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The Economics of e-Health:: Measuring the Long-term Effect of Telecare

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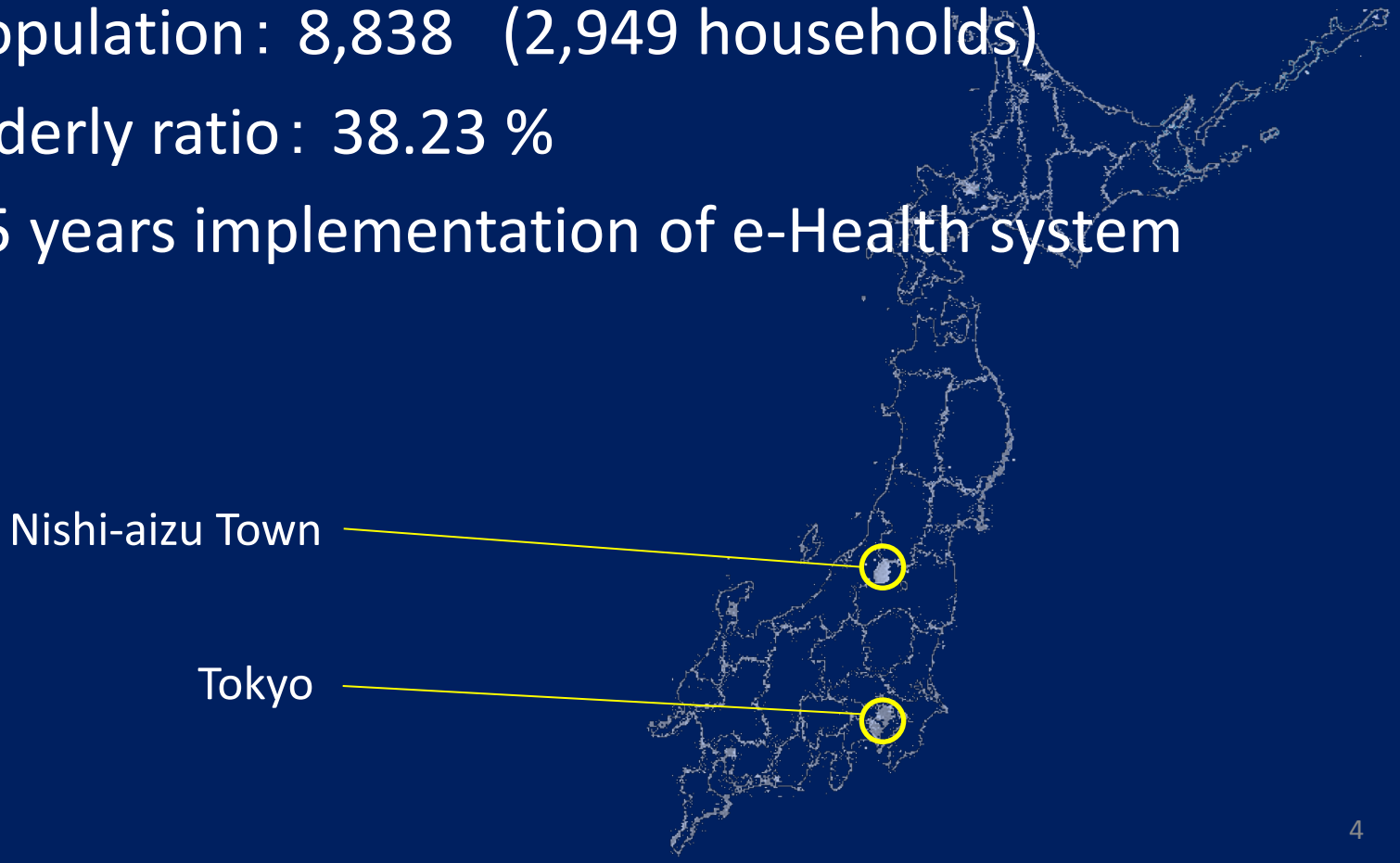
Outline

1. Telecare of Research site
2. Survey Data
3. Economic Analysis
4. Further Implementation of e-Health

Telecare of Research Site

Research Site

- Nishi-aizu Town, Fukushima Prefecture, Japan
  - Population : 8,838 (2,949 households)
  - Elderly ratio : 38.23 %
  - 15 years implementation of e-Health system



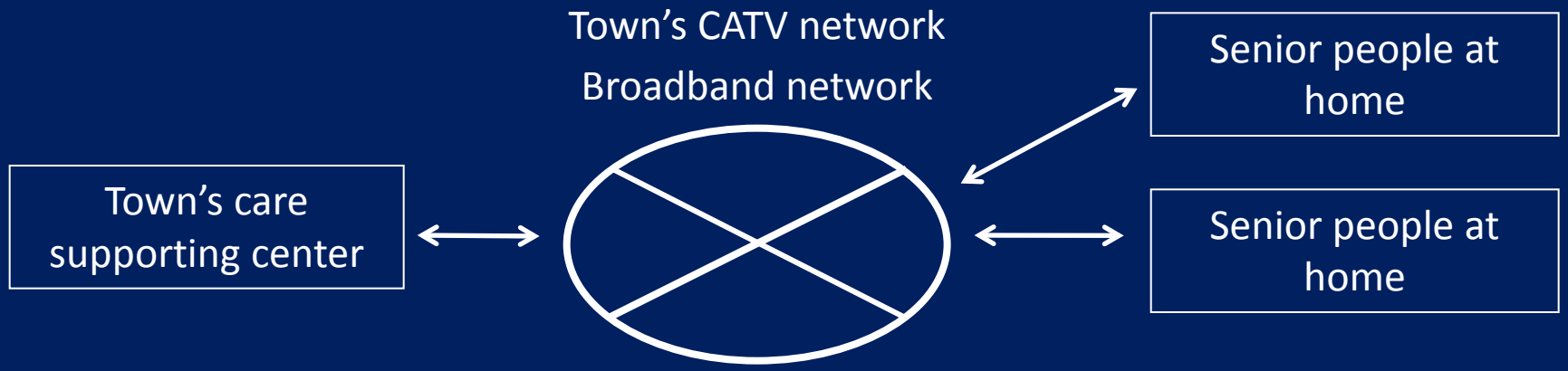
Health Condition of Nishi-aizu in 1985 (before the introduction of e-Health)

1. SMR（Death ratio of strokes）
   176.7(national average 100 ）

2. Life expectancy (1983-87）
   Male　73.1 (national 74.8）　88th
   Female 80.0 (national 80.5）　69th

3.Burden of medical insurance
   49,363 yen（national average 4,357yen）

e-Health System



- Host computer at center
  - Read and store of medical data
  - Advice on health care
- Peripheral device at home
  - Medical examination
  - Measurement of blood pressure, pulse, ECG…
  - Input of temperature, weight…

Survey Data

Surveys


5 years
4years
2002
2006
March 2007
Survey
2010
March 2012
Survey

Number of Samples 2012 Survey

	No. of residents sent questionnaire	No. of valid respondents (No. of valid respondents between 2002 and 2009)
Users	565	272 (91)
Non-users	1035	247 (118)
Total	1600	519 (209)

Gender

	No. of residents sent questionnaire	No. of valid respondents (No. of valid respondents between 2002 and 2009)
Users	565	272 (91)
Non-users	1035	247 (118)
Total	1600	519 (209)

Average Age

	N	Average age
Users	90	75.67
Non-users	118	75.76

Major Diseases Treated

	Users (%)		Non-users (%)		Total (%)	
	2002–2006	2007–2010	2002–2006	2007–2010	2002–2006	2007–2010
Heart disease	19	19	15	15	34	34
	0.21	0.21	0.13	0.13	0.16	0.16
Hypertension	49	51	40	57	89	108
	0.54	0.56	0.34	0.48	0.43	0.52
Diabetes	8	11	9	14	17	25
	0.09	0.12	0.08	0.12	0.08	0.12
Stroke	5	8	7	9	12	17
	0.06	0.09	0.06	0.08	0.06	0.08

Years Using Telecare

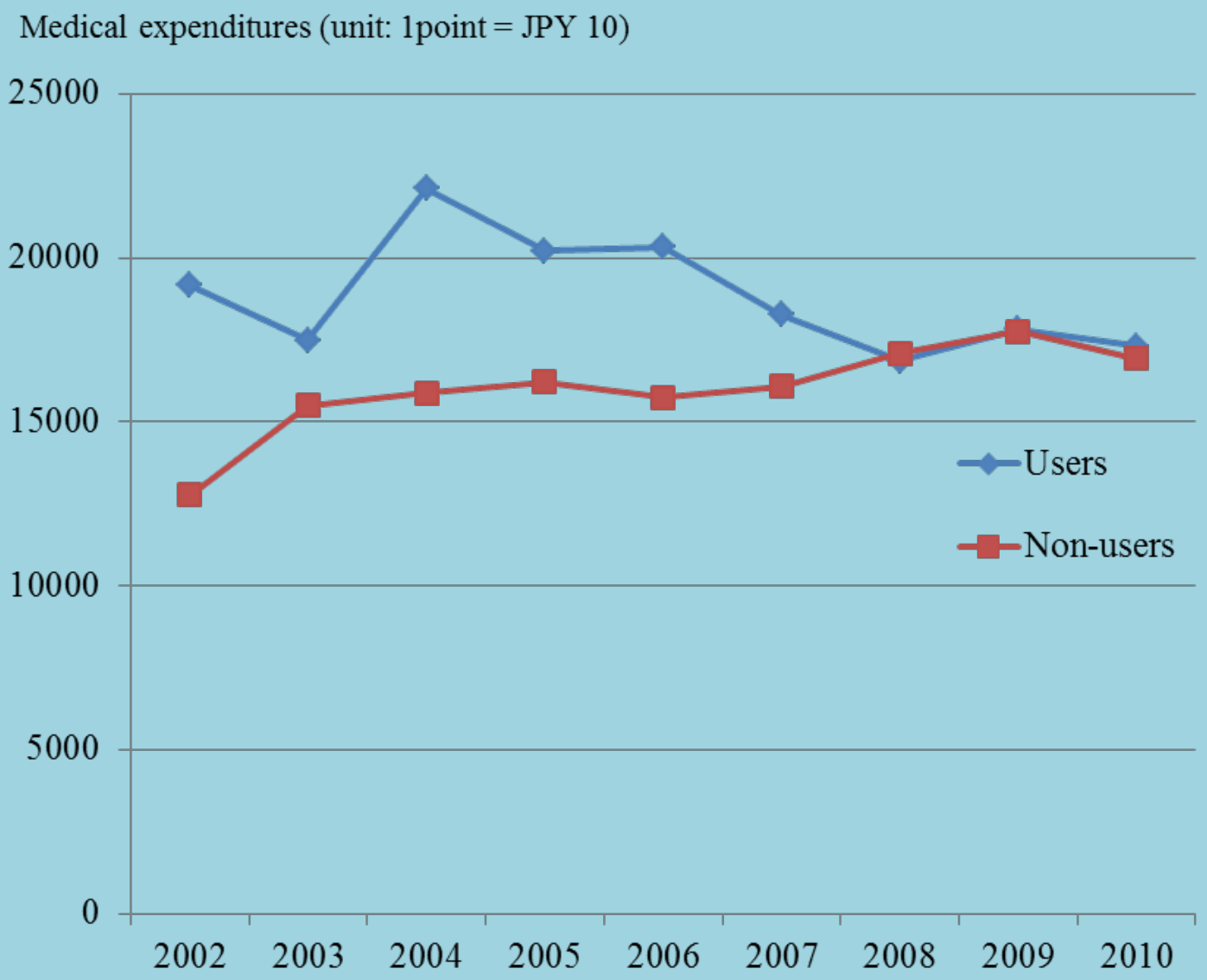
	N
1–3 years	8
3–5 years	8
5–7 years	11
7–10 years	13
>10 years	23
Do not use	27
Total	90

Frequency of Use

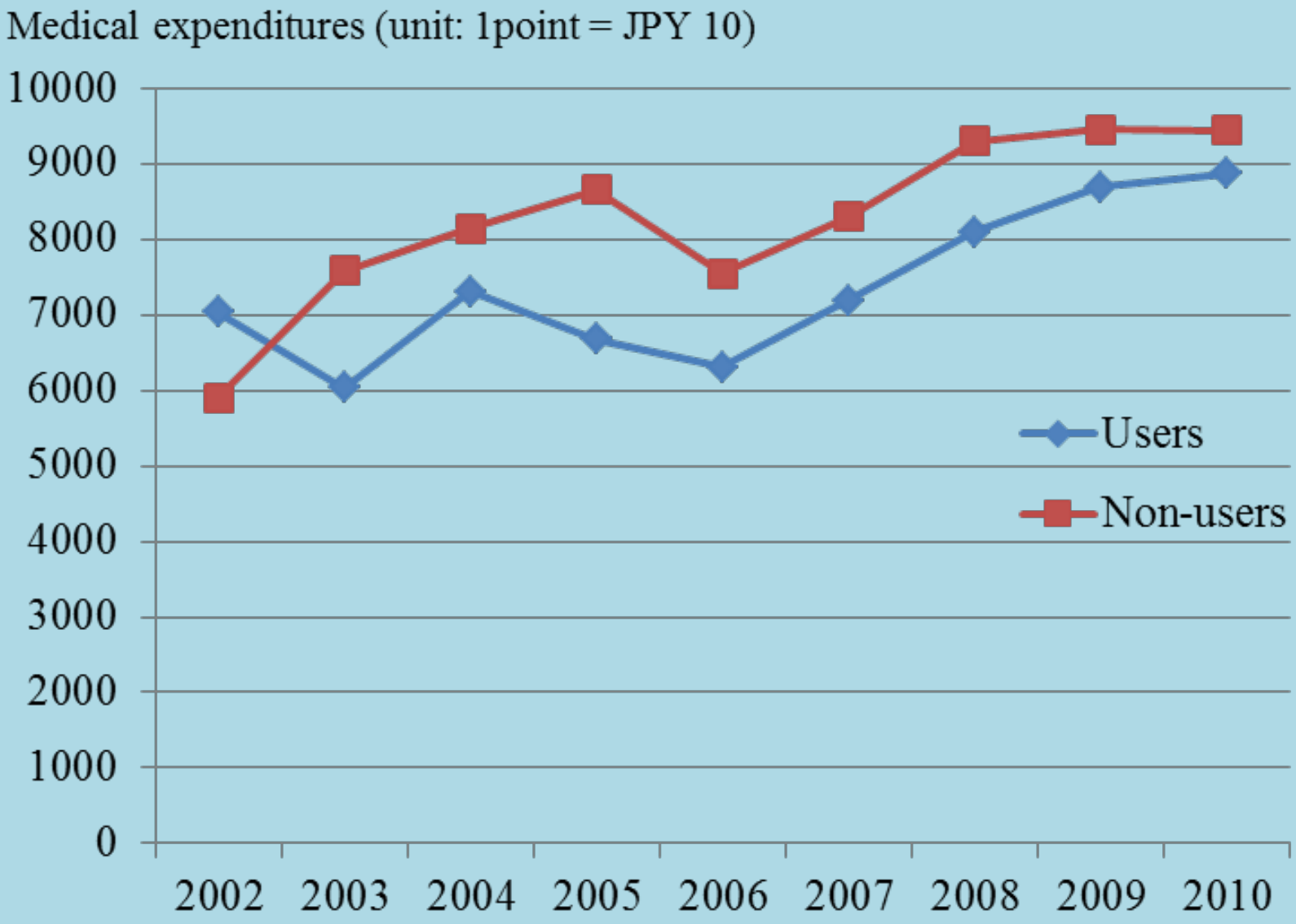
	N
1–3 years	8
3–5 years	8
5–7 years	11
7–10 years	13
>10 years	23
Do not use	27
Total	90

Economic Analysis

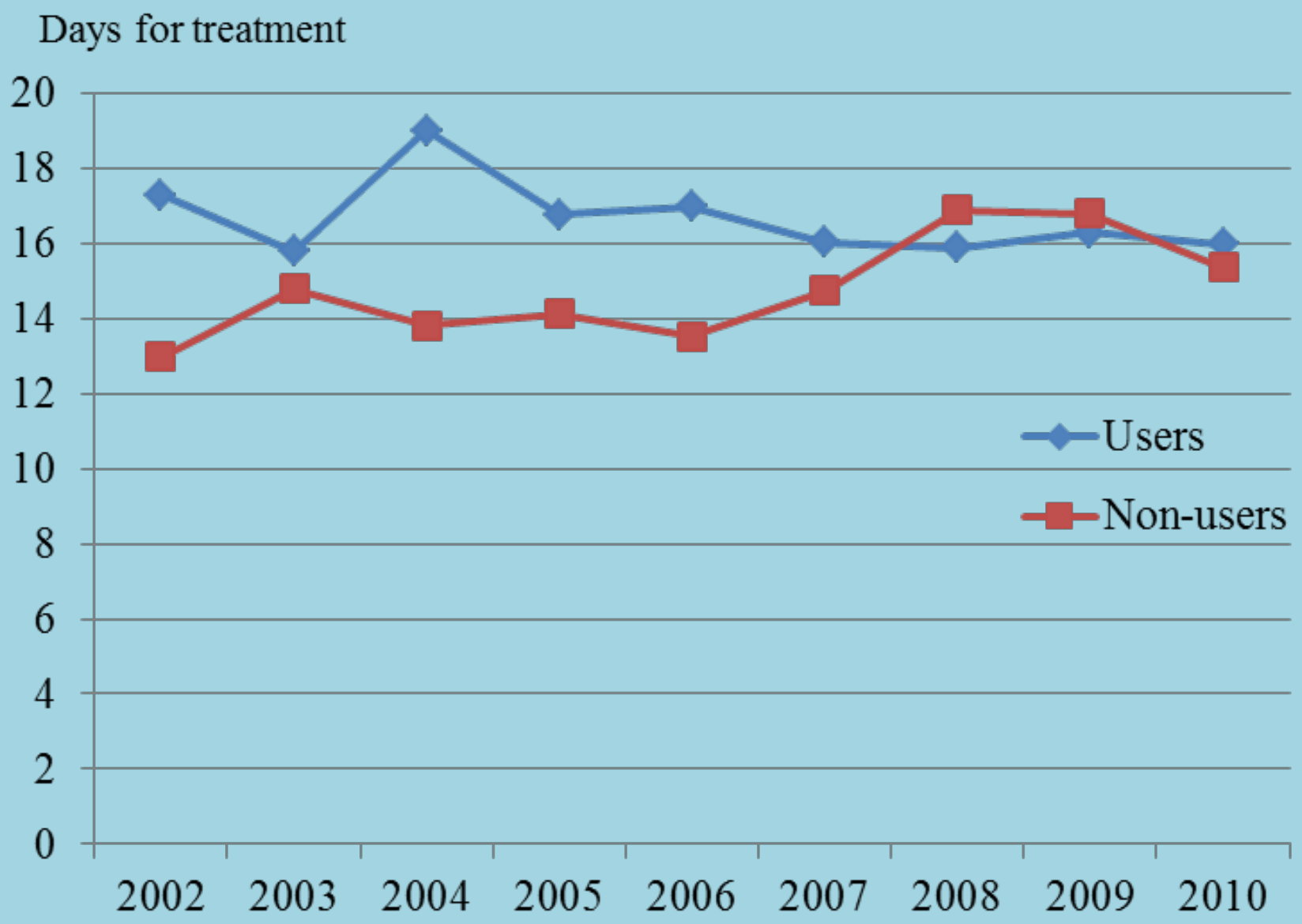
Medical expenditure, all diseases



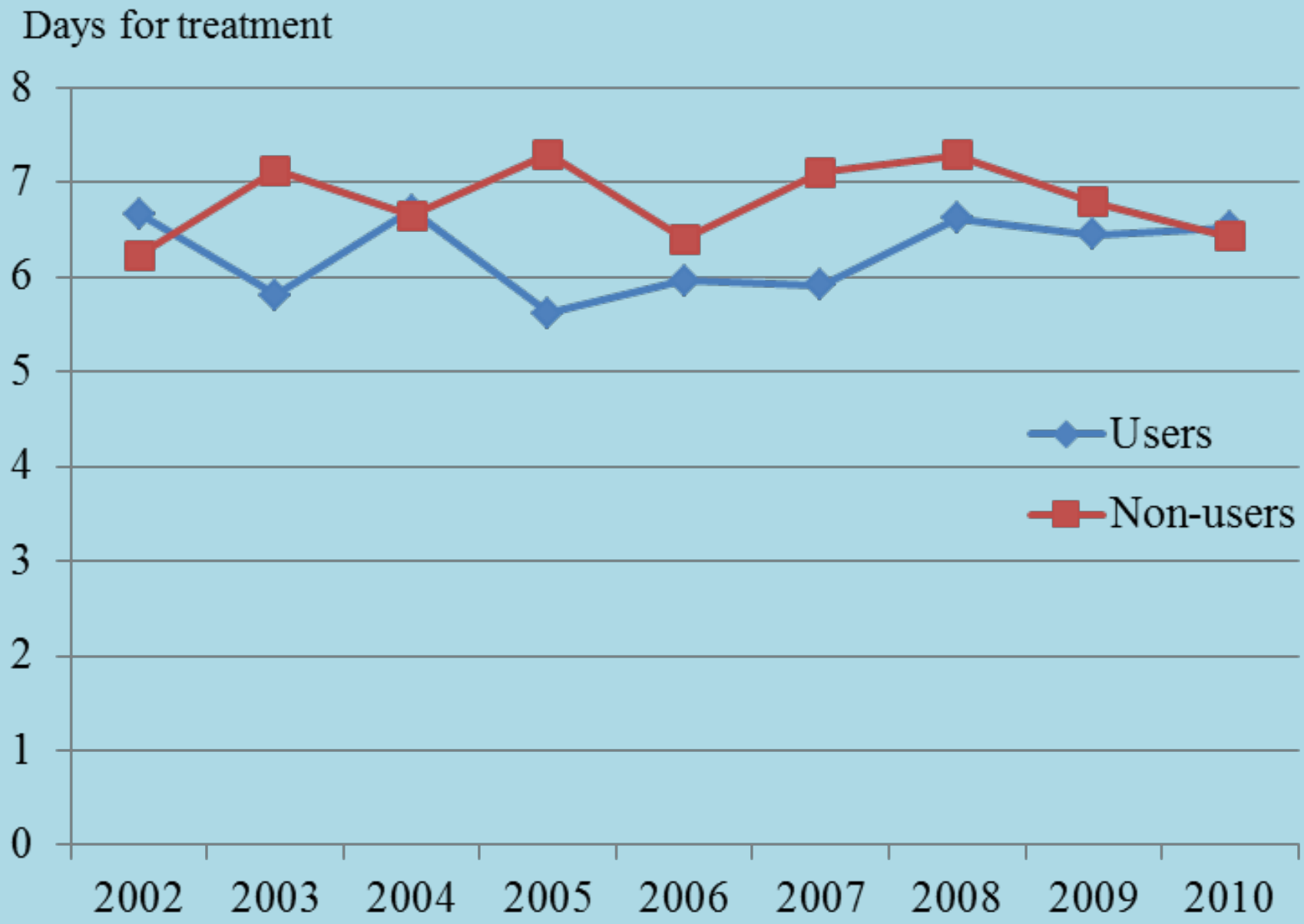
Medical expenditure, chronic diseases



Days of treatment, all diseases



Days of Treatment, Chronic Diseases



Results : Medical Expenditures of Chronic diseases

	Coefficient	SD	*t* value	*p* value
Telecare use	-6494.41	3215.58	-2.02	0.043**
Age	70.83	19.37	3.66	0***
Income	-3.11	8.25	-0.38	0.707
Heart disease	6885.39	4903.83	1.4	0.16
Hypertension	9714.75	1466.91	6.62	0***
Diabetes	5606.42	4452.8	1.26	0.208
Stroke	-6857.28	6447.9	-1.06	0.288
Number of observations			1820	
Arellano–Bond test for AR (2) (*p* value)			0.165	
Test of weak instruments (*p* value)			< 0.01	
Hansen test for over-identifying restrictions (*p* value)			0.692	

Result of Estimation: Days of treatment of Days of Treatment

	Coefficient	SD	*t* value	*p* value
Telecare use	-4.223	1.957	-2.16	0.031**
Age	0.053	0.012	4.5	0***
Income	0.002	0.004	0.47	0.637
Heart disease	1.761	3.873	0.45	0.649
Hypertension	9.061	1.111	8.16	0***
Diabetes	3.37	2.471	1.36	0.173
Stroke	-3.856	4.621	-0.83	0.404
Number of observations			1820	
Arellano–Bond test for AR (2) (*p* value)			0.415	
Test of weak instruments (*p* value)			< 0.01	
Hansen test for over-identifying restrictions (*p* value)			0.231	

Previous results on five-year data

	OLS[1]	System GMM[2]	PSM[3]
Medical expenditure	JPY 15,302 (US$ 191.28)	-	JPY 25,538–39,936 (US$ 319.23–499.20)
Days of treatment	1.6 days	2.0 days	2.6–4.0 days

In 10-year data, telecare reduces medical expenditure by JPY 60,000 (USD600) and days of treatment by 4.2 days

Conclusion:
Further Implementation of e-Health

Towards a Broader Implementation of eHealth

- Low B/C ratio
- Conditions of Further implementation
  - (1) Public subsidies
  - (2) Reimbursement from medical insurance
- Creation of new business models
  - private businesses in health care

Promotion of e-Health

Reimbursements from medical insurance

No rewards for prevention of chronic diseases by e-Health

Changes in medical insurance systems