# Title:

**Worlds of Long-term-care: A Long-term Care System Typology of OECD countries**

## Author names and affiliations:

Mareike Ariaans1,2, \*, Philipp Linden3, Claus Wendt4

1 University of Mannheim, Mannheim Centre for European Social Research, A5, 6, 68159  Mannheim, Phone: +49-621-1812813, Mareike.Ariaans@mzes.uni.mannheim.de

2 University of Siegen, Seminar for Social Sciences, Adolf-Reichwein-Str. 2, 57068 Siegen, Germany; Phone: +49-271-740-5288, [ariaans@soziologie.uni-siegen.de](mailto:ariaans@soziologie.uni-siegen.de)

3 University of Siegen, Seminar for Social Sciences, Adolf-Reichwein-Str. 2, 57068 Siegen, Germany; Phone: +49-271-740-5288, [linden@soziologie.uni-siegen.de](mailto:linden@soziologie.uni-siegen.de)

4 University of Siegen, Seminar for Social Sciences, Adolf-Reichwein-Str. 2, 57068 Siegen, Germany; Phone: +49-271-740-3182, [wendt@soziologie.uni-siegen.de](mailto:wendt@soziologie.uni-siegen.de)

\* Corresponding author

## Short biography – 50-100 words

**Mareike Ariaans** …

**Philipp Linden** is a sociologist (M.Sc.) and works as research assistant and doctoral candidate in the junior research group MEPYSO at the University of Siegen. His research interests are in the field of medical sociology and demography of health, the consequences of medicalization and psychologization of unemployment and early childhood development as well as quantitative research methods.

**Claus Wendt** …

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| Abstract (zählt nicht) | 201 |
| Intro | 192 |
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| T1 (Methods) | 150 |
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# Abstract – 201 words

Providing long-term care (LTC) to the elderly is a major challenge for all welfare states. However, supply, public-private mix, accessibility and performance of LTC systems differ widely across countries. We therefore aim to typologize OECD LTC systems, addressing differences and similarities in these dimensions systematically. Not only is an updated and extended typology needed due to the maturation, economization and marketization of LTC systems but also compared to earlier typologies, we make three advancements. First, previous typologies often focus either on social services in general or on one aspect of LTC such as migration or family caregiving. Our approach clearly focuses on characteristics of LTC *institutions*. Second, earlier typologies used either solely quantitative OECD or Eurostat data or data on institutional and regulatory aspects of LTC systems. We integrate both approaches by using quantitative OCED data on supply, public-private mix, performance *as well as* institutional data on accessibility of systems. Third, we use various clustering methods, in order to derive at a flexible typology. These advancements increase the empirical basis of comparative LTC systems research and make results more comparable to other welfare and healthcare typologies. Our results show

**Keywords:** long-term care, elderly, typology, classification

# Introduction – 192 words

In most OECD countries demographic ageing poses serious challenges to the provision of long-term care (LTC) services. Increasing longevity and the ageing of the baby boom generation lead to an increase in the number of elderly people, while a general higher life expectancy will in many cases increase the duration of time in which LTC services are needed (Rechel et al., 2013; Colombo et al., 2011). Due to this expected double burden both the demand for LTC services will increase and with that also the costs for LTC service provision. Thus, countries reshape their LTC systems, on the one hand to make them more efficient and financially robust and on the other hand to increase the access and performance of LTC systems (Ranci and Pavolini, 2013). Many countries adopted marketization, economization and corporatization reform measures which often tremendously altered the scope and functioning of established LTC systems (Farris and Marchetti, 2017; Ungerson, 1997). Thus, increasing problem pressure and numerous reforms in recent years have altered LTC system in many OECD countries. Therefore, a new and updated LTC typology will include these changes and the results will help to grasp and categorize them.

# Theory – 1732 words

## Long-Term Care

When talking about LTC a clear definition is needed. The OECD defines LTC as:

“Range of services required by persons with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent for an extended period of time on help with basic activities of daily living (ADL). This “personal care” component is frequently provided in combination with help with basic medical services such as “nursing care” (help with wound dressing, pain management, medication, health monitoring), as well as prevention, rehabilitation or services of palliative care. Long-term care services can also be combined with lower-level care related to “domestic help” or help with instrumental activities of daily living (IADL).” (Colombo et al., 2011: 11–2).

Although this definition is independent of age most LTC recipient are above 65 years old (Colombo et al., 2011). Thus, LTC systems are highly important for the elderly and therefore we focus the typology on the services and systems for this age group.

## Long-term Care Classifications

Typologizing welfare states or welfare state systems is not at least since Esping-Andersen's (1990) seminal study a common endeavor in welfare state research. His work and the following adaptions and discussions (Ferrera, 1996) still provide a basic template for case selection and evaluation in social service research (Rostgaard, 2002). Nevertheless, since then a number of different typologies including LTC or LTC facets were published, which may be divided into three major groups. A first group focuses on social services generally, in which LTC is just one part of a bigger social service picture (Anttonen and Sipilä, 1996; Bettio and Plantenga, 2004; Kautto, 2002; Leitner, 2003; Saraceno and Keck, 2010). The second group genuinely concentrates on LTC for the elderly, although often (due to data reasons) also disability is included (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Halásková et al., 2017; Pommer et al., 2009; van Hooren, 2012). Finally, the third group focuses on special aspects of LTC and zoom in on migration in the context of LTC (Anderson, 2012; Da Roit and Weicht, 2013; Simonazzi, 2008; van Hooren, 2012; Simonazzi, 2008), cash for care schemes in LTC (Da Roit and Le Bihan, 2010) and informal care by families (Di Rosa et al., 2011; Leitner, 2003; Pfau-Effinger, 2014; Simonazzi, 2008).

Because our focus lies on building a genuine LTC typology, we identified the second group of typologies as most relevant for us. In these typologies we see a huge variety in the (number of) included country cases, data, methods and results. Concerning dimensions and indicators, we see a huge variety of indicators and measurements as well. However, we also observe four central dimensions, which are repeatedly analyzed in most of the studies.

### I. Supply

The first is supply. It includes financial resources in most typologies (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010), but also staff and staffing levels (Alber, 1995) as well as bed density in institutional LTC (Alber, 1995; Damiani et al., 2011). Furthermore, the type of provision is often included in the supply dimension and operationalized via the percentage of people in ambulatory or residential care settings (Alber, 1995; Damiani et al., 2011; Halásková et al., 2017). We therefore use LTC expenditure (health) per capita in US$ of purchasing power parities as a measure of financial input into the system. It includes all expenditure on bodily related LTC, mainly on “(basic) Activities of daily living (ADL)” like bathing, dressing or eating). We would have liked to include LTC expenditure (social) as well, which includes “instrumental activities of daily living (IADL), which would have given the LTC system expenditure a broader scope (Halásková et al., 2017). Unfortunately, data availability was extremely limited in this dimension.

We further include the number of LTC beds per 1000 population aged 65 or older as institutional supply of services and the number of LTC recipients in institutions measured as the percentage of all people aged 65 years and older as a measure of actual supply of spots in these facilities.

### II. Public-Private Mix

The second dimension operationalizes the role of the state and of private actors. Another dimension is the public-private mix of the systems, which is often part of healthcare typologies (Reibling et al., 2019). Thus, for LTC typologies, only those which specialize on specific aspects or those taking a broader view on social services integrate this dimension (Anderson, 2012) by the intensity of informal care (Bettio and Plantenga, 2004), the reach of public funds (van Hooren, 2012), the proportion of for-profit-providers (Da Roit and Weicht, 2013; Simonazzi, 2008) and the expenditure on or use of uncontrolled cash benefit schemes (Da Roit and Weicht, 2013; Simonazzi, 2008).

The share of private (voluntary and out-of-pocket) expenditure in the total expenditure is included as a measure of public and private involvement in payments for care. We also adopt the availability of cash benefits as an approximation for formal and informal care provision. Research has shown that the availability as well as the unrestricted usage of cash benefits fosters family and migrant care (Da Roit and Le Bihan, 2010; Da Roit and Weicht, 2013).

### III. Access regulation

Access to care is a developed field in healthcare and healthcare typologies (Reibling, 2010; Reibling et al., 2019), but has only been adapted in LTC typologies by Kraus et al. (2010). Restrictions in the systems may, however, pose barriers especially for lower social status groups to access care. Common barriers are means-testing of benefits and limitations of choice. We use three means-testing indicators: means testing-for cash-benefits, means-testing for in-kind benefits (ambulatory and institutional) and means-testing for any benefit (cash benefits, in-kind benefits, other care related benefits). Furthermore, we include three indicators on free and limited choice. Limitations in choice are regional restriction or restrictions due to insurance or benefit plans. The indicators are: choice of homes-care provider, choice of institutional care provider and choice between cash and in-kind benefits.

### IV. Performance

Measuring the performance of LTC systems is especially on an internationally comparative level still in its infancy. Indicators such as the number of institutional and home-based LTC patients with pressure ulcers or unintended weight loss are in many countries not even available on a national or regional basis (Halfens et al., 2013). Therefore, we can only use indicators that are not exclusively but to a large part determined by the quality and performance of LTC services. Thus, we integrate life expectancy of people aged 65 or older and similar to Damiani et al. (2011) the percentage of the population who are 65 or older, who perceive their health as good or very good.

Although quality and performance indicators like the percentage of patients with pressure ulcers or unintended weight loss are not available for a larger comparative country sample (Halfens et al., 2013), some typologies still include quality indicators in their classification systems. Damiani et al. (2011) for example use the share of people over 80 reporting good or very good health and the perceived limitations in ADLs for people aged 65 or older. Kraus et al. (2010) take institutional indicators of mandatory quality assurance systems and the degree and functioning of integrated services.

In contrast to these quantitative OECD and Eurostat indicators, on which nearly all typologies are based (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010), Pommer et al. (2009) utilize Share-Data (micro-data) for their typology. And solely Kraus et al. (2010) adopts quantitative *as well as* qualitative data on institutional setting and rules for access to the system, which are based on own primary data collection. This access dimension has been proven of high relevance for healthcare typologies (Reibling, 2010; Reibling et al., 2019) and is operationalized via means-testing for benefits, entitlement to residential care, home-care benefits and cash benefits as well as choice restrictions in Kraus et al.'s (2010) typology.

The results of these typologies are certainly influenced by their focus and aim but also by the number of included countries. Some studies included only about ten European/OECD country cases (Alber, 1995; Halásková et al., 2017; Pommer et al., 2009) while others analyzed about 20 and more European (Damiani et al., 2011; Kraus et al., 2010) and/or OECD cases (Colombo, 2012).

Despite the large variety in the number of clusters and the composition of those clusters in the different typologies some similarities and parallels can be depicted. The most robust cluster is a Scandinavian or northern European cluster that mostly includes Sweden, Norway, Denmark, Finland and often also the Netherlands (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Pommer et al., 2009). Clusters which include only Eastern European countries can be found in the typologies by Damiani et al. (2011), Halásková et al. (2017) and Kraus et al. (2010) In these clusters often Bulgaria, Hungary, the Czech Republic, Estonia and Slovakia are included, while other Eastern European countries sometimes join. In some studies a second cluster which incorporates Eastern-European as well as Southern European countries is built (Damiani et al., 2011; Kraus et al., 2010; Colombo et al., 2011) including Italy, Spain and Greece. These countries are only depicted in a genuine Southern European cluster by Pommer et al. (2009). Continental European countries such as Germany, France, Austria, Belgium and Luxemburg can be found in many typologies together in one cluster but mostly together with some Eastern European or Northern European countries (Alber, 1995; Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010; Pommer et al., 2009). Non-European countries are rarely included in the typologies. The typology by Colombo (2012), which categorize countries based on financing indicators include Japan and South Korea in a cluster with Germany, Luxemburg and the Netherlands due to their common social insurance approach, whereas New Zealand and Canada are in a cluster with Greece, Spain and Switzerland due to their universal but means-tested financing approach. Halásková et al. (2017) find Australia and South Korea in one cluster.

This short overview on existing LTC typologies shows room for extension. First, most typologies only use quantitative indicators where a huge weight lies on financing indicators. Additional, e.g. institutional indicators focusing on access to long-term care are rarely used here. Second, many typologies have a European focus or only use a small sample of countries. Thus, we would like to extend these typologies by using an OECD sample with as many countries as possible.

# Methodology – 1456 words

## Data

Indicators for the typology of LTC systems came from two data sources (Table 1). First, six quantitative measures were extracted at the 10th of December 2018 for 36 countries on 18 time points (2000-2017) from OECD health data (OECD, 2018). Another six qualitative indicators were distilled from information within the Missoc database (MISSOC, 2018), the Health in Transition reports (European Observatory on Health Systems and Policies, 2018) and the ESPN reports of the European Union (European Commission, 2018) through a coding scheme developed and applied by the first author. CODING SCHEME Since in some countries regional or municipal rules prevail more often than national laws, the codes refer to the dominant rules in place. In case of ambiguous information, we searched for additional information on the indicator within scientific publications and countries’ official websites. To double-check the values of the qualitative indicators, all have been send to national LTC policy experts to check and in case correct the values. The questionnaires were send out between May and July 2019.

--- TABLE 1 ABOUT HERE ---

Table 1: Overview of LTC typology indicators

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Quantitative indicators* | Abbreviation | Mean | SD | Min. | Max. |
| Expenditure per capita in US$, PPP | EXPND | 709.89 | 524.81 | 9.48 | 1745.09 |
| Number of beds per 1000 inhabitants | BEDS | 47.73 | 18.27 | 12.2 | 85 |
| Number of recipients in institutions,  % of all people aged 65+ | RCPTIN | 3.88 | 1.66 | 0.43 | 7.17 |
| Share of private expenditure,  % of total expenditure | PEXPND | 15.84 | 11.09 | 0.19 | 34.56 |
| Life expectancy 65+ | LEX | 19.77 | 1.35 | 16.48 | 21.85 |
| Self-perceived health status (very) good,  % of the population 65+ | SPH | 46.11 | 21.83 | 8.6 | 86.9 |
| *Qualitative indicators* |  |  |  |  |  |
| Cash Availability of cash ebenfits (only inkind, Bound, Unbound) | CASH | 1.08 | 0.81 | 0 | 4 |
| Choice Index (Free, Limited, No benefits) | CIDX | 1.64 | 0.5 | 0 | 1 |
| Choice of homecare provider | HC | 0.4 | 0.49 | 0 | 1 |
| Choice of institutional care provider | IC | 0.36 | 0.83 | 0 | 1 |
| Choice between cash vs inkind-benefits | CVSI | 0.88 | 1.25 | 0 | 2 |
| Means-testing for any benefit (No/Yes) | MTAB | 0.56 | 0.51 | 0 | 1 |

We excluded countries, where data was missing either nearly completely (Chile, Mexico, Turkey) or on single indicators (Austria, Canada, Greece, Hungary, Iceland, Italy, Lithuania and Portugal) leading to an analysis sample of *N*=25 countries. In the analysis we use the average values of the years 2014-2016 since data basis was best in this period. To handle missing values within quantitative indicators we conducted a three-step process: First, we estimated a multiple imputed chained equation (MICE) regression model using predictive mean matching (PMM) for 20 cycles. Following the findings and recommendations of CIT: White et al. 2010 & Kleinke et al. 2011, we imputed missing mean values of indicators by predictive mean matching of the next neighbor, here the next year. If for example the value was missing in 2105 for a specific country, we estimated the model with the full information from 2014 and aggregated the values of 20 cycles to yearly mean. Second, we aggregated imputed data to the yearly-mean of the specific indicator if the true value was missing. Finally, we calculated an overall mean of the observation period (Table 2).

Both, the selection of quantitative measures as well as developing the coding scheme to distill the qualitative indicators were theory-driven processes, with the aim of maximum conceptual validity of outlined dimensions. Nevertheless, cluster analysis profits from a small number of variables, since multicollinearity might weight individual variables too strong biasing the derivation of meaningful clusters (CIT: Milligan/Cooper 1987). While availability of cash benefits (CASH) is singularly assigned to the dimension of provision, the dimension of access regulation consists of two parts. We constructed a sum index (CIDX) consisting of the three variables of choice (homecare, institutional care and cash vs. inkind benefits) which is supplemented with the single indicator means-testing for any benefit, reflecting the general barrier of means-testing in access to long-term care.

--- TABLE 2 ABOUT HERE ---

## Cluster analysis

Cluster analysis is the standard method in welfare state typologies (Jensen, 2008; Reibling, 2010; Wendt, 2014) as well as in LTC typologies (Halásková et al., 2017; Kautto, 2002; Kraus et al., 2010; Saraceno and Keck, 2010) for classifying and developing system types. The innovative approach by Reibling et al. (2019), where the authors utilize multiple cluster analysis within the same methodological framework has several advantages compared to classical approaches that often lack accepted standards and statistical rules (CIT: Fonseca 2013). Since researchers must make technical decisions that potentially shift findings in different ways of interpretation, a single cluster analysis is not appropriate for classifying such complex long-term care systems. The flexibility of the multi-cluster-analysis proposed by CIT: Reibling et al. 2019: 615, however allows to combine results from different specifications “using the variability across those results as measure of confidence about the membership of two observations in one cluster” increasing reliability of the method itself.

Following the proposed framework we specified cluster analysis in Stata 16 with either z- and range-standardized variables, used Gower and squared Euclidian distance as measures of dissimilarity in both, a k-means partitioning analysis as well as a agglomerative cluster analysis with average and Wards algorithms as linkage methods and selected the first and second-best result determined by stopping rules of Calinski-Harabasz and Duda/Hart and Dendrogramms for each of the 24 separate cluster analysis.

Findings from 8 k-means and 16 hierarchical cluster analysis results went equally in the calculation on how often each country was in the same cluster with every other country. To classify as full membership within this network of long-term-care systems, a connection between two countries must show up in ≥ 66% of all cluster analysis and a country needs to have these strong ties with at least half of all countries in the cluster. A partial membership is defined as a connection of two countries in ≥ 50% of cluster analysis. We present one cluster solution which is based on the strict internal consitancy of countries in a cluster and one cluster solution which also integrates smaller ties in the cluster. We mapped the cluster solution by a network graph, which was modelled by UNICNET6/Netdraw.

# Results – 419 words

Figure 1 shows a graphical depiction of the clusters. It shows all ties larger or equal 50%. The graph visualizes groups of countries and how likely it is that two countries belong to a similar type of LTC system. Furthermore, the graph and the information in table 3 show the internal consistency of LTC systems. Based on a high internal consistency nine clusters can be divided of which two clusters incorporate only one country – Estonia and New Zealand – and three clusters only two countries – Germany and Finland, Japan and Korea, and Slovakia and Slovenia.

1. The first cluster consist of Australia, Belgium, Luxemburg, Netherlands, and Switzerland. Each country shares strong ties to each other country in the cluster
2. France, Israel, Spain, the United Kingdom, and the United States constitute a second cluster, in which the tie between the US and France is the only weak one in the cluster.
3. Czech Republic, Latvia, and Poland form a distinct and highly consistent cluster, with all ties between these countries > 90%. No other countries has a partial membership in this cluster. Slovenia has strong ties to only two countires of this cluster – Belgium and Australia – which makes it at Partial member. Further partial members are Slovenia, France, Israel, and the United Kingdom.
4. Denmark, Ireland, Norway, and Sweden show a high internal consistency. All countries can be found in the same cluster in all performed cluster analysis. Japan and Korea have a partial membership in this cluster
5. Finland, Germany form a distinct cluster, ending up in the same cluster solution in 94%. They do not have partial membership in any other cluster.
6. Japan and Korea are closely linked in 94% of all cluster solutions and share a partial membership in the fourth cluster.
7. Slovenia and Slovakia have a strong tie, yet less strong than the other clusters of two by 72%. The countries have a partial membership in the first but also the second cluster.
8. Estonia and 9) New Zealand are sole clusters. Estonia ends up with France and the US in 66% of all cases and is hence a partial cluster member of cluster four. Also New Zealand has two three weak ties to cluster four and is hence considered a partial member.

--- FIGURE 1 ABOUT HERE ---

--- TABLE 3 ABOUT HERE ---

Table 3: Means of quantitative indicators in LTC typology over (N=9) methodological clusters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Cluster composition | AU, BE, LU, NL, CH | CZ, LV, PL | DK, IE, NO, SE | EE | FI, DE | FR, IL, ES, UK, US | JP, KR | NZ | SK, SI |
| Cluster Size | 5 | 3 | 4 | 1 | 2 | 5 | 2 | 1 | 2 |
| EXPND | 1092.46 | 161.82 | 1369.15 | 106.22 | 811.33 | 494.85 | 603.97 | 635.46 | 138.18 |
| Beds | 69.45 | 21.76 | 53.21 | 45.6 | 56.33 | 40.39 | 24.28 | 56.43 | 51.37 |
| RCPT | 5.95 | 1.18 | 4.16 | 5 | 4.4 | 2.93 | 2.63 | 4.6 | 4.43 |
| PEXPND | 15.48 | 5.77 | 10.49 | 34.56 | 23.94 | 25.82 | 18.17 | 6.13 | 2.64 |
| CA | 1.6 | 1.67 | 0.25 | 0 | 2 | 1.2 | 0 | 0 | 1.5 |
| LEX 65+ | 20.50 | 17.49 | 19.93 | 18.05 | 19.84 | 20.52 | 21.08 | 20.37 | 18.38 |
| SPH | 60.02 | 16.08 | 63.43 | 15.87 | 42.73 | 53.48 | 22.68 | 86.9 | 24.9 |
| Choice IDX | 0.6 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 0.5 |
| MTAB | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |

Sources: OECD health data (extracted on 10.12.2018) & MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme

Table 3: Clustering based on benchmark percentages of same cluster solutions

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| ≥0,66 and ≥ 0,5 ties to countries in clsuter | AU  BE  LU  NL  CH | CZ  LV  PL | DK  IE  NO  SE | EE | FI  DE | FR  IL  ES  UK  US | JP  KR | NZ | SK  SI |
| ≥0,5 | FR  UK  IL  SI  SK |  | JP  KR |  |  | AU  BE  LU  NL  CH  NZ  SI  SK  EE | DK  IE  NO  SE | FR  US  UK |  |
| Strongest ties in cluster | LU\_NL\_1.0 | LV\_PL\_1.0 | DK\_IE\_1.0  DK\_NO\_1.0  DK\_SE\_1.0  IE\_NO\_1.0  IE\_SE\_1.0  NO\_SE\_1.0 |  | FI\_DE\_0.94 | ES\_US\_0.94 | JP\_KR\_0.94 |  | SK\_SI\_0.72 |
| Ties ≥0,9 | BE\_LU  BE\_NL  LU\_NL  LU\_CH  NL\_CH | LV\_PL  CZ\_LV  CZ\_PL | DK\_IE  DK\_NO  DK\_SE  IE\_NO  IE\_SE  NO\_SE |  | FI\_DE | ES\_US | JP\_KR |  |  |
| Number of ties in full cluster | 10\_10 | 3\_3 | 6\_6 |  | 1\_1 | 9\_10 | 1\_1 |  | 1\_1 |

A solution of nine clusters, with several small clusters might not be feasible for most purposes. Hence, the clusters can be condensed based on their partial memberships. Figure 1 shows graphically four distinct groups. Each country in those four clusters cannot be found together in more than 50% of all cluster solutions with a country of an other cluster. This shows that the four clusters are distinct from each other.

The supply and performance oriented public systems

The supply and performance oriented mixed systems

The access oriented private systems

The low-supply and low performance mixed systems

--- TABLE 4 ABOUT HERE ---

Table 4: Means of quantitative indicators in LTC typology over (N=5) theory-based clusters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| Cluster composition | AU, BE, FR, IL, LU, NL, NZ, ES, CH, UK, US | CZ, LV, PL | DK, IE, JP, KR, NO, SE | EE | FI, DE |
| Cluster Size | 11 | 3 | 6 | 1 | 2 |
| EXPND | 779.27 | 161.82 | 1114.09 | 106.22 | 811.33 |
| Beds | 55.06 | 21.76 | 45.57 | 45.6 | 56.33 |
| RCPT | 4.45 | 1.18 | 3.65 | 5 | 4.4 |
| Priv. EXPND | 19.33 | 5.77 | 13.05 | 34.56 | 23.94 |
| CA | 1.27 | 1.67 | 0.17 | 0 | 2 |
| LEX 65+ | 20.5 | 17.49 | 20.31 | 18.05 | 19.84 |
| SPH | 59.49 | 16.08 | 49.84 | 15.87 | 42.73 |
| Choice IDX | 1.36 | 1 | 2.67 | 4 | 1 |
| MTAB | 1 | 0 | 0 | 1 | 0 |

Sources: OECD health data (extracted on 10.12.2018) & MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme

--- TABLE 5 ABOUT HERE ---

Table 5: Overview of Cluster Labels and Characteristics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| Cluster composition | AU, BE, FR, IL, LU, NL, NZ, ES, CH, UK, US | CZ, LV, PL | DK, IE, JP, KR, NO, SE | EE | FI, DE |
| Supply (expenditure, beds, recipients institutions | Medium/ medhigh/ medhigh | Low/ low/ low | High/ medium/ medium | Low/ medium/ high | Medium/ medhigh/ medhigh |
| Public-Private Mix | Medhigh/ medium | Low/ medhigh | Medium/ low | High/ low | Medhigh/ high |
| Pefrormance | Medhigh/ medhigh | Low/ low | Medhigh/ med | Low/ low | Medium/ medium |
| Access Regulation |  | Low/ low |  | High/ high | Low/ low |

Based on the cluster means we can characterize the three clusters (See Table 4). Cluster 1 is the “low developed LTC system cluster”. The cluster includes countries of Eastern Europe and Non-European OCED countries in which public LTC provision is still limited. The supply, especially the financial input into these clusters, is low compared to the other clusters and this affects also the performance of the systems which is relatively low. The systems are highly publicly financed, and choice of services are majorly free and means-testing is relevant for only some of the countries. Still, the limited supply in these countries puts the access regulation indicators in perspective.

The second cluster includes Continental and Northern European countries and Japan. This cluster is the “universal developed LTC system type”. These countries share LTC system with high financial and institutional supply which mirrors in high performance levels. The financing is based on a medium level of private financing. The choice of benefits is rather free and means-testing is medium or low in these countries. Thus, public LTC system are rather high developed in these countries with only minor limitations for patients to access and finance their LTC costs.

The third cluster is the “private developed LTC system type”. The countries in these clusters share a medium supply in terms of financing and a low supply in terms of institutional provision. Financing is highly privatized and public services are often restricted by means-testing and choice restrictions. Still, the performance of these systems is relatively high. Thus, limited public provision and access to public provision is mitigated by private financing of services which leads to high performances

# Discussion – 677 words

These results partly support earlier findings of LTC typologies but also provides new evidence on LTC system types. The “low-developed LTC system” cluster includes as earlier typologies a high number of Eastern European countries (Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010) with the addition of three Non-European countries, Australia, New Zealand and Korea. The “universal developed LTC system type” combines the often found Scandinavian cluster (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Pommer et al., 2009) and the continental European cluster (Alber, 1995; Damiani et al., 2011; Halásková et al., 2017). The “private developed LTC system type” is rarely mentioned in the literature. Only Colombo et al. (2011) built a means-tested type including the UK and the US. Yet, our analysis shows that also Israel and Spain belong to this type due to their mainly private approach to LTC provision which yields high performance results.

Although many reforms in countries’ OECD LTC systems focused on privatization and marketization of benefits (Ranci and Pavolini, 2013; Farris and Marchetti, 2017) in recent years and a larger variety of LTC system types could be expected, our results do not show such an increased variety. This does not diminish the often large changes in many countries. Yet, it might show that these changes further increased the gap between well-established LTC systems which at least try to provide inclusive LTC services with a high quality and countries which still rely heavily on informal LTC provision and only supply limited services to the most needy individuals. The “private developed LTC type” fits into this explanation as well. It always included the UK and the US (Colombo, 2012) but is complimented by Spain and Israel, which might have shifted due to reforms and societal developments into this cluster.

# Conclusion

We provided an updated, innovative and flexible LTC typology. We used the latest available data from the OECD database as well as a unique institutional dataset, which we developed ourselves and which has been checked by country policy experts. This is furthermore an innovative approach because most typologies rely heavily on quantitative indicators, especially when a larger country sample is included (Colombo, 2012; Damiani et al., 2011; Halásková et al., 2017). Only in cases of smaller country samples which use more often qualitative comparisons institutional indicators are considered. Thus, a larger country sample as well as a mix of quantitative and institutional indicators has only been adopted by Kraus et al. (2010). But in the last century marketization, commodification and coporatization of care changed LTC systems all over the world (Farris and Marchetti, 2017), which makes a new and updated LTC typology necessary.

In terms of results we could show the validity of existing typologies but could also show that OECD LTC systems can mainly be divided in “low-developed”, “universal-developed” and “private developed” types and that despite many reforms the main dividing line in LTC systems is still *if* publicly organized LTC services are universally provided on a broad basis.

Still, typologies always imply generalizations. For example, in many countries LTC services and access have a high regional fragmentation (Spasova et al., 2018), which cannot be displayed on a brought basis in an internationally comparative typology. Furthermore, LTC systems have not that clear boundaries as other welfare state systems such as healthcare, unemployment or pensions do. LTC can be provided via a separate LTC system or it can be partially integrated in healthcare, social assistance or pension systems, where different access and provision rules apply (Nies et al., 2013). Furthermore, LTC is in many countries still a new issue in the welfare state, because the provision was traditionally devolved to families and now increasingly to migrant care workers (Colombo et al., 2011; Da Roit and Le Bihan, 2010). Unfortunately, indicators on informal care are not available and by nature not reliable. The only approximation, we have included, are cash benefits (especially unbound) which are an institutional measure to increase informal family and migrant care (Da Roit and Le Bihan, 2010; Da Roit and Weicht, 2013).

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Online Appendix

Table A1: Means LTC typology indicators over countries (N=25) and years (2014-2016)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Quantitative indicators | | | | | | Qualitative indicators | | |
| ID | EXPND | BEDS | RCPTIN | PEXPND | LEX | SPH | CA | CIDX | MTAB |
| AU | 99.86 | 52.53 | 6.40 | 5.87 | 20.88 | 76.40 | Unbound | 0 | Yes |
| BE | 1037.03 | 68.10 | 7.16 | 9.43 | 20.05 | 52.30 | Unbound | 2 | Yes |
| CZ | 314.19 | 38.87 | 2.24 | 0.19 | 17.90 | 23.57 | Unbound | 0 | No |
| DK | 1223.61 | 45.95 | 3.97 | 8.25 | 19.43 | 58.57 | In-kind | 3 | No |
| EE | 106.22 | 45.60 | 5.00 | 34.56 | 18.05 | 15.87 | In-kind | 4 | Yes |
| FI | 763.24 | 59.30 | 4.70 | 17.21 | 20.03 | 44.87 | Unbound | 2 | No |
| FR | 696.76 | 53.07 | 4.20 | 22.47 | 21.77 | 41.03 | Bound | 1 | Yes |
| DE | 859.42 | 53.35 | 4.10 | 30.67 | 19.65 | 40.60 | Unbound | 0 | No |
| IE | 1126.68 | 49.20 | 3.53 | 17.79 | 19.76 | 65.43 | In-kind | 2 | No |
| IL | 244.61 | 21.00 | 1.90 | 28.29 | 20.37 | 55.47 | Unbound | 1 | Yes |
| JP | 796.31 | 24.10 | 2.70 | 8.39 | 21.85 | 24.00 | In-kind | 2 | No |
| KR | 411.63 | 24.47 | 2.57 | 27.95 | 20.30 | 21.37 | In-kind | 2 | No |
| LV | 73.42 | 14.20 | 0.43 | 13.10 | 16.48 | 8.60 | Bound | 2 | No |
| LU | 1503.52 | 85.00 | 5.47 | 20.19 | 20.57 | 47.10 | Bound | 0 | Yes |
| NL | 1360.82 | 75.70 | 4.80 | 8.39 | 19.85 | 60.47 | Bound | 0 | Yes |
| NZ | 635.47 | 56.43 | 4.60 | 6.13 | 20.37 | 86.90 | In-kind | 2 | Yes |
| NO | 1745.09 | 52.17 | 4.63 | 8.63 | 20.27 | 66.37 | Bound | 3 | No |
| PL | 97.86 | 12.20 | 0.87 | 4.03 | 18.10 | 16.07 | Unbound | 1 | No |
| SK | 9.48 | 52.07 | 3.93 | 1.17 | 17.08 | 18.77 | Bound | 0 | Yes |
| SI | 266.88 | 50.67 | 4.93 | 4.11 | 19.67 | 31.03 | Unbound | 1 | Yes |
| ES | 294.38 | 44.47 | 1.83 | 18.54 | 21.30 | 40.03 | Bound | 3 | Yes |
| SE | 1381.24 | 65.53 | 4.50 | 7.29 | 20.25 | 63.33 | In-kind | 4 | No |
| CH | 1461.08 | 65.90 | 5.90 | 33.53 | 21.17 | 63.83 | Unbound | 1 | Yes |
| UK | 747.22 | 47.60 | 4.22 | 33.42 | 19.90 | 52.70 | Bound | 2 | Yes |
| US | 491.26 | 35.83 | 2.50 | 26.36 | 19.28 | 78.16 | Bound | 3 | Yes |
| *TM* | 709.89 | 47.73 | 3.88 | 15.84 | 19.77 | 46.11 | - | 1.64 | - |

Sources: OECD health data (extracted on 10.12.2018) &MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme; TM = Total mean