3704
Digestive Surgery D	-0.3053	0.7369	0.1867	1.2052	0.0503	1.0516	0.4663	1.5940	0.0641	1.0662	0.1006	1.1059
Orthopedics D	0.2738	1.3150	0.6532	1.9217	-0.3193	0.7267	-0.3764	0.6863	-0.0808	0.9224	-0.4895	0.6129
OB GYN D	0.0242	1.0245	-0.2768	0.7582	-0.3135	0.7309	0.2771	1.3193	0.4640	1.5904	0.1365	1.1463
Psychiatrics D	0.5188	1.6801	0.0274	1.0277	-0.0591	0.9426	-0.8155	0.4424	-0.7440	0.4752	-0.3440	0.7089
Pediatrics D	-0.0698	0.9326	0.0954	1.1001	0.1562	1.1691	0.5293	1.6978	0.7093	2.0326	0.5490	1.7315
Anesthesia D	0.6853	1.9844	-0.2475	0.7808	-0.0185	0.9817	0.0130	1.0131	0.4060	1.5008	0.2117	1.2358

* : P<0.05 ** : P<0.01

Result : Required policies for expanding practical use of Telemedicine -1

Independent Variables	Introduction of higher technology of imaging and ergonomics		Construction of multi information sharing among community		Construction of routine education system by supervisor		Encouragement of mutual relationship among professions	
	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio
Male D	0.0672	1.0695	-0.3982	0.6715	-0.5519	0.5759*	-0.2966	0.7433
Age	-0.0064	0.9936	-0.0018	0.9982	0.0126	1.0126	-0.0130	0.9871
Physician in facilities D	0.5428	1.7208*	0.5639	1.7575*	0.2021	1.2240	0.4299	1.5371*
Hokkaido D	0.1303	1.1391	0.0340	1.0346	0.5128	1.6699	0.1908	1.2103
Tohoku(Tsunami area) D	-0.1601	0.8520	-0.1038	0.9014	0.2001	1.2215	0.1199	1.1274
Metropolitan area D	0.0088	1.0088	0.5891	1.8024**	0.3222	1.3801	0.5817	1.7891*
Kansai area D	-0.4580	0.6326	-0.1631	0.8495	-0.4699	0.6251	-0.6967	0.4983**
East Japan D	0.2174	1.2429	0.1540	1.1665	0.4925	1.6365*	0.5408	1.7174**
West Japan D	-0.2174	0.8046	-0.1540	0.8573	-0.4925	0.6111*	0.5408	0.5823**
University hospital D	-0.1648	0.8480	0.5889	1.8020	0.9848	2.6773**	0.1960	1.2165
Private hospital D	0.1521	1.1643	0.1706	1.1860	0.2166	1.2418	0.1827	1.2004
Clinical career	-0.0050	0.9950	-0.0033	0.9967	0.0285	1.0289	0.0080	1.0080
Internal Medicine total D	0.2114	1.2354	0.0331	1.0336	0.0350	1.0357	0.1556	1.1683
Surgery total D	0.1390	1.1492	0.1285	1.1372	0.0711	1.0737	0.0523	1.0537
Digestive Int.med D	0.4181	1.5191	0.0320	1.0325	0.2034	1.2256	0.5135	1.6712
Digestive Surgery D	0.0438	1.0448	0.4618	1.5869	0.4148	1.5140	0.0823	1.0857
Orthopedics D	0.3012	1.3515	-0.0445	0.9565	0.3152	1.3705	-0.0309	0.9696
OB GYN D	0.1617	1.1755	0.0917	1.0960	-0.1761	0.8385	-0.4677	0.6265
Psychiatrics D	-0.4446	0.6411	0.0089	1.0089	-0.2453	0.7825	0.1560	1.1688
Pediatrics D	0.0460	1.0471	-0.0456	0.9554	0.2696	1.3094	0.1091	1.1152
Anesthesia D	-0.0842	0.9193	-0.4390	0.6446	0.0448	1.0458	-0.1733	0.8409

* : P<0.05 ** : P<0.01

Result : Required policies for expanding practical use of Telemedicine -2

Independent Variables	Simplification of system usability in telemedicine		Cost reduction of system installation for small facilities		Introduction of outcome-base reimbursement scheme		Operation of continuous training for medical treatment	
	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio	P.R.C	Odds Ratio
Male D	-0.3745	0.6876	0.1461	1.1573	-0.1319	0.8764	-0.4070	0.6656
Age	-0.0068	0.9932	-0.0007	0.9993	0.0036	1.0036	0.0017	1.0017
Physician in facilities D	0.1039	1.1095	0.1268	1.1351	0.2703	1.3104	-0.1077	0.8979
Hokkaido D	0.5410	1.7176	0.2402	1.2715	0.5473	1.7286	0.0208	1.0210
Tohoku(Tsunami area) D	-0.8859	0.4124	-0.3814	0.6829	0.5566	1.7447	-0.1014	0.9036
Metropolitan area D	0.5311	1.7008*	0.4538	1.5743*	0.3287	1.3892	0.4548	1.5759
Kansai area D	-0.4495	0.6380	-0.5980	0.5499*	-0.4895	0.6129*	-0.4827	0.6171
East Japan D	0.2682	1.3077	0.5815	1.7887**	0.3028	1.3537	0.3601	1.4335
West Japan D	-0.2682	0.7647	-0.5815	0.5591**	-0.3028	0.7387	-0.3601	0.6976
University hospital D	0.4069	1.5022	0.3590	1.4319	0.3956	1.4853	0.4438	1.5587
Private hospital D	0.0281	1.0285	-0.0374	0.9633	0.4194	1.5210	0.0253	1.0257
Clinical career	0.0261	1.0264	0.0423	1.0432	0.0148	1.0149	0.0450	1.0460
Internal Medicine total D	-0.0984	0.9063	0.0724	1.0751	0.2199	1.2459	-0.1717	0.8423
Surgery total D	-0.0227	0.9776	0.1500	1.1618	-0.1540	0.8573	0.1350	1.1446
Digestive Int.med D	0.5556	1.7430	0.1816	1.1992	0.0822	1.0857	-0.0651	0.9370
Digestive Surgery D	-0.2007	0.8182	-0.9964	0.3692*	-0.3978	0.6718	-0.2177	0.8044
Orthopedics D	0.1484	1.1600	0.4091	1.5055	-0.0277	0.9726	0.3128	1.3673
OB GYN D	-0.0572	0.9444	0.0566	1.0582	-0.3388	0.7126	0.1715	1.1871
Psychiatrics D	0.1958	1.2163	-0.2168	0.8051	0.0327	1.0333	-0.4546	0.6347
Pediatrics D	0.2960	1.3444	-0.0882	0.9156	-0.0036	0.9964	0.1793	1.1963
Anesthesia D	0.7343	2.0840	0.4160	1.5159	-0.1008	0.9041	-0.2849	0.7521

* : P<0.05 ** : P<0.01

2)- Summary of result

- Those who work in University hospital tend to recognize advantage in using tele-medicine for
 - improving quality of rural health.
 - establishing strong medical team.
 - becoming confidence in treating outside of their specialty.
- Those who work in urban area feel further advantage in using tele-medicine for
 - improving quality of rural health.
 - getting relief against unfamiliar medical care.

2)- Summary of result cont.

- Those who work in University hospital also feel the necessity of installing routine education system when tele-medicine may take its advantage.
- Importance of construction of information networking among facilities is strongly recognized in urban area rather than rural.
- Establishing mutual relationship among professions are observed in east Japan (including Tokyo metropolitan area and Tohoku area) rather than west.
- Installing tele-medicine system with lower costs is recognized in urban area.
- As general observation, difference of clinical category does not relate to the recognition of tele-medicine utilization.

3. Seeking next tactics to introduce ECHO in Japan

Three dimensions of tactics

to whom

to which clinical areas

in ECHO promotion

by what format of system

to whom

#Urban area (east /north east Japan)

#Working at University hospital(s), large acute hospital(s)

may be *the first target* of introduction of ECHO



Nurses, pharmacists and other co-medicals in urban area should be targeted as a second priority of introduction by demonstrating ECHO communication and its advantages.

to which clinical areas

#Internal medicine, OB/GYN, Pediatrics and Anesthesia
plus
digestive surgery

should be *prior to* other clinical areas for introducing ECHO

by what format of system

#partial / middle level spec, lower initial costs system

may be *acceptable* as first installation of tele-medicine as
ECHO

Expected trials

Hokkaido area

- 1) Hokkaido University hospital
- 2) Sapporo Kosei-ren hospital (private, chain hospital)

Tele mentorship system – Department of dermatology

Yokohama area

- 3) St. Marianna University School of Medicine – General internal medicine
- 4) Yokohama city hospital (public hospital) – Palliative care in community

Routine education system involving co-medicals