Quality of child healthcare in European countries: common measures across international databases and national agencies

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Background: The evaluation of child healthcare is not yet widely explored, especially from a cross-country comparison perspective. The routine adoption of measures by national assessment agencies is under-investigated. Though the guiding principles developed at international level call for a child-centric multi-dimensional evaluation of child care, its feasibility is hampered by the availability of robust and harmonized data. Methods: To explore the data availability, international databases (IDBs) were scrutinized and measures dealing with child health-related issues were collated. In parallel, an ad hoc questionnaire was administrated to 30 Country Agents (CAs) to gather measures routinely adopted at local level. To facilitate the comparison of measures, a three-level conceptual map was developed. Results: The IDBs yielded at 207 measures that pertained mainly to non-health determinants of health, whereas the 352 measures obtained from CAs focused on process and outcome. A set of 33 common measures that related to immunization, morbidity and mortality were identified. Conclusions: A limited set of measures used both in IDBs and at national level identify common areas of concerns that certainly capture crucial issues with child prevention and health outcomes. However, they are far from satisfying a child-centric multi-dimensional approach to the evaluation of child well-being and well-becoming. There is room for improvement at both international and national levels. IDBs should include and harmonize measures that concern the provision of child-centric services and encompass physical, social and mental development. At the national level, efforts towards the inclusion of measures that concern non-health determinants of health should be pursued.

Introduction

Since the World Health Organization’s (WHO) publication of the European child and adolescent strategy in 2005,¹ guiding principles for improving the quality of child healthcare have been developed at international level,²-⁵ setting priorities to support policies and target specific areas of intervention. The multi-dimensional approach, which underpins these initiatives, reinforces the concept of well-being in its diverse components: physical, social and mental. It recognizes the importance of health-enhancing factors, such as lifestyle, as well as contextual aspects, among which are environment, economics and socio-cultural background. From this perspective, to monitor progresses achieved in the quality of child care, it is necessary to identify evidence-based measures grounded in robust and harmonized data gathered from different sources and possibly validated by health assessment agencies. Moreover, the adoption of a child-centred perspective requires the development of an ad hoc framework for quality care and standards that ‘take into account children’s right to health and recognizes that their health and physical, psychosocial, developmental and communication needs are different from those of adults’.⁶ In fact, criteria used to evaluate the quality of care for adults cannot be directly translated to children as they differ in terms of health determinants, disease patterns and provision of preventive and therapeutic health services.⁷ Efforts in this direction were achieved by the CHILD project,⁸ which critically revised and improved child health indicators.⁹ It proposed a wide spectrum of indicators, including non-health determinants of health and risk and protective factors, which are key components in child healthcare assessment. The adoption of this comprehensive vision makes the evaluation of child healthcare quality a challenging task, especially in cross-countries analyses.

The monitoring of progress achieved by countries that have signed international conventions and/or adopted international strategies to improve child healthcare is rarely carried out.¹⁰,¹¹ Generally cross-country comparisons tend to be based on disease incidence,¹² on a limited number of countries,¹³ on specific aspects, such as poverty,²,³ or policy.¹⁴ Comparative studies¹⁵ on primary care services in Europe do not include the evaluation of child healthcare. The invisibility of children, which has been repeatedly observed,¹⁶,¹⁷ strongly limits the evaluation of child care and influences the breadth of aspects to be considered when monitoring child well-being and well-becoming. Moreover, little is known about the routine adoption of measures by national health assessment agencies¹⁸ or on the operational issues and policies arising from the implementation of health systems’ evaluation.¹⁹

This article aims to fill this gap through the identification of a set of core shared measures to verify whether a cross-country comparison of child healthcare is feasible. Moreover, it intends to explore whether the available measures fulfills the requirements of a comprehensive, multi-dimensional evaluation of child care from a cross-
country perspective. It analyzes, on the one hand, international databases (IDBs) that collect data on the evaluation of child health status and, on the other hand, the measures routinely used in EU/EEA countries to evaluate the quality of child healthcare.

This study is part of the Models of Child Health Appraised (MOCHA) project that aims to investigate the complexity of health systems in Europe through the appraisal of existing national models of primary healthcare for children.

Methods

Sources of information

To explore the available measures that capture the multi-dimensional aspects of quality of healthcare for children, two types of sources were examined: IDBs and results of a survey submitted to national experts of the healthcare system in the 30 EU/EEA MOCHA countries.

Open-access IDBs dealing with child health-related issues released by main international organizations, agencies, research networks and observatories were scrutinized and their cross-country data availability verified. To be collected, a measure should be child-specific and/or child-related, focused on any health or care-related domain and reported by at least one MOCHA country.

For each identified measure, its description, last available year, child age reference, gender coverage, data availability for each country and the originating source(s) were recorded. Databases were inspected from February to May 2017.

To gather information on measures currently used for evaluating the quality of child healthcare at national level, an ad hoc questionnaire was administered to national experts [Country Agents (CAs)]. They were appointed by the MOCHA project and selected on the bases of their knowledge of paediatric care in their country. They were supported by a network of collaborators to cover the different aspects considered in the project.

The aim of the questionnaire was to explore whether and to what extent child healthcare is recognized as a specific target of quality through the analysis of the metrics routinely used at national level. CAs were asked to list the measures currently used in their own country for evaluating the quality of child healthcare, and to report pertinent references to official documents (e.g. policy documents and/or assessment reports), web links and scientific works produced at national or regional level. These materials were thoroughly examined to identify further unreported measures. A table that summarized all the measures was sent back to the CAs for further checks and clarifications. The queries were sent to the CAs by the end of 2016; the majority of the replies was received between January and May 2017 whilst additional answers were received in May 2018.

Among the 27 MOCHA countries that responded to the questionnaire, four do not have agencies for the evaluation of the quality (Greece, Malta, Poland and Romania). A total of 23 countries reported the presence of agencies, half of them devoting a specific part to child healthcare, while the other countries integrate some child-specific items within their health system evaluation.

Framework identification and measures classification

To facilitate the comparison of measures collected in both IDBs and CAs’ questionnaires, an iterative analysis combining a top-down and a bottom-up approach was adopted to provide a comprehensive map of the different areas of concerns used to evaluate child healthcare. A reference point for the identification of the taxonomies was the conceptual framework developed by Arah et al., which has been variously adopted to perform country comparison of health systems. This framework has the advantage of expanding the Donabedian’s model based on structure, process and outcomes, balancing domains specifically related with health performance measures with those closely connected with factors that influence a child’s well-being. This is also in line with measures proposed by previous research projects and literature on quality indicators that underline the importance of including societal and public health determinants for a more comprehensive evaluation of child healthcare quality.

To build the framework, two research teams independently analyzed and classified the collected measures, and a consensus was reached by subsequently consulting external experts, especially in cases of possible double attributions. The criteria for defining common measures were based on their description and the extent to which both of them would provide equal or equivalent information. When measures were based on different denominators (i.e. at 3 months vs. at 6 months), they were considered separately, while when they were expressed through different rates (e.g. per 100 000 inhabitants vs. per 1 000 000 inhabitants) a harmonization was pursued.

The result of this iterative process is a three-level map that accommodated the different perspectives of the selected sources of information (figure 1). At the highest level of the map are the domains [societal, political, economic and environmental context (SPEEC), health-related behaviour (H-RB), structure, process and outcome], while the other two levels were named categories and sub-categories. Colours on the map helped the identification of specificities of each type of source (dark gray for IDBs and light gray for CAs) as well as their communals (white background).

The entire set of results, as well as the classification of measures within the conceptual map, is available in the Zenodo repository.

Results

Analysis of IDBs

Table 1 shows the analysis of measures available in IDBs. Almost two-thirds of the 207 measures were retrieved from OECD databases (66.2%). Eurostat and the WHO provided 14% and 5.8% of the measures, respectively, while the other identified sources contributed <3% each. A total of 15 measures were found from multiple sources mainly pertaining to immunization and mortality.

The oldest measures collected are from 2002 to 2010 (14.5%), whereas the most recent ones are from 2015 to 2016 (34.3%). More than half of the measures (57%) have an available estimate for 26–30 countries, 26% for 21–25 countries, while for 7.2% the data are available only for 1–5 countries. For six countries, estimates are available for <70% of the measures (Lithuania 68%, Romania 67%, Bulgaria and Malta 63%, Croatia 62% and Cyprus 49%), highlighting important gaps for cross-countries comparison.

Considering the gender perspective, only 29% of the measures report the estimate for male and female separately, while for 38% of the measures, gender disaggregation is not available.

A total of 157 measures (76%) are age-related, and among them, 87 (42%) describe a specific age group. Two age groups are most frequently covered: the one related to children that are <1 year old (n=41) with measures related to vaccine administration, neonatal infant mortality and breastfeeding. The other considers the 10–17 years age group (n=42), focussing on school performance and lifestyle behaviours. Measures that fall in multiple age ranges (i.e. at 3 months vs. at 6 months), they were considered separately, while when they were expressed through different rates (e.g. per 100 000 inhabitants vs. per 1 000 000 inhabitants) a harmonization was pursued.

Type of source (dark gray for IDBs and light gray for CAs) as well as colours on the map helped the identification of specificities of each type of source (dark gray for IDBs and light gray for CAs) as well as their communals (white background).

The entire set of results, as well as the classification of measures within the conceptual map, is available in the Zenodo repository.

Analysis of CAs’ questionnaires

Considering the 23 compiled questionnaires, 352 measures were identified. Looking at the domains in which these measures are...
distributed, the overall tendency is towards measures classified in the process (50.7%), outcome (33.0%) and structure (10.3%) domains. Country evaluation of non-medical determinants of health is rarely accomplished (3.1% for SPEEC and 2.9% for H-RB).

From a country perspective, they are not equally distributed, ranging from a minimum of six measures (Iceland) to a maximum of 130 (UK) (cf. data in 29). Only six countries reported at least 20% of all the retrieved measures: UK (37%), Finland (29%), Ireland (25%), Austria (22%), Estonia (22%) and Denmark (20%). This high variability is evident considering majority (87.1%) of the measures are reported by at most four countries and that close to half of them (44.6%) are reported by only one country. An in-depth analysis of variability highlighted differences in the adoption of measures that privilege a wide spectrum of different aspects of child well-being (breadth vision) vs. a more focused selection of measures that evaluate specific area of concerns from different perspectives (depth vision).

Considering the classification of measures within age ranges, 122 measures (35%) are age-related, and among them, only 34 measures (28%) have a single age range that focus on the neonatal period ($n=29$), especially on birth and delivery ($n=9$) and mortality ($n=8$). Within the measures that cover more than one age interval, 51 measures (42%) comprise the 0–17-year period of life and 7 measures (6%) cover the whole spectrum of age ranges. Among them, 64% consider childhood and adolescence as a whole period, without making any age group distinction. These measures are generally related to hospitalization rates distributed by pathologies or track the prevalence of certain diseases.

Table 2 contains the 29 measures adopted by at least six countries (25% of the CAs). The most common one is immunization rate, adopted by 13 countries. Additional measures regarding immunization highlight its central role, not only in the child health prevention, but also in the child care process in general. These measures are child-specific and focus on explicit age ranges, the majority of them related to the first years of life. Among the 11 measures that consider a single age range, 7 are related to the neonatal period, while only 1 measure is focused on age 1–4 years. The remaining three measures cover four out of the five age classes considered. Moreover, there is an evident concentration of the measures on two key focal points: natality and mortality. Considering natality, the countries reported the generic birth rate, the number of stillborn and the number of live births, while mortality is considered both in general terms (total mortality per age group) and for specific life periods (birth, neonatal, infant and adolescence).

This analysis not only highlights the worrying lack of common measures of children’s healthcare quality in Europe, but also shows the evident gap in the selection of child-specific measures that do not consider other important aspects of child life-course development.

**Common measures**

The analysis of both sources of information highlights the different perspectives used to evaluate child healthcare, as depicted in the coloured areas of figure 1. Domains directly linked to child healthcare (structure, process and outcome) show the predominance of sub-categories used at country level, while domains covering non-healthcare determinants (SPEEC) and lifestyle attitude (H-RB) present a higher proportion of measures collected by IDBs.
Table 1 Characteristics of the 207 measures collected from IDBs

| Measures | n (%) |
|----------|-------|
| Source |       |
| Centralized Information for Infectious Diseases (CIID) | 2 (1.0) |
| Eurostat | 29 (14.0) |
| Organization for Economic Co-operation and Development (OECD) | 137 (66.2) |
| The World Bank Data | 6 (2.9) |
| United Nations Children’s Fund (UNICEF) | 6 (2.9) |
| World Health Organization (WHO) | 12 (5.8) |
| Multiple sources* | 15 (7.2) |
| Last available year |       |
| 2002–10 | 30 (14.5) |
| 2011–12 | 28 (13.5) |
| 2013–14 | 78 (37.7) |
| 2015–16 | 71 (34.3) |
| Countries’ coverage |       |
| 1–5 countries | 15 (7.2) |
| 6–10 countries | 6 (2.9) |
| 11–15 countries | 5 (2.4) |
| 16–20 countries | 9 (4.3) |
| 21–25 countries | 54 (26.1) |
| 26–30 countries | 118 (57.0) |
| Gender disaggregation available |       |
| Yes | 60 (29.0) |
| No | 79 (38.2) |
| Not applicable | 68 (32.8) |
| Age |       |
| Specific age range: |       |
| <1 | 41 (19.8) |
| 1–4 | 3 (1.4) |
| 5–9 | 1 (0.5) |
| 10–17 | 42 (20.3) |
| 18–24 | 70 (33.8) |
| Overlapping rages (i.e. 0–4, 0–17, 0–24, 1–9, 1–24, 5–17, 10–24) | 0 – |
| Not applicable | 50 (24.2) |
| Domains |       |
| Structure | 20 (9.7) |
| Process | 23 (11.1) |
| Outcome | 40 (19.3) |
| Health-related behaviour | 22 (10.6) |
| Social, political, economic and environmental context | 102 (49.3) |
| Total | 207 (100.0) |

* Beyond the reported ones, additional sources were: Eurobarometer; European Observatory on Health System and Policies; European Quality of Life Survey; Health Behaviour in School-ages Children (HBSC); Institute for Health Metric and Evaluation (IHME).

Table 3 shows the 33 common measures identified in both the IDBs and the CAs’ questionnaire.

This analysis looked at the metrics used to evaluate child care through a different lens, considering the common measures detected in the analysis of CAs’ questionnaires. Its aim is to confirm a potential use of shared, available measures on which a consensus on its importance has been achieved, especially when they are widely diffused in the current practice of national assessment agencies. In this way, they can represent a candidate set of core measures for cross-country analysis, and/or be suggested as metrics to be introduced at country level.

The results in table 3 are presented starting from the domain containing the majority of the common measures, i.e. the outcome domain (39.4%). Among the 13 measures classified in this domain, 7 concern mortality rates with different levels of granularity, sometimes with a certain degree of overlap. The main focus is on infant mortality, referred to as specific child age (neonatal and perinatal), along with causes of deaths. These measures were provided by IDBs for the majority of countries considered in this analysis, even if they are not always included in the evaluation of child care at national level.

In nine countries, breastfeeding is considered an important aspect for the evaluation of the quality of healthcare. Moreover, two measures on the proportion of children who were exclusively breastfed at 3 and 6 months were also available in the IDBs for an additional 10 countries.

Within the process domain, the prevention category includes measures mostly related to immunization, providing different clusters of vaccines and vaccination periods, while the specialist/hospital care category comprises measures concerning in-patient length of stay and discharges. Both aspects offer important information on the delivery of primary and secondary care.

Three measures common to the two sources belong to the structure domain and concern general health expenditure and workforce, confirming that this domain is more widely assessed at country level and considers a larger set of diverse aspects.

Although the SPEEC domain is mainly covered by IDBs, in six sub-categories, there are measures shared by the two sources. These concern population demographic characteristics, education and socio-economic contexts. It is worth noticing that bullying, which is an emergent concern analyzed by an international survey, is adopted at country level more frequently than other surveys reported in IDBs, such as those related to lifestyle behaviour.

Considering the domain H-RR, two measures concern addiction (tobacco and alcohol) and four measures refer to nutrition (consumption of fruits and vegetables and two related to obesity). These are potential candidates for evaluating the quality of healthcare in several countries as the country coverage by IDBs is almost complete. More importantly, they are among the few indicators that consider adolescents as a target group for the evaluation of health.

Discussion

This article presents the results of an analysis carried out in parallel on two sources of information. On the one hand, IDBs were inspected to collect measures that monitor child health and investigated data availability at EU/EEA country level. On the other hand, measures adopted at country level for the routine evaluation of child care were analyzed on the basis of information and documents provided by MOCHA-appointed CAs.

The three-level map of child relevant domains allowed for the classification of a considerable number of measures collected (IDBs=207 and CAs=352) and facilitated the detection of possible specialities of the two groups of sources and/or communalities. Moreover, the resulting map outlines the breadth of domains and sub-categories that, even if further improvable, may represent a starting point for an adequate multi-dimensional evaluation of child healthcare.

What emerged from the comparison of the two sources of information is the tendency to privilege different aspects of care for children. This is evident already at the domain level: the IDBs collect data mainly focused on socio-economic aspects, while the evaluation at country level tends to adopt measures related to process and outcome. Differences in scope of data collection may explain this tendency. IDBs aim to monitor and compare the population health status by providing a benchmark useful for the identification of areas of intervention that do not exclusively pertain to health systems. For this reason, they adopt a broader concept of child well-being, which considers the different socio-economic characteristics of each country. On the contrary, agencies performing quality assessment tend to focus on the performance of the health services based on the resources available in the structure, the process applied, and finally considering its effects in terms of outcomes. This is probably related to the traditional flow of routinely collected administrative information that in many countries is related with the increasing necessity of monitoring health expenditure and containing costs.

If these differences in perspectives at the domain level can enrich the evaluation of child healthcare, when it comes to an in-depth...
Table 2 List of the 29 measures reported by at least 25% (N=6) of the countries: measure description, number of countries using it and its characteristics

| Measure | Domain | Sub-category | # of countries | Measure characteristic |
|---------|--------|--------------|----------------|------------------------|
| Immunization rates/coverage | Process | Immunization | 13 | ✓ |
| Infant mortality per 1000 live births | Outcome | Mortality | 11 | ✓ |
| Number of live births | SPEEC | Live birth | 10 | ✓ |
| Immunization coverage | Process | Immunization | 9 | ✓ Measles Mumps Rubella |
| MMR (measles/mumps/rubella) | | | | |
| % of low birth weight newborns | Outcome | Health issue | 9 | ✓ |
| Number of stillborn children per population | Outcome | Mortality | 9 | ✓ |
| Number of health workers/human resources | Structure | General | 8 | |
| Percentage of children aged 24 months who have received 3 doses diphtheria (D3), pertussis (P3), tetanus (T3) vaccine, haemophilus influenzae type b (Hib3), polio (Polio3), hepatitis B (HepB3) (6 in 1) | Process | Immunization | 8 | ✓ Diphtheria Tetanus Pertussis Poliomyelitis Haemophilus B Hepatitis B |
| Immunization coverage DTP3 (diphtheria, tetanus, pertussis vaccine, 3 doses) | Process | Immunization | 8 | ✓ Diphtheria Tetanus Pertussis |
| Hospitalization rate (among children and adolescents) per 1000 [100 000] | Process | Admission | 8 | ✓ |
| In-patient hospital days (length of stay) for common diagnoses | Process | Length of stay | 8 | |
| Teenage pregnancies per 1000 females | SPEEC | Adolescent maternity | 8 | ✓ |
| Number of dental care providers | SPEEC | Specialist | 7 | |
| Health expenditure per capita | Structure | General | 7 | |
| % children aged who have received 3 doses meningococcal C (MenC3) vaccine | Process | Immunization | 7 | ✓ Meningitis |
| Caesarean section rate | Outcome | Birth delivery | 7 | ✓ Caesarean delivery |
| % of babies exclusively breastfed (up to 6 months age) | Outcome | Breastfeeding | 7 | ✓ |
| Total mortality per age groups | Outcome | Mortality | 7 | ✓ [0–11m.] [1–4] [5–9][10–17] |
| Birth rate | SPEEC | Live birth | 7 | ✓ |
| % 12 years girls who have received first dose of HPV1 (human papillomavirus) vaccine | Process | Immunization | 6 | ✓ Papilloma virus [10–17] |
| Use of antibiotics (DDD/defined daily dose per bed-days/patients) | Process | Drug consumption | 6 | |
| Health visitors home care visits | Process | Home care | 6 | |
| Outpatient attendances at paediatric hospitals | Process | Admission | 6 | ✓ |
| Hospitalization due to asthma bronchial (among children and adolescents) | Process | Admission | 6 | ✓ Asthma [0–11m.] [1–4] [5–9][10–17] |
| Number of hospital discharges | Process | Discharge | 6 | |

(continued)
Table 2

| Measure                                                                 | Domain       | Sub-category | # of countries | Measure characteristic |
|------------------------------------------------------------------------|--------------|--------------|-----------------|-------------------------|
| Cancer incidence (among children and adolescents) per 100 000          | Outcome      | Morbidity    | 6               | Cancer                  |
| Number of children who die 0–140–27 days (neonatal death) after birth per 1000 live births | Outcome      | Mortality    | 6               | [0–11m.]                |
| Suicide rate among adolescents per 100 000                             | Outcome      | Mortality    | 6               | Abortion                |
| Spontaneous abortions                                                  | Outcome      | Mortality    | 6               |                        |

Table 3 Common measures between IDBs and national experts, categorized within the map domains

| Sub-category                  | IDBs measure | CAs measure | IDBs countries | CAs country |
|-------------------------------|--------------|-------------|----------------|-------------|
| Outcome domain               |              |             |                |             |
| Category: health status       |              |             |                |             |
| Breastfeeding                 | % of children who were exclusively breastfed at 3 months | % of babies breastfed at first visit (or 3 month) | BEL, CYP, CZE, DNK, ESP, FIN, GBR, HUN, ISL, ITA, NLD, NOR, PRT, SVK | DEU, GBR, IRL, LVA |
| Breastfeeding                 | % of children who were exclusively breastfed at 6 months | % of babies exclusively breastfed at 6months | All MOCHA countries excluding EST, FRA, LTU, SVN | EST, FIN, GBR, HUN, IRL, LTU, NLD |
| Health issue                  | Number of live births weighing <2500 g as a proportion of total live births | % of low birth weight newborns | All MOCHA countries excluding CYP | AUT, BEL, DEU, EST, FIN, GBR, IRL, ITA, PRT |
| Disability                    | % of children aged 0–15 with a disability, by severity, age and sex | Newly recognized disabilities of children | | BGR, LVA |
| Morbidity                     | % of children aged 13–14 self-report that they have ever had asthma | % of children suffering from asthma by age group | AUT, BEL, DEU, ESP, EST, FIN, GBR, IRL, LTU, LVA, MLT, POL, PRT, ROU | AUT, DEU, EST, FIN |
| Morbidity                     | Estimated number of children (0–14) with type 1 diabetes | Incidence rate of diabetes type 1/type 2 among 0–14 years children | All MOCHA countries excluding BGR, HRV, MLT, ROU | AUT, EST, FIN, LTU, LVA |
| Mortality                     | Crude death rate for all childhood cancers | Cancer mortality among children and adolescents | All MOCHA countries | AUT, FIN, GBR |
| Mortality                     | % of suicides by people aged 15–19 | Suicide rate among adolescents | All MOCHA countries | AUT, FIN, GBR, IRL, LTU |
| Mortality                     | Infant mortality, total and by age, cause of death, country of occurrence and residence, NUTS 2 region of occurrence | Infant mortality | All MOCHA countries | AUT, BGR, CYP, DEU, EST, FIN, GBR, HUN, IRL, LTU |
| Mortality                     | Under 20x deaths, total, by age, cause of death, NUTS 2 region of residence, country of residence and occurrence | Mortality rate related to the 10 most important causes of death (ICD-10) by age | All MOCHA countries | AUT, FIN, GBR, IRL, LTU |
| Mortality                     | Perinatal mortality, total and by country and NUTS 2 region of occurrence | Perinatal mortality | All MOCHA countries excluding ISL | BRG, LVA |
| Mortality                     | Perinatal death 1000+ grams | Mortality rate by birth weight (1000 grams and over) | All MOCHA countries excluding BGR, ESP, FRA, GBR, GRC | LVA |
| Mortality                     | Neonatal mortality, total, by type, country and NUTS 2 region of occurrence | Number of children who die 0–140–27 days after birth (neonatal death) | All MOCHA countries | BGR, EST, FIN, GBR, IRL, NOR |

Process domain

Category: prevention

Immunization % of infants vaccinated against diphtheria, | % of children aged 24 months who have | All MOCHA countries | AUT, DEU, EST, FIN, GBR, IRL, ITA, LVA |

(continued)
| Sub-category | IDBs measure | CA$ measure | IDBs countries | CA$ countries |
|--------------|--------------|-------------|----------------|---------------|
| Immunization | % of infants vaccinated against measles-containing vaccine (MCV1/MCV2), mumps/rubella containing vaccine (RCV1) | Immunization coverage measles/mumps/rubella (MMR) | All MOCHA countries | AUT, DEU, EST, FIN, GBR, ITA, LTU, LVA, IRL, SWE |
| Immunization | % of infants vaccinated against DTP3 | Immunization coverage DTP3 | All MOCHA countries | AUT, DEU, EST, FIN, GBR, LTU, LVA, POL, IRL, DEU, FIN, GBR, IRL, ITA |
| Immunization | % of surviving infants who received the third dose of pneumococcal conjugate vaccine (PCV3) | Immunization coverage pneumococcal/PCV booster (pneumonia, sepsis, meningitis) | BEL, BGR, CYP, DEU, DNK, FRA, GBR, GRC, HUN, IRL, ISL, ITA, LUX, NLD, NOR, SVK, SVN, SWE |
| Category: specialist/hospital care | Length of stay | In-patient hospital days (length of stay) for common diagnoses | BEL, CYP, CZE, DEU, DNK, FIN, FRA, GBR, HRV, HUN, ISL, ITA, LUX, NLD, NOR, POL, PRT, ROU, SVK, SWE | CYP, DNK, EST, FIN, GBR, IRL, LTU, LVA |
| Category: specialist/hospital care | Discharges | Number of hospital discharges | BEL, BGR, CYP, CZE, DEU, DNK, FIN, FRA, GBR, HRV, HUN, ISL, ITA, LUX, MLT, NLD, NOR, POL, PRT, ROU, SVK, SWE | AUT, EST, FIN, GBR, IRL, LTU |
| Structure domain | Category: health expenditure | % current expenditure on health for pregnancy, childbirth and the puerperium | Payment for assistance in childbirth | CZE, DEU, HUN, NLD, SVN LVA |
| Structure domain | Category: health expenditure | % current expenditure on health, by disease (ICD) | Health expenditure per capita | CZE, DEU, HUN, NLD, SVN AUT, CZE, DNK, EST, FIN, GBR, IRL |
| Structure domain | Category: child care provider/workforce | Physicians by medical specialty: general paediatricians | Number of medical doctors by specialty | All MOCHA countries excluding SVK BGR, DEU, LVA |
| Social, political, economic and environmental context (SPEEC) domain | Category: demographic | Life expectancy | Life expectancy | All MOCHA countries BRG, DNK |
| Social, political, economic and environmental context (SPEEC) domain | Category: education | Live births | Number of live births | All MOCHA countries AUT, BEL, BGR, CYP, EST, FIN, GBR, LTU, LVA |
| Social, political, economic and environmental context (SPEEC) domain | Category: education | % of primary-school-age children who are not enrolled in primary or secondary school | Early-school leavers | All MOCHA countries excluding AUT, CZE, SVK AUT |
| Social, political, economic and environmental context (SPEEC) domain | Category: socio-economic | % of 11- to 15-year-olds who report having been bullied at least 2 or 3 times at school in the previous couple of months, by gender | % of children aged 10–17 who report having been bullied at school | All MOCHA countries excluding CYP AUT, FIN, GBR, IRL, NLD |
| Social, political, economic and environmental context (SPEEC) domain | Category: adolescent maternity | Teenage births adolescent fertility rate (births per 1000 women ages 15–19) | Teenage deliveries (age 15–17 years) | AUT, BEL, CZE, DEU, DNK, ESP, FIN, FRA, GBR, GRC, HUN, IRL, ISL, ITA, LUX, NLD, NOR, POL, PRT, ROU, SVK, SWE GBR, ICE, LTU |
| Social, political, economic and environmental context (SPEEC) domain | Category: socio-economic | Poverty at risk of poverty rate (cut-off point: 60% of mean equivalized income), age 0–17 | Poverty of children and adolescents; lasting risk of poverty | All MOCHA countries AUT, GBR |

Health-related behaviour (H-RB) domain

Category: addiction

(continued)
They are generally gathered through reported indicators in the European strategies for children and adolescents, which certainly capture crucial issues of morbidity and mortality, and are far from satisfying a child-centric multi-dimensional approach of health and life-stages.

This analysis brings to the fore the limitations of both sources of information, which hinder a multi-dimensional approach of child healthcare evaluation. They are mostly related to the non-adoption of a life-course approach, which represents one of the fundamental statements of health strategies and international recommendations. Children and adolescents’ psychophysical development needs are rarely analyzed during the measurement of quality of care, especially if we consider mental health. Age distribution following paediatric life-stages should be improved in both IDBs and national evaluation practices. While the major focus on the maternal, perinatal health, and on the first years of the child fulfil the need to assess a crucial period of child development, more effort should be devoted, especially in national evaluation practices, to the collection of data related to later stages of child development, especially in adolescents.

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The sole responsibility for the content of this article lies with the authors. It does not necessarily reflect the opinion of the European Union, or of the full project. The European Commission is not responsible for any use that may be made of the information contained therein.

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Key points

- There is a need for a common set of harmonized measures to evaluate the quality of care that encompasses all components that influence child well-being and well-becoming.
- The comparison of the results from international databases and national experts highlighted a limited set of common measures that relate to the quality of child healthcare, which are far from satisfying a child-centric and multi-dimensional approach.
- There is room for improvement, both at international and national level, considering age distribution that should cover all paediatric live stages.
- Efforts on collection of data on adolescents and mental health should be encouraged.

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