Annex 1: Setting the Care Need Rate for Persons Aged 85 Years and Over

Empirical observation shows that the care need by age group 65–69, 70–74, 75–79, and 80–84 years is almost identical in four countries (China, Japan, the Republic of Korea, and Germany). For the older age group, 85–59, 90–94, and 95+ years, care need is highest in Japan, followed by Germany, the Republic of Korea, and China. This order is similar to the level of life expectancy – the higher the life expectancy, the higher the care need rate (Annex 1, Table 1).

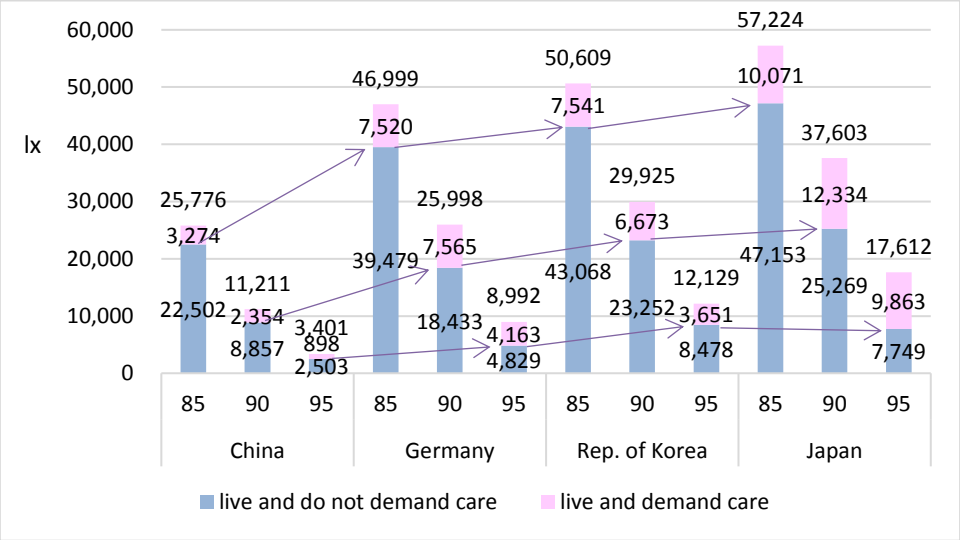
Annex 1, Table 1. Care Need Rate and Life Table Functions (both sexes)

Age	2010	2015	2015	2015
	China	Rep. of Korea	Germany	Japan
	Cannot live independently	Care grade 1–3	Nursing care level II+III	Care level 3–5
65–69	1.5%	0.8%	1.3%	1.0%
70–74	2.7%	2.0%	2.2%	2.0%
75–79	4.3%	4.2%	3.9%	4.1%
80–84	8.0%	8.0%	8.2%	8.8%
85–89	12.7%	14.9%	16.0%	17.6%
90–94	21.0%	22.3%	29.1%	32.8%
95+	26.4%	30.1%	46.3%	56.0%
e_x (expectation of life at age x in life table)				
85	5.21	6.82	6.23	7.70
l_x (survivors at age x in life table)				
85	25,776	50,609	46,999	57,224
90	11,211	29,925	25,998	37,603
95	3,401	12,129	8,992	17,612

Sources:
China – Population census 2010. Compiled by Authors.
Rep. of Korea: National Health Insurance Service, Long-term Care Insurance Statistics 2015. Special tabulation by Authors.
Germany – Nursing care statistics, Federal Statistical Office.
Japan: Survey of Long-term Care Benefit Expenditures, October 2015, Ministry of Health, Labour and Welfare.
Life table functions – World Population Prospects: The 2017 Revision, United Nations Population Division.

This is to say, in a country where people can live longer, some survive because care need is available, whereas in a country where people die more easily, some die before receiving care. Annex 1, Figure 1 shows a theoretical schema for this. For example, in China, out of 100,000 persons born, 25,776 persons survive at the age of 85. Among these 25,776 persons, 3,274 need care and 22,502 do not need care. In Japan, 57,224 persons survive at the age of 85, among those, 10,071 need care and 47,153 do not need care. In Japan, people have more chances of surviving; there are three times more persons who need care, but more than double live without needing care compared to China. The higher the survivorship (lx), the higher the care need rate. This is to say that the healthy survivor effect (Baillargeon and Wilkinson, 1999) or a form of the dynamic equilibrium (Manton, 1982) is present.

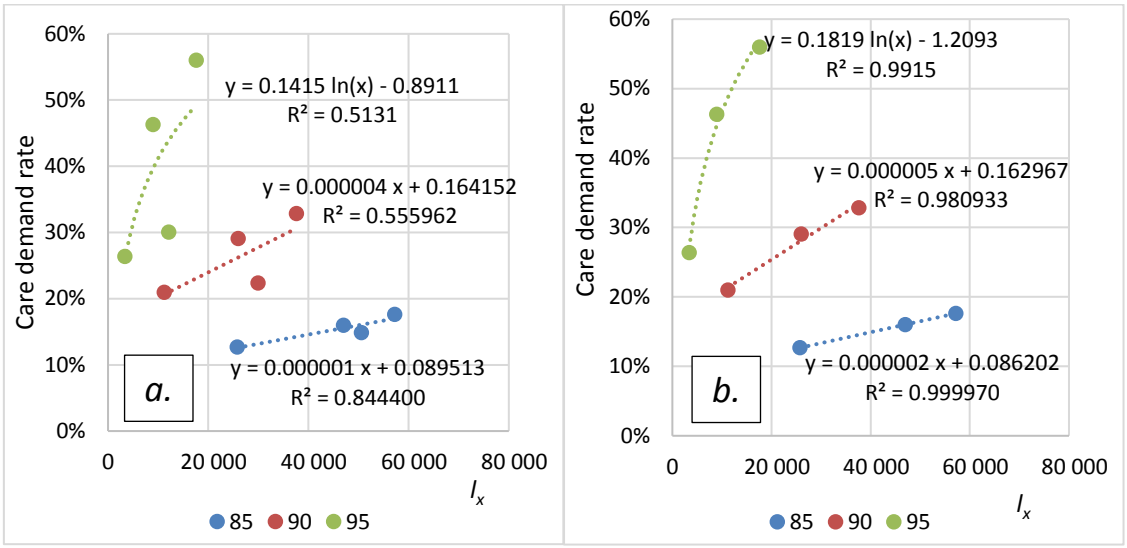
Annex 1, Figure 1 Theoretical Schema of l_x (Survivors) With and Without Care Need



Note: According to the Sullivan method of calculating healthy life expectancy, Lx, instead of lx, should be used. Due to the data availability, lx is used here as an alias for Lx for the purpose of visualising the theoretical schema.
Sources: Same as Annex 1, Table 1.

Considering this relationship between life table functions and care need rate, the estimation formulae were established using the data of the four countries. Annex 1, Figure 2 shows the relationship between l_x (survivors in life table at age 85, 90, 95 years) and care need rate of respective 5-year age groups starting with 85, 90, 95 years old, for four countries (a) and three countries except the Republic of Korea (b). Linear regression was employed for ages 85 and 90 years, and the logarithmic regression was employed for age 95 years. Although the data of three countries (b) gives a much better R^2 (correlation coefficient), formulae using four countries data (a) were used to estimate the care need in Chapter 2.

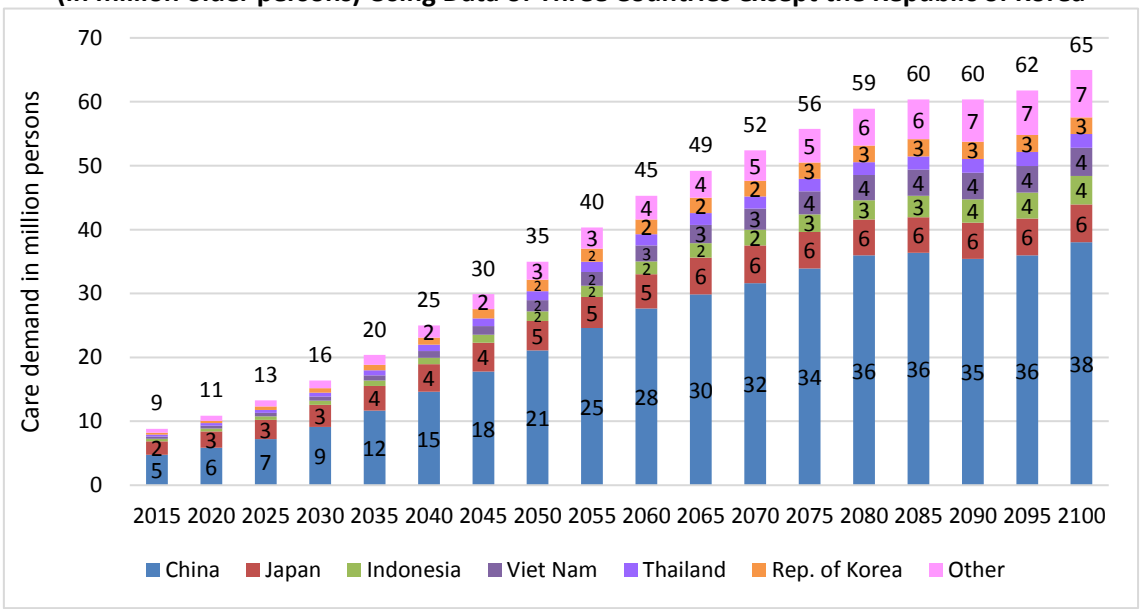
Annex 1, Figure 2 Age-specific Care Need Rate and Life Table Function (l_x)



Source: Calculated by Author.

While there is no reason to exclude the Republic of Korea at this stage, care need is estimated using the better-fitting formulae of three countries data (b), and is shown in Annex 1, Figure 3 and Annex 1, Table 2 for reference. The estimates tend to be larger.

Annex 1, Figure 3 Care Need Estimates in East and Southeast Asia (in million older persons) Using Data of Three Countries except the Republic of Korea



Source: Estimated by Authors.

Annex 1, Table 2 Estimates of Care Need in East and Southeast Asia (in 1,000 older persons)

Using Three Countries' Data except the Republic of Korea

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
China*	4,748	5,863	7,235	9,128	11,667	14,648	17,800	21,119	24,601	27,673	29,843	31,614	33,900	35,985	36,376	35,440	35,960	38,021
Japan	2,120	2,567	3,007	3,442	3,890	4,278	4,483	4,593	4,877	5,355	5,780	5,906	5,746	5,610	5,555	5,619	5,765	5,939
Indonesia	383	445	536	665	834	1,039	1,266	1,508	1,751	1,992	2,232	2,478	2,734	3,019	3,337	3,687	4,055	4,431
Viet Nam	376	442	526	641	801	1,041	1,369	1,756	2,145	2,522	2,891	3,268	3,636	3,956	4,137	4,164	4,180	4,407
Thailand	301	386	491	618	776	967	1,186	1,409	1,606	1,758	1,857	1,903	1,929	1,978	2,065	2,149	2,178	2,173
Rep. of Korea	287	391	527	691	889	1,132	1,431	1,756	2,048	2,261	2,404	2,488	2,542	2,610	2,676	2,724	2,660	2,602
China, Taiwan	147	187	234	293	372	475	599	719	809	878	941	1,004	1,047	1,049	1,040	1,030	991	950
Philippines	136	165	201	249	308	377	452	533	625	734	861	1,009	1,177	1,360	1,554	1,759	1,981	2,227
Myanmar	84	96	115	141	172	202	233	263	293	322	351	384	418	450	478	499	517	536
North Korea	73	87	105	122	146	180	217	260	300	334	362	389	427	476	523	564	598	633
China, Hong Kong	69	87	108	132	164	212	274	335	383	416	441	472	501	520	519	503	484	491
Malaysia	56	74	97	126	163	207	258	319	394	485	595	725	867	1,000	1,099	1,165	1,220	1,293
Singapore	29	41	57	78	106	142	184	226	263	293	319	341	357	373	393	413	424	433
Cambodia	18	23	28	37	48	61	75	97	119	149	186	230	277	322	357	399	443	497
Lao PDR	8	9	10	13	16	20	24	31	38	48	59	71	84	97	109	121	134	147
Mongolia	4	4	5	7	9	12	16	20	24	29	33	38	42	46	50	56	64	75
China, Macao	3	3	5	7	9	14	19	25	30	34	38	42	48	55	57	55	53	55
Timor-Leste	1	1	2	2	3	3	4	4	5	6	7	9	12	17	21	27	34	41
Brunei	1	1	1	2	2	3	4	6	7	9	11	12	14	15	16	17	18	18
Total	**8,845**	**10,874**	**13,291**	**16,391**	**20,374**	**25,014**	**29,895**	**34,979**	**40,320**	**45,298**	**49,212**	**52,383**	**55,757**	**58,937**	**60,363**	**60,390**	**61,759**	**64,970**

* Excluding Taiwan, Hong Kong, and Macao.

Source: Estimated by Authors.

Annex 2: Care Industry and Occupation

Annex 2, Table 1 Composition of Industry of Human Health and Social Work Activities

	Group	Class	Description
Division 86			**Human health activities (Health)**
	861	8610	Hospital activities
	862	8620	Medical and dental practice activities
	869	8690	Other human health activities
Division 87			**Residential care activities (Social work)**
	871	8710	Residential nursing care facilities
	872	8720	Residential care activities for mental retardation, mental health, and substance
	873	8730	Residential care activities for the elderly and disabled
	879	8790	Other residential care activities
Division 88			**Social work activities without accommodation (Social work)**
	881	8810	Social work activities without accommodation for the elderly and disabled
	889	8890	Other social work activities without accommodation

Source: United Nations (2008), *International Standard Industrial Classification of All Economic Activities, Revision 4*, Statistical Papers, Series M No.4/Rev.4, Statistics Division, Department of Economic and social Affairs, https://unstats.un.org/unsd/publication/seriesM/seriesm_4rev4e.pdf (accessed 29 March 2019).

Annex 2, Table 2 Care-related Occupation and Domestic Workers

Care-related Occupation

ISCO-08 Code				Description
2	Professionals			
	22	Health professionals		
		221	Medical doctors	
			2211	Generalist medical practitioners
			2212	Specialist medical practitioners
		222	Nursing and midwifery professionals	
			2221	Nursing professionals
			2222	Midwifery professionals
		223	Traditional and complementary medicine professionals	
			2230	Traditional and complementary medicine professionals
		224	Paramedical practitioners	
			2240	Paramedical practitioners
		226	Other health professionals	
			2261	Dentists
			2262	Pharmacists
			2263	Environmental and occupational health and hygiene professionals
			2264	Physiotherapists
			2265	Dieticians and nutritionists
			2266	Audiologists and speech therapists
			2267	Optometrists and ophthalmic opticians
			2269	Health professionals not elsewhere classified

3	Technicians and associate professionals			
	32	Health associate professionals		
		321	Medical and pharmaceutical technicians	
			3211	Medical imaging and therapeutic equipment technicians
			3212	Medical and pathology laboratory technicians
			3213	Pharmaceutical technicians and assistants
			3214	Medical and dental prosthetic technicians
		322	Nursing and midwifery associate professionals	
			3221	Nursing associate professionals
			3222	Midwifery associate professionals
		323	Traditional and complementary medicine associate professionals	
			3230	Traditional and complementary medicine associate professionals
		325	Other health associate professionals	
			3251	Dental assistants and therapists
			3252	Medical records and health information technicians
			3253	Community health workers
			3254	Dispensing opticians
			3255	Physiotherapy technicians and assistants
			3256	Medical assistants
			3257	Environmental and occupational health inspectors and associates
			3258	Ambulance workers
			3259	Health associate professionals not elsewhere classified
	33	Business and administration associate professionals		
		334	Administrative and specialized secretaries	
			3344	Medical secretaries
		341	Legal, social, and religious associate professionals	
			3412	Social work associate professionals
5	Service and sales workers			
	51	Personal service workers		
		515	Building and housekeeping supervisors	
			5152	Domestic housekeepers
	53	Personal care workers		
		532	Personal care workers in health services	
			5321	Health care assistants
			5322	Home-based personal care workers
			5329	Personal care workers in health services not elsewhere classified

Domestic workers

ISCO-08 Code				Description
9	Elementary occupations			
	91	Cleaners and helpers		
		911	Domestic, hotel, and office cleaners and helpers	
			9111	Domestic cleaners and helpers

Source: ILO (2012), *International Standard Classification of Occupations – Structure, group definitions and correspondence tables*, https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf (accessed 29 March 2019).