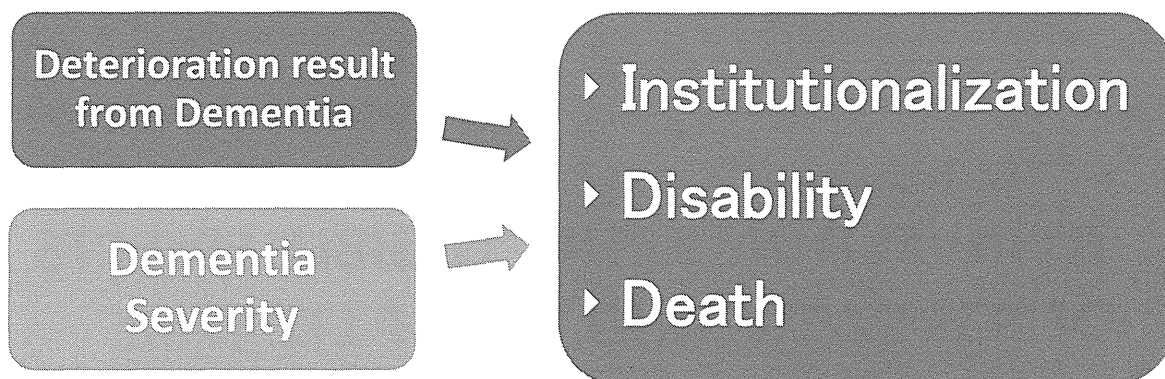


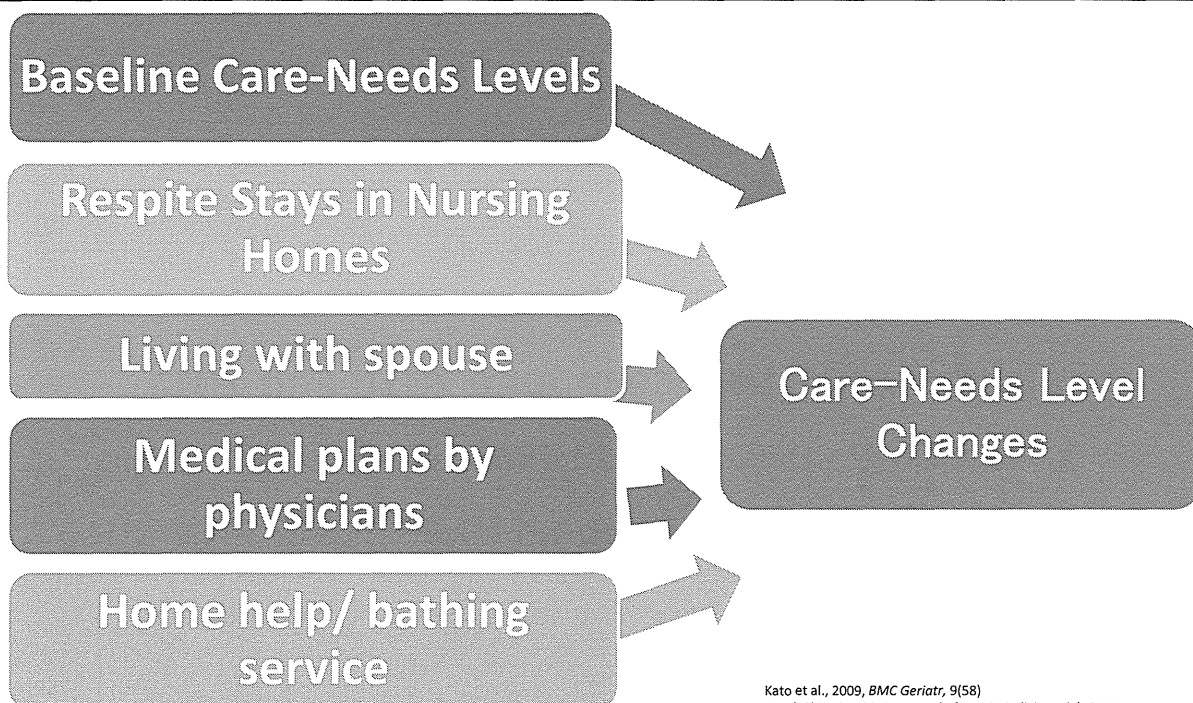
Dementia Severity and the rate of deterioration



Matsuda et al., 2009, *Asian Pacific Journal of Disease Management*, 3(3), 75-81
Murtaugh et al., 2011, *J Aging Health*, 23(3), 554-577.

9

Factors related to Care-Needs Level Changes



Kato et al., 2009, *BMC Geriatr*, 9(58)
Kim & Shiwaku, 2012, *Journal of Rural Medicine*, 7(1), 6-14
Koike & Furui, 2013, *Health Policy*, 110(1), 94-100.
Olivares-Tirado et al., 2012, *BMC Health Serv Res*, 12(1), 239
Tomita et al., 2010, *BMC Health Serv Res*, 10(345).

10

Question:

HOW ABOUT THE CORRELATION BETWEEN DEMENTIA AND THE DETERIORATION OF LTC SERVICE USERS?

Aim:

TO INVESTIGATE THE POSSIBLE EFFECTS OF DEMENTIA AND USE OF LTC CARE SERVICES ON THE DETERIORATION OF CARE-NEEDS LEVELS OF ELDERLY PERSONS IN JAPAN.

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Sample

■ Sample size

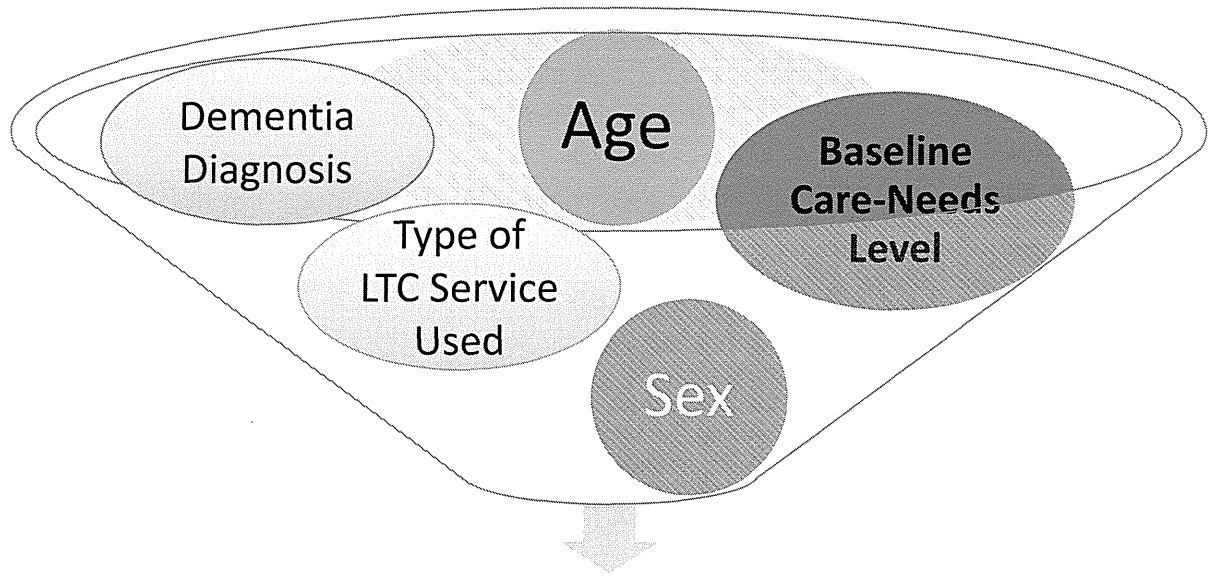
■ 50,268

■ Subject

- ① Aged 65 years and above
- ② Utilized LTC service in June 2010 and 2011
- ③ Baseline Care-Needs Level 1 to 5
- ④ Beneficiaries of National Healthcare Insurance (ICD-10)

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Variables of Multiple Logistic Regression



Care-Needs Level Deterioration: 1
Care-Needs Level Stable or Improved: 0

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HERE COMES THE RESULTS

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Demographic Characteristics (1/3)

Variable	Change in Care needs Level		Deterioration Proportion (%)	P-value
	Stable or Improved n= 34,298	Deteriorated n=15,970		
Age (years, Mean±SD)	83.9±7.4	85.6±7.3		
	n (%)	n (%)		
Age Group (years)				<0.05
65–69	1,375 (4.0)	381 (2.4)	21.7	
70–74	2,483 (7.2)	747 (4.7)	23.1	
75–79	5,313 (15.5)	1,920 (12.0)	26.5	
80–84	8,475 (24.7)	3,577 (22.4)	29.7	
85–89	8,775 (25.6)	4,195 (26.3)	32.3	
90–94	5,536 (16.1)	3,331 (20.9)	37.6	
>95	2,341 (6.8)	1,819 (11.4)	43.7	

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Demographic Characteristics (2/3)

Variable	Change in Care needs Level		Deterioration Proportion (%)	P-value
	Stable or Improved n= 34,298	Deteriorated n=15,970		
Sex				<0.05
Female	25,144 (73.3)	11,121 (69.6)	30.7	
Male	9,154 (26.7)	4,849 (30.4)	34.6	
Baseline Care needs Level				<0.05
1	6,044 (17.6)	3,791 (23.7)	38.5	
2	9,692 (28.3)	4,277 (26.8)	30.6	
3	7,588 (22.1)	3,604 (22.6)	32.2	
4	5,869 (17.1)	2,864 (17.9)	32.8	
5	5,105 (14.9)	1,434 (9.0)	21.9	

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Demographic Characteristics (3/3)

Variable	Change in Care needs Level		Deterioration Proportion (%)	P-value
	Stable or Improved n= 34,298	Deteriorated n=15,970		
Dementia				<0.05
Non-dementia	24,416 (71.2)	9,981 (62.5)	29.0	
Baseline dementia	6,275 (18.3)	3,438 (21.5)	35.4	
New dementia	3,607 (10.5)	2,551 (16.0)	41.4	
Services Used				<0.05
Facility care services	9,309 (27.1)	5,363 (33.6)	36.6	
Home care services	24,231 (70.6)	10,268 (64.3)	29.8	
Community-based care service	758 (2.2)	339 (2.1)	30.9	
Total	34,298 (100)	15,970 (100)	31.8	

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Results of Logistic Regression Analysis of Care-Needs Level Deterioration (1/2)

Variable	Odds Ratio (95% confidence interval)	p-value
Services used		
Facility care service (reference)	1	
Home care service	0.631(0.60-0.66)	<0.05
Community-based care service	0.628(0.55-0.72)	<0.05
Dementia		
Non-dementia (reference)	1	
Baseline dementia	1.42(1.35-1.49)	<0.05
New dementia	1.70(1.61-1.80)	<0.05
Sex		
Male(reference: Female)	1.47(1.41-1.54)	<0.05

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Results of Logistic Regression Analysis of Care-Needs Level Deterioration (2/2)

Variable	Odds Ratio (95% confidence interval)	p-value
65-69 (reference)	1	
70-74	1.06(0.92-1.22)	0.458
75-79	1.21(1.18-1.70)	<0.05
80-84	1.39(1.23-1.57)	<0.05
85-89	1.63(1.45-1.85)	<0.05
90-94	2.17(1.91-2.45)	<0.05
>95	3.04(2.66-3.48)	<0.05
Care needs level 1 (reference)	1	
Care needs level 2	0.66(0.63-0.70)	<0.05
Care needs level 3	0.60(0.56-0.64)	<0.05
Care needs level 4	0.55(0.52-0.59)	<0.05
Care needs level 5	0.31(0.28-0.33)	<0.05

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Results of Logistic Regression Analysis of Care-Needs Level Deterioration by baseline care needs level (1/3)

Baseline Care needs Level	1	2	3	4	5
Variable	OR(95%CI)	OR(95%CI)	OR(95%CI)	OR(95%CI)	OR(95%CI)
65-69 (reference)	1	1	1	1	1
70-74	1.07 (0.78-1.42)	0.96 (0.74-1.23)	1.11 (0.81-1.52)	1.08 (0.78-1.50)	1.22 (0.73-2.05)
75-79	1.11 (0.83-1.47)	0.96 (0.76-1.20)	1.62 (1.23-2.13)**	1.19 (0.88-1.60)	1.66 (1.05-2.63)*
80-84	1.25 (0.95-1.65)	1.20 (0.97-1.50)	1.72 (1.32-2.24)***	1.16 (0.87-1.55)	2.67 (1.72-4.16)***
85-89	1.52 (1.16-2.01)**	1.30 (1.05-1.62)**	1.91 (1.46-2.49)***	1.51 (1.13-2.02)**	3.42 (2.20-5.30)***
90-94	1.92 (1.44-2.55)***	1.83 (1.46-2.29)***	2.47 (1.89-3.24)***	1.90 (1.42-2.54)***	4.95 (3.18-7.71)***
>95	2.96 (2.11-4.15)***	2.86 (2.23-3.67)***	3.42 (2.57-4.54)***	2.26 (1.68-3.06)***	7.45 (4.76-11.7)***

*p<0.05 and **p<0.01 and ***<0.001, respectively.

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Results of Logistic Regression Analysis of Care-Needs Level Deterioration by baseline care needs level (2/3)

Baseline Care needs Level		1	2	3	4	5
Sex	Male	1.37	1.40	1.50	1.41	1.97
	(reference: Female)	(1.25-1.51)***	(1.28-1.52)***	(1.37-1.65)***	(1.27-1.57)***	(1.70-2.29)***
Facility care service (reference)		1	1	1	1	1
Services used	Home care service	0.26	0.38	0.63	0.88	1.30
		(0.22-0.30)***	(0.34-0.42)***	(0.58-0.69)***	(0.80-0.97)**	(1.15-1.47)***
	Community-based care services	0.28	0.43	0.50	0.62	1.30
		(0.20-0.38)***	(0.33-0.57)***	(0.38-0.65)***	(0.44-0.88)**	(0.79-2.14)

*p<0.05 and **p <0.01 and ***<0.001, respectively.

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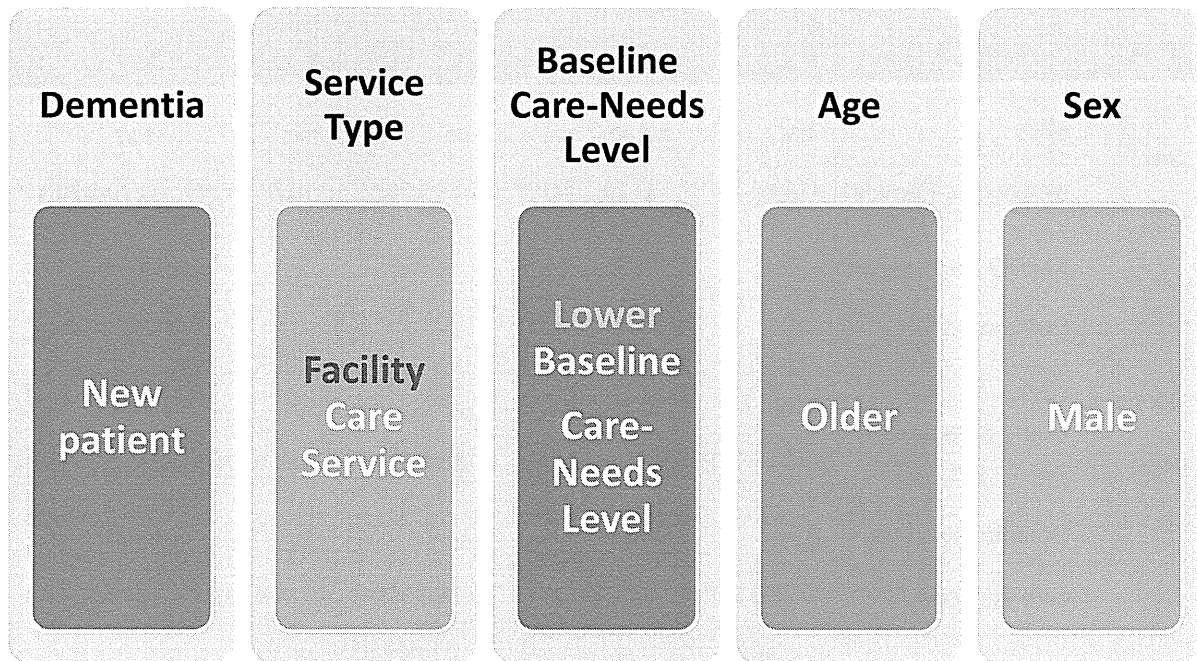
Results of Logistic Regression Analysis of Care-Needs Level Deterioration by baseline care needs level (3/3)

Baseline Care needs Level		1	2	3	4	5
Dementia	Non-dementia (reference)	1	1	1	1	1
	Baseline dementia	1.53	1.84	1.38	1.22	1.00
		(1.37-1.72) **	(1.66-2.04)***	(1.24-1.52)***	(1.09-1.36)***	(0.87-1.16)
	New dementia	1.83	2.30	1.64	1.36	1.12
		(1.62-2.08)***	(2.05-2.58)***	(1.46-1.84)***	(1.19-1.57)***	(0.94-1.34)

*p<0.05 and **p <0.01 and ***<0.001, respectively.

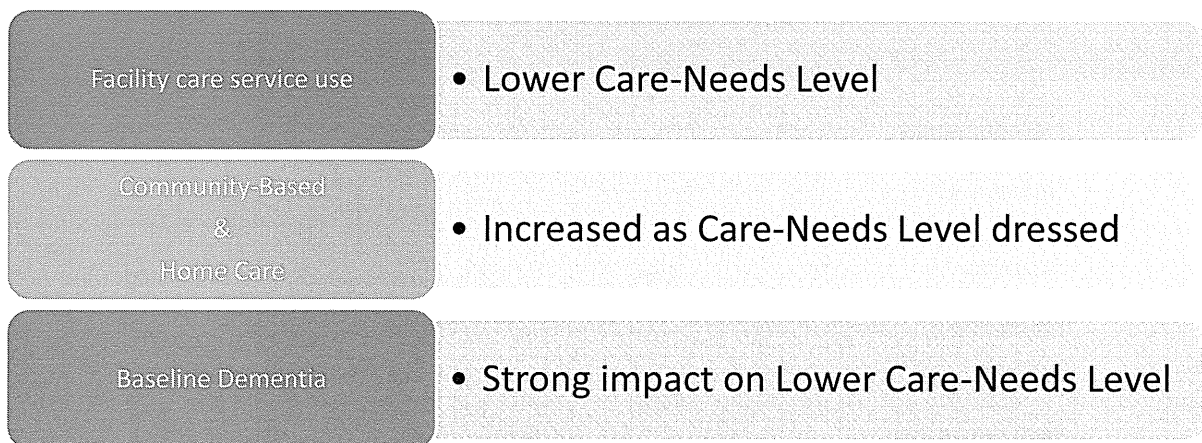
22

High Risk Factor of Care-Needs Level Deterioration



23

Conclusion



Baseline care needs level and dementia diagnosis should be considered important factors when developing LTC policies and Care Plan for insured individuals

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Thank you for your listening.

The relationship between dementia diagnosis and long- term care expenditure.

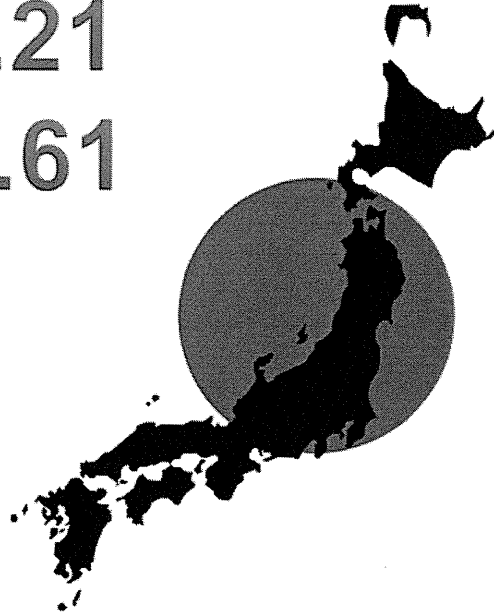
Huei-Ru Lin, Tetsuya Otsubo, and Yuichi Imanaka

京都大学大学院 医学研究科 医療経済学分野

INTRODUCTION

Life expectancies of Japan.

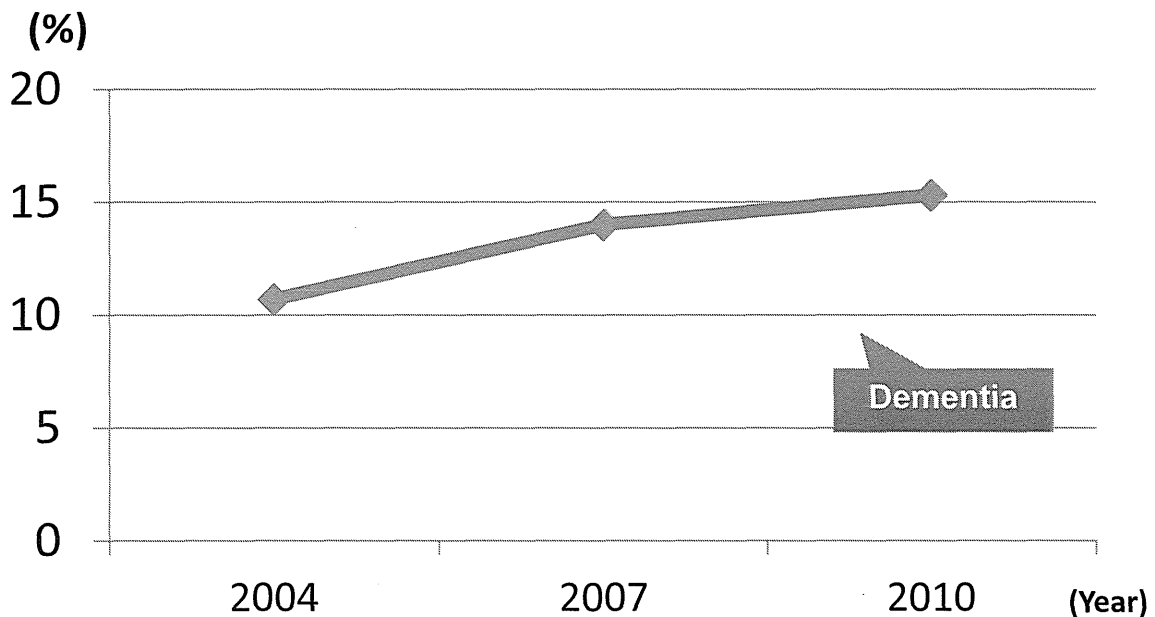
Male :80.21
Female:86.61



Health and Social Statistics Division of Statistics and Information Department (2014). Abridged Life Tables for Japan 2014, from <http://www.mhlw.go.jp/toukei/saikin/hw/life/life13/dl/life13-02.pdf>

3

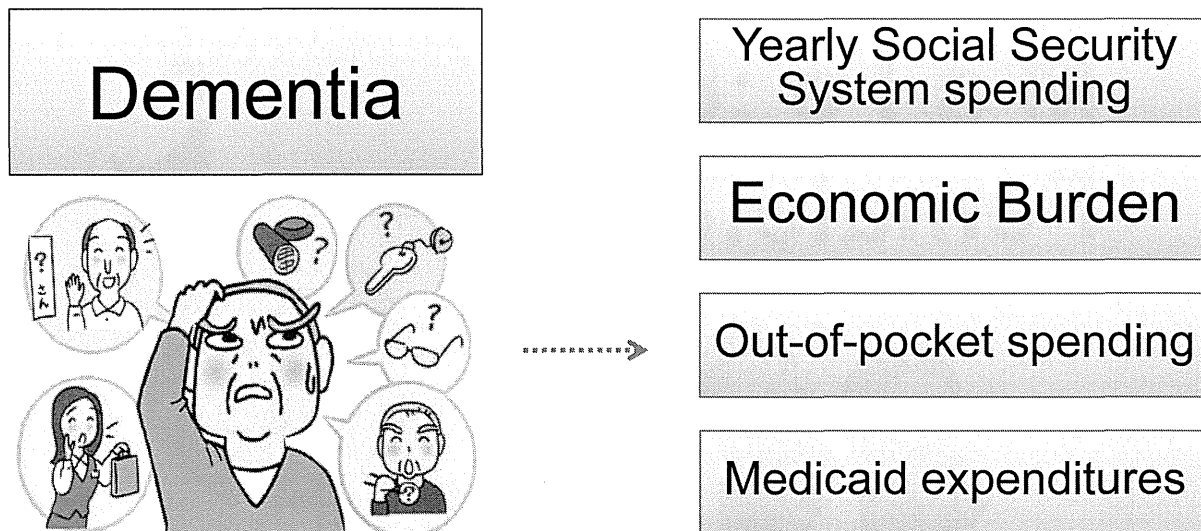
The main reason of needing long-term care service



Health and Social Statistics Division of Statistics and Information Department (2004). Comprehensive Survey of Living Conditions.,
Health and Social Statistics Division of Statistics and Information Department (2007). Comprehensive Survey of Living Conditions.,
Health and Social Statistics Division of Statistics and Information Department (2010). Comprehensive Survey of Living Conditions.,

4

The influence on economics by dementia



Schwarzkopf, L. (2011). *Value in health*, 14(6), 827-835.

Luengo-Fernandez, R., Leal, J., & Gray, A. M. (2011). *Journal of Alzheimer's disease*, 27(1), 187-196.

Delavande, A., Hurd, M. D., Martorell, P., & Langa, K. M. (2013). *Alzheimer's & dementia*, 9(1), 19-29.

Lin, P.-J., Biddle, A. K., Ganguly, R., Kaufer, D. I., & Maciejewski, M. L. (2009). *Medical care*, 47(11), 1174-1179.

Yang, Z., Zhang, K., Lin, P.-J., Clevenger, C., & Atherly, A. (2012). *Health services research*, 47(4), 1660-1678.

Kang, I. O., Lee, S.-Y., Kim, S. Y., & Park, C. Y. (2007). *International journal of geriatric psychiatry*, 22(7), 675-681.

5



Question:

- How about the correlation between dementia and the long-term care insurance expenditure of LTC service users?

6

Aim:

- To investigate the possible effects of dementia and use of LTC care services on the long-term care insurance expenditure of elderly persons in Japan.

7

METHODS

8

Sample

■ Database

- Kyoto prefecture long-term care insurance database
- Kyoto prefecture national health care insurance database

■ Subject

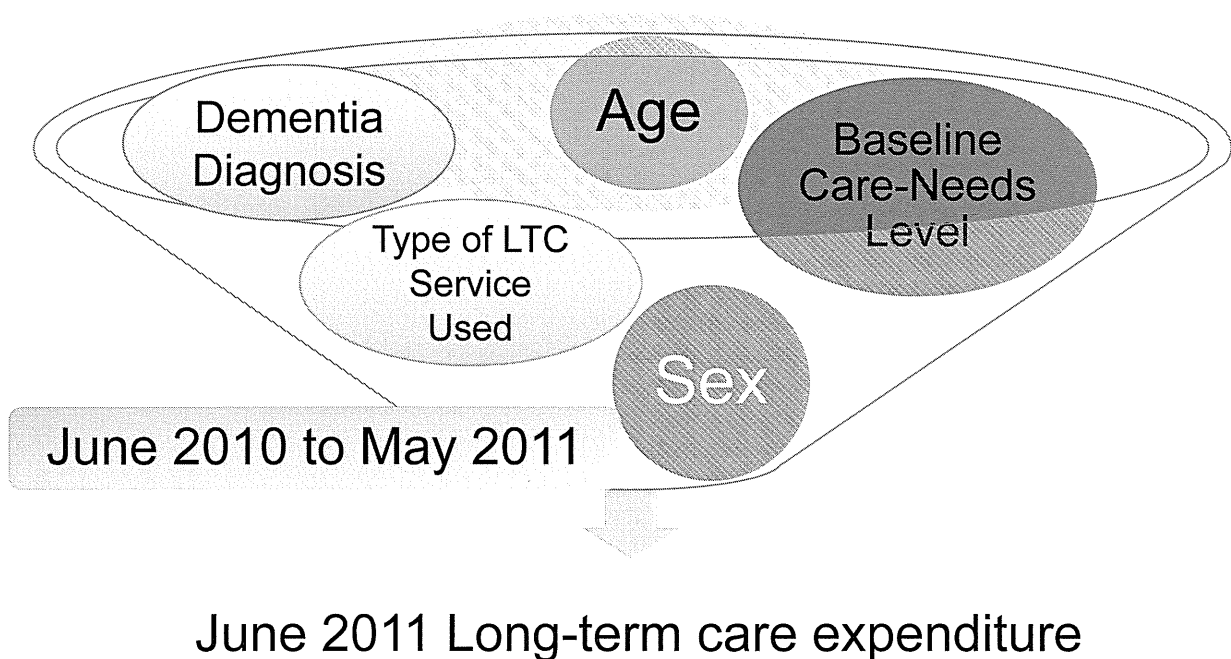
- ① Aged 65 years and above
- ② Utilized LTC service in June 2010
- ③ Having expenditure record in June 2011
- ④ Baseline Care-Needs Level 1 to 5
- ⑤ Beneficiaries of National Healthcare Insurance (ICD-10)

■ Sample size

- 44,441

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Variables of Multiple Linear Regression

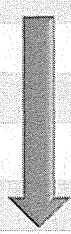


10

HERE COMES THE RESULTS

11

Demographic Characteristics (1/3)

Variable	Dementia		Dementia Proportion (%)	P-value*
	Non Dementia n= 30,523 n (%)	Dementia n=13,918 n (%)		
Age (years, Mean±SD)	83.89(7.667)	84.65(6.534)	31.3	<0.0001*
Age Group (years)				<0.0001*
65–69	1,412 (4.6)	239 (1.7)	14.5	
70–74	2,399 (7.9)	631 (4.5)	20.8	
75–79	4,634 (15.2)	2,044 (14.7)	30.6	
80–84	7,092 (23.2)	3,834 (27.5)	35.1	
>85	14,986 (49.1)	7,170 (51.5)	32.4	

*Result of X²-test of numbers of samples of dementia and non dementia group;

12

Demographic Characteristics (2/3)

Variable	Dementia		Dementia Proportion (%)	P-value*
	Non Dementia n= 30,523 n (%)	Dementia n=13,918 n (%)		
Sex				<0.0001
Female	21,947 (71.9)	10,710 (77.0)	32.8	
Male	8,576 (28.1)	3,208 (23.0)	27.2	
Baseline Care needs Level				<0.0001
1	6,495 (21.3)	2,773 (19.9)	29.9	
2	9,662 (31.7)	3,217 (23.1)	25	
3	6,491 (21.3)	3,422 (24.6)	34.5	
4	4,705 (15.4)	2,571 (18.5)	35.3	
5	3,170 (10.4)	1,935 (13.9)	37.9	

*Result of X²-test of numbers of samples of dementia and non dementia group

13

Demographic Characteristics (3/3)

Variable	Dementia		Dementia Proportion (%)	P-value*
	Non Dementia n= 30,523 n (%)	Dementia n=13,918 n (%)		
Services Used				<0.0001
Facility care services	7,841 (25.7)	4,679 (33.6)	37.4	
Home care services	17,878 (58.6)	5,624 (40.4)	23.9	
Community-based care service	4,804 (15.7)	3,615(26.0)	42.9	
Total	30,523 (100)	13,918(100)	31.3	<0.0001

*Result of X²-test of numbers of samples of dementia and non dementia group

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Long-Term Care Expenditure (1/3)

Variable	Expenditure of June 2011		P-value*
	Non Dementia 201106 Expenditure Mean (SD)	Dementia 201106 Expenditure Mean (SD)	
Age Group (years)			
65–69	154,872 (105,128)	204,953 (101,583)	<0.0001
70–74	148,344 (101,276)	202,271 (101,276)	<0.0001
75–79	157,323 (105,494)	204,309 (100,845)	<0.0001
80–84	169,266 (105,668)	213,285 (97,062)	<0.0001
>85	192,903 (102,709)	228,932 (92,795)	<0.0001

*Result of t-test of expenditure of dementia and non dementia group.

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Long-Term Care Expenditure (2/3)

Variable	Expenditure of June 2011		P-value*
	Non Dementia 201106 Expenditure Mean (SD)	Dementia 201106 Expenditure Mean (SD)	
Sex			
Female	182,756 (106,102)	225,462 (94,493)	<0.0001
Male	161,371 (101,751)	199,098 (99,417)	<0.0001
Baseline Care needs Level			
1	106,885 (73,223)	145,257 (83,733)	<0.0001
2	137,074 (84,580)	187,105 (88,043)	<0.0001
3	201,773 (92,551)	234,945 (81,008)	<0.0001
4	246,032 (91,037)	266,480 (77,026)	<0.0001
5	286,737 (94,399)	289,193 (80,139)	0.340

*Result of t-test of expenditure of dementia and non dementia group.

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Long-Term Care Expenditure (3/3)

Variable	Expenditure of June 2011		P-value*
	Non Dementia 201106 Expenditure Mean (SD)	Dementia 201106 Expenditure Mean (SD)	
Services Used			
Facility care services	284,138 (65,186)	283,408 (61,508)	0.536
Home care services	128,931(84,726)	159,111(92,307)	<0.0001
Community-based care service	17,9418(97,514)	230,290 (80,435)	<0.0001
Total	176,748 (105,335)	219,385 (96,289)	<0.0001

*Result of t-test of expenditure of dementia and non dementia group.

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Results of multiple linear regression analysis of LTC expenditure in June 2011 (1/3)

Variable	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	SE	Beta	
(Constant)	107914	1058		.000
Gender (Reference: Female)	-74373	837	-.031	.000
Baseline Care Needs Level (Reference: Care Needs Level 1)				
2	24018	1208	.104	.000
3	68944	1349	.275	.000
4	95188	1512	.337	.000
5	128339	1719	.392	.000
Baseline Care Needs Level with dementia (Reference: Care Needs Level 1 with dementia)				
2	11158	2295	.028	.000
3	1154	2385	.003	.628
4	-6295	2653	-.014	.018
5	-17766	2911	-.035	.000

Results of multiple linear regression analysis of LTC expenditure in June 2011 (2/3)

Variable	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	SE	Beta	
Age (years, reference: aged 85 years)				
65-69	-16530	2125	-.030	.000
70-74	-23333	1677	-.056	.000
75-79	-15640	1282	-.053	.000
80-84	-7117	1091	-.029	.000
Age with dementia (years, reference: aged 85 years with dementia)				
65-69	3456	5371	.002	.520
70-74	10370	3537	.012	.003
75-79	10470	2281	.021	.000
80-84	6617	1860	.018	.000

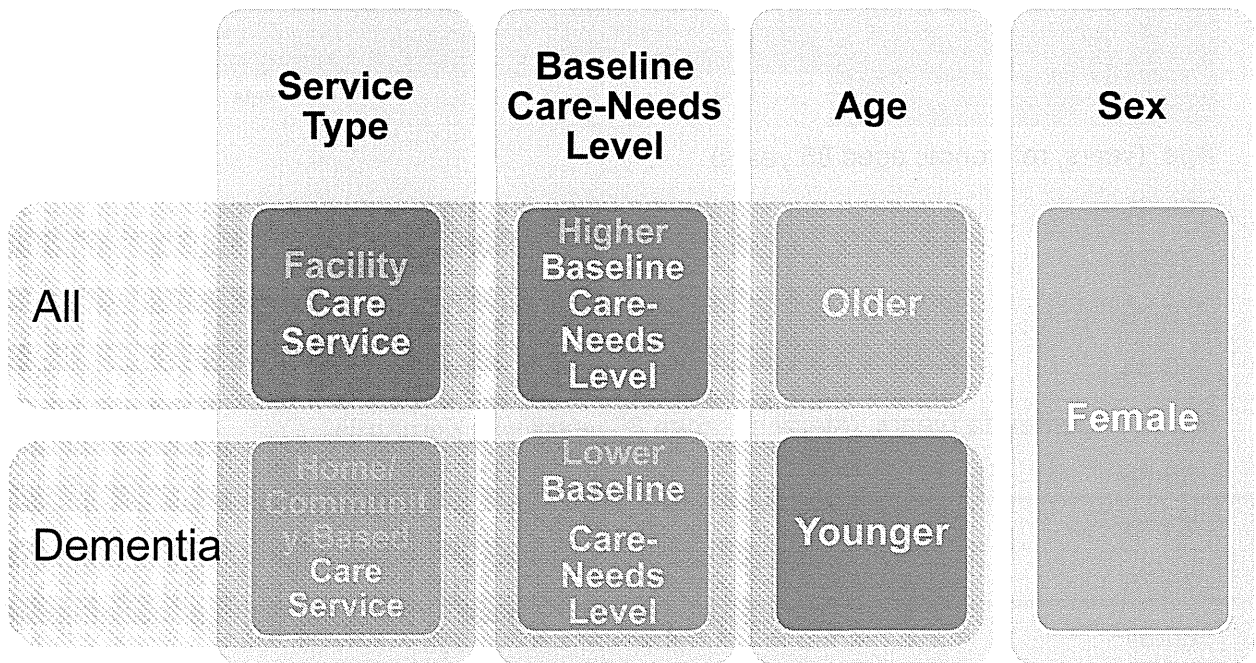
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Results of multiple linear regression analysis of LTC expenditure in June 2011 (3/3)

Variable	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	SE	Beta	
Service (Reference: Home care service)				
Dementia -Home care service	33214	1933	.126	.000
Community-Based care Service	59702	3652	.056	.000
Dementia -Community-Based care Service	80827	3632	.087	.000
Facility care service	102918	1099	.376	.000
Dementia -Facility care service	100341	2312	.295	.000

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High Risk Factors Related to Long-Term Care Insurance Expenditure



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DISCUSSION

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