

MONITORING EDUCATION PARTICIPATION

Framework for Monitoring Children and Adolescents
who are Out of School or at Risk of Dropping Out



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Abbreviations and Acronyms

5DE	Five Dimensions of Exclusion
ANER	Adjusted Net Enrolment Rate
ASER	Age-Specific Enrolment Rate
CEE/CIS	Central and Eastern Europe and the Commonwealth of Independent States
COE	Council of Europe
DHS	Demographic and Health Survey
Ed-DQAF	Education Data Quality Assessment Framework
EFA	Education for All
EMIS	Education Management Information System
ESL	Early School Leavers
ID	Identification
IDP	Internally Displaced Person
IS	Information System
ISCED	International Standard Classification of Education
IVRS	Interactive Voice Response System
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoU	Memorandum of Understanding
NEET	Young people Neither in Employment nor Education and Training
NER	Net Enrolment Rate
OECD	Organisation for Economic Co-operation and Development
OOSC	Out-of-School Children
SABER	Systems Approach for Better Education Results
SDG	Sustainable Development Goal
SMIS	School Management Information System
UIS	UNESCO Institute for Statistics
UNPD	United Nations Population Division

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Introduction

Context

An estimated 61 million children of primary-school age, 60 million young adolescents of lower-secondary-school age and 142 million of upper secondary age are out of school, based on the latest figures as of 2016.¹ The children who are not enrolled in school are often those from the most socially marginalized communities, including children with disabilities, children from ethnic-minority communities, children excluded because of gender barriers and children living in extreme poverty. All of these children have the right to education and are currently being deprived of that right. Moreover, education – including high-quality pre-school – benefits not just the individuals themselves, but also society, such as in terms of lower unemployment, reduced criminality, more social cohesion, higher tax revenues, and lower public health and welfare expenditures.²

Underlying the problem of OOSC are key data, analysis and policy gaps. There is a general lack of adequate tools and methodologies to identify OOSC, to measure the scope and describe the complexity of exclusion and disparities, to assess the reasons for exclusion, and to inform policy and planning. There is a need to acquire a better overview of existing data, utilize the range of data collected through administrative records and household surveys and make more effective use of such data sources. More information is

There is a need to acquire a better overview of existing data, utilize the range of data collected through administrative records and household surveys and make more effective use of such data sources.

needed on profiling OOSC and on the multiple and overlapping forms of exclusion and disparities that affect them. The data also needs to be better used, as often data are not leveraged for policy purposes. The importance of relevant and reliable data was emphasized in the original Education for All (EFA) goals and Millennium Development Goals (MDGs), and once again is being emphasized in the Post-2015 UN Development Agenda and the Sustainable Development Goals (SDGs). In particular, emphasis is placed on improving access to and use of data to better monitor targets and for more informed decision-making, which includes making better use of disaggregated and geospatial data, and strengthening countries' statistical capacities.³

The first step in supporting out-of-school children (OOSC) to realise their right to education is to understand their situation. Who are the children out of school, where do they live and why are they out of school? Many countries have difficulties developing effective policies to respond to the needs of out-of-school children because of a lack of reliable information. Besides a lack of information on known out-of-school children, there are also many out-of-school children who are unknown or invisible. They are invisible because ministries of education often do not monitor children who have never enrolled in school, and may also exclude children who are not part of the formal schooling system—for example, children with disabilities attending special schools.

¹ UIS, 2016.

² e.g. European Commission, 2011; 2013; Heckman, 2006a; 2006b.

³ UNESCO, 2012a; United Nations, 2012; 2013, United Nations Department of Economic and Social Affairs, 2015

Without an effective national monitoring system it is difficult, if not impossible, to obtain accurate figures on out-of-school children and children at risk of exclusion. Moreover, without an effective monitoring system there is a great risk that policies and strategies are not informed by evidence, or are based on unreliable evidence – which is possibly worse. With limited and unreliable data, the possibilities for analysing the causes of exclusion are severely limited. And with weak monitoring systems, children who are out-of-school or at risk of dropping out might not be identified on time to trigger appropriate response interventions. To address these issues, a monitoring system needs to be based on a robust framework with clearly defined indicators, procedures and roles and responsibilities, and a clear understanding of information flows in the system and the potential information gaps and barriers.

It should be noted that out-of-school children and adolescents are henceforth referred to as ‘OOSC’.

The Global OOSC Initiative

Despite substantial gains in school enrolment since the new millennium, progress has stagnated since 2007.⁴ The usual approaches to tackle the problem of out-of-school children have failed. New and innovative measures are required to reach the remaining out-of-school children who are often from the hardest-to-reach groups, which face multiple, complex and overlapping barriers to schooling.

The [Global Initiative on Out-of-School Children](#) was launched jointly by UNICEF and the UNESCO Institute for Statistics in 2010 to make a significant, sustainable reduction in the number of children who are out of school. It aims to support countries in identifying OOSC and children who are at risk of dropping out, analysing the characteristics of these groups of children and the barriers that lead to their exclusion, and subsequently identifying, promoting and implementing sound policies that address exclusion. It considers the problem and means of tackling the problem of OOSC from a multi-sectoral perspective.

The Global OOSC Initiative builds on the *Children Out of School: Measuring Exclusion from Primary Education* report published jointly by the UNESCO Institute for Statistics and UNICEF in 2005. The OOSC Initiative Conceptual and Methodological Framework introduced the ‘Five Dimensions of Exclusion (5DE)’ model, which recognizes the importance of pre-primary education (Dimension 1) in addition to primary education (Dimension 2), and goes beyond primary to include also lower-secondary education (Dimension 3). Moreover, the model focuses not just on OOSC (excluded children), but also on children at risk of dropping out from primary school (Dimension 4) and lower-secondary school (Dimension 5).⁵ The Global Out-of-School Children Initiative Operational Manual has since replaced the OOSC Initiative Conceptual and Methodological Framework, and serves as the how-to guide for conducting national studies on OOSC.⁶

Five Dimensions of Exclusion

Five Dimensions of Exclusion is the core model guiding the Global Initiative on Out-of-School Children.⁷ It distinguishes between children who are out of school and children who are at risk of dropping out. The Five Dimensions are shown in figure 1.

The term ‘exclusion’ has a slightly different meaning depending on the population concerned: children who are out of school are excluded from education, while children who are at risk of dropping out may be excluded within education because they may face discriminatory practices or attitudes within the school.

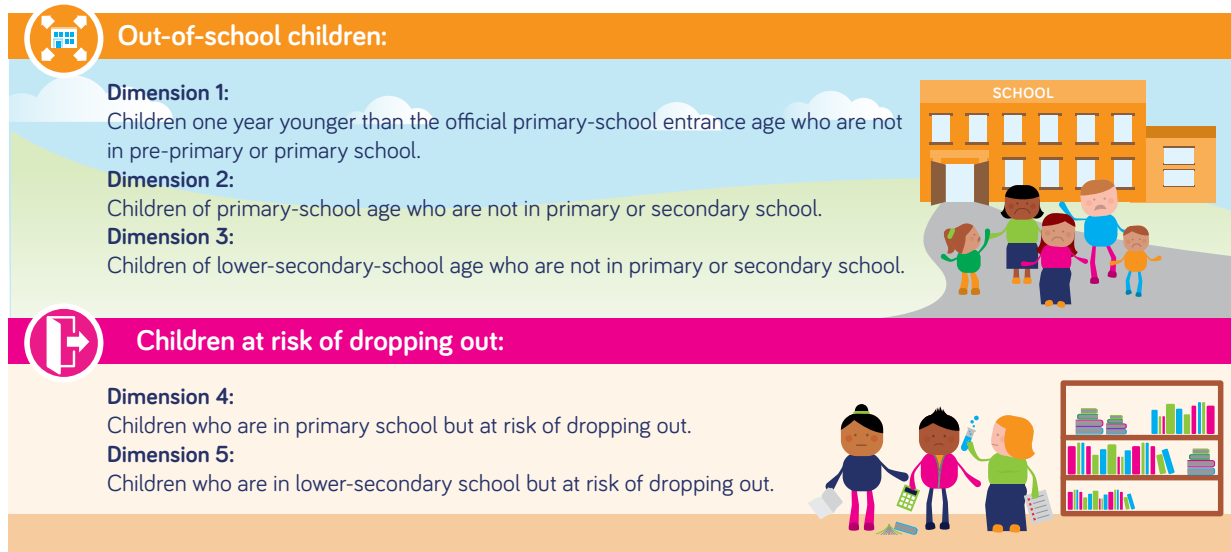
⁴ UIS and UNICEF, 2015.

⁵ UNICEF and UIS, 2011.

⁶ UNICEF and UIS, 2016.

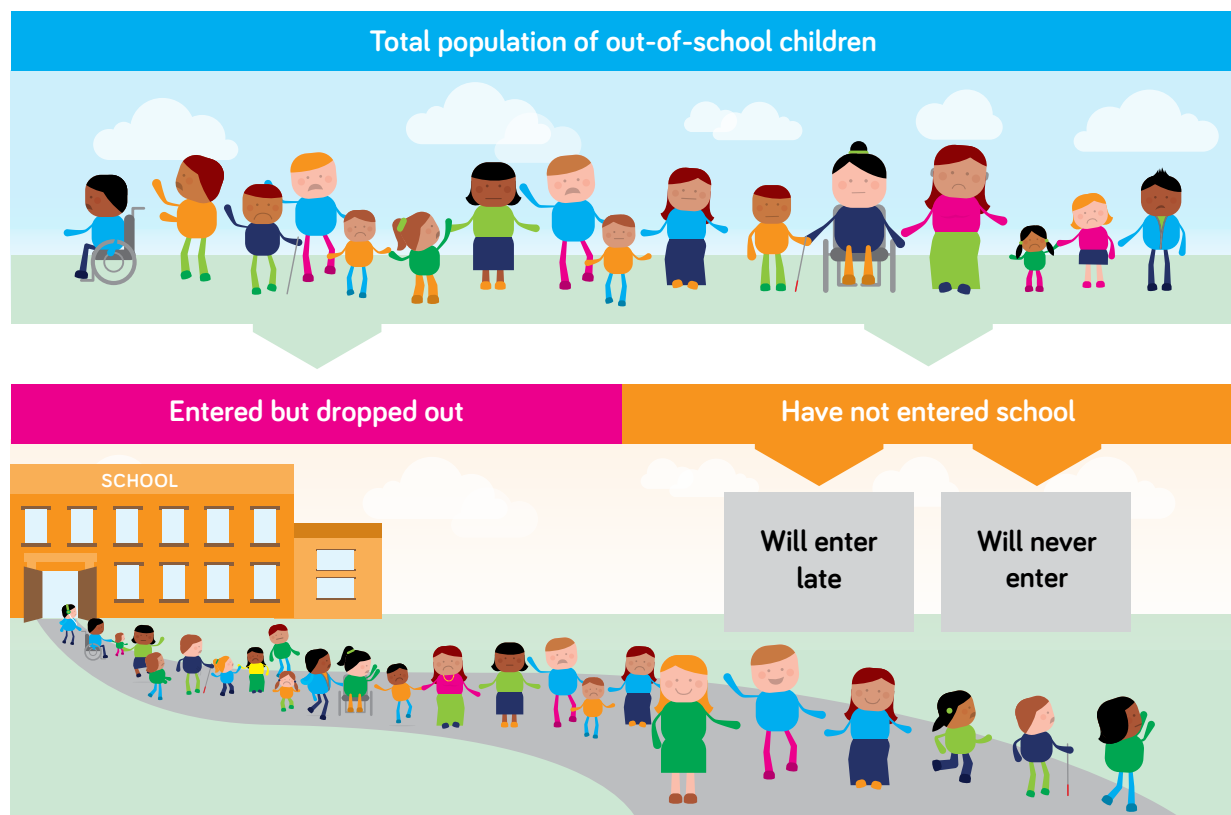
⁷ UNICEF and UIS, 2011; UNICEF and UIS, 2016.

Figure 1. The Five Dimensions of Exclusion



In addition, the model distinguishes between OOSC who entered school in the past and dropped out, and those who have not entered school. The latter group is further divided into children who will enter school in the future as late entrants and children who will never enter school, as shown in Figure 2.

Figure 2. Classification of the out-of-school population, by school exposure



The Education Management Information System (EMIS)

Central to the successful monitoring of OOSC and children at risk of dropping out is the EMIS. The EMIS is “an institutional service unit producing, managing and disseminating educational data and information, usually within a national ministry or department of education”, whose functions include “collecting, storing, integrating, processing, organizing, outputting, and marketing educational data and statistics in a timely and reliable fashion”.⁸ The purpose of an EMIS is to provide timely and reliable data for education planning and management, as well as to support evidence-informed policy decision-making. It is not just a database sitting at the national level, but typically encompasses a network of interconnected systems at national, regional, local and school levels. Information flows should not be unidirectional, from school to national level, but rather should flow vertically between the local and the national levels, and horizontally across all sectors – not just between departments or units at various administrative levels. In this exchange of information, various stakeholders are both data producers and users.

As pointed out in the World Bank Framework Paper *What Matters Most for Education Management Information Systems*, people are an important component of an EMIS.⁹ This includes people who operate the EMIS, people who collect, maintain and disseminate the data, and stakeholders at multiple levels who use the EMIS for data analysis, monitoring and decision-making. Therefore, the EMIS should not be seen as a largely technical endeavour. While database management, automation and Internet connectivity are important aspects of a modern EMIS, these will have little impact without considering also clear guidelines, training, understanding and acceptance by the people who collect, analyse and use the data for decision-making.

About this Framework

UNICEF’s series on education participation and dropout prevention

This framework is the first volume of UNICEF’s series on education participation and dropout prevention. It aims to equip and inspire decision-makers and practitioners working in the field of education exclusion and dropout with guidance and ideas to both improve the data and information on education exclusion, and the response interventions to ensure that all children are in school and learning.

Volume 1: Monitoring Education Participation outlines a Framework for developing a system to monitor children and adolescents who are out of school or at risk of exclusion from education.

The aim of the OOSC Monitoring Framework is to provide a practical step-by-step guide which can support countries in developing or improving their national monitoring system, in order to:

- Reliably identify OOSC and children at risk of exclusion, and make currently invisible OOSC visible to the monitoring system.
- Obtain better data, both in terms of breadth (a broader range of relevant disaggregated data) and quality (more reliable data).
- Analyse the causes of exclusion.
- Develop and establish evidence-informed policies and interventions to prevent exclusion.

⁸ Hua and Herstein, 2003.

⁹ Abdul-Hamid, 2014.

A distinction needs to be made between results at the national level, in terms of improved policies, strategies and legislation, and at the regional and local levels, in terms of improvements in the capacity of regional- and local-level institutions and schools to identify and support OOSC and children at risk of dropping out. To be an effective public-management tool, a monitoring and evaluation system also needs to be results-based – moving beyond inputs and outputs towards outcomes and impacts.¹⁰

Volume 2: *Improving Education Participation* complements the Framework by addressing policy measures and interventions aiming to improve education access and retention. It provides concrete options for policy, strategy and practice development in education inclusion and dropout prevention. The focus areas of the handbook have been selected based on the experience stemming from UNICEF and UIS’s regional initiative on out-of-school children and adolescents, and based on the content of the *Call for Action Education Equity Now: Including All Children in Quality Learning*¹¹

Taken together, the two volumes *Monitoring Education Participation* and *Improving Education Participation* provide guidance and tools for developing a comprehensive system of monitoring and interventions to reduce education exclusion.

OOSC Visibility Model

Visibility has a specific meaning in the Framework. It indicates whether a child’s record is visible (that is, it exists) in the government data monitoring system. Simply put, children who are not known to ministries of education because their records are not accurate, or are non-existent, will be impossible to reach through interventions and they will not be taken into consideration in policy and programme design. The most vulnerable and disadvantaged children – such as homeless children, institutionalized children, children in nomadic communities and children with disabilities – are also the most likely to be invisible, as defined below. Vulnerable groups of children are often omitted by design from household survey data; they are also more likely to be invisible in administrative data.¹² The Framework proposes different methods to improve the coverage of administrative data so that children who are not in any government database can be identified, added, and thus made ‘visible’ to monitoring efforts and targeted interventions. It emphasizes the need to not just estimate the number of OOSC, but also to use child-level records to determine exactly who is out of school – and, if possible, why?

The Framework proposes different methods to improve the coverage of administrative data so that children who are not in any government database can be identified, added, and thus made ‘visible’ to monitoring efforts and targeted interventions.

This OOSC Visibility Model is the core model of the Monitoring Framework, and it is additional and complementary to the 5DE model. As illustrated in Figure 3, the OOSC Visibility Model classifies OOSC based on three levels of visibility in the EMIS or other government education database used to monitor school-age children.¹³

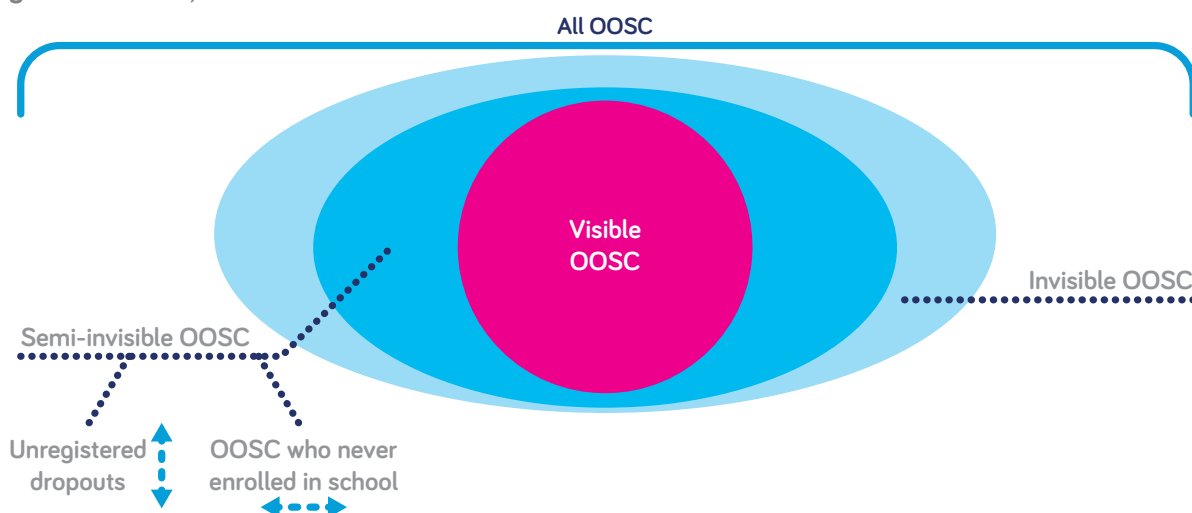
¹⁰ Kusek and Rist, 2004.

¹¹ UNICEF, 2013.

¹² Carr-Hill, 2012.

¹³ The relative size of the ovals in this figure is for illustration purposes only and does not represent the actual number of children in each group in any particular country. The actual size of each area would vary from one country to another.

Figure 3. Visible, Semi-invisible and Invisible OOSC



- **Visible OOSC:** *Visible OOSC* are so-called because they can be identified using the ministry of education database or EMIS. *Visible OOSC* typically are school leavers (dropouts), as they have come into contact with the schooling system and are thus recorded. In Figure 3, they are represented by the red oval.
- **Semi-invisible OOSC:** These are OOSC who currently cannot be identified using the EMIS, but could be made visible through improved vertical or horizontal information flows. In Figure 3, they are represented by the dark blue oval. They consist of the following two groups:
 - **Unregistered dropouts:** Children who dropped out but were never recorded as such in the EMIS, because schools or educational institutions did not record or report the dropouts. These OOSC could be identified using improved *vertical* information flows from schools and educational institutions to the national level (see Step 2 and Step 4).
 - **OOSC who never enrolled in school:** Children who never enrolled but for whom information can be collected by use of *horizontal*, cross-sector information flows (information sharing). Records on children can be linked through a unique ID, such as a birth certificate number, to identify those who are not recorded in the ministry of education database, but are recorded in other databases such as civil or local registries, whether electronic or paper-based. Compulsory-school-age children who are not enrolled in school, but exist in other databases or registers, may be out of school (see Step 5 below).¹⁴
- **Invisible OOSC:** These are children who are not visible in any government administrative data or records from schools or education institutions. They are thus completely invisible in terms of their absence from electronic databases or registers. They generally represent the most vulnerable and disadvantaged children (see Step 5: 'Tracking Invisible OOSC'). In Figure 3, they are represented by the light-blue oval.
- **Visible children at risk of dropping out:** Children attending school but at risk of dropping out, who are identified as such within schools, and the data are also monitored at national or sub-national level.
- **Invisible children at risk of dropping out:** Children attending school but at risk of dropping out who are either not identified as such within schools, or are identified but not included within school-level data monitored at national or sub-national level (see Step 6).

¹⁴ Discrepancies between databases or lists of children can also be indicative of data inaccuracies, rather than signify out-of-school children (for example, a child who has left the country but is still registered as living in the country). Therefore, this approach can also be used to improve the accuracy of records in the databases being cross-referenced.

The most vulnerable and disadvantaged OOSC are the most likely to be invisible in government education statistics. The Visibility Model emphasizes the need to (i) use different methodologies to make invisible children visible in the data, according to their level of visibility; (ii) use these methodologies to obtain a better estimate of the total number of OOSC in a country, as well as the different groups of OOSC and potentially future OOSC; and (iii) obtain better data, both in terms of breadth (a broader range of relevant disaggregated data) and quality (more reliable data), to inform policy and decision-making, such as by cross-checking data from different sources.

Visibility and the 5DE

In the 5DE model, each dimension can be associated with expected levels of visibility according to the classification described above. This is shown in Table 1. *Visible OOSC* will generally be those in Dimensions 2 and 3 who have dropped out. Unregistered dropouts are *Semi-invisible OOSC* (who are likely erroneously considered, as in Dimensions 4 or 5). Those who have never entered school, whether in Dimensions 1, 2 or 3, could be either *Semi-invisible OOSC* if they exist in administrative or school records, or *invisible OOSC* if they are not recorded in any government records at all.

Children in Dimensions 4 and 5 who are at risk of dropping out may be visible at the school level. Schools may, for example, monitor and provide support to children in difficult circumstances and children who display characteristics associated with dropout risk, such as frequent absence. However, unless this information is reported by schools they are often invisible at the regional and national levels.

Dimension	Group of children by exposure to education	Group of visibility these children may belong to
Dimension 1: Pre-primary-age OOSC	Have not entered school	Semi-invisible or Invisible OOSC
Dimension 2: Primary-age OOSC Dimension 3: Lower-secondary-age OOSC	Dropped out	Visible OOSC
	Unrecorded dropouts	Semi-invisible OOSC
	Have not entered school	Semi-invisible or Invisible OOSC
Dimension 4: At risk of dropping out in primary school Dimension 5: At risk of dropping out in lower-secondary school	In school	May be visible at the school level, but invisible at regional and national level

The eight steps of the Monitoring Framework

This section outlines the framework for monitoring OOSC and children at risk of dropping out in terms of eight implementation steps and corresponding barriers. Developing a monitoring system is a collaborative endeavour between different ministries, departments and organizations at different administrative levels. It involves mapping information flows between these entities - which are often quite complex - establishing partnerships and information-sharing agreements, and clearly establishing roles and responsibilities. It also refers to the challenges along the way and the strategies to overcome them. The Monitoring Framework consists of the eight steps described in Figure 4.

Figure 4. Eight-step Monitoring Framework for OOSC and children at risk of dropping out

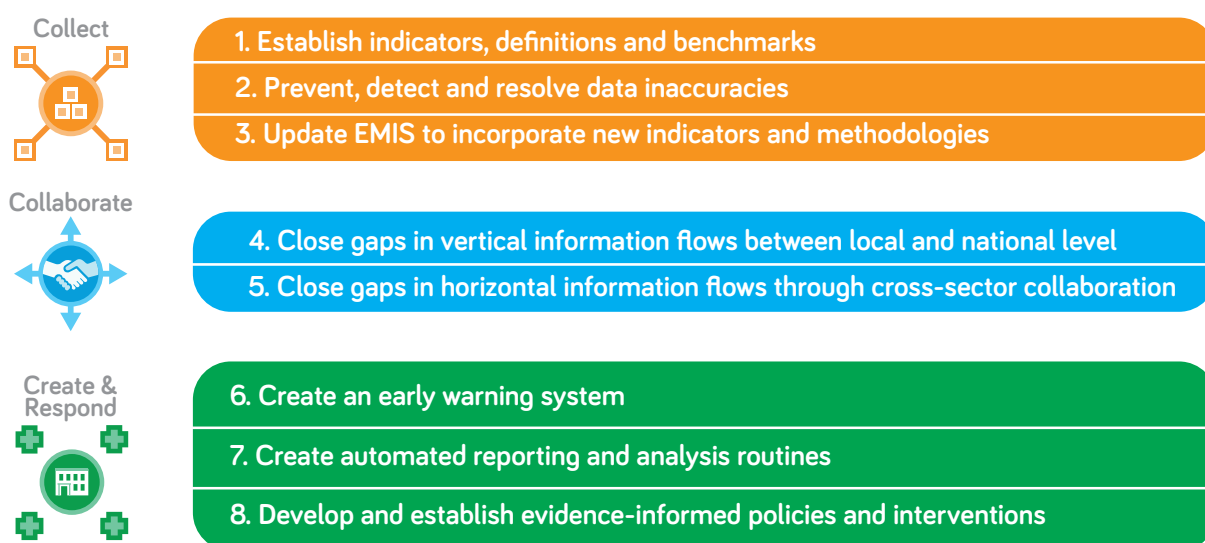
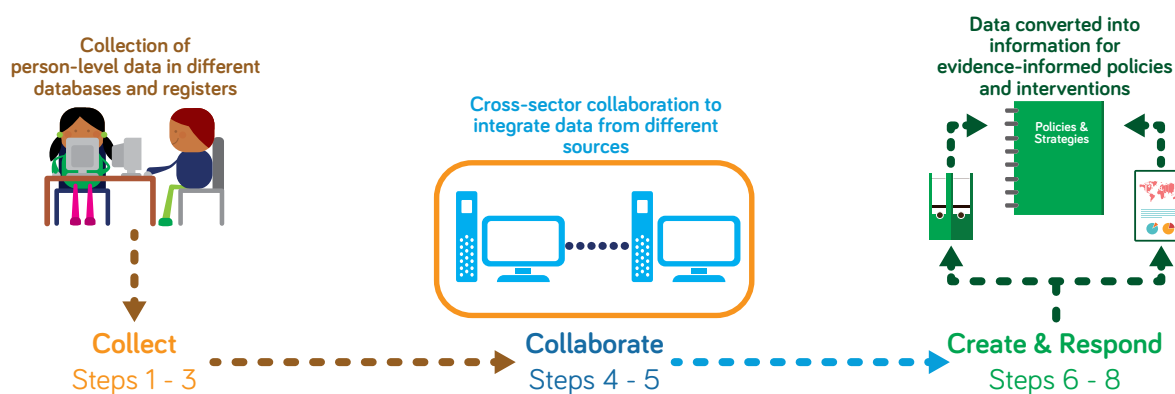


Figure 5 describes the data and information flows with respect to the different steps, which are discussed in detail in the following sections. Steps 1 to 3 are concerned with improving the availability and accuracy of data on OOSC and children at risk of dropping out. Steps 4 and 5 are concerned with closing gaps in horizontal and vertical information flows, bringing together information from different sources for monitoring and analysis. Steps 6 to 8 focus on converting the data into information for evidence-informed policies and interventions to reduce exclusion from education.

Figure 5. Data and information flows in the eight-step framework



There are many barriers to monitoring OOSC and children at risk of dropping out. For example, data required for monitoring, planning and decision-making are often unreliable or unavailable.

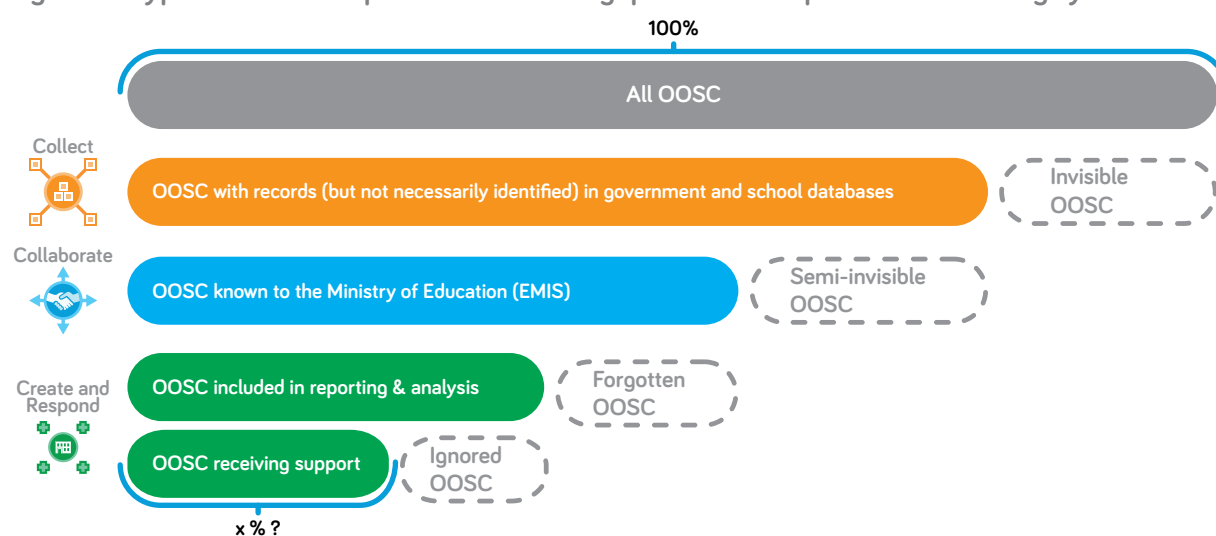
The following barriers to monitoring OOSC are discussed within each corresponding step of the Monitoring Framework:

- Step 1 - Barrier: Information on OOSC and children at risk of dropping out is incomplete.
- Step 2 - Barrier: Information on OOSC and children at risk of dropping out is inaccurate.
- Step 3 - Barrier: EMIS cannot incorporate new indicators and methodologies.
- Step 4 - Barrier: Gaps in vertical information flows from the local to the national level.
- Step 5 - Barrier: Lack of inter-agency collaboration and data sharing.

- Step 6 - Barrier: Children at risk of dropping out are not identified and monitored.
- Step 7 - Barrier: Data on OOSC and children at risk of dropping out is not reported and analysed.
- Step 8 - Barrier: Evidence and its analysis do not inform policies and interventions to address education exclusion.

Figure 6 summarizes potential information loss due to these barriers at various stages in the monitoring system, from the collection of data to the use of the data for evidence-informed decision-making. The length of the bars in this hypothetical example reflects the percentage of OOSC captured at each step. The decreasing length of the bars at each step reflects information loss, so that by the time the information is analysed and used, only a fraction of the total number of OOSC may be captured (or none at all). Information on children at risk of dropping out is not included in this example - it is often not collected and analysed at all, or else only at the school level.

Figure 6. Hypothetical example of information gaps in each step of the monitoring system



The first bar represents all OOSC in the country. The second (orange) bar covers all OOSC for whom records exist in government and school databases, including the EMIS, but also other databases such as the civil registry or social services database. These children have not yet been identified as being out of school at this stage, but merely have their personal details recorded in a government database. *Invisible OOSC* are now excluded as they represent those OOSC who are not recorded in any database, such as homeless and refugee children. The third bar (blue) reflects the actual proportion of OOSC known to the ministry of education, which excludes *Semi-invisible OOSC* – that is, currently invisible OOSC who could be made visible through cross-referencing other government databases or by checking school records. The fourth bar (green) represents OOSC included in reporting and analysis. Certain groups of OOSC may be excluded from reporting and analysis, and are thus referred to as *Forgotten OOSC*. The fifth and final bar (green) represents OOSC who receive support. Inclusion in reporting and analysis does not guarantee that efforts will be made to support those children, and OOSC who do not receive support in spite of their situation being known are referred to as *Ignored OOSC*.

How to use the Monitoring Framework

The OOSC Monitoring Framework is structured to facilitate diagnosing shortfalls in the monitoring system and how to overcome them. It consists of eight steps and corresponding barriers. The Appendices provide practical indicators, tools, examples and detailed technical information which can be applied in developing an effective monitoring system. This structure aims to facilitate the identification of the barriers and steps which are most pertinent based on the national context. From country studies (mainly in the CEE/CIS region) it has become apparent that progress towards monitoring OOSC and children at risk of dropping out tends to be uneven. For example, a country may have a sophisticated EMIS (Step 3), but the data may not be accessible and reported on a routine basis (Step 7), so data are inadequately used; or a country may have most components of a good monitoring system in place, but lack clearly defined indicators and benchmarks for monitoring OOSC and children at risk of dropping out (Step 1). The path towards building a better monitoring system is therefore different for each country. While Steps 1 to 8 reflect a logical progression, it is not meant to prescribe a certain order in which a monitoring system is developed. Instead, it functions more like a toolbox which provides various sets of tools to be selected and adapted based on a diagnosis of the key gaps in the monitoring system. While some tools are for countries at an early stage of developing a monitoring system, other tools may be applicable even for countries which have a robust and sophisticated monitoring system already in place.

Step 1: Establish indicators, definitions and benchmarks

This step outlines key concepts and proposed definitions necessary to develop a robust monitoring system for OOSC and children at risk of dropping out. Indicators and data on OOSC and children at risk of dropping out may be unavailable, incorrectly defined, inconsistently interpreted and/or insufficiently disaggregated. The aim of this first step is therefore to distinguish between different approaches to measuring OOSC, clarify the differences between OOSC and the Eurostat concepts of early school leavers (ESL) and young people neither in employment nor education and training (NEETs), and finally to establish consistent and complete definitions of truancy, dropout, late enrolment and OOSC relevant to the national context.

Barrier: Information on OOSC and children at risk of dropping out is incomplete

There are four common problems in terms of the indicators and corresponding data required for monitoring OOSC and children at risk of dropping out:

- **Unavailability:** *Indicators and data* on OOSC and children at risk of dropping out are unavailable.
- **Incorrect definition:** For the *indicators* which do exist, the definition or method of calculation is incorrect.
- **Inconsistent interpretation:** *Indicators* and their definitions are ambiguous and interpreted differently between and within ministries and/or between national, local and school levels.
- **Insufficient disaggregation:** The *data* are not or cannot be sufficiently disaggregated to be useful for analysis.

Indicators and data for OOSC and children at risk of dropping out are unavailable

In some countries there are no 'official' OOSC indicators defined by the relevant statistical authorities, and hence there is no regular monitoring of the rate and number of OOSC. Establishing such OOSC indicators requires population estimates by single year of age (which should be available from the latest population census¹⁵), as well as enrolment data for all (compulsory) school-age children and adolescents by single year of age. In addition, enrolment data should include all types of schools and relevant institutions, some of which may not fall under the purview of the ministry of education.

For example, some types of special schools and institutions for children with disabilities may not fall under the responsibility of the ministry of education, but instead another ministry such as the ministry of labour and social protection.¹⁶ Other types of schools for which the ministry of education may not have any data – or only limited data – include private schools or community-run schools, pre-schools and kindergartens, vocational (or Technical and Vocational Education and Training – TVET) schools, as well as children who are home schooled.

Enrolment data should include all types of schools and relevant institutions, some of which may not fall under the purview of the ministry of education

¹⁵ A census is normally carried out only every 10 years, and population estimates become less reliable the longer the period since the last census.

¹⁶ UNICEF 2016a.

Data on pre-primary-age children (typically aged three to six) are a crucial part of the monitoring system.

It is important that information on OOSC and children at risk of dropping out encompasses all school-age children in the country, regardless of the kind of school or institution they are attending, if any. Otherwise, these indicators will fail to capture exactly those children they are intended to capture: vulnerable and disadvantaged children who are not in the regular school system.

This data is needed to monitor the school readiness of new entrants to grade 1. It is also important to monitor the coverage of education services for pre-primary-age children and who benefits from these services. Lack of pre-primary experience is an important risk factor for future dropout. Moreover, the pre-primary period is the most cost-effective to invest in, both in terms of individual cognitive benefits and economic returns for society as a whole; it is particularly a crucial period for reducing future disparities in school achievement by socio-economic group.¹⁷ In addition, early childhood is a critical period for children with disabilities, for whom intervention before the age of five can make an enormous difference.¹⁸ These factors underscore the importance of high quality¹⁹ early childhood development services, especially for children with disabilities. Data on the pre-school-age population are also needed for estimating and planning for the intake of students in the coming school year.

Information on children at risk of dropping out is often not recorded or may only exist at the school level. If it does exist, it may be descriptive and not quantified, which prohibits it from being analysed at an aggregated level (such as regionally or nationally). Indicators on children at risk of dropping out are further discussed in Step 6.

As discussed in the Introduction, the Framework introduces the concept of *Semi-invisible OOSC* – school-age children who are not in any education database, but whose records can be found in other non-education databases. These children can be identified by linking enrolment records with data on school-age children from government databases such as the civil registry. The absence of formalized cross-sector collaboration and information-sharing agreements can prohibit the exchange of information. Similarly, obtaining data on children at risk of dropping out, or in general vulnerable children, requires information-sharing agreements to be established across sectors. Cross-sector information sharing is discussed further under Step 5 below.

For the indicators which do exist, the definition or method of calculation is incorrect

Calculations of the number or percentage of OOSC may be incorrect if (i) they include only dropouts in the calculation and do not include children who have *never* enrolled in school, and/or (ii) they are calculated using the Net Enrolment Rate (NER), which by definition does not include children who are enrolled in a different education level than the one expected for their age.

¹⁷ E.g. Heckman, 2006a; 2006b.

¹⁸ Research suggests that Early Childhood Intervention (ECI) can be particularly effective for children with disabilities, increasing the returns to schooling and thus promoting their enrolment and attendance. While studies of ECI generally do not have benefit-cost calculations, the results of these interventions can be dramatic (Bailey and Powell, 2005), not just in terms of mental or physical functioning, but socialization as well. Research looking at services to children under five finds significant increases in the measures of cognitive capabilities (Guralnick, 2004). Therefore, if the goal is to reduce the number of children with disabilities who are not in school, efforts must start prior to school age. See also: WHO and UNICEF (2012).

¹⁹ The significant benefits of pre-primary education do not apply if it is of low quality.

As discussed above, ministries of education may report only the number of dropouts in their out-of-school estimate. Children who have never enrolled in school are an important group of OOSC and can be a significant proportion of the total number of OOSC. Children who have never been to school also need to be included in the monitoring system – otherwise they remain invisible or semi-invisible. In some post-Soviet countries such as Kazakhstan, Kyrgyzstan, Moldova and Tajikistan, teachers are required to visit households in their school zone to identify school-age children who should enrol in first grade in the coming school year. However, even with such a system in place, there are a number of difficulties: not all schools may carry out this time-consuming task if it is not enforced and/or financially compensated; teachers generally rely on a list of addresses where children live who have reached school age (for example from the local municipality), but such lists are often inaccurate; and schools may not have any incentive to report this data. The potential lack of incentive for accurately reporting data are further discussed under Step 2 below.

Another possible calculation error is when OOSC are calculated based on the Net Enrolment Rate, i.e. the primary or lower-secondary OOSC rate is calculated as 100 minus the primary or lower-secondary NER. The often-used NER is not a sufficient measure of being ‘in school’, because children who are not enrolled in the expected education level for their age may be enrolled in a *higher* or *lower* level of education and not necessarily out of school. The Five Dimensions of Exclusion take this into account. Hence, Dimension 1 encompasses “Children one year younger than the official primary-school entrance age who are not in pre-primary or primary school”, Dimension 2 encompasses “children of primary-school age who are not in primary or secondary”, and Dimension 3 encompasses “children of lower-secondary-school age who are not in primary or secondary school”. This is an important distinction which can significantly affect overall OOSC figures. It also requires accurate data on children’s ages, which is not always available. The ‘Adjusted’ Net Enrolment Rate (ANER) includes children of a given school age enrolled in one *higher* level of education. For example, the *primary ANER* includes children enrolled in secondary education. But the *lower-secondary ANER* does not take into account children of lower-secondary-school age enrolled in primary education.

Indicators and definitions are ambiguous and interpreted differently between and within ministries and/or between national, local and school levels

Different government figures for OOSC can arise when (i) there is no explicit definition and calculation method for OOSC rates, (ii) there is more than one definition adopted by different ministries or even within ministries, and/or (iii) those making the calculations have a different interpretation of how OOSC figures should be calculated if the calculation method is not strictly defined. In the CEE/CIS region, this has resulted in different OOSC figures being reported by different ministries and even conflicting figures from within ministries of education themselves.

It is also not uncommon to receive different responses at different administrative levels and in different schools to the question “when is a child considered out of school?” A definition of ‘out of school’ should also elaborate *at what point and for what* reasons a child should be considered out of school. For example, it should provide guidelines on how many days of absenteeism for no excused reasons constitute having dropped out, and explicitly specify the excused reasons for absenteeism. Definitions need to be both clear and elaborate to avoid any ambiguity, and the definition adopted must be communicated horizontally across different ministries and departments, and vertically across different administrative levels, to avoid different interpretations which can significantly skew the data. The section ‘Establishing a definition of dropout’ in Step 1 describes these issues in more detail.

The data are not or cannot be sufficiently disaggregated to be useful for analysis

Disaggregated data are necessary to identify the characteristics of OOSC or children at risk of dropping out, which can be used as the basis for analysing the causes of exclusion. Common levels of disaggregation are by school year, by sex and by school grade or level of education. In addition to these levels of disaggregation, it is also important to be able to disaggregate by single year of age (as discussed above) and by location (such as rural/urban, region and district). More in-depth analysis of the characteristics of OOSC and children at risk of dropping out would require the combination of two or more characteristics, such as by single year of age and sex, or by single year of age, region and sex. The lack of availability of disaggregated data, and the lack of options to produce data at various disaggregated levels when not available, are key obstacles in conducting a meaningful analysis of the data which would be useful to inform policies and strategies to reduce exclusion.

Different approaches to calculating the number and percentage of OOSC

Different methods and sources of data can arrive at different estimates of the number and percentage of OOSC. This section compares and contrasts three approaches: the UIS methodology, household census methodology, and government approaches to calculating OOSC figures. Because the Framework focuses on data for national monitoring purposes, it does not propose using the full UIS methodology as the methods and data sources for the latter are designed specifically for international comparison.

UIS approach to calculating OOSC figures

The aim of the UIS methodology is to calculate internationally comparable national estimates on OOSC. The UIS uses the International Standard Classification of Education (ISCED), designed by UNESCO to facilitate comparisons of education statistics and indicators of different countries on the basis of uniform and internationally agreed definitions. This may sometimes differ from the national system of classifying educational levels and corresponding age ranges, and of compulsory education.²⁰

The UIS figures are calculated by comparing the enrolment of primary and lower-secondary-school-age children (submitted to the UIS by the delegated authority in the country – generally the ministry of education or national statistical office), in primary education (ISCED 1) and secondary education (ISCED 2 and 3), with the United Nations Population Division (UNPD) population estimates for the given school age group. The UNPD population estimates are based on a variety of sources depending on the country – including censuses, surveys, vital statistics and population registers.²¹ The UNPD estimates of the school-age population for a given country may not be the same as the estimates used at the national level due to differences in methodology.

For national monitoring, the UIS methodology is useful to adopt in order to routinely calculate internationally comparable OOSC figures. However, because the age ranges used do not necessarily align with those used in the national education system, and because the source of population data is not necessarily the source that is used in the country for population-based statistics, it is not recommended as the only, or main, approach to calculating OOSC figures. The recommended approach to calculating OOSC figures for the purposes of national monitoring is discussed later in this section.

²⁰ For International Standard Classification of Education, see also: <http://www.uis.unesco.org/isced>

²¹ UNPD, 2014.

Household survey-based approaches to calculating OOSC figures

One common source of data for OOSC statistics is from sample-based household surveys such as the Multiple Indicator Cluster Survey (MICS) and the Demographic and Health Survey (DHS). Based on a representative sample of the population, the resulting figures from household survey data are generally therefore accurate only to the levels for which the sample was designed: typically to provide representative estimates for the national level, the regional level and for rural and urban areas. The sample design rarely leads to accurate and reliable figures at lower-level administrative divisions, which are needed for in-depth monitoring of OOSC. This is due to the prohibitive cost of sufficiently increasing the sample size for these areas to obtain the desired level of accuracy. Unlike enrolment data, which in theory covers all schools, surveys are subject to sampling error, and also depend on household respondents answering questions honestly and correctly.

Household surveys also lead to different out-of-school rates because they typically record attendance rather than enrolment. If administrative figures of OOSC do not take into account attendance, the OOSC rate can be underestimated (as children may be enrolled but not attend school). On the other hand, in data collected with DHS or MICS a child is considered to be *in school* if she or he attended school *at any time* during the academic reference year provided in the questionnaire. Therefore, only children who never attended during the school year are considered to be out of school; this is not sufficiently precise for national monitoring of chronic absenteeism during the school year, for example. The way the question is phrased in the questionnaire can thus also significantly affect the calculated OOSC rate. While household survey figures undoubtedly play a valuable role in identifying the characteristics of OOSC to inform policy-making, and as a source for comparison against enrolment-based figures of OOSC, they are not the ideal data source for identifying and monitoring OOSC.

Calculating OOSC figures for national monitoring purposes

For national monitoring purposes, the Framework focuses on enrolment records from administrative data sources. This is because enrolment data are based on – at least in principle – all students enrolled in all schools in the country, rather than a sample of students. The data are routinely collected and can be linked to the population or civil registry data to gain a complete picture of the school participation of school-age children in the country. The data are collected at the individual student level and can be used by teachers and other school-level staff. However, enrolment data can also be inaccurate for various reasons, for example if schools have an incentive to over-report enrolment where punitive measures are taken for declining enrolment, such as a reduction in funding allocated to the school (see Step 2).

UIS methodology also uses enrolment data. However, for national monitoring purposes the compulsory age range according to national legislation is typically considered in determining the number of OOSC. This age range may be different from the age range for ISCED 1 and 2 used by UIS.

For national monitoring, three key considerations to obtain reliable and complete OOSC figures are:

- **Use the best source, or multiple sources, for population data:** Government OOSC figures may be based on population estimates which are different from the UNPD population estimates on which UIS figures are based. The population estimates used by the government may be more accurate if they are based on the latest census data, as UNPD population estimates are not immediately updated whenever new census data are released. On the other hand, projection methods used in a country to generate population estimates may be less accurate or reliable than the methods used by UNPD. In some countries, relatively reliable civil registry data is available. Ideally, OOSC figures are calculated considering both population census and civil registry data, as neither may be completely accurate.

- **Avoiding age discrepancies in calculating out-of-school figures:** Ideally, the reference date for calculating population by single year of age should be matched to the reporting date for school enrolment – which is typically at the beginning of the school year. If, for example, the population reference date is toward the end of the school year, then the population of children determined to be of school age may not have been of school age on the enrolment reference date (for example the beginning of the school year). These children could thereby falsely be considered as out of school. If the population figures cannot be calculated for a specific reference date, the alternative would be to calculate enrolment by single year of age according to the population reference date (using student date-of-birth records). If neither approaches are possible, it should be taken into account that there will be some error in out-of-school figures. In such cases, it is recommended that the population and enrolment reference dates are included with the figures to indicate the extent of the mismatch.
- **Including all OOSC, not just dropouts:** OOSC figures should include children who have never enrolled in schools, some of whom may enter school in the future as late entrants and others who may never enter. In some countries, only dropout figures are available, so these other two groups of OOSC are not monitored. To include the full compulsory school-age population, enrolment figures by single year of age need to be compared with population figures by single year of age. Determining a comprehensive definition of OOSC for national monitoring purposes also depends on a clear definition of truancy and dropout. Two groups of OOSC who may be missed in the monitoring of dropout indicators are:
 - Those who have never enrolled but may enrol later.
 - Those who have never enrolled and may never do so.

In countries where there are many children who enrol late or never enrol at all, a focus on school-age children who left school would only capture a fraction of the out-of-school population. This is discussed below.

Key concepts: distinguishing between OOSC and early school leavers

Early school leaving or *ESL* is a term often used synonymously with dropout, but it is important to distinguish between the international and national definitions of these terms for monitoring purposes. Early school leaving, like indicators for OOSC, has both international and national definitions used by various agencies and countries. The international Eurostat definition of early school leavers comprises people aged 18 to 24 who have achieved no higher than lower-secondary education and are no longer in education or training.²² It excludes anyone who participated in some form of education or training in the four weeks prior to which the measurement is made. While this is an important indicator to measure the attainment of basic life skills and labour market preparedness of young people, for the purposes of monitoring OOSC the focus is on the school participation of compulsory-age children. In the Framework, children who leave school before the completion of compulsory education are called dropouts, to avoid confusion with the Eurostat definition of ESL. The Eurostat definition is for international comparisons and is not useful for monitoring dropouts who are of school-going age and are *currently* out of school. Therefore, monitoring the ESL rate as a proxy for OOSC would not include those children who leave school younger than age 18. Countries such as the Netherlands and Australia monitor early school leaving according to their own definitions, which are somewhat similar to the Eurostat definition. A table comparing different definitions of OOSC and ESL is provided below.

²² See: http://europa.eu/rapid/press-release_MEMO-11-52_en.htm?locale=en. Similarly, OECD defines early school leavers as students who do not complete upper-secondary education - <http://www.oecd.org/edu/highlights.pdf>

Another related term is *NEET*, which is defined by Eurostat as young people who are neither in employment, nor education or training, typically in the age range 15 to 29, although other age ranges may be considered.²³ It therefore looks specifically at adolescents and youth typically older than the age range for compulsory education who are not employed.

Table 2 summarizes the differences between OOSC and early school leavers.

	Age range	Attainment	Training
Out-of-school children–National monitoring, proposed definition	Compulsory school age range according to national legislation	Did not complete the last grade of compulsory schooling, which is typically the last grade of ISCED 2	Those in training (not participating in the formal school curriculum) are considered as out of school
Out-of-school children–International comparability, UIS definition	ISCED 1 primary- school age, and; ISCED 2 lower-secondary-school age	Attainment of school-age population not considered	Same as National monitoring, proposed definition
Early school leavers–National monitoring, Netherlands example	Depends on country (E.g. 12-to-23 year olds in the Netherlands)	Depends on country	Depends on country
Early school leavers–International comparability, Eurostat definition	18 to 24 year olds	No more than complete ISCED 2	Those in training in the past 4 weeks are not considered as ESL

Distinguishing between absenteeism and truancy for monitoring children at risk of dropping out

Prior to establishing a definition of dropout and OOSC, the concept of truancy needs to be defined as distinct from absenteeism. Absenteeism refers to when a student does not attend school (for any reason), while truancy refers to unexcused (or unjustified) absenteeism, i.e. absenteeism without a valid reason such as illness. A clear distinction needs to be made between truancy and absenteeism at the policy level and in the communication of this policy to schools. Otherwise, school-level truancy procedures and reporting of truancy will be inconsistent between schools. This can also affect reporting of dropout, since dropout is typically defined – and reported – in terms of a certain period of truancy.

Absenteeism refers to when a student does not attend school (for any reason), while truancy refers to unexcused (or unjustified) absenteeism

²³ [http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Young_people_neither_in_employment_nor_in_education_and_training_\(NEET\)](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Young_people_neither_in_employment_nor_in_education_and_training_(NEET))

It is very important for schools to accurately register and closely monitor both absenteeism and truancy, not only as a means to measure dropout, but also as indicators in themselves to inform the intervention of school-based actors to support children at risk of dropping out (See Step 6). Chronic truancy, which is defined as a threshold for truancy at which point a student is considered at increased risk of leaving school early, are strong signs of disengagement from school and among the surest signs that a student is about to drop out. Truancy and absenteeism indicators are therefore among the key indicators for monitoring dropout risk, and the period of time associated with chronic truancy should be calibrated such that school-level staff is alerted in time to take action before the student leaves school for good. In other words, if a school-level response takes place only once a child has met the criteria to be classified as a 'dropout', it is likely too late for most interventions to support the student to resume her or his education.

Chronic absenteeism due to a disability

It is important to note that disability is **not** an excused reason for absenteeism. Schools should therefore record such instances as dropout in line with the definition above, and ensure that the cause of dropout is also recorded. If the school is unable to accommodate the needs of the student, there should be a process to resolve these issues in dialogue with the family and if necessary come up with alternative arrangements for schooling.

Step 6 describes some of the indicators which should be monitored with respect to the ability of schools to accommodate the needs of children with disabilities, and individual-level indicators to identify schools where the needs of children with disabilities cannot be met. The monitoring of such indicators is crucial to identify schools which need support in being inclusive for children with disabilities, and identify children with disabilities whose needs are not being met, so that action can be taken before such children drop out from school. For additional information see this UNICEF Inclusive Education webinar booklet: [EMIS and children with disabilities](#).

Truancy indicators also serve to complement out-of-school and dropout figures. They are particularly important when dropout rates are likely to be underreported for various reasons. It could be that dropout of students of compulsory school age is a politically sensitive issue, whereby reporting dropout may lead to repercussions, such as less funding to the school, or other punitive measures. Another scenario is that non-attendance of compulsory-school-age children is not considered as 'dropout' in the sense of a (possible) permanent departure from school. In such cases the truancy indicator is even more important, as it may be the only way to monitor compulsory-school-age children and adolescents who are at risk of dropping out or have dropped out. In this way, truancy indicators can serve as a partial, proxy measure of dropout, since they can capture the population of children who are not regularly, or are no longer, attending school.

In general, truancy and absenteeism indicators are most useful for the issue of *children at risk of dropping out* – for interventions and early warning systems by school and community-level actors. Dropout indicators are most useful for the issue of *OOSC* – for statistical reporting for district-, regional- and national-level monitoring and policy-making.

Defining and recording absenteeism and truancy is further discussed in Step 6.

Establishing definitions of OOSC, dropout and late entry

The very first step to improving information on OOSC is to review – that is, examine and if necessary revise – the national laws and regulations on OOSC and related terms: late entry to school and dropout. The following questions need to first be considered in defining OOSC and dropout:

- What is the age range for compulsory school attendance according to national legislation? In addition:
 - At what age is a child legally mandated to enrol in school, and is there a specific reference date by which the child must be the given age?
 - How strictly is the age of school entry enforced, i.e. can a child enter any time after reaching school entry age, or is there a specified time period after reaching school entry age when a child must enrol in school? What is the procedure when a child does not enrol within this specified time period after reaching school entry age? Is late enrolment monitored so that action can be taken when this occurs?
- Is a distinction being made between being out of school and having dropped out? A definition of out of school should not be the same as the definition of dropout. OOSC figures should – in addition to dropouts – include children who have never been to school. This includes children of compulsory school age who may enrol late. Also discussed below is the issue of children enrolled in special schools.
- At what point is a child considered to have dropped out according to law or regulation? This is discussed under '*Establishing a definition of dropout*' below.
- How many days of school is a child allowed to miss before having to repeat the year or take an exam to continue to the next year?
- What kinds of absences are considered excused? In some countries, helping parents with seasonal farm work is an excused reason to be absent from school. This is discussed further in Step 6.

When considering how dropout should be defined, it can be useful to consider dropout as a spectrum. A student may be truant for 1 day, or 10 days, or 2 years – but at which point is the student considered to have dropped out? And does it count as dropout if the student is a long-term absentee due to an illness? How about when a student migrates abroad? Moreover, the dropout process is often gradual, and may start with occasional truancy, continue on to chronic truancy, and finally lead to a permanent departure from school. For such a slippery term, it is important to precise exactly what is

meant by dropout, or otherwise the number of dropouts can be significantly under-reported or over-reported.

It is important to precise exactly what is meant by dropout, or otherwise the number of dropouts can be significantly under- or over-reported.

Dropout can be defined in many different ways, and inconsistencies and ambiguities in dropout definitions are a common problem. Dropout definitions vary across and within countries, for different education programmes (for example, for children in regular schools compared to children in special schools for children with disabilities) and over time (due to modifications of the definition and formula). For example, Lehr et al. (2004) noted that in the United States there are inconsistencies in dropout definitions between states, between school districts, over time and for different education programmes. Establishing a consistent, clear and unambiguous definition of dropout, which is understandable to all school administrators, is essential in obtaining accurate figures on OOSC. Unclear definitions which are open to interpretation can lead to methodological inconsistency. It also has financial implications for schools and regions, as funding allocated to schools typically depends on the number of students enrolled. Dropout definitions therefore also need to be fair, in terms of providing an accurate snapshot of enrolment numbers per school during the school year.

Based on a review of the different forms of dropout definitions and their strengths and weaknesses, it is recommended that, at a minimum, the following criteria are considered in a dropout definition:²⁴

- The compulsory school age range, according to legislation, during which children or youth can be classified as dropouts (and OOSC).²⁵
- The reporting date on which schools are required to submit enrolment and dropout information.
- A clear specification of the kinds of absenteeism which are considered to be excused (such as suspension or school-approved illness). This is discussed in more detail in Step 6.
- A clear list of education programmes that are or are not included in the dropout calculation (which programmes students may attend and be considered as ‘in school’ – for example, whether night school or other alternative education programmes are included).
- A list of exclusionary conditions, for example: migrating abroad, transferring to another government-approved education programme (including a list of such education programmes), completed compulsory education, and death.

Below is a template for defining dropout based on the above criteria.

Template for defining dropout

A child or youth is considered to be a dropout if, as of [insert date], he or she is between age [insert starting age of compulsory education] and [insert ending age of compulsory education], and:

1. Was enrolled in school at some time in the past.
2. Did not attend school at all between the start of the current school year and [insert calendar date for school reporting of enrolment/dropout] and has no excusable reason for this absence.
3. Does not meet any of the exclusionary conditions.

Excused reasons for absenteeism are: [insert list].

Exclusionary conditions are: [insert list].

A template for defining an out-of-school child or youth is shown at page 28. It encompasses two groups: dropouts and children who have never enrolled in school.

Template for defining OOSC

A child or youth is considered to be out of school if, as of [insert date or regulation for age/time of school entry], he or she is between age [insert starting age of compulsory education] and [insert ending age of compulsory education], and has:

1. Dropped out, or
2. By [insert calendar date for school reporting of enrolment/dropout] has not enrolled in school and has not been enrolled in school at any time in the past.

²⁴ Based on Kominski, 1990; Lehr et al., 2004; Stillwell, Sable & Plotts, 2011; Thurlow, Johnson & Sinclair, 2002; Williams, 1987. Note that there is currently no international standard for defining dropout.

²⁵ In the absence of a compulsory school age range, such as in Bhutan, the age range from ISCED 1 (primary-school age) up to and including ISCED 2 (lower-secondary-school age) could be used.

Late entry into grade 1 of primary school has received surprisingly little attention in the literature on OOSC. Late entry should also be defined so that it can be monitored as a distinct group of OOSC. Monitoring of late entrants is particularly important because (i) late entry has been associated with dropout, and (ii) some children who may enter late may in fact never enrol in school, so these children need to be identified as early as possible.

Template for defining late entrants

A child or youth is considered to be a late entrant if, as of *[insert date]*, he or she is between age *[insert starting age of compulsory education]* and *[insert ending age of primary education]*, and by *[insert calendar date for school reporting of enrolment/dropout]* has not enrolled in school, and has not been enrolled in school at any time in the past.

Key OOSC indicators

As discussed in the Introduction, the Framework distinguishes between three groups of OOSC – *Visible OOSC*, *Semi-visible OOSC* and *Invisible OOSC*. Appendix 1 provides the definitions and calculation methods for these and other key OOSC indicators, as well as benchmarks for monitoring progress over time. Levels of disaggregation are also specified which would better enable the monitoring and analysis of OOSC, including the trends and patterns in OOSC characteristics at national and sub-national levels. Indicators for monitoring children at risk of dropping out from school are discussed in Step 6.

The indicators in Appendix 1 are not intended as an exhaustive list, but are to be included as part of a more comprehensive set of indicators used by countries for monitoring purposes.

Step 2: Prevent, detect and resolve data inaccuracies

Errors in data can be intentional or unintentional. Intentional inaccuracies can be prevented by providing greater incentives to accurately report attendance and dropout data. Unintentional inaccuracies can be prevented through data-quality management and cleaning procedures – to prevent data errors from occurring, as well as resolve those errors that are already in the system. These different approaches are discussed below. When children who are out of school are still *recorded* as in school – even though they dropped out (sometimes long ago) – they are considered to be *Semi-invisible OOSC*, as discussed in Step 1. Improving the accuracy of the data, particularly absenteeism records, is crucial to identifying these children.

Barrier: Information on OOSC and children at risk of dropping out is inaccurate

Both enrolment records and population data may contain inaccuracies, which affect the reliability of data on out-of-school children.

Even when clear and complete indicators and corresponding calculation methods for OOSC and children at risk of dropping have been established, this does not ensure that the data are accurate. As discussed previously, OOSC are typically identified by comparing enrolment records with data on the school-age population. Both sources of data may contain inaccuracies.

Inaccuracy of baseline population data

In some countries, population or civil registry data contain inaccuracies: they may not be sufficiently up to date in terms of recording births, deaths, or movement within or out of the country. This is particularly true for data quality at the local or municipal level, which are important for schools to identify school-aged children in their catchment areas who are not enrolled in school. Out-of-school figures based on population census data are unfortunately not always very accurate (Carr-Hill, 2012). A census is normally only carried out every 10 years, and population estimates become less reliable the longer the period since the last census. A highly mobile population can undermine the accuracy and reliability of out-of-school figures. In Albania, for example, 2011 census results indicated that the population had decreased by 7.7 per cent since 2001, whereas population projections from the 2001 census predicted an increasing population. The resulting OOSC estimates were therefore very inaccurate. In general, new population figures may be considerably smaller or larger than the old ones, and subsequently OOSC rates may also become considerably smaller or larger. Recalibrated databases and subsequent changes in estimates of OOSC tend to be even more pronounced in countries with relatively small populations. It is therefore important to consider how old the census data are, and also how reliable the census data and the sampling methodology are (for example, if the population count includes refugees).

'Age heaping' is another source of error in population census (as well as household survey) data. It entails the rounding of ages to numbers ending in 0 or 5 (for example 5, 10, 15, etc.) when there is uncertainty about the exact age of household members. In some countries, this can lead to significant inaccuracies in age-wise population estimates.

Information is not accurately recorded or reported at the school level

Significant errors can also exist in data collected by the school. Information may not be accurately recorded or reported for the following reasons:

- **Intentional:** Schools may deliberately report inaccurate information, if they have a greater incentive to report inaccurate figures than they do for reporting accurate figures. For example, if per-student financing has been implemented, reporting dropout or truancy may lead to reduced funding or threaten to reduce the number of teachers that can be employed by the school. Parents or the community may also apply pressure to not report dropout. This can lead to lower dropout figures and thus inflated enrolment figures. Children and parents themselves may also provide inaccurate information regarding the reasons for absenteeism, providing an excused reason (for example, illness) when the actual reason for absenteeism was not excused (for example, missing school in order to work). Sometimes students may not be actual dropouts, but rather skip school in order to receive private tutoring at home, especially prior to exams. For the proposed solutions to the problem of schools not reporting accurate information, see ‘Incentivising accurate reporting of truancy and dropout’, below.
- **Unintentional:** Schools may also report inaccurate figures because of one of the following reasons:
- **Overly complex or ambiguous forms:** If the forms to be filled in are too difficult to understand, or can be interpreted in different ways, this can significantly increase the error rate.
- **Lack of clear definitions, direction and support:** As discussed in Step 1, it needs to be clear when a child should be considered out of school, or at risk of dropping out. In the absence of clear definitions and guidelines there is a high potential for misinterpretation and confusion regarding the information that needs to be recorded. A common misinterpretation in some countries is to record children as dropouts when they have in fact migrated abroad or have transferred to another school. Another area where there is often a lack of clarity is in identifying children with disabilities. Simply asking teachers to identify which children are disabled or have a particular diagnosis tends to under-identify children with disabilities – especially those with mild or moderate disabilities. It is better practice to ask about children who have difficulty doing basic activities, such as seeing, hearing, walking, communicating, etc.
- **Errors introduced when recording information:** Data-entry errors are impossible to avoid, but can be *reduced* through well-designed forms and data validation checks, and *resolved* through data cleaning (for details, see Appendix 2). Errors can also be introduced each time data needs to be aggregated or copied for reporting purposes – for example, when information is copied from one form to another (particularly for non-electronic forms and if the forms use different formats).
- **Inaccurate determination of student age:** UIS research²⁶ has found that administrative records tend to count more students as being *within the expected age range* for the given education level compared to household surveys; the research findings suggest that the number of overage students may be underreported by schools.
- **Lack of staff capacity and training:** School staff may not be trained to complete forms or enter EMIS data, may be overburdened and may not have been assigned the explicit task of entering certain kinds of data. Even if forms are clear and unambiguous, completing forms takes time and – in particular for computer-based forms – a certain level of expertise. Schools do not always have staff with both the time and ability to accurately complete the forms.

²⁶ UNESCO, 2010b.

Lack of data validation and cleaning

The best approach to minimizing data errors due to mistakes during data entry is to prevent them from occurring. This can be done through good form design and data validation checks during data entry. However, it is impossible to prevent all data entry errors. Therefore, it is also important that 'data cleaning' is carried out on a regular basis to identify and correct incomplete, inaccurate and inconsistent data.

Poor form design, lack of data validation checks and data errors which are never identified can lead to highly inaccurate data. Causes of data-entry errors include:

- Overly complex or ambiguous forms, as discussed in the previous section.
- Poorly designed forms, for example:
 - Lack of consistency between forms, including different layouts, or different input types for the same information in different forms (for example codes in one form, full names in another form).
 - Open-answer fields which should be multiple-choice fields, such as school type needing to be spelled out as 'private' or 'public' instead of using a code (for example 1 = private school, 2 = public school). Open-answer fields are more likely to lead to errors in data entry.
- Absence of data validation checks, such as restricting the format of date of birth and numerical fields, detecting duplicate IDs, detecting inconsistent pieces of information, double data entry and so on.

For more details, see Appendix 2.

Incentivising accurate reporting of truancy and dropout

The incentive for accurately reporting student truancy and dropout should be higher than the incentive for not reporting this information.

The incentive for accurately reporting student truancy and dropout should be higher than the incentive for not reporting this information. Schools and other bodies reporting these figures should therefore be penalized for incorrect reporting and/or rewarded for correct reporting. As a starting point, it can be useful to make two lists and put them side by side: (i) a list of incentives for schools to report attendance and dropout accurately, and (ii) a list of incentives for schools to not report

attendance and dropout accurately (see Step 2). Of course, the first list should be longer and more compelling than the second list. Intentional non-reporting of absenteeism, and inflation of enrolment numbers by schools, are a problem in many countries. Schools have an incentive to inflate enrolment and hide absenteeism if this leads to increased school funding.

The following approaches are recommended to incentivize accurate reporting of OOSC:

- **Do not penalize reporting of OOSC and truancy:** It is absolutely critical that schools are not unfairly penalized for reporting of OOSC and truancy, and that schools do not fear that they might be unfairly penalized. Schools should instead feel reassured that they will be supported if they have high dropout numbers (discussed below), and schools should certainly not receive all the blame in case of high dropout rates. There are many factors which affect dropout which are not school-related (see also Step 6). The problem could also be that schools are simply not receiving the support they need. There are known cases in countries in the CEE/CIS region where schools have been unfairly penalized for reporting OOSC, for example by firing and replacing the school head in an area where dropout was largely unrelated to school factors (with reasons including children starting work at a very early age). It is unavoidable, however, for schools to be penalized if per-student financing is implemented as discussed in Step 2. Reporting dropout or truancy can have negative repercussions on funding made available to the school. The points below discuss various approaches for countering this potential disincentive to report accurate figures.

- Penalize the non-reporting of OOSC and truancy:** One approach is to fine those schools which have been found to inaccurately report OOSC or truancy. In addition, or as a complementary approach, schools could be penalized through a public ranking system. Failure to accurately report OOSC or truancy would lead to schools receiving the lowest accountability ranking, and this information could be published online and made accessible to the public. Schools which rank lowest in terms of accountability could be subject to increased school inspections or auditing. As an example, the Texas Education Agency assigns yearly Accountability Ratings for both schools and districts in the state of Texas in the United States (Texas Education Agency, 2000).²⁷ To ensure that schools accurately report dropout, a ‘Data Quality Measure’ has been included as part of the Accountability Ratings. Schools which fail to accurately report dropout data receive the lowest rating. This puts pressure on both schools and districts with schools that do not meet accountability standards, and this pressure can lead to improved accountability. As described in Step 5: ‘Using student-level absenteeism data to identify Semi-invisible OOSC’, if schools reliably report truancy, this information could be used to determine and calculate dropout without relying on schools to report dropout. School accountability could be included as one of the indicators to be monitored at the national and sub-national level.
- Incentivize the reporting of OOSC, truancy and children at risk of dropping out:** As indicated above, dropout can be the result of schools not receiving the support they need. It is crucial that schools do not feel that they only report figures and never receive anything in return. Information should flow both ways, as discussed in Step 4. Secondly, school staff should feel that the more detailed and accurate the information they provide, the better and more tailored will be the support they receive. A relevant concept is ‘vertical equity’, which refers to the application of differential funding levels for students whose needs differ – for example, ensuring that additional funding is allocated to students in high-cost areas (such as in rural and remote schools), or in expensive education programmes (such as programmes for students with disabilities). In a number of countries participating in PISA (OECD Programme for International Student Assessment), the data indicates that socio-economically *advantaged* schools are generally much better staffed and resourced compared to socio-economically *disadvantaged* schools.²⁸ This contrasts with the situation in certain Organisation for Economic Co-operation and Development (OECD) countries, such as Estonia, Germany and Poland, where socio-economically *disadvantaged* schools tend to be better staffed and resourced. The first step to addressing dropout in schools is not to punish those schools, but rather to investigate what the reasons for dropout are and how the schools could be better supported. Accurate reporting of truancy and dropout requires that the school staff is reassured it will be fairly treated and, ideally, receive additional support to better respond to the issues faced.
- Include a truancy indicator which is not linked to any repercussions:** If reporting dropout or extensive absenteeism or truancy has an immediate impact on staff time, it can be a disincentive to report. For example, it could lead to supplemental exams being organized for the student at the end of the school year, meetings being organized with parents, and arrangements made for mandatory repetition. Therefore, it can be beneficial to have one or more chronic absenteeism indicators that are used entirely for monitoring purposes, making it very clear that there are no consequences or repercussions associated with the indicator. For a list of indicators related to absenteeism and truancy, see Appendix 1.
- Record information in such a way that OOSC are difficult to hide:**

 - It is recommended that teachers record not just ‘absenteeism’, but also ‘attendance’. Recording of attendance needs to become a habitual process – a daily routine – so that this important activity is done consistently. Ideally, the attendance register functions as a checklist which always needs to be

²⁷ <http://ritter.tea.state.tx.us/perfreport/account/index.html>

²⁸ Schleicher, 2012.

completed, and not just when a student is absent. If *only* absenteeism is recorded, it may not become a routine and it is therefore more likely to be forgotten or omitted.

- In addition to attendance, teachers normally also record other information on each student – such as grades on assignments and tests, a personal diary and so on. If this information is recorded in the EMIS instead of (or in addition to) paper-based records, it would allow the automatic identification of children where this information is missing, warranting an investigation to check if this child is still attending school. It is difficult to falsify attendance records of a student if one has to also falsify a student diary, assignment and test grades, and so on. Therefore, having checks on this information could also be an important deterrent to falsifying attendance.
- **Automated monitoring and cross-checking of information to identify incorrect reporting of OOSC:** Automated checks can be done to detect anomalies which either signify non-attending children who have not been recorded as such, or mistakes or lapses in data entry, namely:
 - Automated checking of information for the same student as recorded by different schools (School Management Information System [SMIS] only).
 - Automated cross-checking of the EMIS with other sources of information about the child, for example if the child is registered as living in region X, she/he can no longer be enrolled in a school in region Y (SMIS only).
- **Regular school inspections (without prior notification to schools) during which information is cross-checked to identify incorrect reporting of OOSC:**
 - School inspectors verify information between different school forms recording the same information.
 - School inspectors verify that day's attendance records with actual class attendance.

School inspectors have (or should have) the important responsibility of verifying whether student absenteeism is accurately recorded, and checking that students registered as enrolled are actually attending the school. The problem with cross-checking school registers with actual attendance is that there are ways of 'fixing' the school registry when there is an inspection.²⁹ An innovative solution adopted in India is described below.

Another potential issue is the existence of 'non-existent' (or 'ghost') students. Such students could be identified by tracking students through a centralized EMIS (see 'Tracking student movements within the country' under Step 4) and cross-sector information exchange (see 'Incentives for cross-sector cooperation' under Step 5). The problem of 'ghost students' is similar to the issue of 'shadow schools' (non-existent schools) and 'ghost teachers' (non-existent or absent teachers), which can account for a large proportion of the education budget in some countries. For example, in India, Indonesia, Peru, Uganda and Zambia the estimated cost of teacher absenteeism as a percentage of current expenditure on primary education ranged from around 10 to 24 per cent.³⁰ This highlights the importance of monitoring the existence and presence of students and teachers in schools. The scope of the issue of ghost students is less well known, but it is likely to also have significant financial implications in some countries.

²⁹ Two strategies which have been described by education experts during country visits are:

(i) Schools keeping one 'real' daily register kept for inspectors in case they visit (which matches the actual school situation), and a second register for the records in which student absenteeism is hidden.

(ii) Placing a dot next to every absent student and a tick next to every present student. At the end of the day, the dots are turned into ticks (indicating absent students are present), but when an inspector visits, the dots are converted into 'X's.

³⁰ See Patrinos & Kagia, 2007. Note that not all absenteeism is a sign of corruption, but in some countries, unjustified absenteeism for teachers and students is a significant, widespread issue.

Country example 1. Mobile-phone-based digital attendance monitoring in India

EduTrac is an innovative mobile-phone-based data-collection system which was pioneered by UNICEF in Uganda in partnership with the Ministry of Education and Sports.³¹ The Indian version of EduTrac was launched by UNICEF in partnership with the Government of India's *Sarva Shiksha Abhiyan* ('Education for All Movement') programme, and in 2015 covered 15,000 government schools in the states of Assam, Chhattisgarh, Karnataka and Madhya Pradesh.

EduTrac is not just useful for monitoring attendance and other key school information; it is also a system for *verifying the accuracy* of attendance reporting by schools, and for instilling a sense of the importance of school attendance. If this information is acted upon, it should over time lead to more accurate attendance reporting, and higher attendance by teachers and students. In India, where both student and teacher non-attendance are huge problems, EduTrac can be used by cluster coordinators who monitor around 20 schools in their area to check if reported attendance matches actual attendance. Unlike school records, which could be changed after the fact, EduTrac records cannot be modified once reported. EduTrac collects information real-time and makes the information instantly accessible via a web-based dashboard to relevant stakeholders, including the cluster coordinators.

A key factor in the success of EduTrac is that it requires only a basic mobile phone and mobile network coverage.³² Other real-time monitoring systems generally require working computers or smartphones, reliable power and Internet connectivity. EduTrac collects information via SMS or the Interactive Voice Response System (IVRS). IVRS is the approach used in India. It is a system which calls school respondents at set times and uses a pre-recorded dialogue system to request information which respondents then enter into the mobile phone. It may include both frequent information collection, such as daily or weekly student and teacher attendance, and one-time or infrequent information collection, such as school infrastructure availability and functioning.

Other factors which are critical to the success of EduTrac are (i) ensuring that school respondents do not have to pay any fee for providing information (whether via SMS or IVRS), (ii) keeping the time required for responding to information requests to 2 minutes a day (or less), and (iii) ensuring the information requests are in the local language.

Data quality management

There are two key aspects to data quality management. The first is to prevent data errors from occurring, and the second is to fix problems in the data in a process known as data cleaning. It is always preferable, and much less costly, to prevent problems from occurring as much as possible. Data errors will inevitably occur, however, and therefore data checks – which can be automated – need to be conducted on a regular basis, and there needs to be a clear procedure for fixing those errors.

³¹ See http://www.unicef.org/education/files/EduTrac_Documentation_-_March_2013.pdf and also the related initiative Ureport (<http://www.ureport.ug/>), a free SMS-based system through which Ugandans can speak out on what is happening in their communities.

³² Not all schools have network coverage nor does school staff always have access to a mobile phone, so this solution is not applicable everywhere. In India, for example, tens of thousands of villages are not covered by mobile connectivity, although the situation is changing rapidly.

Approaches to reducing errors made in data entry include good questionnaire or form design, clear and unambiguous instructions, and built-in validation checks. Procedures for fixing or ‘cleaning’ data errors include identifying and removing duplicates, and identifying and fixing incorrect IDs, records with missing but required data, validation errors (such as numbers which are out of range) and data inconsistency errors.

Data quality management and corresponding procedures are described in detail in Appendix 2.

Community involvement in improving data accuracy

Save the Children and UNICEF in partnership with national governments have piloted Community-based EMIS (also called C-EMIS or CEMIS) in a number of countries in South and Central Asia (Bangladesh, Kyrgyzstan, Nepal, Pakistan, Sri Lanka and Tajikistan).³³ Involving the community is an excellent approach to improving the accuracy of data and in particular for identifying *Invisible OOSC*, such as through household visits. It is also an opportunity to foster collaboration between local stakeholders such as youth, parents, teachers and local government representatives, and develop their capacity to collect, record and monitor quantitative and qualitative data. Furthermore, C-EMIS can also increase local ownership and accountability.

To be most effective, C-EMIS should not be a separate data collection from EMIS but rather be used to complement and verify information in the EMIS. Formal procedures could be established to cross-check EMIS data with C-EMIS data, and follow-up on any discrepancies in order to improve the accuracy of EMIS data. See also Step 5, which discusses means of horizontally sharing and linking information between ministries and organizations.

⁶ See also: Basher, 2010.

Step 3: Update and extend EMIS to incorporate new indicators and methodologies

As discussed in Step 3, a well-designed Education Management Information System is essential in establishing a successful monitoring system.³⁴ In order to be capable of producing the indicators related to monitoring OOSC discussed in this step, the EMIS needs to:

- Include information on enrolment by single year of age.
- Incorporate absenteeism data and distinguish between excused and unexcused reasons for absenteeism.
- Add data on children who have never been to school.
- Distinguish between different reasons for dropout.

In order to produce the indicators related to monitoring OOSC, the EMIS should include school-level data (such as those related to accommodating the needs of children with disabilities), as well as person-level data (such as the student dropout risk indicators discussed in Step 6). Incorporating these capabilities may entail extending the current capabilities of the EMIS, or may even require a complete redesign, as well as revised procedures for collecting information. As the EMIS collects more information as well as a greater variety of data, EMIS training and data quality management (see also Step 2) become increasingly important in order to ensure that data are correctly entered and are reliable.

There is a global trend of moving towards more sophisticated Education Management Information Systems to improve the monitoring and overall functioning of national education systems. Two key developments – the school-level recording of person-level data, and connecting EMISs with other databases – are discussed below.

This section provides insight into the basic requirements of an EMIS if it is to be used to successfully monitor OOSC and children at risk of exclusion. More detailed information and specifications for the design and development of the EMIS can be found in Appendix 3.

Barrier: EMIS cannot incorporate new indicators and methodologies

The EMIS varies significantly between countries in scope and capability.³⁵ It may include data on students, school staff, enrolment, finances and school characteristics and performance. In some countries, the EMIS incorporates most or all education data. In others, the data are spread across different departments and databases, and may be further spread across various administrative levels (discussed in Step 4 below).

Many of the obstacles discussed above can only be resolved if the EMIS is extended, updated or re-designed to incorporate new functionality. This includes the capacity to generate student statistics by single year of age and other levels of disaggregation, incorporate student absenteeism data (including reason for absenteeism) and add dropout risk indicators.

A significant challenge is moving from a system which records data at the aggregate level to one which records

³⁴ See 'Introduction – The Education Management Information System (EMIS)' for a brief introduction.

³⁵ And potentially within countries as well, if different regions manage their own EMIS.

data at the person level. This can be done by establishing a School Management Information System in which information can be entered at the school level and uploaded to the EMIS. If the EMIS is web-based, then the SMIS can function as an extension of the EMIS, enabling schools to enter data directly into the EMIS. The implementation of an SMIS and its key advantages are further discussed in Step 3.

There are several technical requirements that can be a barrier to the implementation of an SMIS which is linked to the EMIS. A school requires at least one dedicated computer, a staff member with the time and technical skills to enter the data, and reliable (though not necessarily continuous) Internet connectivity. In spite of these barriers, several CEE/CIS countries have already implemented such a system, and several more are in the process of doing so.

The following are the drawbacks of having only aggregated EMIS data recorded electronically (at the school level or typically a higher level of aggregation such as the regional level), as opposed to person-level data:

- It limits the kinds of analysis which can be carried out. For example, it would typically not be possible to disaggregate and analyse data based on characteristics associated with risk of exclusion from education (such as absenteeism, disability, etc.).
- It is not possible to identify *Semi-invisible OOSC* who are missing in school enrolment records but can be found through other databases. This requires person-level data for the databases to be cross-referenced. This is further discussed below.
- It is not possible to (automatically) calculate the exact age of all enrolled children from their dates of birth. This is needed to accurately determine if a child is of compulsory school age, and hence can be considered as 'out of school'. This also affects the reliability of OOSC rates, which is further discussed in Step 1.

In addition, with (largely) paper-based systems, information is more likely to be outdated and contain errors:

- Paper-based forms increase the delay between data collection and dissemination. It is more time consuming, as data needs to be recorded at least twice, once on paper (or more, if it is re-recorded at district or higher levels) and once again electronically. Some data may never be entered electronically, which limits its use and dissemination beyond the level where the data are archived. In addition, schools sometimes have to complete multiple forms containing the same or similar information – processes which could be automated if the data are entered immediately in electronic format.
- Unlike electronic forms, paper-based forms cannot have built-in data validation checks, which can lead to a much higher error rate when entering or recording information. Errors can also be introduced when individual-level data are aggregated manually.

An EMIS based on paper forms or aggregated data can therefore be one of the greatest barriers to improving the monitoring of OOSC and children at risk of dropping out. However, from a technical point of view the barrier can be overcome as long as there is political will, sufficient funding and a competent team of EMIS developers who are able to understand the needs of end-users. With the rapid evolution in the availability, sophistication and facility of implementing new information technologies, this technical barrier can be expected to be reduced over time (although possibly countered by rising ambitions and expectations for information technology). On the other hand, the institutional and organizational barriers can be more difficult to overcome. These are discussed in the following sections.

School Management Information System

An important EMIS development is to ensure that school and student data are digitized and are part of – or report to – the EMIS. An application which manages school and student information is known as a School Management Information System, School Information System or Student Information System. If the SMIS has been developed as a web-based extension to the EMIS, then information from schools can be entered directly into the EMIS by school staff through the web interface. In such cases, the entire system may be referred to as the EMIS, rather than as separate entities (EMIS and SMIS). An alternative system is one where school staff enters information through installed software on a computer that is linked to the EMIS. In this case, the application and/or the application administrators should ensure that the relevant information is regularly reported to the national EMIS when Internet connectivity is available. To avoid confusion, SMIS is used henceforth to refer to the school-side information system, regardless of whether it is an extension of the EMIS or a separate system.

The implementation of an SMIS makes data on individual students accessible at the national level, as well as any other administrative levels if permission is granted and the data are made accessible via the web. It also ensures that data are more up-to-date, in particular if the SMIS is web-based, in which case the EMIS always reflects the current situation as far as schools themselves keep their records up to date.

Prior to SMIS, data from schools may have been entered at multiple levels (for example community, regional and national) and data lost along the way – as it is often aggregated at the regional or province level and databases at different levels are not linked. As a result, data at lower-level administrative divisions (such as the level of districts, towns, communities and schools) is usually not available, at least not at the national level. Through SMIS, theoretically data at all administrative divisions can be monitored, even at the level of the individual.

Privacy provisions are an important safeguard of this detailed information (see Step 4: ‘Privacy and data protection’). By recording data on individual students, it becomes possible to track them as they go from one school to another (which might otherwise be incorrectly recorded as a dropout), and implement mechanisms to support individual students according to their needs. Without SMIS, a monitoring system is generally limited to monitoring at the national level to inform national

By recording data on individual students, it becomes possible to track them as they go from one school to another, and implement mechanisms to support individual students according to their needs.

strategies and policies. SMIS enables (more effective) monitoring at regional and local levels, as well as the implementation of strategies and policies which directly target specific communities, schools as well as students.

There are many kinds of questions which can be answered thanks to SMIS which are (likely) unanswerable without such a system in place, such as:

- How many children are absent frequently or for long periods of time at the district/community/municipality/school level? (Including the flexibility to modify the frequency and period of absenteeism in order to monitor different levels of absenteeism).
- What is the rate of OOSC at the district/community/municipality/school level?
- Which districts/communities/municipalities/schools have the highest rate of OOSC?
- Which districts/communities/municipalities/schools have a large proportion of students at risk of dropping out?
- Which factors lead to dropout in certain districts/communities/municipalities/schools?
- Which strategies could be implemented to reduce dropout in certain districts/communities/municipalities/schools with high levels of dropout?

Listed below are some key characteristics and advantages of an SMIS over traditional paper or electronic forms.³⁶ Of course, these advantages only apply if the SMIS is well implemented and used, as a poorly functioning or underused SMIS will not improve the monitoring of out-of-school and at-risk children.

Timely data: An SMIS can lead to much more timely data, assuming that the SMIS regularly reports data to the EMIS. If schools enter data directly into the EMIS, then the EMIS will even have real-time information which shows the current situation in schools. In contrast, without such a system in place, schools may submit information only a few times a year, so available data may be several months or even up to a year old. This enables better decision-making based on recent or reasonably recent data, rather than data which may be outdated and no longer accurate.

Greater flexibility and responsiveness to needs: An SMIS is more flexible and responsive to changing needs, in particular if it is completely web-based. A web-based system can evolve and improve based on current and future information needs, and be updated instantaneously as all schools always access the latest version through the web. In contrast, it can be tedious and costly to update electronic or paper-based forms in all schools.

Accessible anytime, anywhere, by anyone: An SMIS – assuming it is at least partially web-based – can theoretically be accessed anytime, anywhere and by anyone, enabling stake holders at different levels (for example national, regional and school) to access information relevant to their needs. This requires a system where both the provision and presentation of information is adapted to the needs of different types of users, as discussed in Step 7 below. Some SMIS even enable relevant information to be accessed by parents and students.

Automatically determining when a student is at risk of dropping out, is about to drop out, or has dropped out: As discussed in Step 1 – ‘Establishing a definition of ‘dropout’ – an SMIS could provide alerts to school staff when a student is at risk of dropping out, about to dropout, or has dropped out. The EMIS should at least be able to determine whether a student has dropped out based on the provided absenteeism records, including the reasons for absenteeism, without necessarily requiring schools to determine and report dropout.

Data display: An EMIS which includes an SMIS can only be useful as a monitoring system if it can output and display data in a meaningful way for stakeholders and decision-makers. This is an essential step, which if properly implemented can significantly improve the usefulness of the system for monitoring and decision-making.

Cost savings: Although an SMIS can be costly to implement in the short-term, it can lead to significant cost savings in the long term by reducing the need for filling in the same information multiple times, at the school level and beyond the school level. The experience of Armenia indicates that the introduction of an SMIS can be done at relatively low cost (assuming that schools already have a computer for administrative purposes and Internet connectivity); the main cost factor is the training of school staff to use the SMIS system.

Improved data quality: When well implemented an SMIS can significantly reduce errors in the data, as data are entered just once, reducing the introduction of errors currently occurring through copying/transferring of information from one entity to another. Electronic recording of information also enables error prevention and automatic error checking to be built in to the system (see also ‘Data quality management’ in Appendix 2).

More accurate data on OOSC and at-risk children: Because an SMIS can lead to better data quality as well as the monitoring of individual children, it can lead to significantly more accurate figures and general information on OOSC and at-risk children.

³⁶ Electronic forms are different from an SMIS in that an SMIS is considered to be a database system which is connected to a national education database, i.e. the EMIS. In contrast, electronic forms are independent files or spreadsheets which are only stored locally on the school's computers, and need to be submitted manually (rather than automatically) just like paper-based forms.

Note: in the context of this report, SMIS is not considered as a separate system to EMIS, nor as a replacement, but rather as an extension of the existing EMIS (extending the management of information to the school level).

Figure 7 shows an example student administration screen from OpenEMIS, an open source EMIS – initially developed by UNESCO – with built-in SMIS features.³⁷

Figure 7. Example EMIS student administration screen from OpenEMIS

The screenshot displays the 'Edit' page for a student named AAIZ MUHAMMAD. The interface includes a left-hand navigation menu with sections for 'GENERAL' (Overview, Attachments, More) and 'DETAILS'. The main content area is titled 'Overview' and contains the following fields:

- Information:**
 - Identification No.: 3540109726995
 - First Name: John
 - Last Name: Doe
 - Gender: Male
 - Date of Birth: 30 - May - 1996
 - Profile Image: Choose File (No file chosen). Max Resolution: 400 x 514 pixels, Max File Size: 200 KB, Format Supported: jpg, jpeg, png, gif.
- Address:**
 - Address: 1 School Road Learnville
 - Postal Code: 232323
- Address Area:**
 - Country: Papua New Guinea
 - Province: EAST SEPIK PROVINCE
 - District: ANGORAM
 - LLG: ANGORAM / MIDDLE SEPIK

³⁷ <http://www.openemis.org>

Student-level data requirements

The following is a proposed minimum set of data fields for recording information on each student in the EMIS, which would enable the calculation of key education indicators as described in Appendix 1.

1. Name.
2. Student/Education ID.
3. National/Person ID (this would be an ID which is also used in other databases, e.g. a birth certificate number).
4. Date of birth.
5. Sex.
6. Contact details (for example address, phone number).
7. Grade (for each year enrolled, in order to track grade repetition).
8. Daily attendance register.
9. Previous enrolment in pre-primary or early learning/childhood development programmes:
10. none, < 1 year, 1 year, 2 years, > 2 years.
11. Academic records (test/exam results).
12. Additional fields such as dropout risk and disability indicators (see Step 6).

Linking the EMIS with other sources of data

Another EMIS evolution is to link it with other databases to facilitate information exchange. In order to identify *Semi-invisible OOSC*, as well as better identify children at risk of dropping out, the EMIS would need to incorporate data from other sources (or alternatively, a separate database system could incorporate data from EMIS as well as other sources).

Even education-related data are often managed by different institutes and in different databases. A key aspect of EMIS development is integrating this data from multiple sources, at different levels of education administration. For example, there may be separately managed databases for data related to OOSC (such as enrolment and dropout), data which could be used to identify children at risk of dropping out (such as achievement and absenteeism), data related to school environment or quality (such as school and teaching resources and teacher qualification), as well as databases at different levels (such as a school-level database, a regional-level database and a national-level database).

When databases are linked, many kinds of previously unanswerable questions can be answered, such as:

- How many and what proportion of children with disabilities are out of school?
- What kinds of disability are most common for children out of school?
- How are dropout risk factors related to actual dropout?
- How is the school environment related to learning achievement?
- Identifying *Semi-invisible OOSC*: How many compulsory-school-age children recorded in non-EMIS databases (such as the civil registry or health database) are not in the EMIS, and are therefore potentially out of school? In Georgia, for example, the EMIS is linked to the civil registry database, which enables one to cross-reference the list of children in each database.

Cross-sector information sharing is discussed in more detail under Step 5 below.

Pilot-testing and training

Staff members need to be trained to use the new or modified database platform. A ‘pilot test’ could be organized in certain districts or regions to test the new platform. It would need to be tested by a variety of users with different requirements (for example users at different administrative levels – school, district, region and national) to get their critical feedback and suggestions, so that their inputs can be used to improve the platform before the final version is developed and deployed nation-wide. Training and testing, therefore, need to be conducted *during* the development of the EMIS.

It is worthwhile to invest in making the EMIS as easy to use as possible, such as by making the interface intuitive and user-friendly, developing good user documentation, and providing help text and guidance within each screen and for every input field. This not only improves usage and reduces errors, but also reduces the need for training and support – which are among the most costly aspects of implementing a new EMIS. See also Appendix 3 for details.

Frameworks for assessing EMIS quality

The following sections briefly describe several frameworks or diagnostic tools which can be used to assess and improve EMIS quality. These are generally applicable frameworks for improving EMIS quality, and are not just for improving the monitoring of OOSC and children at risk of dropping out.

Education Data Quality Assessment Framework (Ed-DQAF)

The Education Data Quality Assessment Framework (Ed-DQAF) was developed by UIS and the World Bank and has been used primarily in Sub-Saharan Africa to assess the quality of national education data systems. It is a diagnostic tool for assessing the whole data production process based on six dimensions:

- Pre-requisites for quality (legal and institutional environment, resources, relevance, quality awareness).
- Integrity.
- Methodological soundness (professionalism, transparency, ethical standards).
- Accuracy and Reliability (concepts and definitions, scope, classification, basis for recording, source data available, source data regularly assessed, statistical techniques, regular assessment of intermediate data, revision studies).
- Serviceability (data disseminated are timely and at regular intervals, statistics are consistent).
- Accessibility (statistics are presented in a clear manner, accessible and pertinent metadata, user assistance).

During a fact-finding mission, a group of experts discuss each of the 140 practices of the DQAF and score it using a dedicated matrix. Recommendations and an action plan are then produced from the findings of the assessment.

SABER EMIS Assessment Tool

As part of the Systems Approach for Better Education Results (SABER) initiative, the World Bank developed the SABER EMIS Assessment Tool, which draws from a number of tools including the Ed-DQAF. It can be used to evaluate both the quality of the data and the EMIS itself, and is based on the following four core policy areas:³⁸

- **Enabling environment:** Assessment of intended policies in relation to a sustainable infrastructure and human resources that can handle data collection, management and access.

³⁸ Abdul-Hamid, 2014.

- **System soundness:** Assessment of the degree to which the processes and structure support the components of a comprehensive information management system.
- **Quality data:** Assessment of the degree to which an EMIS system accurately collects, securely saves, and produces high-quality, timely information.
- **Utilization for decision-making:** Assessment of the reality of system implementation and utilization of EMIS information in decision-making.

ISO 9000 – Quality management standards

The ISO 9000 series is a widely used family of international quality management standards.³⁹ These standards provide guidance and tools that can be used to evaluate and improve EMIS quality and improve decision-making informed by data.

The ISO 9000 series defines eight quality management principles:⁴⁰

- Principle 1 – Customer focus.
- Principle 2 – Leadership.
- Principle 3 – Involvement of people.
- Principle 4 – Process approach.
- Principle 5 – System approach to management.
- Principle 6 – Continual improvement.
- Principle 7 – Factual approach to decision-making.
- Principle 8 – Mutually beneficial supplier relationships.

³⁹ http://www.iso.org/iso/home/standards/management%E2%80%90standards/iso_9000.htm. See also

⁴⁰ http://www.iso.org/iso/qmp_2012.pdf

Step 4: Close gaps in vertical information flows between local, regional and national levels

Vertical information flows refer to information exchange from the local level to the national level and back to the local level. This step discusses potential areas where information loss can occur and how to address them.

Barrier: Gaps in vertical information flows from the local to the national level

Information loss refers to important education information which remains at the level of the school or education institution and is not shared vertically. There are various ways in which such information loss occurs:

1. **Data aggregation:** The process of aggregating data as it is shared with higher-level education authorities. For example, schools may have data on each individual student, but send only the aggregated data (such as total enrolment by sex and grade) to the district office. The district office collects data for each school, but sends only the aggregated data for the district (such as total enrolment in all district schools by sex and grade) to the regional office, and so on.
2. **Non-reporting by institution:** A second type of data loss concerns education institutions which do not report any information (including enrolment data) to the ministry of education. Depending on the country, this may include pre-schools, child-care services, private schools, private monastic institutions, special schools for children with disabilities, and so on. Sometimes this information is collected by another ministry – and in this case it may require horizontal rather than vertical information exchange (see Step 5).
3. **Non-reporting by type of data:** A third type of data loss concerns certain types of data which are excluded in reporting to the ministry of education. Absenteeism data, or the condition of school infrastructure, for example, is often not reported by education institutions.

A key barrier to closing gaps in information flows is the significant organizational changes it may require, in addition to the technical changes (as described in previous sections, for example the implementation of a School Management Information System). If information is entered at the school level, it reduces the role of district or regional offices which were previously responsible for this process. It requires school staff to take on new responsibilities. It also leads to new responsibilities at the regional and/or national levels, where it now becomes possible to perform sophisticated analysis and monitoring of the situation of OOSC and children at risk of dropping out, including tracking their movement within the country. It raises privacy concerns, regarding the safeguarding of sensitive information on children and adolescents, ensuring that confidential information does not fall into the wrong hands (see also Step 4: 'Privacy and data protection' for some of the privacy issues concerning the exchange of information on individuals). All these organizational changes can lead to resistance by the persons affected and become barriers to change. It is therefore important to advocate the benefits to those affected by changes in vertical information flows. For example, improved vertical information flows can significantly reduce the school workload if duplicate information reporting requirements are streamlined to just a single reporting process.

Preventing information loss through a School Management Information System

Information loss from data aggregation can be prevented with a web-based SMIS, in which data entered at the school level goes directly into the EMIS and bypasses all administrative levels in between. If it is not feasible to establish a web-based SMIS (at least not in the short term), then the alternative approach is to identify points where the data are aggregated. To avoid data loss, the reporting procedures would need to be modified to ensure *all* data flows vertically to the national level and not just the aggregated data. If this is also not feasible, for example due to technical constraints, then the levels of disaggregation required for the analysis should be established (see also Step 1) and at least these levels of disaggregation should be maintained.

Figure 8. Information loss in vertical information flows

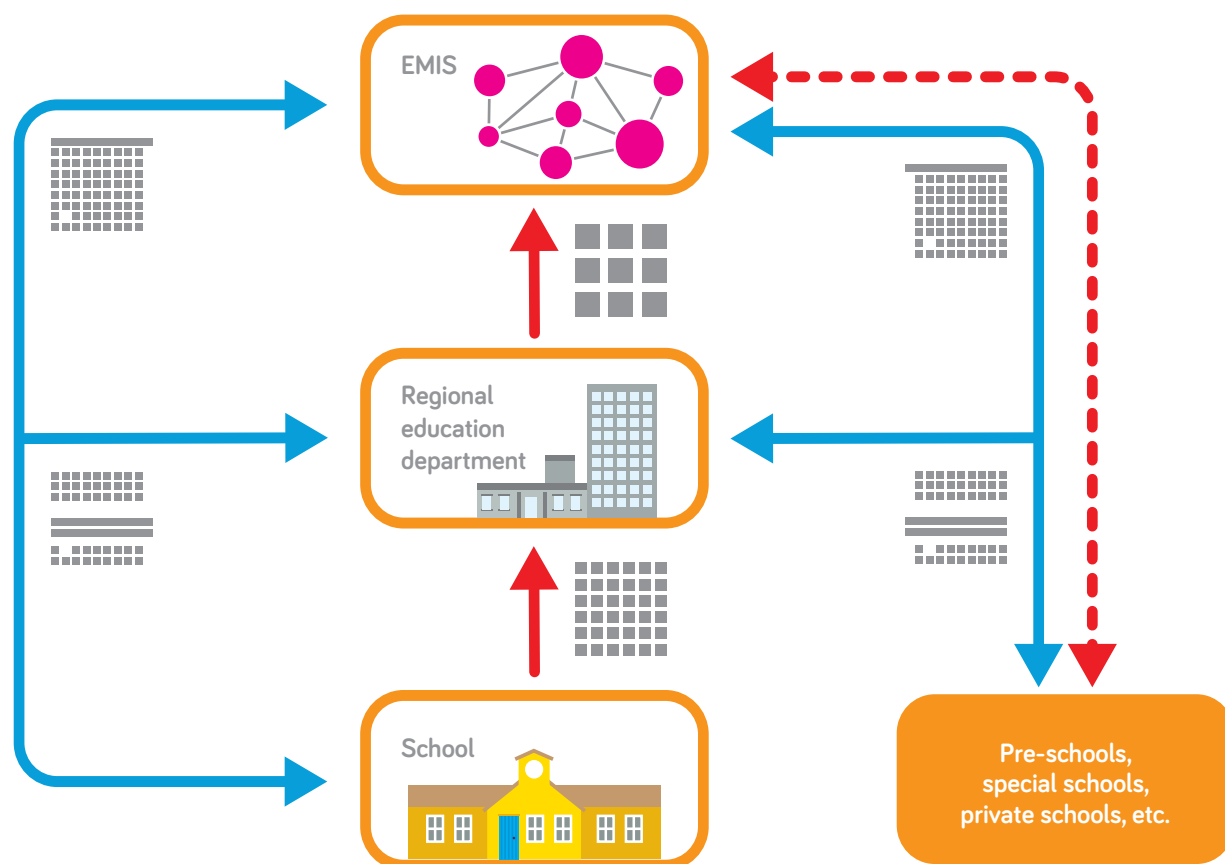


Figure 8 provides a simplified hypothetical view of information loss in vertical information flows, based on the situation in some countries prior to the establishment of a country-wide SMIS (which reports information directly from the school to the EMIS as discussed in Step 3). In this example, the red upward arrows in the centre represent aggregated school-level information provided from the school to the regional education department. The regional education department in turn passes on the data to the ministry of education. At each step, information is further aggregated and information is lost. For example, the regional education department receives school-level data, so student-level information is lost. In the next step, the ministry of education receives regional-level data, so school-level data is lost. The left-hand-side green arrow indicates how information loss can be prevented by providing student-level data directly from the school to the national level. It also indicates information flows back from the national to the regional and school levels, which is discussed under ‘Two-way information flows’ below. The dashed red arrow on the right-hand side illustrates potential information

gaps from pre-schools, childcare services, private schools and other educational institutions, which in some countries do not report information (such as enrolment) to the ministry of education. The right-hand-side green arrow indicates how information loss can be prevented by requesting that these educational institutions send data electronically to the EMIS, such as by providing a log-in to a web-based SMIS, or via other means of reporting electronic data to the EMIS. The aggregation of data is represented by the size of the dotted squares, with the smallest dots representing student-level data being reported directly to the EMIS, and bigger squares representing aggregated data (for example, school- or regional-level data).

To avoid errors being introduced, data should be entered electronically as early as possible, ideally at the school level. If the school submits data in written form, this means that the district or regional office has to enter data for many different schools. Mass data entry has a great potential for errors, because efficiency can be at the cost of accuracy. At the school level, the persons entering the data are aware of the school context and are more likely to detect any problems with the data. Since this person is in the school, any concerns about the data can be directly followed up. If the school has no Internet connectivity, the data could be sent through USB flash drives or other data storage devices, and then merged electronically at the regional or district office. Once the data are in electronic format, data aggregation can be done automatically. It is recommended that manual aggregation of data is avoided if at all possible, to avoid human error.

To identify information flows and potential gaps, it is useful to map them as shown in Step 5: Figure 10. Horizontal information flows and gaps in information flows. While this is a simplified mapping, a more complete mapping could show both vertical and horizontal information flows. It should include all the key organizations and departments which play a role in these information flows. Its main purpose would be to identify potential gaps in information flows, as well as duplicate data collections. As horizontal and vertical information flows can change rapidly, such a mapping represents a snapshot in time and would need updating as the situation changes.

Tracking student movements within the country

An important advantage of a centralized EMIS with student-level data is that it enables the tracking of student movements within the country. Without such a system, it can be difficult to determine whether a student has dropped out in a particular region or locality, or has simply moved to another region or locality. Student-level data also prevents duplication, where students may be enrolled in multiple schools – inflating student enrolment numbers and wasting the education budget on non-existent students. To track student movements, an important requirement is that students have a unique ID (for example, a student ID) which follows them wherever they go, be it a pre-school, regular school, special school or training institution, etc. Ideally, all education institutions and places where school-age children may reside would report to a centralized EMIS, so that the education status of all school-age children can be monitored.

Expanding the range of data shared by schools

As discussed previously in Step 4, certain types of data collected by schools are often not reported to the ministry of education. While some of this data may only be relevant at the school level, certain types of data could be used to improve the monitoring of OOSC and children at risk of dropping out.

In particular, absenteeism records provide a means of determining dropout, and can thus be used to identify *Semi-invisible OOSC*. *Semi-invisible OOSC* include children and adolescents who no longer attend school

but are still enrolled. In some countries this could be a large group of children, and thus enrolment figures could be significantly overestimated.⁴¹ This could be for various reasons. For example, if there are no clear criteria for establishing when a student is considered a dropout it could often go unreported (as discussed in Step 1), while schools may be reluctant to report dropout if it reduces school funding.

To use absenteeism records to determine dropout, schools first need clear, unambiguous criteria for establishing dropout consistently. As discussed in Step 1, they include being able to distinguish between excused and unexcused reasons for absenteeism, defining dropout in terms of a specific number of consecutive days of unexcused absenteeism. The second requirement is electronic registration of absenteeism at the student level. If absenteeism is already recorded electronically in schools (which is the case in some countries), there may be no need to rely on schools to report dropout if the system could automatically determine dropout based on these records.

Two-way information flows

Information reporting should be an equal exchange, where those who report information also receive information in return which is useful to them.

Information needs to flow both up and down; all too often it flows only up from the school level to the national level. It should be an equal exchange, where those who report information also receive information in return which is useful to them. This is also an incentive to provide accurate information.

A key advantage of sharing information from top to bottom is that it can provide comparative information. It can allow schools to compare their situation with other schools in the area, region or nationally, and district and regional offices can similarly compare their situation with other districts or regions. This allows them to conduct their own analysis, set their own benchmarks and measure their own performance relative to others (for example, in terms of reducing dropout rates). The My School website⁴² in Australia, for example, provides detailed information on nearly 10,000 schools in the country. Anyone, including school staff and parents, can find detailed information for their own school as well as other schools (in their neighbourhood, or nationally), including: general information about the school, enrolment figures, school finance data, student attendance rate, school literacy and numeracy test results, and the school's Index of Community Socio-Educational Advantage (ICSEA).⁴³ Ideally, it should inspire collaboration rather than competition, and encourage schools, districts and regions to learn from each other.

Privacy and data protection

If person-level data are recorded and included in the EMIS as discussed in Step 3, privacy is a concern. Some of the possible data-protection measures to be taken when establishing data-sharing agreements include:

- **Password protecting data**, ensuring that only authorized persons have access to this data.
- Establishing **security procedures**.
- **De-identifying data**, removing personal identifiers such as name and birth certificate number from the data.

⁴¹ In some countries children who do not return to school in a given school year are not explicitly reported as having dropped out, but are nevertheless still reflected in the reduced enrolment figure for that school.

⁴² <http://www.myschool.edu.au>

⁴³ The ICSEA was created to enable meaningful comparisons of National Assessment Program – Literacy and Numeracy (NAPLAN) test achievements by students in schools across Australia, as key factors in students' family backgrounds have an influence on students' educational outcomes at school. See also: <http://www.myschool.edu.au/AboutUs/Glossary#G2>

In case individual data are de-identified, personal identifiers may be replaced with a key. This key could be used by authorized persons to re-identify the data, so essentially this is an additional security measure besides password protection of the entire database. Re-identification would of course be necessary to follow up on and provide support to children. However, for general research, monitoring and analysis purposes, it should not be necessary to be able to identify individuals. For such purposes, irreversibly 'anonymizing' the data would be a good approach to enable disaggregated data analysis without the privacy concerns.

The following are some of the major international acts on data protection:

- OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data.⁴⁴
- Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.⁴⁵
- Council of Europe (COE) Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data.⁴⁶

⁴⁴ <http://www.oecd.org/sti/ieconomy/privacy.htm>

⁴⁵ <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:31995L0046>

⁴⁶ <http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/108>

Step 5: Close gaps in horizontal information flows through cross-sector collaboration

While the EMIS is key to monitoring OOSC and children at risk of dropping out, identifying and monitoring these children is inherently a cross-sectoral undertaking. Information needs to be shared horizontally between and within ministries and organizations. In the context of the Framework, cross-sector or inter-agency information flows are referred to as horizontal information flows, as they generally refer to information flows at the same administrative level (for example the national level).

The purpose of closing horizontal information gaps is to ensure that the entire pre-school and school-age population can be monitored by the ministry of education, and not just the sub-set of the school-age population that has been recorded in ministry of education databases. Many different organizations record information which is potentially useful for identifying and monitoring OOSC and children at risk of dropping out, including on health centres and hospitals, police departments, civil registry offices and social services departments, as well as NGOs. These sources of information are important for identifying OOSC who do not appear in the EMIS or other government education databases – that is, they are *Semi-invisible OOSC* or *Invisible OOSC*.

Barrier: Lack of inter-agency collaboration and data sharing

The ministry of education does not have access to all the required information for monitoring OOSC and children at risk of dropping out: cross-sector collaboration is essential.

The ministry of education does not have access to all the required information for monitoring OOSC and children at risk of dropping out. Identifying *Semi-invisible OOSC* who never attended school requires access to population data from other sources, such as from the civil registry, ministry of health and ministry of labour and social protection (the actual names of these ministries vary from country to country, but their roles are similar). The ministry of education may also have limited or no access to data

on children in educational institutions outside the purview of the ministry of education – for example, special schools, orphanages and juvenile detention centres. Identifying children not in school or at risk of dropping out may require information on vulnerable children from several sources, such as the police or the ministry of labour and social protection. Moreover, information on children with disabilities may come from different ministries. For example, in Tajikistan special schools or institutions for children with disabilities may fall under the responsibility of the ministry of education, ministry of the interior, ministry of health or ministry of labour and social protection. A major bottleneck in the monitoring system is therefore the lack of cross-sector information flows or information sharing between ministries and organizations.

Inter-agency collaboration is needed not only for collecting information on OOSC and children at risk of dropping out, but also for analysing and acting on this information. Policies and strategies to support these children should not only come from the ministry of education, but also other ministries which are responsible for children's well-being such as the ministry of health. A lack of inter-agency collaboration in supporting

vulnerable and excluded children is further discussed under Step 8. Strategies and best practice to improve cross-sector coordination for response interventions to children identified as out of school or at risk of dropping out are addressed in *Improving Education Participation (Area 8)*.⁴⁷

Using cross-sector person-level data to identify Semi-invisible OOSC

Semi-invisible OOSC include children and adolescents who never enrolled in school who could be identified by linking student-level enrolment records with records in other government databases. Some national databases may contain person-level records, such as the civil registry, whereas other person-level databases may only be found at lower administrative levels. No single database provides a complete picture of all school-age children and adolescents in a country. However, if combined, they can be used to establish a more complete picture, with the intention of identifying *Semi-invisible OOSC*.

The ministry of education typically lacks information on the following groups of children:

- **Children who have never enrolled in school:** Population data from the civil registry could be used to determine which school-age children have never enrolled in school, and where they are located. This may require a cooperation agreement between the ministry of education and ministry of interior or internal affairs.⁴⁸ In the absence of accurate population data from the civil registry, such data collected by health centres may be a reliable source (based on children who visited health centres, including for vaccinations), so requiring a cooperation agreement with the ministry of health. For example, in Albania health centres used to provide schools with lists of children who would be of school age in the coming school year. With the introduction of the Four Ministry Cooperation Agreement (see Appendix 4), this information is planned to be provided by the Department of Public Health to Regional Education Directorates.
- **Children with disabilities:** Although UNICEF advocates for the inclusion of children with disabilities into mainstream schools and classrooms, the reality is that children with disabilities often attend special schools. This poses particular challenges for monitoring the school participation of children with disabilities. The special schools they attend could be run by the government or by private entities. And even when they are run by the government they may not be run by the ministry of education, but rather by another ministry such as the ministry of social welfare or ministry of health. Because responsibilities are split across different ministries, there is often a lack of coordination on data collection for children with disabilities. In addition, many children with disabilities live in institutions.⁴⁹ As a result, no one ministry may have a complete picture of children with disabilities in the country. Cross-sector cooperation agreements and information exchange are therefore typically needed, so that the ministry of education can monitor the extent to which the educational needs of children with disabilities are met.
- **Children in juvenile justice centres:** Ministries of education typically do not monitor school-age children in juvenile justice centres. Information exchange on children in conflict with the law is not just important for monitoring OOSC, but also for children at risk of dropping out. It is important that the ministry of education is able to monitor school-age children who leave juvenile justice centres and ensure they return to school or are otherwise enrolled in a suitable education programme. A significant proportion of children in these centres may be children with disabilities.⁵⁰
- **Invisible OOSC:** These children cannot be identified via cross-sector electronic information exchange. The section 'Tracking Invisible OOSC' below proposes alternative approaches to identifying these children.

⁴⁷ UNICEF, 2016b.

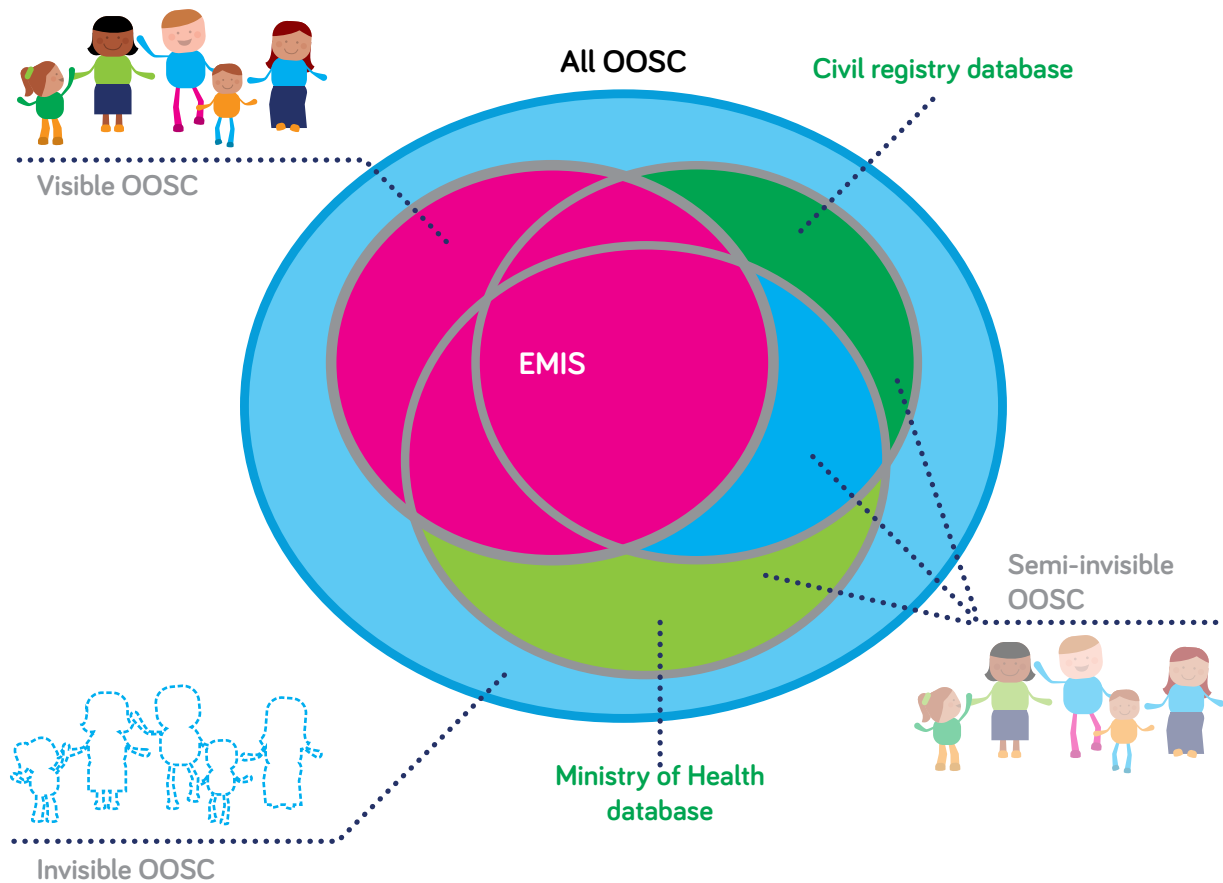
⁴⁸ The exact names of the ministries are of course different in each country.

⁴⁹ UNICEF, 2013.

⁵⁰ See, for example, Mears and Aron, 2003, who look at the situation in the United States.

Figure 9 is a modified version of Figure 3 from the OOSC Visibility Model. It illustrates how horizontal information flows can be used to identify *Semi-invisible OOSC*. The area represented by the pink circle represents *Visible OOSC* – that is, OOSC identified through the EMIS – and may not represent all OOSC. In this example, the civil registry database and the ministry of health database are used to complement the EMIS in order to identify *Semi-invisible OOSC*. The dark-blue shaded areas represent those *Semi-invisible OOSC* who are not in the EMIS, and can be identified through these two other databases. The light-blue shaded area surrounding the three circles represents *Invisible OOSC*, who are not identified through any of the government databases used (see also the section ‘Tracking Invisible OOSC’ below).

Figure 9. Linking databases to identify Semi-invisible OOSC



To identify *Semi-invisible OOSC*, individual person records in the three databases need to be linked through a common unique ID field, such as a birth certificate number; compulsory-school-age children who are not in the EMIS, but do exist in other databases, may be out of school – assuming these data are accurate. A secondary purpose of linking the databases is to identify and resolve discrepancies between the databases which are due to errors or missing data in one or more of the databases, for example incorrect IDs, or children enrolled in school who are missing from the EMIS or from the civil registry (as discussed in Step 1).

Incentives for cross-sector cooperation

There are important economic incentives for cross-sector information sharing and cooperation: it can greatly reduce inefficiencies when there are parallel systems fulfilling similar roles, and remove duplication in data collection and service delivery; furthermore, it can help identify cases where schools are receiving funding for 'ghost students' (non-existent students). Ghost students could be identified through cross-sector information exchange by, for example, linking EMIS records with civil registry records. If there are students in EMIS records who are not in the civil registry (or another database), they are either ghost students, or it is indicative of gaps in the civil registry or other database being used; fixing data-quality issues is another incentive for cross-sector information exchange. Establishing links between databases could serve many other purposes as well. It could, for example, be used to identify children at risk of dropping out, by drawing relevant information from different sources and linking it together (see also Step 6 below). To go even further, a national database on children in difficult circumstances could be established: multiple databases could be linked, going beyond the example in Figure 9. Such a database could be used for many different purposes by different ministries and organizations, such as for identifying children in conflict and emergency situations, and to better coordinate and align services targeted towards children in difficult circumstances across all relevant ministries and organizations which support these children. This is a large, complex and potentially time-consuming undertaking. However, the broader appeal of a more general database – which serves the interests of all ministries and organizations involved – may be the incentive required for inter-ministerial cooperation in sharing information. For example, in Kyrgyzstan the development of an inter-agency database is planned for children in difficult circumstances, including children without parental care, children with disabilities, children in conflict with the law, children who are victims of violence or crime, children living in low-income families, working children, street children, and children in conflict and emergency situations whose livelihoods are disrupted. Such a database would be used by different ministries and organizations for different purposes. They would all benefit from having easy access to an expanded range of information beyond the information that each individual agency itself collects. Establishing formal cooperation between ministries and organizations through information-sharing agreements is looked at in the next section.

Establishing information-sharing agreements

Information-sharing agreements are required so that information can be shared, databases can be linked and data from different sources can be pooled. For example, a Memorandum of Understanding (MoU) stipulating information-sharing agreements could be established and signed between the ministry of education and other relevant ministries and organizations to share information related to school-age children who may be out of school or at risk of dropping out. See Appendix 4 for an inter-ministerial cooperation agreement from Albania. The MoU would outline information-sharing arrangements between institutions to allow for timely sharing and merging of data. It may consist of the following sections:

- A preamble/background section outlining the reasons why an MOU is needed.
- A definitions section, to ensure a consistent understanding of the different indicators, actors and processes involved.
- Sections for each of the entities signing the MoU outlining their roles, tasks and responsibilities.
- A section outlining how to maintain the confidentiality of the data being shared, which requires balancing the right to education (which would require sharing of certain personal information, including dropout risk factors) with the right to privacy.
- Procedures for information sharing.

- Dispute resolution, outlining the procedure to be taken when any disagreements arise out of or related to the MoU.
- Commencement date and signatures of the heads or nominated representatives of the different entities involved.

In addition to an MOU or other formal information-sharing agreement, arrangements also need to be made to coordinate timely information flows from different databases and to enable person-level data to be linked together. It is a collaborative effort, which can and if possible should be beneficial to all participating ministries and organizations. It also does not necessarily need to restrict itself to information on OOSC and children at risk of dropping out. As discussed above, to be of greater benefit to the participating ministries and organizations, the scope for information sharing could be broadened to a cross-cutting issue which is important for all stakeholders, such as vulnerable children in general.

Linking databases

Once formal sharing arrangements have been established, the information from different databases would need to be linked to identify *Semi-invisible OOSC* and children at risk of dropping out.

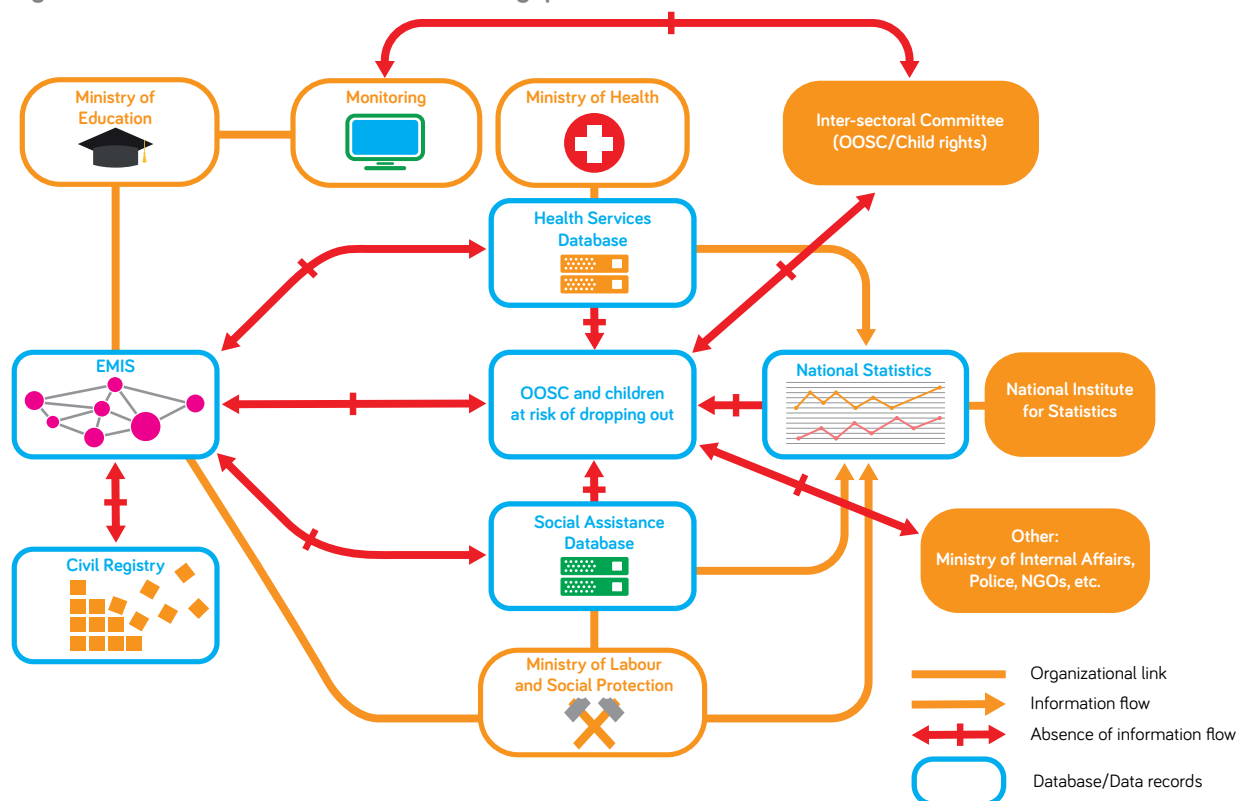
Examples of information to be shared and linked together include birth date (to determine if the child is of compulsory school age), absenteeism records (to determine if the child dropped out), address details (to track where OOSC are located and how they can be contacted), and child characteristics (to analyse the characteristics of OOSC and the reasons for exclusion), including potential dropout risk information, as discussed in Step 6 below.

Linking these data sources is not only useful for identifying OOSC, but also to uncover inaccuracies in any of the databases being compared. It can therefore be used to improve the overall data quality and reliability of these databases, such as by identifying and fixing incorrect child IDs and other person records, and removing duplicate records.

Figure 10 shows a hypothetical example of horizontal, or cross-sectoral, information flows. This is a simplified view loosely based on the situation in several countries for which mappings on information flows related to OOSC were developed.⁵¹ The ministry and database names are purposely generic. Although their names vary from country to country, the general structure displayed in the diagram was similar across the five countries for which such information flow diagrams were created. The databases are represented by blue boxes, and the red arrows indicate how they should be linked. The merged or pooled data could be stored in the EMIS itself, in the national statistics database or in a new database set up specifically for this purpose – which is the case in the example below. Alternatively, the results from cross-checking between databases could be output as a report – for example, a list of *Semi-invisible OOSC* who have never enrolled in school, based on cross-checking enrolment records with population records. Maintaining data confidentiality is a concern, which is discussed in Step 4: ‘Privacy and data protection’.

⁵¹ In Albania, Armenia, Georgia, Kyrgyzstan, Romania and Tajikistan.

Figure 10. Horizontal information flows and gaps in information flows



The arrows in black indicate existing information flows. Cross-sector information flows are in this example limited to information submitted by different ministries to a national statistics institute. While the national statistics database can be an important source of cross-sector information, its usefulness for monitoring OOSC and children at risk of dropping out tends to be limited. It normally collects a limited range of indicators from different ministries with limited levels of disaggregation.

The red arrows indicate gaps in information flows which would be required to pool or cross-check information on OOSC and children at risk of dropping out from different sources. This process has the following technical requirements:

- **Person-level data:** Records from two databases can only be meaningfully linked if person-level data is available in both databases. If this is not available (i.e. if person-level records are paper based), it would require the digitization of these records.
- **Common unique ID:** Through a common ID (identifier), a person-level record in one database can be linked with the corresponding record for that person in other databases. This requires therefore that the linked databases use the exact same identifier, such as a birth certificate number.
- **Linking the data:** There are several options for linking data:
 - Databases can be permanently linked, in particular if they use the same database system or infrastructure. If feasible this may be the most efficient and cost-effective solution, since this avoids having to manually link records between databases and the associated processes (described below). It also means that records can be efficiently compared at any time, thereby increasing the frequency with which cross-checks between databases can be conducted. Cross-checks could even be done real-time, for example detecting discrepancies between records for an individual in two databases *at the time that the information is being entered*. Linking person records to identify OOSC – and other processes combining information from different

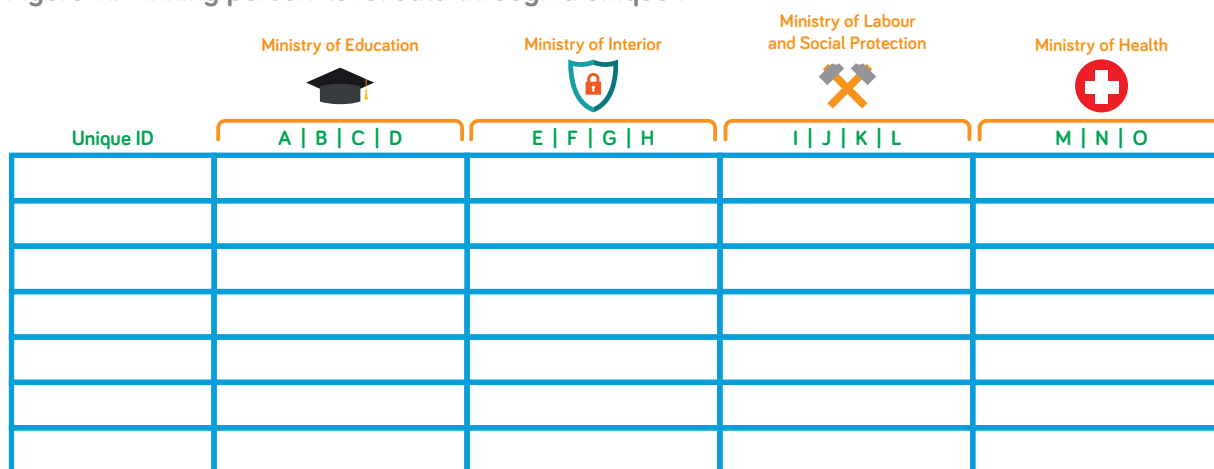
databases – can all be automated. However, different ministries may use completely different database systems (for example, in terms of software, file formats and data structure) which may not be compatible – and this may make linking the databases impractical if not impossible. Another obstacle is that the databases would need to be linked over a network or through the Internet, which could pose a further technical challenge.

- An alternative solution is to export data from the different databases in a common, standard data format⁵², which would enable the data to be linked together. The result of this could be a spreadsheet or database, in which data are pooled from different sources at regular, scheduled intervals. Even in this case, the export and merging processes could be largely automated to facilitate this process.
- A third option is to establish an interagency database which could replace or complement existing databases – and where data are entered by different ministries and departments within ministries through a web-based interface. This is the most complex and costly solution, but can also be the most advantageous in the long-run, because such a database could serve many more purposes besides identifying OOSC and children at risk of dropping out.

Figure 11 illustrates how individual person records from different databases can be linked or merged through a unique ID. One row represents a person record, and different components of this record would be drawn from different databases.

For an examination of some of the possibilities, see Appendix 3.

Figure 11. Linking person-level data through a unique ID



⁵² For example, the Comma-separated values or ‘CSV’ data format.

Tracking Invisible OOSC

Invisible OOSC are by definition those who are not registered in the civil registry or any other database. Those at higher risk of not having legal documents and not being registered in any database include children with disabilities (discussed in the following section) – who are sometimes hidden at home by families due to the social stigma – as well as internally displaced persons (IDPs), refugees and in general migrants from other countries. Possible approaches to identifying these *Invisible OOSC* are as follows:

- **School procedures:** Allowing children to enrol in school without any documentation, and providing guidelines to schools to support families and children in obtaining documentation (such as a birth certificate). Evidence from several countries has indicated that while the policy may be that schools need to enrol children without legal documentation, in practice these children may continue to be refused entry to school. Collaboration with NGOs which support children and families without legal documentation is one way to identify and address such issues (see below).
- **Establishing partnerships with NGOs and other community-level organizations:** These organizations may have information on *Invisible OOSC*, which could be shared with government agencies. In particular, NGOs and community workers may know about families with children with disabilities who might otherwise be invisible. Parents may feel shame about having a child with a disability, or feel that knowledge about their children may impact their other children's lives (for example marriage chances) and so may hide them.⁵³ Data-gathering methodologies must be sensitive to the fact that parents of children with disabilities may not admit to their children's presence in their homes. When birth registries or registries of people receiving disability benefits exist, they too can alert enumerators about the presence of family members, although agencies collecting vital statistics often express the concern that children with disabilities are less likely to have their births registered.
- **Door-to-door visits:** In some post-Soviet countries, teachers are required to make door-to-door visits prior to the start of the school year to identify school-age children who should enter grade 1 the coming school year. This is generally the obligation of the local government authorities, which delegate responsibility to the schools. Schools can thus play a role in identifying *Invisible OOSC*, and to follow-up on any children identified who end up not enrolling in school. The Karaganda region in Kazakhstan has a noteworthy approach to tracking invisible children, which is described in the box below. It needs to be taken into account, however, that some children may be missed in door-to-door visits. For example, street children, children in unauthorized camps and children with disabilities hidden away by their families due to social stigma could be missed in door-to-door visits. Moreover, such visits may not always be (thoroughly) conducted, in particular if they are weakly enforced and teachers are not financially compensated. Unfortunately, children who are likely to be missed in door-to-door visits are likely to be the most disadvantaged and the most likely to be out of school. These children could be identified through cooperation with the police and local NGOs. Furthermore, teachers may also need a police escort if they are wary of entering certain areas. Nevertheless, door-to-door visits can provide crucial information on children who might otherwise be invisible.
- **Community EMIS:** Improving the accuracy of EMIS data through a Community EMIS (see also Step 3: 'Community EMIS' above).
- **Local-community leaders and village councils or elders:** They are generally knowledgeable about OOSC and children in difficult circumstances in their community, and could be consulted in identifying

⁵³ Groce, 2006.

Invisible OOSC (and potentially a community EMIS – see Step 2: ‘Community involvement in improving data accuracy’).

- **Addressing the issue of home births:** A key reason why some children remain unregistered is home births. One approach to resolving this issue, used in Georgia, is to make it the responsibility of the person attending the birth (the midwife, doctor and/or community leader) to register (or ensure the registration) of the birth. This process should be standardized and monitoring is required to ensure it is done successfully and consistently. In addition, birth registration should be free. Simplified procedures (for example, to avoid the need for a court case when parents do not have the required documentation) are also important.

Country example 2. Identifying OOSC in Karaganda, Kazakhstan

In the Karaganda region of Kazakhstan, child-level information collected by teachers during door-to-door visits is entered into the regional education database. By having information on children in school and children not in school in the same database, it is possible to identify and produce reports of school-age children who are not enrolled in school. Moreover, it records children from 0 to 18, not just children up to the school starting age. As a result, the system can also track older children excluded from education (for example migrants) who would otherwise be invisible to the monitoring system. *It closes the information gap inherent in education databases, which generally only have data on children enrolled in specific educational institutions, and not those children who may be in special schools or other institutions not in the education database, or children who are completely excluded from education.*

The door-to-door visits are conducted before the start of the school year, and again four months into the school year in order to verify the information. Information collected includes enrolment in all levels of education (from pre-school to higher and vocational education) and all types of educational institutions. This database is not just used by schools and the local department of education, but also by the Department of Internal Affairs, and therefore also serves as an excellent example of cross-sector use of information. The accuracy of data could further be improved by linking the child-level data with other databases, to verify this information across databases (such as the health database containing child-level vaccination records, or the civil registry database). It also needs to be taken into account that some children, such as street children, may be missed in door-to-door visits.

Step 6: Create an early warning system for identifying children at risk of dropping out

It is better to prevent dropout than to address dropout once it has already occurred. Addressing problems early increases the success rate of interventions, and it is also more cost-effective.

While it is not possible to know for certain that a student is going to drop out, there are reliable warning signs which can be used to identify children who are at high risk of dropping out. An early warning system is one which uses various indicators which have proven to be associated with dropout in order to identify students at risk of dropping out, such as frequent absenteeism. It should not depend on a single indicator such as absenteeism, however, because students with multiple characteristics associated with dropout are at higher risk of dropping out.⁵⁴

Which indicators or student characteristics are most important for identifying and monitoring dropout risk varies considerably between countries. They may even vary considerably between regions within a country. An early warning system does more than prevent dropout: it is also a system for identifying students in difficult circumstances who need support, regardless of whether or not they will drop out. With limited resources, priority should be given to students who are most at risk and most in need of support. Therefore, an early warning system should be able to assess different levels of dropout risk to determine the level of priority. It should also collect information which can help determine the kind of support a student needs.

An early warning system does more than prevent dropout: it is also a system for identifying students in difficult circumstances who need support, regardless of whether or not they will drop out.

The appropriate form of support could very well involve cooperation across ministries. The chances of dropping out are a function not only of child characteristics, but also of family dynamics. For example, studies show that the presence of an adult with disabilities in a household can also lead to non-attendance among children without disabilities because of their increased responsibilities.⁵⁵ In circumstances like these, having the proper support from the ministry of social welfare for families which include a member with a disability could be an important factor in limiting the dropout rates of children.

At the regional and national levels, dropout risk can be monitored through quantitative indicators. At the school level, these quantitative indicators can be used to compliment personal knowledge of the situation and recorded descriptive information about the student. The indicators can thus support the decision-making process in determining which kind of support the student needs. The companion volume to this Framework, *Improving Education Participation*, provides examples and best practice on how to develop school-based dropout prevention and response interventions based on data collected by an early warning system.⁵⁶

⁵⁴ Lehr et al., 2004; Neild, Balfanz & Herzog, 2007.

⁵⁵ Mont and Nguyen, 2013.

⁵⁶ UNICEF, 2016b.

Barrier: Children at risk of dropping out are not identified and monitored

It is difficult to determine which information can and should be used to identify a child at risk of dropping out. Many different factors have been found to affect dropout risk, and narrowing the list to a manageable size is challenging. Much of the research on dropout risk is conducted in the United States and other high-income countries – and not all of them are relevant in each country context. In addition, the relative importance of each risk factor will certainly vary significantly from country to country. For example, belonging to the lowest wealth quintile can be a very high dropout risk factor in a country with extreme income inequality and a low dropout risk factor in a country where the wealth disparities between rich and poor are much smaller. Different countries also have unique dropout risk factors, such as belonging to a particular ethnic group – for example, Roma children in Central and Eastern Europe. To further complicate matters, dropout risk is often the result of multiple factors – such as disability, poverty, ethnicity and sex. The first barrier in identifying children at risk of dropping out is therefore the difficulty in identifying a set of reliable dropout risk indicators and adapting it to the country context. The second barrier is the difficulty in using those indicators to determine dropout risk. The third barrier is actually obtaining the information required to determine dropout risk. Schools may have (or share with other schools) a social pedagogue, psychologist or school counsellor who provides support services to children.⁵⁷ Keeping records of the difficulties children are facing is already part of his or her job. Implementing a system to determine dropout risk is thereby facilitated, as there is already a designated person responsible for obtaining at least part of the information required. If there is no such person at the school level, obtaining this information can be problematic. Furthermore, certain kinds of information would probably need to be obtained from other sources – and possibly other ministries, as described in Step 5. It is important, though, to identify exactly what information is needed in a particular situation. For example, a teacher could identify children he or she perceives as having difficulties with doing basic activities like seeing, hearing, walking, communicating and learning, etc. that put them at risk of dropping out. But to identify a child's particular medical needs or design a rehabilitation programme would require an expert in the field.

Student-level dropout risk indicators

Children can be identified as being at risk of dropping out by analysing key characteristics which have been found to be strongly associated with dropout. Extensive research has been conducted on factors associated with dropout risk, and some indicators are more strongly associated with dropout than others. Three indicators – known as the ABC of disengagement from school – are especially important:⁵⁸

- **A:** Academic achievement is below standard
- **B:** Behaviour problems
- **C:** Chronic absenteeism

In particular, these indicators are useful because they cover observable behaviours which are strongly linked to dropping out. The ABC indicators are effective because the information required is generally already collected by schools for each student, they are actionable (interventions can cause a change in the indicator) and allow for frequent and consistent measurement on a particular student. The USAID-funded School Dropout Prevention Pilot Program tested the effectiveness of dropout prevention interventions in Cambodia, India, Tajikistan and Timor-Leste and found that these three indicators, in addition to up to three additional indicators selected as relevant to the context, were an effective way to monitor dropout risk.⁵⁹

⁵⁷ In some countries, larger schools may have a full-time social pedagogue, psychologist or school counsellor, who may also support other schools in the surrounding area.

⁵⁸ Adapted from: Frazelle, S. & Nagel, A. (2015). A practitioner's guide to implementing early warning systems (REL 2015–056). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northwest. (Originally: Absenteeism, Behaviour, Course performance).

⁵⁹ USAID. (2015). School Dropout Prevention Pilot Program. Available online: <http://schooldropoutprevention.com/>. Accessed 23 November 2015.

It is recommended that the ABCs of school disengagement are included as the base indicators, with additional indicators (if deemed necessary) included based on the following criteria:

- **Relevance** given the country and/or local context. For example, in rural schools difficulty commuting to school could be an important indicator; in certain urban areas this may not be an important risk factor.⁶⁰
- **Availability** of the required information and the facility with which it can be obtained.
- **Sensitivity** of the data. Data of a sensitive nature (such as family circumstances) may not be possible to obtain or record.

A more comprehensive list of dropout risk factors is listed in Table 3 below. The identified risk factors are based on research on OOSC and dropout risk⁶¹, as well as discussions with a wide range of experts, including government and NGO representatives, school heads, teachers and students in various countries.⁶² It is intended to provide an overview of dropout risk factors, which can be turned into measurable indicators for the early warning system. They are included under the following categories:

- **D:** Disability
- **E:** Entry and progression in education
- **E:** Early adult responsibilities
- **F:** Family circumstances and peers

While it is not recommended that *all* indicators in Table 3 are used to monitor dropout risk, they can still serve as guidance during discussions with students and their parents/guardians, and to identify potential causes of the ABCs. It should be taken into account that some indicators under E and F are background factors, which may or may not cause dropout. For example, while poverty is correlated to dropout risk, not all children from poor families are at higher risk of dropping out. Such indicators need to be interpreted more carefully. While certain background factors have been associated with dropout, such as living in poverty, it should not be assumed that all poor children are at higher risk of dropout. These factors should therefore be interpreted with caution and within the national or regional context.

Table 3. Example indicators for measuring dropout risk

Academic achievement

- Poor academic achievement.⁶³

Behaviour

- Disengaged behaviour (low school engagement). This can include low levels of attention and concentration, does not do homework, no participation in extra-curricular activities, socially isolated.
- Disruptive behaviour: Suspension for serious misconduct, such as anti-social behaviour, bullying, violence, stealing, substance use, or trouble with the law.

⁶⁰ To identify relevant indicators, the first step may be to conduct a literature review, although in some countries there may be little or no relevant research to determine dropout risk indicators. A second step may be to organize an interdisciplinary expert panel involving relevant experts from different ministries, as well as other organizations, including UN agencies and NGOs involved with disadvantaged children, in order to develop a list of indicators. Another, possibly complimentary approach, would be to conduct field research to determine the causes of dropout – for example, a survey or focus group discussions and interviews with those who work closely with or are otherwise very familiar with the situation of disadvantaged children and children who dropped out, including NGO staff; school heads, teachers, parents and students in schools which have a high dropout rate; and of course out-of-school children and adolescents themselves.

⁶¹ Chávez Chávez, 2001; Eloundou-Enyegue, 2000; Hunt, 2008; UNICEF and UIS, 2011; Mont, 2013; and in particular Hammond et al., 2007, who identified risk factors which are significantly related to school dropout in multivariate analysis (Significant at $p < .10$) in at least two of the studies examined in a comprehensive review of 25 years of ERIC literature.

⁶² Albania, Armenia, Bhutan, Georgia, Kazakhstan, Kyrgyzstan, Romania and Tajikistan.

⁶³ Poor course performance can be measured, for example, through the number of failing grades, or by taking the average grade and comparing it with a certain threshold below which students are identified as at-risk.

Chronic absenteeism
<input type="checkbox"/> Frequent absenteeism: 10-20 per cent days missed during the current school year.
<input type="checkbox"/> Severe absenteeism: More than 20 per cent of days missed during the current school year.
Disability
<input type="checkbox"/> Based on the level of difficulty participating and learning in class due to the disability, which is discussed in detail in the section <i>Student-level disability indicators</i> below.
Entry and progression in education system
<input type="checkbox"/> At least two years older than the expected age for his or her grade, but has not repeated a grade. ⁶⁴
<input type="checkbox"/> Has previously dropped out, but returned to school.
<input type="checkbox"/> No pre-primary experience (for primary-school students). ⁶⁵
<input type="checkbox"/> Repeating or has repeated a grade. ⁶⁶
Early adult responsibilities
<input type="checkbox"/> The student's workload outside school (paid or unpaid) severely hinders his/her ability to focus on school work. This can include household work or taking care of family members (for example family members with disabilities or who are chronically ill, or younger siblings).
<input type="checkbox"/> Marriage. ⁶⁷
<input type="checkbox"/> Pregnancy or parenthood.
Family circumstances and peers
<input type="checkbox"/> Difficulty commuting to school (for example, lives far from school and cannot afford or has no access to public transport). ⁶⁸
<input type="checkbox"/> Lives in difficult circumstances (<i>to be defined more specifically according to the national context—for example, in terms of poverty, living conditions [such as being homeless or living in an orphanage], affected by extreme situations such as natural disasters or equivalent events, being from a family of refugees or displaced persons, or having one or more disabled family members</i> ⁶⁹).
<input type="checkbox"/> Large family size. ⁷⁰
<input type="checkbox"/> Appears to have family problems at home which significantly affect the student, such as conflict, quarrels, divorce of parents, loss of a loved one, drugs or alcohol abuse, physical, sexual or emotional abuse, etc.
<input type="checkbox"/> Has difficulties with the language used in school, because a different language is spoken in the home.
<input type="checkbox"/> Low family engagement – for example, parents/guardians not attending school meetings, refuse to discuss their child with teachers, express no interest in the child's education, etc.
<input type="checkbox"/> Peer pressure – friends or siblings have dropped out from school.
<input type="checkbox"/> Victim of bullying.

⁶⁴ This may be considered separately from repeating a grade, as children may also be overage due to late school entry, or due to dropping out and re-entering school.

⁶⁵ Lack of pre-primary experience has been associated with dropout risk, and is one of the key indicators in the methodology of the UNICEF/UIS Global Initiative on Out-of-School Children.

⁶⁶ Many studies have identified repetition as one of the strongest predictors of dropout (e.g. Hattie, 2009).

⁶⁷ This is a dropout risk factor in many countries, in particular for girls in rural areas.

⁶⁸ In Bhutan, for example, many children live in areas not connected by road. Some walk more than two hours a day to get to school and back.

⁶⁹ At times families with children without disabilities may also need disability-related support if there are disabled adults in the household. These children might have additional responsibilities, either in terms of caring for their adult relatives or in generating income (see, for example, Mont and Nguyen, 2013).

⁷⁰ Based on Eloundou-Enyegue, 2000.

Student-level disability indicators

Children with disabilities are often excluded from education, and those who are in school are at higher risk of dropping out. There are a number of special issues relating to identifying and monitoring children with disabilities in school.

A disability is any restriction of functioning as a result of an impairment, such as being unable to move your legs. Based on the Social Model of Disability, disability results from the interaction between a person's impairment (such as loss of hearing) and their environment. In the context of the Framework, it means that disability arises when a child with an impairment encounters barriers in the environment – in particular the school environment – that prevent her/him from attending or participating in school. Identification of children with disabilities should be based on their difficulties undertaking a range of basic activities – not by asking teachers to report on how many children are 'disabled' or who have a particular diagnosis. Those more traditional methods have been shown to significantly underreport children with disabilities – especially those with minor or moderate disabilities that can still have a significant impact on their schooling.

It should be noted that the word disability usually conveys the impression that the condition is 'medically' severe, and so can miss children with mild or moderate impairments. Moreover, children with disabilities should be identified by the type of difficulties they face – vision, hearing, gross-motor, fine-motor, intellectual, communication, and/or behaviour and socialization – rather than just indicators reporting numbers of children with different kinds of disabilities, because children with different types of impairments face different types of barriers. School systems may be good at removing barriers in one area (for example, physical accessibility) but not in another area (for example, dealing with deafness). For monitoring purposes, the extent to which schools can meet the needs of children with different types of disability needs to be captured. Indicators for monitoring disability should therefore distinguish between the type of disability and the degree to which it is causing difficulties in participating and learning in class.

Even a minor impairment can significantly increase dropout risk. For example, many children with vision problems correctable by glasses drop out of school. While this is a minor impairment and not often thought of as a 'disability', if it is an impairment that acts as a barrier to participating in school, it leads to dropping out and is still having a significant impact on the child's life.

Table 4 encapsulates UNICEF's recommendations for collecting data on children with disabilities in an EMIS. Capturing this information is not synonymous with tallying children with particular medical diagnoses. It focuses on a student's ability to participate and learn, and not the specific condition, which is what matters when it comes to educating a child. It also lessens stigma by asking about difficulties, as opposed to disability, and the 'disability' is classified by both type and impact on participation and learning. The types of impairment correspond closely to the domains of functioning in the UNICEF and Washington Group on Disability Statistics module on Child Functioning⁷¹ (seeing, hearing, mobility, self-care, upper-body functioning, communication, learning, emotions, behaviour, attention, coping with change, relationships and playing). The main differences, with the intention of making them more suitable for monitoring in school contexts, are as follows:

- Mobility is split into gross motor and fine motor, because they have different effects on ability to participate and learn in school.
- Behaviour and socialization is an umbrella term encompassing several domains of functioning (emotions, behaviour, attention, coping with change, relationships and playing).

⁷¹ http://www.cdc.gov/nchs/washington_group.htm

	Levels of difficulty participating and learning in class due to an impairment			
	None⁷³	Some	A lot	Unable to
Vision				
Hearing				
Gross motor (e.g. walking or climbing steps)				
Fine motor (e.g. writing or fastening clothes)				
Intellectual⁷⁴				
Communication (understanding and being understood by others)⁷⁵				
Behaviour and socialization				

Capturing information as suggested with Table 4 allows the system to track the impact of having one or multiple disabilities. It can also be used to monitor the prevalence of each type of disability. In reporting the information, it is recommended that data are disaggregated by sex, because studies have shown that disability can have a more significant impact on girls, and so the gender dimension needs to be considered.⁷⁶ For an example of how this information can be summarized at the school level, see Appendix 1, Table 7 (Indicators for children with disabilities aggregated at the school level).

One of the advantages of access to student-level data on disability as captured in Table 4 is that it enables new kinds of analysis. For example, disability could be directly linked to other factors such as truancy, achievement and dropout.

In addition to the indicators above, a field could be added indicating the percentage of time spent in regular classrooms compared to segregated classrooms. If children with disabilities are mainly taught in segregated classrooms, the school is not inclusive (neither is the system); it is rather a continuation of the special-school system running within regular schools, where children with disabilities continue to be isolated from their peers.

Recording of absenteeism and non-continuation of education

Absenteeism is often considered to be one of the most important dropout risk indicators. A crucial requirement for an early warning system is therefore to accurately monitor absenteeism. This entails monitoring for each student:

- The duration of absenteeism.
- The reason or reasons for absenteeism.
- Distinguishing between excused and unexcused reasons for absenteeism.

⁷² 'None' is included although it constitutes no probable dropout risk, because (i) it can be used to identify schools which are able to accommodate children with disabilities, and (ii) it can be used to generate statistics on children by type of disability, not just for those children with disabilities who have difficulties participating and learning in class. See also an alternative way of collecting similar data but aggregated at the school level in Appendix 1, based on the classification by Mont, D. (2013).

⁷³ This column is for children with an impairment (for example vision or restriction in mobility), but it does not affect their ability to participate and learn in class (for example, due to ramps, corrective eyeglasses, and other factors which enable these children to participate and learn without restriction).

⁷⁴ For a description of this disability, see <http://www.dsm5.org/documents/intellectual%20disability%20fact%20sheet.pdf> and <http://aaid.org/intellectual-disability/definition/faqs-on-intellectual-disability#.Vl1KFMqUeio>

⁷⁵ For a description of this disability, see <http://www.dsm5.org/Documents/Social%20Communication%20Disorder%20Fact%20Sheet.pdf>

⁷⁶ Rousso, 2003.

Having detailed information on why students are absent could lead to a much better understanding of why children are dropping out – information which is currently not recorded in many countries. In addition, it could be disaggregated by factors such as age, sex and region, to enable a more thorough analysis of reasons of dropout for different groups of children.

To help teachers obtain the required information, a standardized absence form which parents or guardians would need to complete could be developed for schools. The form may include a list of excused reasons for absenteeism and a separate open-ended field, 'Other, please indicate'. An example absence form is shown in Figure 12.⁷⁷

Figure 12. Example student absence form

Student absence form

Please complete this form and return it to your child's teacher

Name: _____

Was absent from: ____ / ____ / ____ to ____ / ____ / ____

Reason:

- Illness or unavoidable medical/dental appointment
- Religious ceremony
- Serious and/or urgent family situation, such as a funeral
- Affected by natural disasters or hazardous weather conditions

Other, please indicate: _____

Signed: _____ (parent/guardian)

Date: ____ / ____ / ____

This absence form would need to match the actual daily attendance register which teachers complete.

If the absenteeism is for an unexcused reason (that is, any reason which is not on the list of excused reasons) there may be many different kinds of reasons for this absence. It is important to find out the exact reason for absenteeism: an unexcused absenteeism is not just an important dropout indicator, it could also be the first sign of actual dropout if the student does not return to school. A certain time frame, for example three days, could be provided for teachers to fill in the actual reason for unexcused absenteeism. This should give enough time to obtain or investigate the reason for absenteeism, and it is part of the responsibilities of the school to know if and why students are absent for no excused reason. If this is considered to be too time consuming for class teachers, the reason for unexcused absenteeism could perhaps be completed only for students who are chronically truant, for example with at least 10 per cent of school days missed during the current school year.

If schools do not report this information, or always indicate 'reason could not be identified', this information could be used to identify schools where the school staff frequently does not know why students are absent. It may be indicative of poor relations between the school and the community, uncooperative parents, and/or lack of interest of school staff in investigating absenteeism.

⁷⁷ Based on a review of excused reasons for absenteeism in schools in the legislation of several countries and states. For an example from the Australian state of New South Wales, see: http://www.schools.nsw.edu.au/media/downloads/schoolsweb/student-support/programs/attendance/attend_parents.pdf http://www.schools.nsw.edu.au/media/downloads/schoolsweb/student-support/programs/attendance/attend_parents.pdf

There are also situations where absenteeism for an excused reason eventually leads to dropout, such as due to chronic illness or as a result of natural disasters.

Below is an example form with a proposed list of reasons for unexcused absenteeism, to be completed if no excused reason for absenteeism has been provided. It may also include a space for comments, such as pertaining to the circumstances leading to the absenteeism and the action undertaken by the school in following-up (an example specification for follow-up action is provided in the form, based on the approach used in the Netherlands). This form would need to be adapted to the national or regional context.

Figure 13. Example form: Reporting of absenteeism or non-continuation of education and action taken

To be completed by the class teacher:

- **Excused reason for absenteeism:**
 - Illness or unavoidable medical/dental appointment
 - Religious ceremony
 - Serious and/or urgent family situation, such as a funeral
 - Temporary suspension due to breach of school discipline
 - Affected by natural disasters or hazardous weather conditions
- **Other reason for absenteeism or non-continuation of education (select all that apply):**
 - Completed [insert final grade of compulsory education]
 - Physical, cognitive, emotional or other disability which made continued schooling too difficult
 - Difficulty keeping up with peers/poor results in class
 - Peer pressure (such as friends not going to/dropping out from school)
 - Difficulty in commuting to school
 - Unable to afford the costs of schooling (such as uniform/clothing, school materials, etc.)
 - Marriage
 - Pregnancy or parenthood
 - Due to inadequate school water, sanitation and hygiene facilities
 - Discrimination/victim of bullying at school
 - Work (including both formal and informal, paid and unpaid work)
 - Student's lack of interest in school
 - Student's family's lack of interest in their child's education
 - Family problems at home (such as violence or drug/alcohol abuse)
 - Under investigation
 - Reason could not be identified
 - o If under investigation, or if the reason could not be identified, please explain below:
 - _____
 - o Comments
 - _____
- **Actions undertaken (select all that apply):**
 - Parent/guardian contacted, on the following date: ____ / ____ / ____
 - (insert relevant government body) contacted, on the following date: ____ / ____ / ____
 - o Additional actions undertaken, or comments:
 - _____

The reason for unexcused absenteeism could be interpreted by the system as the reason for dropout, should the student not return to school. In some countries, the reason for dropout is already recorded, but with limited options. As in the example above, it is important to have both a range of options which reflect actual reasons for dropout in the country, as well as the option to select multiple reasons (because students may drop out for more than one reason).

An early warning system is an evolving system, and the data it collects should be used to improve the system itself and the accuracy with which it determines dropout. The data collected by the early warning system could provide a statistical basis for the actual causes of dropout, by analyzing the profiles of dropouts and the reasons for dropout. This requires that the system keeps records over time of (i) children who dropped out, (ii) their dropout risk data, and (iii) the actual recorded reasons for dropout.

Reporting and determining student dropout risk

Research has shown that exposure to multiple risk factors increases the risk of dropout.⁷⁸ Therefore, combining risk indicators could lead to a more accurate determination of dropout risk.

Two types of risk indexes could be automatically generated by the EMIS⁷⁹:

- **Student-level risk index:** Student-level risk indexes, the cumulative weight of all indicators combined, would be used to identify students who are most at risk of dropping out and most in need of support. These will often also be the most vulnerable children, facing various kinds of problems (poverty, difficult living conditions, disability, discrimination, violence in the home, etc.).
- **School-level risk index:** School-level risk indexes aggregate the student-level risk indexes for the entire school, to identify schools which require targeted support to prevent future dropout. Support needs could be identified through an analysis of the risk indicators at school level and through dialogue with the school staff. The following two school-level risk indexes can be used to identify both schools with a high *number* of at-risk students ('total student risk index') and schools with a high *proportion* of at-risk students ('average student risk index'):
 - **Total student risk index:** sum of risk indexes for all students in school.
 - **Average student risk index:** total risk index/number of students in school.
 - **Participation and learning index for children with disabilities:** See "Monitoring schools' ability to accommodate the needs of children with disabilities" in Appendix 1

Once indicators have been established, a format needs to be chosen for presenting the information so it can be used by schools. An example report is shown in Table 5.⁸⁰ To facilitate the monitoring of multiple children at risk of dropout, the report is kept simple, showing only summary information. The form could be paper-based or electronic (such as a spreadsheet). The information that goes into the form would need to be collected and monitored by the class teacher in collaboration with a school psychologist, pedagogue, counsellor or other person providing support services to children – if there is such a person in the school, for students with at least one risk factor. More detailed information could be recorded separately in a confidential notebook for each student.

⁷⁸ Lehr et al., 2004; Neild, Balfanz & Herzog, 2007.

⁷⁹ Ideally, the data to generate the risk index can be automatically generated. However, in the absence of an automated system, student risk scores can be calculated through a paper-based system, such as explained in the learning modules prepared for the USAID-funded School Dropout Prevention Pilot Programme: <http://dropoutpreventionlab.org/en>

⁸⁰ See also the 'Student Report Screen' from the National High School Center, United States, in Heppen & Therriault, 2008, <http://files.eric.ed.gov/fulltext/ED521558.pdf>

If dropout risk information is entered electronically, such a summary could be automatically produced by the EMIS or school information system. Dropout risk should be monitored throughout the school year, and hence the system should be able to produce a report on *demand*, based on the latest information recorded in the system.

Student name	Class	Academic achievement	Behaviour problems	Chronic absenteeism	Disability	Entry and progression	Total
May Roe	IV	2	1	1		1	5
Matt Doe	V				2		2
John Doe	VI			1	1	1	3

Indicators can be quantified in terms of severity. For example, depending on the severity of absenteeism, a value of 1 (frequent absenteeism) or 2 (severe absenteeism) can be assigned to the student for this indicator. To prioritize which students are most in need of support, a dropout 'risk index' can be calculated for each student by summing the numerical values for each risk indicator.⁸¹

Although having a numerical value for dropout risk gives the illusion of being an exact measure, it should not be interpreted as such. For example, a student with a risk index of 4 can be interpreted as being at greater risk of dropping out compared to a student with a risk index of 2; it should not be interpreted as the former being twice as likely to drop out compared to the latter. The aim of the methodology is to identify dropout risk as accurately as possible, given the available time and resources. The total number is only to support class teachers and other school staff in prioritizing cases. The actual prioritization can also be based on additional, background information, some of which cannot be quantified.

The following are example indicators and determinations of the severity (1 or 2):

Academic achievement: (based on the latest available results for a student):

- 1: At least one failing grade, and/or average grade below a certain threshold (to be determined).
- 2: At least three failing grades, and/or average grade below a certain threshold (to be determined).

Behaviour:

- 1: Disengaged Behaviour (low school engagement). This can include low levels of attention and concentration, does not do homework, no participation in extracurricular activities, socially isolated.
- 2: Disruptive Behaviour: Suspension for serious misconduct, such as anti-social behaviour, bullying, violence, stealing, substance use, or trouble with the law.

Chronic absenteeism:

- 1 (Frequent absenteeism): 10-20 per cent days missed during the current school year.
- 2 (Severe absenteeism): More than 20 per cent of days missed during the current school year.

Disability:

- 1: Has some difficulty participating or learning in class due to a disability.
- 2: Has a lot of difficulty participating and learning in class due to a disability.

⁸¹ The total could also be expressed as a percentage of the total number of possible risk points.

Entry and progression in education:

- 1: Repeater (repeating or has repeated a grade).
- 1: No pre-primary experience.
- 1: Has previously dropped out.
- 2: Any two or three of the above.

At least some of this information could be recorded electronically, so that dropout risk could be determined automatically. For example, possible methods for recording absenteeism in the EMIS include: (i) class teachers using a classroom tablet with an absenteeism app that connects to the EMIS (efficient, but high cost), or (ii) a shared PC for staff members who would need to enter the paper-based attendance register into the EMIS (inefficient, but lower cost).⁸²

Dropout risk reports could be produced at the regional and national level, summarizing the information by school, or by region, rather than by student. Reporting data for analysis and decision-making is further discussed in Step 7.

EMIS truancy alerts

Beyond flagging and creating reports of students at risk of dropping out, an early warning system could also send (automated) alerts. These alerts would need to be linked to the legislation on and definition of absenteeism and truancy as discussed in Step 1, including a defined period of truancy which leads to specific follow-up actions. For example, in cases of truancy of any period recorded by the school, an SMS could be immediately and automatically sent to notify the parents. In cases of truancy beyond a certain period of time, an alert could be sent to the authority which monitors and enforces compulsory school attendance. The example of the Netherlands is described in Country example 3. Procedures for responding to truancy are further discussed in Step 8.

Country example 3. Enforcing compulsory school attendance in the Netherlands

In the Netherlands it is mandatory for schools to raise an alert in cases of truancy (unexcused absenteeism) of at least 16 hours within the past 4 weeks. This alert goes to an official of the local municipality who is in charge of enforcing compulsory education. It leads to an inquiry with the school and parents to find a solution. In case of continued truancy, it can lead to a fine for parents or even loss of child benefits. In certain cases, youth who are truant may need to do community service or a compulsory training/course.

Long-term performance agreements or ‘covenants’ have been established between schools, municipalities and the national government in order to reduce early school leaving. The performance of educational institutions in reducing the dropout rate compared to the previous school year is closely monitored, and well-performing schools are granted a performance subsidy.⁸³

⁸² For an example of electronic recording of attendance see <http://demo.opensis.com/opensis/> and log in as a teacher.

⁸³ For more information, see also: http://www.aanvalopschooluitval.nl/userfiles/file/2014/VSV-Boekje_UK_2014.pdf

Step 7: Create automated reporting routines and analyse reports to inform evidence-informed policies and strategies

With the required information for monitoring OOSC and children at risk of dropping out acquired as described under Steps 1 to 6, reports can be produced to analyse the data. These reports should not be based on what data are most readily available, but rather on data which are most useful in the analysis. If such data are not available, then it is back to previous steps – to ensure that the necessary data can be obtained.

The sections below discuss several key aspects to consider for reporting information:

- Reporting requirements at national, sub-national and local levels.
- Producing automated yet customizable reports to meet diverse needs.
- Presenting information according to the type of analysis required.

Barrier: Data on OOSC and children at risk of dropping out is not reported and analysed

The key bottlenecks in reporting and analysing data are as follows:

- The absence of clear indicators and benchmarks to work towards (see also Step 1).
- The lack of capacity of the EMIS or information management system to produce reports (see also Step 3).
- The lack of human resources capacity to do the reporting and analysis.
- The absence of (clear) roles and responsibilities for reporting and analysis.

As discussed, in many countries data on OOSC and children at risk of dropping out is not available or is incomplete. If this is the case, reporting and data analysis is not very useful.

The absence of clear benchmarks is the next obstacle to consider. The analysis needs to have a purpose, which is to achieve the benchmarks set – for example, halving the proportion of OOSC, or closing the equity gap in OOSC for children with disabilities, for ethnic minorities, or between girls and boys, and so on. Benchmarks are also needed to measure performance and progress made.

If benchmarks exist, as well as the data required to analyse performance and the causes of exclusion, the reports can be generated. The next barrier is thus the capacity to generate the reports, both in terms of human resources and technical capacity. If reports can be generated with the click of a button, with little technical know-how, the human resources requirements will not be high – either in terms of staff time or expertise. Many Education Management Information Systems can automatically produce various kinds of reports, and some include customization options (see also Country example 4. Reporting and disseminating data for 1.5 million schools in India' below). In the absence of an EMIS with the required reporting functionality (see also Step 3), the reports need to be created manually. This process can be time consuming and requires considerable technical expertise – and is thus costly as well.

Another potential barrier is the absence of clear roles and responsibilities for generating the reports according to the type of analysis being conducted. Two kinds of analysis can be distinguished:

- At the system level for national- and regional-level monitoring and decision-making. At this level, the focus would be on identifying the causes of exclusion, the priority areas and progress made towards benchmarks.
- At the individual level, which is generally referred to as case management, where ‘case’ refers to the child needing support and ‘management’ refers to analysing available information for a child and coordinating a response based on identified support needs.⁸⁴

Case management would not focus exclusively on education issues, but more broadly on various factors of vulnerability (such as poverty, disability or violence in the home). For case management, a multi-disciplinary team would therefore be most appropriate, given that it concerns a cross-sector issue (as discussed in Step 5).

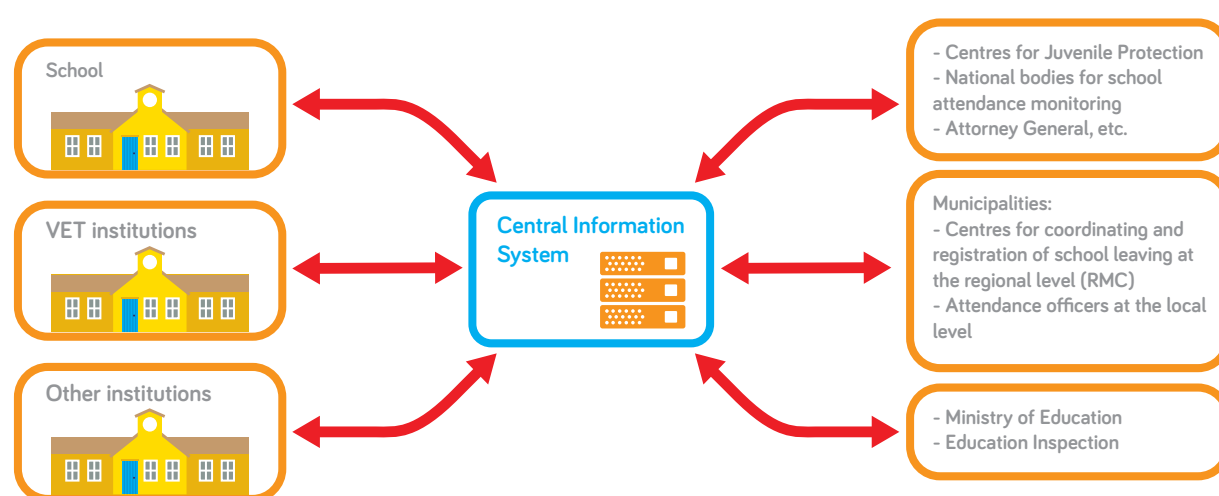
Lack of appropriately trained staff can be an obstacle with respect to both system-level analysis and case management.

System-level reporting and analysis

In some countries, all information required for system-level reporting and analysis is pooled within a single central database – i.e., the EMIS – through both vertical and horizontal information flows. An example from the Netherlands is provided in Figure 14. Person-level information is collected by a central Information System (IS)⁸⁵ from different kinds of education institutions, and then reports to the relevant bodies at different administrative levels (from the national level to the local level). Because data are at the person-level, data can be disaggregated according to the requirements of the analysis, for example, by region and by school.⁸⁶

For monitoring OOSC and children at risk of dropping out at the national and regional level, information needs to be presented in a summarized form. In Romania, for example, the Agency for Quality Assurance in Pre-University Education (which is part of the Ministry of Education) combines multiple student- and school-level factors into a school effectiveness index. It incorporates comprehensive data on student characteristics which are related to dropout risk, and links it to school characteristics such as absenteeism and dropout rates. This index can be used to identify schools which are underperforming given the school context.

Figure 14. Information exchange for monitoring and analysis of school leaving in the Netherlands⁸⁷



⁸⁴ See also: UNICEF, 2016b.

⁸⁵ Which is similar to the EMIS as described in the Framework.

⁸⁶ See for example: <http://www.aanvalopschooluitval.nl/english>

⁸⁷ Based on a diagram published in the document *Capacity Building of the National Institutions' Representatives, Study Visit to the Netherlands* (Serbia National Education Council (NEC), UNICEF and the Centre for Education Policy (CEP), 2013).

National and regional cross-sector committees would be required to address the diverse range of problems underlying education exclusion, such as poverty, disability and discrimination (see Step 8 for a more detailed description of their responsibilities). These committees would need aggregated information on education exclusion, such as at the regional level for the national committee, and local and school level for the regional committees. Reports would need to not only provide information on numbers and rates of OOSC, but also identify the key reasons for exclusion from education. In addition, it should identify the key profiles of OOSC (for example *children with disabilities, poor urban boys*⁸⁸, *rural adolescent girls, children in specific regions of the country*) and analyse the reasons for absenteeism for each of the profiles. Conducting such research and analysis is discussed in the [Global Out-of-School Children Initiative Operational Manual](#).⁸⁹ The analysis would need to distinguish between children who have never enrolled in school and children who dropped out, as the reasons for not going to school would be different. This is the kind of information which could be used for strategic policy and decision-making to reduce education exclusion. Trends over time are also important for monitoring progress – or lack of progress – made (for an example, see Figure 21. *Dropout Explorer of the Ministry of Education, Culture and Science in the Netherlands*). This would also need to be by various levels of disaggregation, such as OOSC rates over time by the different profiles of OOSC.

As discussed in Step 4, reports should be available – and customized – to all levels. This includes schools, which need access to relevant reports which would enable them to monitor and benchmark their own performance relative to other schools or regional or national averages.⁹⁰

Case-level reporting and analysis

The School Management Information System can play an important role in supporting schools with the monitoring of students at risk of dropping out, by clearly presenting data related to dropout risk – such as truancy data – at student, class and school levels, and signalling those students at risk of dropout. Subsequently, specific procedures or guidelines for schools need to be established to support school staff in taking action based on this information (for example, whether it concerns truancy, poor academic performance, or family issues, etc., and the extent of the issue). These actions may include liaising with different service providers, for which school staff may need to play a coordinating role.

More generally, children in difficult circumstances may need support from different service providers depending on the problems – and this goes beyond education exclusion, but also concerns other related factors such as poverty, health issues, disability, etc. Since such responsibilities go beyond the school level, it would be more effectively addressed through a case-management system, through which cross-sector teams (consisting of case managers or social workers) play a coordinating role. For example, in Armenia case managers have the primary responsibility of identifying individual support needs (including medical, financial and counselling) and liaising with the appropriate bodies. For such a system to be effective, case managers (or social workers) dealing with particular cases should be able to undertake a needs assessment based on available information. This information may come from different sources. For example, schools could provide information collected as part of the early warning system (see Step 6). Other kinds of information (regarding disability, conflict with the law, etc.) would need to be obtained from the relevant authorities through cross-sector information exchange (see Step 5). The information needs to be presented in a way which highlights key information, and facilitates analysis and decision-making on how to best support each case. Similar to the early warning system, cases should be handled in order of priority, focusing first and foremost on children and adolescents most in need of assistance.

⁸⁸ In some countries schools record which students are from poor families in order to identify which students may need financial support; in Australia, family-background data is collected for all students and used to create a school-level 'Index of Community Socio-Educational Advantage' – see also <http://www.myschool.edu.au/AboutUs/Glossary#G2>.

⁸⁹ UNICEF and UIS (2016).

⁹⁰ See, for example, the Australian website www.myschool.edu.au

Producing automated yet customizable reports to meet diverse needs

Data on OOSC and children at risk of dropping out need to be monitored and analysed on a routine basis. For this reason the reporting and dissemination procedures should be largely automated, and information-sharing agreements should be in place so data can be easily and efficiently obtained.

Generic reports, such as the statistical booklet summarizing EMIS data produced by ministries of education, are not very useful for monitoring OOSC and children at risk of dropping out. Reports need to focus on particular issues, such as trends in OOSC by region over time, progress made towards benchmarks, characteristics of OOSC, identified dropout risk factors, absenteeism and truancy trends, and types of support received and required by dropouts. To be effective and efficient, a national web-based monitoring system needs to be able to tailor information according to user needs. That is, the types of information and levels of disaggregation should be tailored to the user's role and responsibilities (for example researcher, policy-maker, education planner, statistician, social worker, teacher or parent). For teachers and parents, for example, information at the school and person levels would be most useful, whereas for an education planner at the national level, information at national, regional and district levels might be most useful. Different types of users also need different kinds of information, and certain kinds of information are confidential and should only be accessible to those with the right of access to that information. Such reports may take the form of a web-based dashboard rather than a static report, where users can select indicators, areas of the country, and a specific presentation format (for example table, chart or map) depending on their needs. Special reports following a specific template could also be automatically produced on a routine basis, for key stakeholders at various administrative levels – national, regional, local levels and school level – with information and levels of disaggregation relevant to those levels.

To be effective and efficient, a national web-based monitoring system needs to be able to tailor information according to user needs.

For an example of a highly customizable reporting system on a large scale – reporting on information from 1.5 million schools in India – see Country example 4 below.

Country example 4. Reporting and disseminating data for 1.5 million schools in India

The Indian U-DISE or *Unified District Information System for Education* makes available data on 1.5 million schools in all 680 districts in India.⁹¹ In terms of the quantity and breadth of data made available, U-DISE is unique – it may well be the largest publicly accessible government education database in the world. The reporting system includes a wide range of indicators including on school facilities, enrolment, teacher characteristics and flow rates⁹². Several levels of disaggregation can be selected, such as by gender, caste, educational level and administrative level (state, district and block). School-level data and data for previous school years are also available. U-DISE demonstrates that even with a paper-based data-collection system in a country the size of India⁹³, the data once entered can be made accessible via a centralized, highly responsive and disaggregated data-dissemination system. Moreover, since it is web-based, it can be accessed anytime, anywhere, by any administrative level in India or any other interested parties or stakeholders.

⁹¹ See www.schoolreportcards.in, and select Report Module from the top menu.

⁹² Promotion, repetition, transition, retention and dropout rates, and internal efficiency indicators.

⁹³ While previously it could take years for all this data to reach the national level, with increasing digitization it took around four to five months as of 2015.

Presenting information according to the type of analysis required

Information should be presented in a format which facilitates the type of analysis required and which best conveys the story or the key messages. Interactive reporting systems have the advantage of allowing users to change the type of presentation used (for example bar chart or time-series graph) as well as customize the presentation itself according to their needs (for example selecting for comparison only particular regions or schools). With traditional, non-interactive reporting, it needs to be taken into account that the reader has no choice but to analyse the information in the format provided. If the incorrect format is used, it can make certain kinds of analysis difficult, inefficient or even impossible, and it can distract from the story and key messages. For example, it is still very common to use tables to present data. Tables are useful for looking up information, but it can be very difficult to identify and analyse trends if the data is in this format. Other presentation formats, such as time-series graphs and maps make it much easier to see trends in the data, such as trends over time, geographic trends (trends by region), dropout trends by age, and so on.

When reporting data, it should be presented in a way that is easily comprehensible, convincing and engaging. Too often, data are simply included in a report because it exists and seems relevant to the topic. Whenever data are presented, the following needs to be clarified:

- Why is the data included? If there is no good reason, it should not be included. Within a report, tables and figures can be trimmed to represent only what is relevant to the key messages, while the full data sets may be included in appendices.
- What are the key messages that the data should convey? The interpretation of the data should be facilitated, not just by describing the data presentation (for example graph, map or table), but by emphasizing the key messages through the data presentation itself. The key messages can, for example, be emphasized using colour, highlighting, bold emphasis and explanatory labels. Elements which might distract from the key messages may be removed, but not at the risk of making the data presentation misleading. For example, when trying to make a case, any data contradicting that case should not be removed (but any data irrelevant to that case could be removed).
- Which type of analysis needs to be applied to understand and interpret the data? The presentation format should be chosen which best supports this type of analysis. This is further discussed below.

When preparing data for analysis, it is useful to experiment with different presentation options. The following guiding questions can help determine the presentation format and its design:

- What type or which types of analysis need to be conducted to interpret the data and the key messages?
- Which presentation format best suits this type of analysis?
- The presentation format should convey one or several key messages in the data – what are they? What is the major story revealed by the data?
- How can the design be modified to best convey the key messages? (For example, by highlighting the highest or lowest values).
- If available, which levels of disaggregation provide the best insight into the data? (For example, presenting a statistical map at district level might reveal new patterns which are not apparent in a regional map).
- Are there several categories of related data to be analysed together? In this case, it could be split into several charts or graphs (see Figure 15), or combined into one presentation format (see Figure 16).

- Can information be presented both as a ratio and in absolute numbers (for example, the proportion of OOSC and the number of OOSC by region)? Presenting information in one way or another can change the message, so in some cases it can be useful to present more than one variant.

The following is a list of common ways in which data can be analysed and corresponding suggested presentation formats. Examples of these presentation formats are provided below.

- Making straightforward comparisons of data: bar chart.
- Analysing data with several dimensions or categories: table, point chart (also known as a dot plot).
- Analysing relationships between two or more indicators: scatter plot, bubble chart.
- Analysis of geographical trends: thematic map.
- Comparisons over time: time series (line) graph.

This is by no means an exhaustive list of types of analysis or of the many types of presentation formats or visualizations which can be used. With respect to presentation formats, it should be taken into account that the target audience may not always be very familiar with less commonly used graphs such as parallel coordinates, box plots and tree maps. Visualizations which are both complex and uncommon would need additional explanation, and are perhaps to be avoided if they can be presented as well using another format. Choice of visualization is always useful, however, in an interactive reporting system, as the user can decide how to display the information.

For guidelines on how to produce graphs to better explore and analyse data, see also Statistics New Zealand's. Graphics Guidelines and Schwabish 2014.⁹⁴

Graphs or tables?

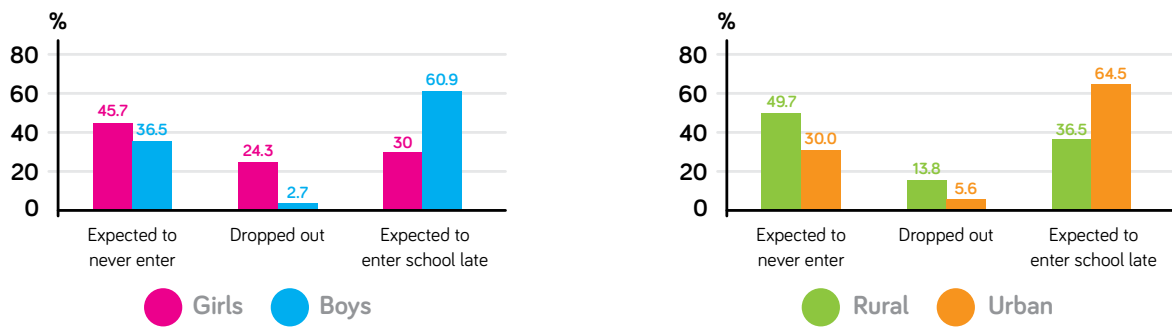
One of the most common ways of presenting data is through tables; but tables are only suitable for very specific situations. Tables are generally best suited for looking up figures or for comparing a very small set of numbers. Large tables in particular should almost always be avoided in the body of a report and should generally be placed in the appendices (except if data look-up is the purpose of the report or report section). An exception is when there are several categories or cross-classifications of related data, which provide important information and cannot be easily and clearly presented in visual form. In this case a small- or medium-size table may sometimes be useful for analysing the data, in particular if key values are highlighted.

Making straightforward comparisons of data

- Suggested presentation formats: bar or column chart (regular or stacked).
- Examples:
 - Categories of OOSC by sex and location (rural/urban) (see Figure 15).
 - Over-age enrolment in primary school.
 - Reasons why children are out of school by percentage of respondents.
 - Number of OOSC by single year of age.

⁹⁴ Schwabish, 2014; <http://www2.stats.govt.nz/domino/external/web/aboutsnz.nsf/092edeb76ed5aa6bcc256afe0081d84e/e5eee0bf7fe734cecc256c670072b8ec?OpenDocument>

Figure 15. Categories of primary-school-age OOSC in Kyrgyzstan (2005)



Source: Adapted from UNICEF and UIS, 2012a: 38-39

Analysing data with several dimensions or categories

- Suggested presentation formats: table, point chart.
- Notes: A point chart displays multiple points on the vertical axis and categories or cross-classifications along the horizontal axis. It is similar to a line chart, but with the lines removed, displaying only the data points. It is a good alternative to a table for displaying multiple categories or cross-classifications of data, as unlike alternative graph types it can remain relatively clutter free. It is useful to discover and analyse trends in such kinds of data, but for direct comparison of values a table is more suitable.
- Example: Proportion of OOSC by country, sex and income group (see Figure 16).

Figure 16. Proportion of lower-secondary-school-age children out of school, by country, sex and household wealth quintile (per cent)

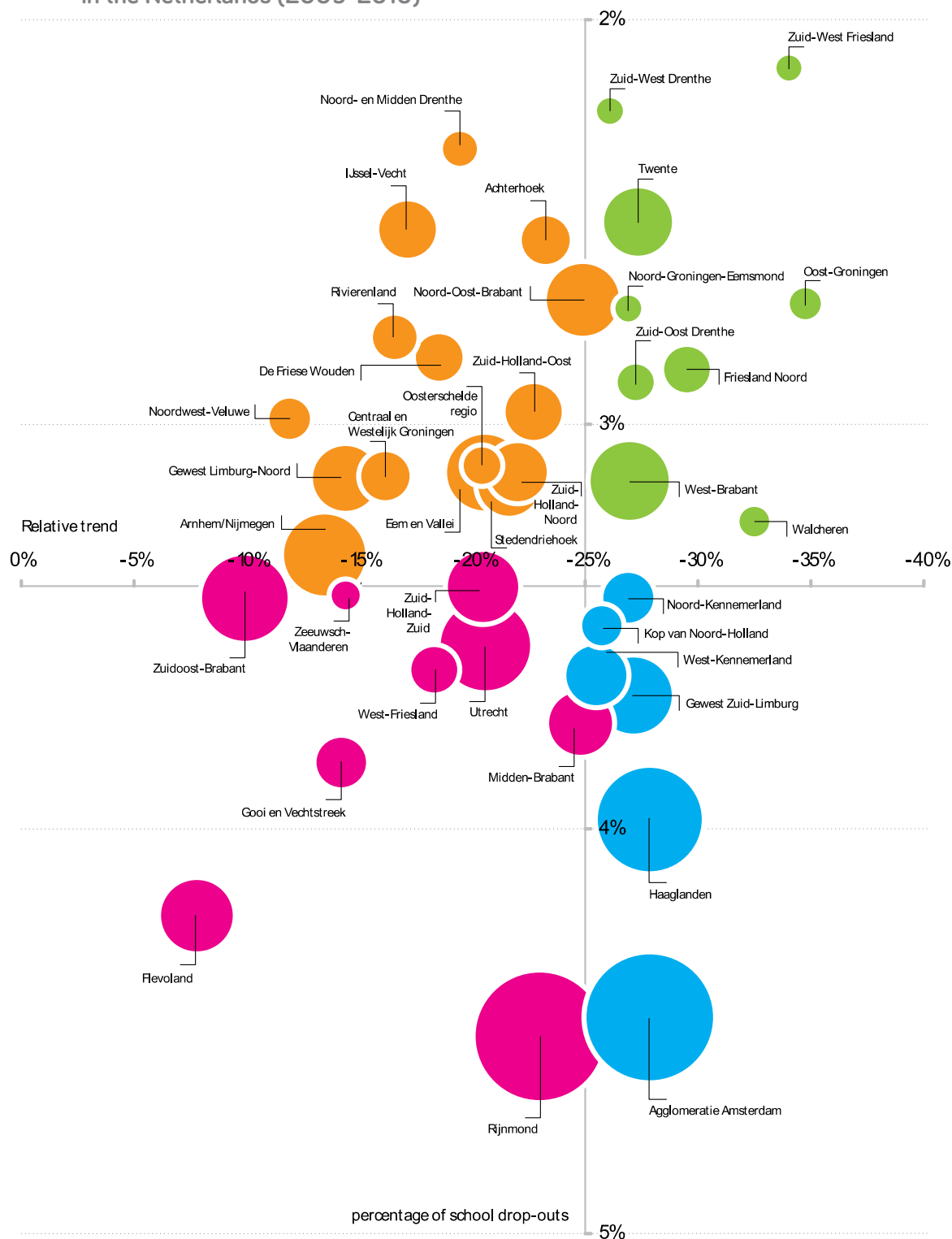


Source: Adapted from UNICEF and UIS, 2014a: 25

Analysing relationships between two or more indicators

- Suggested presentation formats: scatter plot (for two indicators or dimensions), bubble chart (for three indicators or dimensions, as shown in Figure 17).

Figure 17. Dropout percentage, relative trend and absolute dropout number by region in the Netherlands (2009-2010)



Source: Adapted from UNICEF and UIS, 2012a: 38-39

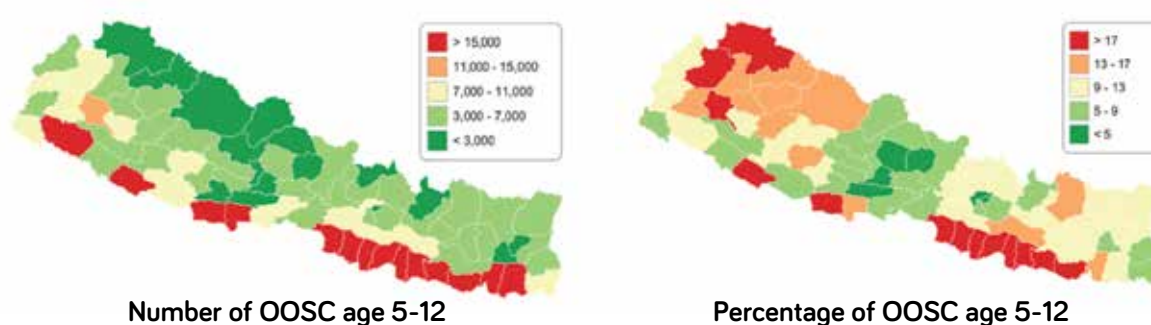
- Examples:
 - Comparison by region of child labour rates (y-axis) and the proportion of children living in rural areas for each region (x-axis).
 - Comparison by region of the percentage of children who dropped out (y-axis) and the relative trend compared to the previous year (x-axis), with the bubble size reflecting the number of dropouts for the same period (see Figure 17).

An example from the Netherlands Ministry of Education in monitoring progress in reducing early school leaving by region is shown in Figure 17. The y-axis shows the percentage of children who dropped out (regions towards the *top* have a low dropout rate). The x-axis shows the relative trend compared to the previous year (regions towards the *right* achieved the biggest reduction in dropout rate). The aim of all regions is to be in the top-right quadrant, indicating both a low dropout rate, and a significant improvement compared to the previous year. The size of the bubbles reflects the absolute number of dropouts for the same period. For example, the region West-Brabant, although in the top-right quadrant (thus successful), still has a large absolute number of dropouts, due to the school-age population of the region.

Analysis of geographical trends

- Suggested presentation format: Thematic map, such as a proportional symbol map or choropleth map. In a choropleth map, administrative regions are coloured according to their statistical value. In general, the smaller the administrative division the better, as it provides more detail and is less misleading. For example, the high number of OOSC for a particular region could be the result of just a single district within the region, which would become evident in a district-level map but hidden in a region-level map.
- Example: Choropleth maps showing the number and percentage of OOSC by district in Nepal (see Figure 18)

Figure 18. Number of OOSC (left) and percentage of OOSC (right) by district in Nepal (2011)

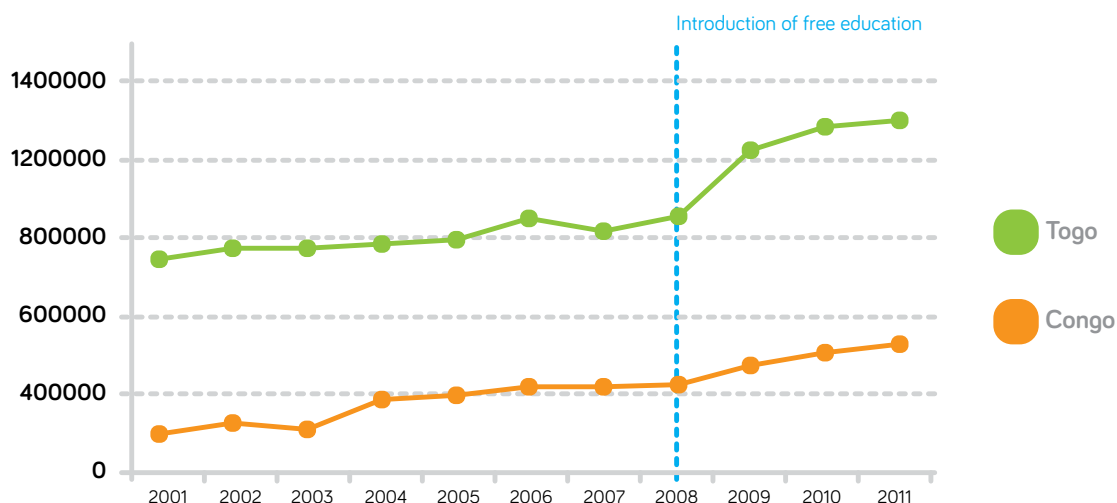


Source: Nepal Census 2011 data

Comparisons over time

- Suggested presentation format: Time series or line graph.
- Example: Primary-school enrolment over time, showing the increase in enrolment following the introduction of free education in 2008, for Togo and Congo (see Figure 19).

Figure 19. Primary-school enrolment, before and after the introduction of free education in 2008, Togo and Congo

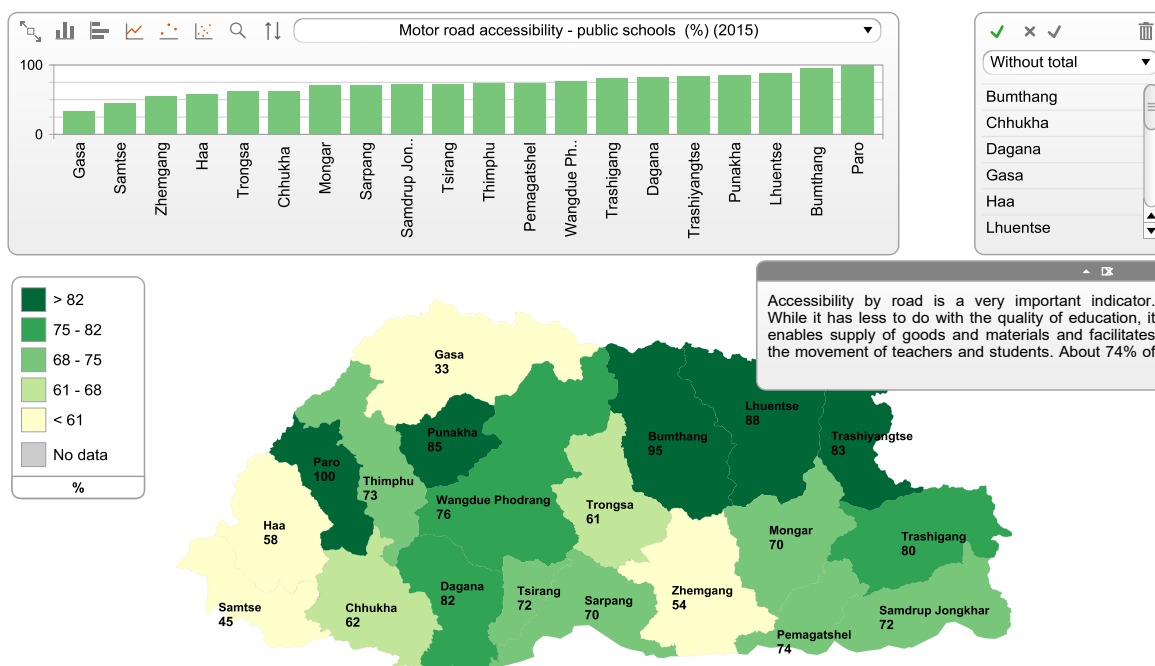


Source: UNICEF and UIS, 2014b: 52

Interactive dashboards

Figure 20 shows an example interactive web-based dashboard visualizing Bhutan EMIS data.⁹⁵ Data categories are selectable from the horizontal menu at the top of the screen, and indicators from the panel in the top-left corner. The selected category is 'Accessibility' and the selected indicator is 'Motor road accessibility – public schools'. Highlighted in the interactive map is the district 'Gasa', which has the lowest motor-road accessibility, which is highlighted in yellow in the bar chart. A description of the indicator can be found on the left of the map.

Figure 20. EMIS dashboard with interactive maps and graphs



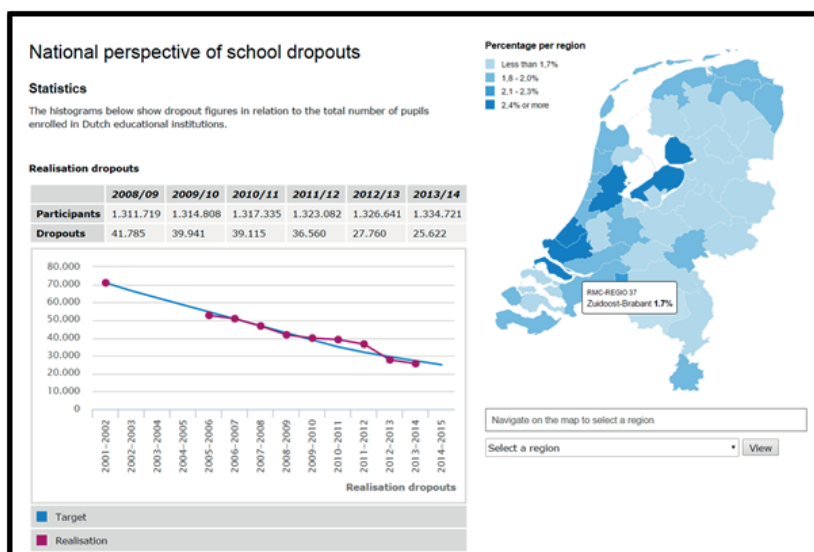
⁹⁵ This dashboard was created using StatPlanet (www.statsilk.com) for the Ministry of Education in Bhutan. Underlying the dashboard is a simple spreadsheet, which is editable using Excel. It is also possible to automate the process of importing EMIS data into the spreadsheet.

Other components of the dashboard in Figure 20 include the map legend in the bottom-left corner, the district selection in the top-right corner, and various graph-type options through the icons above the bar chart (such as a scatter plot or time-series graph). There is also an option to display school-level data, visualized as colour-coded dots on the map. Besides EMIS data, the dashboard also includes some census data (literacy rates by district). Such a dashboard is therefore also useful to combine various sources of information, as discussed in Step 5.

Another example of a web-based dashboard which combines different ways of presenting information is the Netherlands' web-based Dropout Explorer, of the Ministry of Education, Culture and Science, shown in Figure 21.⁹⁶ It maps school dropout at various administrative levels, displays dropout trends over time, and compares the realised reduction in dropout rates with the target for each year. In contrast to the previous example, the Dropout Explorer has a very specific purpose – reducing dropout rates – and does not include other kinds of education data.

A balance needs to be found between having insufficient information for analysis, monitoring and decision-making, and having too much information, causing information overload. To simplify the analysis and the messages, it may be useful to keep the report highly focused. However, the advantage of an interactive dashboard is that it does not present all information at the same time, but rather according to user selection. The challenge is to keep the dashboard user-friendly while still providing enough choice in customizing the data selection and presentation format.

Figure 21. Dropout Explorer of the Ministry of Education, Culture and Science in the Netherlands



⁹⁶ <http://www.vsvverkenner.nl/english/>

Step 8: Develop and establish evidence-informed policies and interventions

Effective and productive decisions and strategies require not only evidence which is reliable, relevant and complete. It also requires capacity to interpret the evidence, and tools and guidance for acting upon the evidence. The final step of the Monitoring Framework is therefore to ensure that the analysis in Step 7 is followed-up with an evidence-informed response.

Step 8 discusses some of the key mechanisms through which improved monitoring and evidence can inform policies and interventions. It does not explore in detail policy and practice options to prevent and respond to the issue of OOSC and dropout. The CEE/CIS region has developed a handbook to address policy measures and interventions aiming to improve education access and retention, to provide countries with concrete options for policy and strategy development in the area of education exclusion and dropout prevention and response.⁹⁷ Together, Volume 1 (the Framework) and Volume 2 (the handbook) constitute a comprehensive set of 'tools' to equip and inspire education decision-makers and practitioners with guidance and ideas – both to improve the data and information on education exclusion, and then to act on it – to ensure that all children are in school and learning.

Barrier: Evidence and its analysis do not inform policies and interventions to address education exclusion

As discussed under Step 7, there are two main approaches to addressing education exclusion – at the system level, and through individual interventions.⁹⁸ These two approaches have different challenges with respect to evidence-informed decision-making.

At the system level, the purpose of the monitoring system is to inform policies and strategies which reduce exclusion from education and close equity gaps. The practice of regularly and systematically using evidence for policy- and decision-making in ministries of education – or any other ministry – remains the exception rather than the rule. It requires a significant institutional and cultural shift. There are many obstacles for this shift to take place, including:⁹⁹

At the system level, the purpose of the monitoring system is to inform policies and strategies which reduce exclusion from education and close equity gaps.

- Lack of an enabling environment, such as budget constraints, lack of capacity to review evidence, and political sensitivities which obstruct transparent reporting.

⁹⁷ UNICEF, 2016b.

⁹⁸ A third type of intervention may be defined – targeted interventions – which focus on a particular group (such as adolescent girls); for more details, see *Improving Education Participation: Policy and Practice Pointers for the ECA Region* (UNICEF, 2016b).

⁹⁹ Black, 2001; Carden, 2009; Cooper, Levin and Campbell, 2009; Hattie, 2009; Innvær et al., 2002; Livingstone, 2005; Nutley, Davies & Walter, 2002; Ross and Jürgens-Genevois, 2006; Weiss, 1999.

- Time constraints of policy- and decision-makers to engage with evidence.
- High turn-over of policy-making staff.
- A lack of personal contact between those conducting the analysis and policy- and decision-makers.
- Lack of availability of sufficiently up-to-date information for decision-making.
- Ineffective dissemination and communication of evidence, with lack of clear, concrete messages and policy directions.
- Lack of capacity of policy-makers and decision-makers to interpret the evidence and, specifically, lack of data literacy.

In addition, a key obstacle is related to Step 7 – the reporting and presentation of information. The results of the analysis need to be presented clearly to policy- and decision-makers. If they are not communicated clearly, including the key (policy) messages from the data, then they are likely to be ignored or misunderstood. The worst-case scenario is not one where evidence is ignored in policy- and decision-making processes, but one where misleading evidence – or misunderstanding of the evidence – leads to ineffective and counterproductive policy decisions and strategies.

A lack of inter-agency collaboration is a further, important obstacle in using evidence for decision- and policy-making. Policies and strategies to support children excluded from education need to be holistic, involving many different agencies and institutions – as the causes of education exclusion are often complex and multi-dimensional. Children may be out of school for a multitude of interconnected reasons, including poverty, disability, health problems, early marriage, trafficking, child labour, lack of legal documentation, conflict with the law and discrimination. Addressing such complex cross-sectoral issues requires formal cooperation between ministries and institutions – both at the national and sub-national level (for an example, ‘Inter-ministerial cooperation on OOSC’, see Appendix 4). Obstacles to cross-sector collaboration include conflicting political agendas of the line ministries, competition for funding, and overlapping roles and responsibilities.¹⁰⁰

Cross-sector cooperation is crucial because there is often a lack of coordination between services supporting children, for example between the health and education sectors. This leads to children receiving duplicated support from different institutions, as well as children receiving no support at all. NGOs often play an important role in filling gaps in service provision, as they should, but children facing education exclusion should not need to depend on the presence of NGOs to ensure that their right to quality education is met.

With respect to case-by-case decision-making, a key obstacle is the lack of clearly defined roles, responsibilities and procedures in addressing the issue of OOSC and children at risk of dropping out. From the school perspective, there are often many uncertainties. It may not be clear what the responsibilities of schools are, and where their responsibilities end – for example, once a child is out of school, is it the school’s responsibility to try and get the child to come back to school, or is the child then no longer the school’s responsibility? Is the school’s responsibility limited to children who dropped out from that school, or does it also include all children in the school zone (which in some countries have explicitly defined boundaries)? Moreover, the procedures may also not be clear – when a child is at risk of dropping out (or has already dropped out), what are the next steps? Who should be contacted (for example, the parents, the police, the child-rights unit or other agency) and when? Schools may not have explicit procedures, or they may have developed their own procedures which are inconsistent with the procedures used by other schools. Beyond the school level, the roles and responsibilities of other institutions which support children are also often unclear when it comes to OOSC and children at risk of dropping out.

¹⁰⁰ UNICEF, 2016b.

System-level policies and interventions

The development of effective system-level policies and interventions for addressing education exclusion depends on relevant and reliable evidence. It furthermore depends on effective reporting and analysis. As discussed in Step 7, reports need to highlight the key profiles of OOSC and why these particular profiles (such as *children with disabilities, poor urban boys, rural adolescent girls and children in specific regions of the country*) are most likely to be excluded from education. It also requires an understanding of how causes of education exclusion for specific profiles change at different points in the education cycle, from failing to enter school, to dropping out at different grades and transitions between education levels and schools. Policy- and decision-makers need a high level of data literacy to interpret and evaluate the evidence, and derive the UNICEF, 2016b. implications for developing successful policies and interventions which reduce education exclusion and close equity gaps. Given the complexity of this task, clear reporting with effective presentations and visualizations of the evidence are crucial, in order to facilitate their interpretation.

The ministry of education and the different education authorities at various administrative levels are primarily responsible for addressing exclusion from education, but – as highlighted throughout this Monitoring Framework – OOSC are a cross-sector issue. As described in the previous section, education exclusion is associated with a wide range of cross-sector issues, including poverty, disability, health problems, early marriage, trafficking, child labour, lack of legal documentation, conflict with the law and discrimination. A wide range of expertise and interventions are needed from different sectors in order to fully address the complex and multifaceted causes of education exclusion. Cross-sectoral collaboration is also required to avoid duplication and ensure better service delivery (see also ‘Incentives for cross-sector cooperation’ under Step 5).

A wide range of expertise and interventions are needed from different sectors in order to fully address the complex and multifaceted causes of education exclusion.

A first requirement for cross-sector cooperation is for representatives from the different sectors to meet regularly. This could be through the establishment of national and regional cross-sector committees or commissions, consisting of representatives from the relevant ministries, agencies or departments. Their role would include the establishment of information-sharing agreements, and coordinating the collaboration between sectors. They would need to have the decision-making power to initiate evidence-informed action, such as in the form of revised policies, or specific strategies and interventions. An example is the regional Children’s Affairs Commissions in Kyrgyzstan, which discuss cases of education exclusion and establish multi-disciplinary teams to intervene.

Further commitment towards cross-sector cooperation involves the establishment of formal agreements (i.e. Memorandums of Understanding, protocols of collaboration). These agreements would outline the roles and responsibilities of the different parties in achieving a specific goal that requires cross-sector cooperation, such as identifying OOSC, or coordinating interventions for children in difficult circumstances. An example is the Four Ministry Cooperation Agreement on identifying OOSC in Albania (see Appendix 4).

Case-level procedures and interventions

Many of the system-level policies and guidelines for reducing education exclusion are implemented at the school level. School staff, therefore, tends to bear a large responsibility in terms of reducing dropout. In some countries, school staff also has the responsibility of ensuring all children in the school zone are in school.

Schools also have the key role of monitoring students at risk of dropping out or at the point of dropping out, and reporting dropout and the reasons for dropout.

To be able to take these responsibilities, schools need as much support as possible. The first kind of support entails training, including training on identifying and monitoring children at risk of dropping out, data-literacy training to interpret various kinds of student- and school-level information, and training in the use of the EMIS and other relevant information systems for monitoring and reporting on OOSC and children at risk of dropping. School staff needs to be able to understand key concepts and definitions, such as 'dropout', 'excused and unexcused reasons for absenteeism' and 'chronic absenteeism'. They also need to be able to interpret various kinds of information – such as dropout risk reports, school evaluations, trends over time and progress towards targets, and student assessment data. Finally, they need clarity and guidance with respect to their roles and responsibilities for using and acting on this information.

Schools also need support in the form of human resources. In particular, small schools with few staff members would have difficulties fulfilling the tasks above, such as schools where the principal is also a teacher and administrator. This support may come through additional school staff, such as school counsellors or social pedagogues, who may support one large school and/or several smaller schools. The burden on schools can also be reduced through a case-management system, through which children in difficult circumstances (whether due to health, poverty, disability, etc.) are supported, as discussed in Step 7. In this case, the coordinating function lies with case managers, who liaise with schools and various service providers, rather than school staff.

Roles and responsibilities for case-level interventions

Roles and responsibilities depend on whether a child has never been in school, is at risk of dropping out, or has already dropped out. Responses and actions subsequently fall into four categories: (i) ensuring all children enter school and do so on time, (ii) implementing measures to prevent students from becoming at risk of dropping out, (iii) intervening at the moment a student is identified as at risk of dropping out (see Step 6), and (iv) implementing compensation measures to support the return to school for OOSC, or providing alternative educational arrangements.

Responsibilities corresponding to the different categories of interventions need to be clearly defined, to establish the accountability of the different parties involved and avoid inaction. Since OOSC is a cross-sectoral issue, it requires also information sharing and cooperation agreement between these different parties. A clear separation of roles and responsibilities across the different sectors is required to prevent overlap and ensure all children excluded or at risk of exclusion from education receive the support needed. Collaboration is needed between sectors to close information gaps and make sure that no child is invisible in the system.

With respect to children who have never been in school (who may enter school late or not at all), it may be the responsibility of the school (concerning children in their school zone), or the local administrative units, or regional education offices. Procedures for data sharing and how to respond to this information also need to be established to avoid inaction. Social workers, doctors or other local-level actors (such as the police) may have information which can be used to identify children who have never entered school. The local government can play an important role in supporting and collaborating with the various actors in the community to identify out-of-school children not known to schools.

Decision flow and referral mechanism for children who are absent from school

Once a student has been identified as being at risk of dropping out (Step 6), clear procedures are required on which course of action to take and by whom. Depending on the nature and severity of the issues, different people and agencies would need to get involved.

Procedures for dealing with absenteeism can be outlined in a decision flow and referral system, which needs to be linked with the early warning system discussed in Step 6. While schools may be well aware of the different options for dealing with absenteeism (for example contact the parents, liaise with school inspectors, contact the police department, organise for a teacher or social worker to visit the family), it is not always clear in which circumstances to use these approaches. It is recommended that clear, detailed procedures are developed to help schools determine the right course of action, and respond to the situation quickly. For example, procedures for schools established by the Durrësi Regional Education Directorate in Albania include maintaining daily student attendance records, recording specific data for students at risk of dropping out, and periodic analysis of the data. More specific courses of action could be described through a bulleted list. The following example course of action for unexcused absenteeism is from the Washington State's truancy law:¹⁰¹

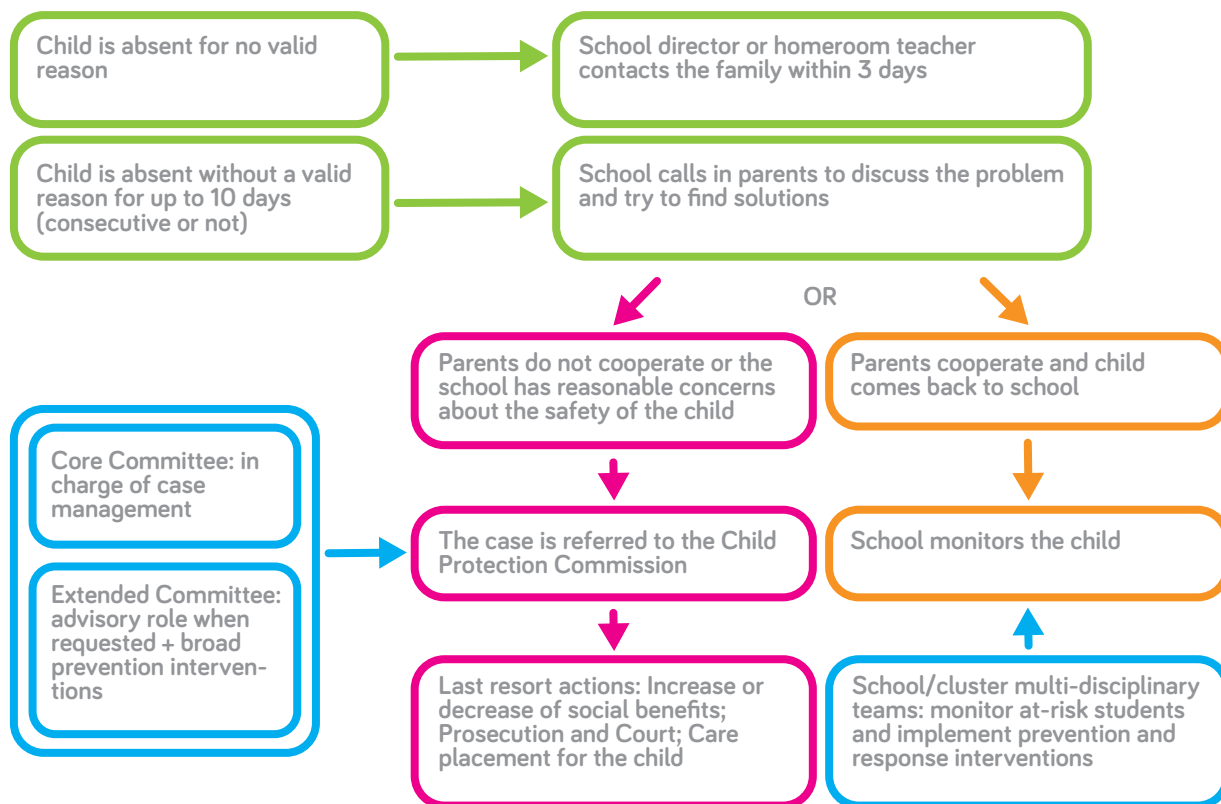
- After *one* unexcused absence in a month, the school is required to inform the parent in writing or by phone.
- After *two* unexcused absences, the school is required to initiate a parent conference to improve the student's attendance.
- After *five* unexcused absences in a month, the parent and school must enter a contract to improve the student's attendance. Or, the case can be referred to a Community Truancy Board.
- After *seven* unexcused absences in a month, or 10 unexcused absences in an academic year, the school district may file truancy petitions with the juvenile court.
- If the student is not in compliance with a court order resulting from a tuition petition, the school is required to file a contempt motion.

Guidelines can also be developed in the form of a decision flow diagram, which can better accommodate ways of dealing with different circumstances. An example from Portugal is provided in Figure 22¹⁰². In Portugal, all actors can refer children who are not going to school, including social services, schools, health professionals and the police. This referral system focuses on absenteeism and represents a simplified illustration of possible decision flows. When it comes to risk of dropping out, many more factors besides absenteeism come into play, including disability, family problems, learning difficulties and so on. A more sophisticated decision flow and referral system would be required in such cases, and possibly the involvement of experts whose sole task is to handle each individual case and make the appropriate decisions.

¹⁰¹ <http://www.k12.wa.us/GATE/Truancy/>

¹⁰² Antonowicz, 2013.

Figure 22. Decision flow diagram for children at risk of dropping out - example from Portugal



Connecting the Steps

Overall, this Monitoring Framework presented a series of interrelated steps to produce a robust system which identifies and monitors children out of school and at risk of dropping out and empowers institutions and all actors working with vulnerable children to uphold every child’s right to quality education. It provided guidance and methods for going beyond ad-hoc and uncoordinated interventions to establishing systematic, evidence-informed approaches to monitoring children excluded from education and coordinating a response based on their identified needs. In particular, it focused on identifying and supporting those children excluded from education who are currently semi-invisible or invisible, who are most in need of support and least likely to receive it.

Lastly, it is important to note that a good monitoring system is always a work in progress, with the flexibility to adapt to changing circumstances – whether due to a change in policy or definitions, in technology or the structure of institutions. Moreover, it needs to continuously evolve, to better identify, monitor and support the OOSC of today and tomorrow.

Useful resources and further reading

- **UNICEF/UIS Global Initiative on Out-of-School Children**
 - Global website: <http://www.allinschool.org>
 - UNICEF Regional Office for Central and Eastern Europe and the Commonwealth of Independent States (ECA): <http://www.education-equity.org>
 - UIS: <http://www.uis.unesco.org/Education/Pages/out-of-school-children.aspx>
- **Step 1. Establish indicators, definitions and benchmarks**
 - UIS Data Centre: <http://data.uis.unesco.org>
 - UIS Glossary of Statistical Terms: <http://www.uis.unesco.org/Pages/Glossary.aspx>
 - UNPD Population Estimates: <http://esa.un.org/unpd/wpp>
- **Step 3: Update and extend EMIS to incorporate new indicators and methodologies**
 - SABER Assessment Tool for EMIS
https://www.openemis.org/files/resources/OpenEMIS_SABER_EMIS_Assessment_Tool_en.pdf
 - World Bank Group: What Matters Most for Education Management Information Systems: A Framework Paper
http://wbfiles.worldbank.org/documents/hdn/ed/saber/supporting_doc/Background/EMIS/Framework_SABER-EMIS.pdf
 - infoDev guide to Education Management Information Systems (EMIS)
<http://www.infodev.org/en/Publication.151.html>
 - Education Management Information System (EMIS): Integrated Data and Information Systems and Their Implications In Educational Management
http://www.infodev.org/infodev-files/resource/InfodevDocuments_188.pdf
 - UNICEF Guide for Including Disability in Education Management Information Systems, (expected to be released in 2016).
 - OpenEMIS - UNESCO's open source EMIS: <http://www.openemis.org>
 - Open source School Management Information Systems:
 - OpenSIS: <http://opensis.com>
 - Fedena: <http://www.projectfedena.org>
 - A list of alternatives: <http://alternativeto.net/software/powerschool>
- **Step 6: Create an early warning system for identifying children at risk of dropping out**
 - The Dutch approach to preventing early school leaving: <http://www.aanvalopschooluitval.nl/english>
 - USAID Dropout Prevention Lab: <http://dropoutpreventionlab.org/>
 - US-based National Dropout Prevention Center: <http://www.dropoutprevention.org>
 - US-based National High School Center – Early Warning System (EWS):
<http://www.betterhighschools.org/ews.asp>
- **Step 7: Create automated reporting routines and analyse reports to inform evidence-informed policies and strategies**
 - OpenEMIS Visualizer: <http://www.openemis.org/products/visualizer>
 - The Netherlands – Dropout Explorer: www.vsvverkenner.nl/english
 - StatPlanet visualization and mapping software: <http://www.statsilk.com>

- Country maps: <http://www.statsilk.com/maps/download-free-shapefile-maps>
- Examples interactive visualizations for monitoring indicators and progress towards benchmarks:
 - UN Integrated Implementation Framework (IIF) Platform for tracking progress on the Millennium Development Goals: <http://iif.un.org/sites/iif.un.org/files/StatPlanet/StatPlanet.swf>
 - World Bank EdStats: <http://blogs.worldbank.org/education/node/647>
- UNESCO eAtlas series:
<http://www.uis.unesco.org/Education/Pages/unesco-e-atlas-launch.aspx>

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Appendix 1: Indicators, definitions and benchmarks

This appendix lists the proposed key indicators, definitions and benchmarks for monitoring OOSC. Please note that this is by no means intended as a comprehensive list of indicators, and it is recommended that countries include additional indicators and benchmarks related to enrolment and OOSC according to country-specific needs. For a broader list of education indicators beyond OOSC, see the UIS¹⁰³ and Eurostat¹⁰⁴ websites. See also Step 1, in which some of the key indicators and their definitions are discussed in greater detail.

The following is a list of indicators defined in this appendix:

- Key terms:
 - Compulsory-school-age population
 - Truancy and absenteeism:
 - Prolonged truancy
 - Chronic truancy
 - Chronic absenteeism
 - Permissible absenteeism
- Enrolment indicators:
 - Pre-primary Net Enrolment Rate
 - Primary Adjusted Net Enrolment Rate
 - Lower-secondary Adjusted Net Enrolment Rate
- OOSC indicators:
 - Dropout:
 - Status dropout rate
 - Event dropout rate
 - Cohort dropout rate
 - Number and percentage of OOSC
 - Number and percentage of out-of-school children who have never enrolled in school
 - Status OOSC rate
 - 5DE indicators:
 - Dimension 1 - Pre-primary age not in school rate
 - Dimension 2 - Primary age OOSC rate
 - Dimension 3 - Lower-secondary age OOSC rate
 - OOSC indicators by level of visibility:
 - Number and percentage of *Visible OOSC*
 - Number and percentage of *Semi-invisible OOSC*
 - Number and percentage of *Invisible OOSC*

¹⁰³ <http://data.uis.unesco.org/>

¹⁰⁴ http://epp.eurostat.ec.europa.eu/portal/page/portal/education/data/main_tables

Indicators and definitions

- **Key terms:**
 - **Compulsory-school-age population:**
 - **Definition:** Compulsory school age refers to the age range in which a child or adolescent should attend school according to national legislation. The compulsory-school-age population refers to the total number of children and adolescents who are in this compulsory school age range.
 - **Notes:** For the calculation of enrolment and OOSC rates, population data needs to be available either by single year of age, or for the relevant age range (such as total population for the primary-school age range).
 - **Data sources:** The choice of data source for population data can significantly affect the population estimate and the resulting enrolment, dropout and OOSC figures. The different options must therefore be carefully considered. If the data are available, dropout and OOSC rates could be calculated based on the different sources of population data – for example, census population data and civil registry population data. The following sources of population estimates can be used for the enrolment and OOSC rate calculations:
 - **United Nations Population Division:** UNPD produces population estimates and projections for all countries and areas in the world.¹⁰⁵ The data are derived from a variety of sources depending on the country – including censuses, surveys, vital and population registers – and are processed using a standardized methodology (UNPD, 2014). In order to ensure international comparability, the UIS uses UNPD population estimates for its calculations of population-based indicators such as enrolment and OOSC rates. The UNPD population data are revised every two years.
 - **National population census data:** This data may be more up-to-date than the UNPD population revision, if new census data was recently released. However, it may not necessarily be more accurate for projected population figures, depending on the projection method used.
 - **Civil registry:** In some countries, population data from the civil registry may not be reliable at all, or only reliable for parts of the country (such as urban areas). If the civil registry data are reliable, it can be used as an alternative source of population data. It can also be used to provide a point of comparison with enrolment rates and OOSC figures calculated with the population census data. If the civil registry data are incomplete, it could be complemented with person-level data from other databases as described in Step 5. In addition, if civil registry data are reliable for specific areas or regions, figures could be calculated using civil registry population data as a source only for those specific areas or regions. Some countries no longer conduct traditional censuses and instead rely on population registers and other administrative databases to carry out register-based censuses, often complemented by sample surveys.¹⁰⁶
 - **Truancy and absenteeism:** The following are proposed definitions and indicators relating to truancy and absenteeism. As discussed in Step 6, they are critical for monitoring dropout risk. Accurate truancy records are also necessary to determine whether a student has dropped out. These definitions are based on:

¹⁰⁵ <http://esa.un.org/unpd/wpp/>

¹⁰⁶ For example, Austria, Bahrain, Belgium, Denmark, Finland, Israel, the Netherlands, Singapore and Turkey. For more information see <http://unstats.un.org/unsd/demographic/sources/census/censusdates.htm>

- **Chronic truancy:** A student who has been absent from school without an excused reason for part of the school year, expressed as a percentage of the total number of school days (or hours). The related indicators would be defined as the number and percentage of students in a given level of education who have been absent from school without an excused reason for a specified percentage of the school year. Several levels of chronic truancy could be defined and monitored, for example:
 - **Severe truancy:** More than 20 per cent of days missed during the current school year.
 - **Frequent truancy:** 10–20 per cent of days missed during the current school year.
- **Chronic absenteeism:** This is the same as the indicator for chronic truancy, except that it includes both excused and unexcused absenteeism.
- **Permissible absenteeism:** The maximum period of time a student may be absent before having to repeat the year, or needing to pass an exam to continue to the next grade.

Principal EMIS indicators

There are dozens of education indicators. Even when considering only indicators required for monitoring OOSC, it is still a long list. Because the number of indicators may seem overwhelming, this section discusses the five principal indicators from which most of the key education indicators related to school entry, participation, progression, completion and OOSC can be calculated.¹⁰⁷ This includes the new post-2015 education indicators proposed by the Technical Advisory Group (UIS, UNICEF, UNESCO, OECD and the World Bank Group).¹⁰⁸ These five indicators, together with population data, can be considered as the ‘building blocks’ for other indicators.

The first three indicators, from A to C, are age-specific indicators:

- **Indicator A: Enrolment in primary or secondary education, by single year of age.**
 - **Definition:** The number of compulsory-school-age children or adolescents by single year of age who are enrolled in primary or secondary education (ISCED levels 1, 2 or 3).
- **Indicator B: Enrolment in early childhood educational development programmes or pre-primary, by single year of age.**
 - **Definition:** The number of children by single year of age who are enrolled in early childhood educational development programmes or pre-primary education (ISCED levels 01 and 02), from 0 to the last year of official pre-primary school age.

¹⁰⁷ References: - Eurostat education indicators: <http://ec.europa.eu/eurostat/web/education-and-training/eu-benchmarks/indicators>. The EU ‘early school leaving’ indicator is a special case which requires some additional information. Further details are provided below.

Technical Advisory Group (2015). *Technical Advisory Group Proposal: Thematic Indicators to Monitor the Post-2015 Education Agenda*, <http://www.uis.unesco.org/Education/Documents/tag-proposed-thematic-indicators-post2015-education-agenda.pdf>

UIS website, the UN institute responsible for producing data and methodologies to monitor education trends at national and international levels: <http://www.uis.unesco.org>

UNICEF and UIS (2011). *OOSCI Conceptual and Methodological Framework (CMF)*, New York and Montreal.

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UNICEF and UIS (2016). *Monitoring Education Participation: Framework for Monitoring Children and Adolescents who are Out of School or at Risk of Dropping Out*, Geneva: UNICEF Regional Office for Central and Eastern Europe and the Commonwealth of Independent States.

¹⁰⁸ When the final list of indicators to monitor the education-related targets of the Sustainable Development Goals are released, these will be updated.

- **Indicator C: Number of children and adolescents who left school, by single year of age.**
 - **Definition:** The number of compulsory-school-age children or adolescents by single year of age who are currently not enrolled in primary, secondary or higher levels of education (ISCED 1 or higher), but have been enrolled at some time in the past (have dropped out).

The next two indicators are grade-specific:

- **Indicator D: Total enrolment by education level and grade.**
- **Indicator E: Total number of repeaters by grade.**

Population data by single year of age is required to calculate OOSC rates. Therefore, for the automatic calculation of these rates, population data (at least for the past few years) would need to be included in the EMIS. The EMIS should provide an easy means of updating this information when new population data becomes available.

- **Indicator F: Age-specific population data.**
 - **Definition:** The number of children or adolescents by single year of age, from 0 to 24 years.

The following are three important indicators which can be calculated from the indicators above. Unlike the international education indicators described below, these three indicators are by single year of age rather than aggregated by age group. This enables a better identification of where exactly the problem is occurring (for example if late entry to school is an issue and at what age students are dropping out, for specific levels of disaggregation such as by sex and by region).

- **1. Age-specific enrolment rate (ASER) in primary or secondary education.**
 - **Calculation:** For each single year of age from one year younger than the starting age of primary education to 18 (or higher, subject to data availability):
 - Indicator A/Indicator F (*total enrolment in primary or secondary education by age, divided by population by age*).
 - **Source:** This is an age-specific version of international OOS rate indicators.
- **2. Age-specific enrolment rate in early childhood educational development programmes, or pre-primary education, or primary education.**
 - **Calculation:** For each single year of age: 0 to one year older than the primary starting age.
 - (Indicator A + B)/Indicator F (*total enrolment in early childhood educational development programmes, pre-primary education, or primary education by age, divided by population by age*).
 - **Source:** This is an age-specific version of the international early childhood education and pre-primary-level indicators.
- **3. Age-specific Semi-Invisible or Invisible OOSC** (compulsory-school-age children who are not recorded in the EMIS).
 - **Calculation:** For each single year of age (for the compulsory school age range):
 - Indicator F – Indicator A – Indicator C (*population by age – enrolment in primary or secondary education by age – dropouts by age*).
 - **Source:** OOSC Monitoring Framework.

Enrolment indicators and definitions

The UIS calculates all of its education indicators (including enrolment rates) according to ISCED levels.¹⁰⁹ The enrolment indicators below concern only the education levels associated with ISCED level 0 - early childhood education, 1 - primary education and 2 - lower-secondary education (UNICEF and UIS, 2011).¹¹⁰ Primary and lower-secondary education can also be referred to as the first and second stages of basic education. This classification of education programmes largely corresponds (but not always) to the national structures of education systems (the classification for most countries in the world can be found on the UIS website). These three ISCED levels correspond to dimensions 1 to 3, which are defined below. Enrolment figures should include children and adolescents in any type of education programme, including private schools and special schools for children with disabilities. However, enrolment in programmes which are not recognized by the country as equivalent to formal education should be calculated separately to enrolment figures for programmes recognized as equivalent to formal education; for example, non-formal or religious education, or day-care-centre programmes for children with disabilities, which do not include sufficient curricular content or duration.

The accuracy of enrolment rates very much depends on whether dropout is clearly defined and recorded as discussed in Step 1.

- **Enrolment Rate by Age:**
 - **Definition:** The percentage of children or adolescents by single year of age who are enrolled in primary or secondary education, from the official primary-school entry age up to 18 years old.
 - **Indicator calculation:** The number of children enrolled in primary or secondary education divided by the number of children in the population, by single year of age.
 - **Notes:** This indicator incorporates the Eurostat indicator ‘18-year-olds in education’, but includes also younger years of age down to primary-school entry age.¹¹¹
- **Pre-primary Net Enrolment Rate:**
 - **Definition:** The percentage of children of pre-primary-school age who are enrolled in pre-primary education.
 - **Indicator calculation:** Number of children of pre-primary-school age enrolled in pre-primary education, divided by the number of children of pre-primary-school age.
 - **Notes:** See also the Dimension 1 indicator below.
- **Primary Adjusted Net Enrolment Rate:**
 - **Definition:** The percentage of children of primary-school age who are enrolled either in primary or secondary education.
 - **Indicator calculation:** The number of children of primary-school age enrolled in primary or secondary education, divided by the number of children of primary-school age.
 - **Notes:** The primary ANER is the complementary indicator to the primary-school age out-of-school rate. It is different from the more commonly used primary NER because it captures enrolment in both primary and secondary education. The primary NER *only counts* children of primary-school age who are in primary education, which can lead to a lower estimate of the enrolment of the primary-school age group (UNICEF and UIS, 2011).

¹⁰⁹ The International Standard Classification of Education designed by UNESCO to facilitate comparisons of education statistics and indicators of different countries on the basis of uniform and internationally agreed definitions. See also: <http://www.uis.unesco.org/isced>

¹¹⁰ <http://www.uis.unesco.org/Pages/Glossary.aspx>

¹¹¹ <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00060&plugin=1>

- **Lower-secondary Adjusted Net Enrolment Rate:**
 - **Definition:** The number of children of lower-secondary-school age who are enrolled either in lower- or upper-secondary education.
 - **Indicator calculation:** The number of children of lower-secondary-school age enrolled in lower- or upper-secondary education, divided by the number of children of lower-secondary-school age.
 - **Notes:** The lower-secondary ANER is different from the more commonly used lower-secondary NER, because it captures enrolment in lower and upper secondary. The lower-secondary NER only counts children of lower-secondary-school age who are in lower-secondary education, which can therefore lead to a lower estimate of the enrolment of the lower-secondary-school age group (UNICEF and UIS, 2011). In contrast to the Primary ANER, the lower-secondary ANER is not the complimentary indicator to the lower-secondary-age OOS rate, because it does not count enrolment in primary education. See also the calculation for lower-secondary-age OOSC below.
- **Other indicators:**
 - **18-year-olds in education (per cent):** The percentage of all 18-year-olds who are still in any kind of school (all ISCED levels). Source: [Eurostat](#)

OOSC indicators and definitions

- **Dropout:**
 - **Definition:** See Step 1
 - **Calculation methods:** Three kinds of dropout rate statistics are commonly used, as described in Table 5 (adapted from Thurlow, Johnson, & Sinclair, 2002; Lehr et al., 2004):
 - The *status dropout* rate provides cumulative data on dropouts, typically among young adults (for example 16- to 24-year-olds), and measures the proportion of individuals who dropped out from school and have not completed compulsory education (for example did not receive a high-school diploma), regardless of when they dropped out. The name of the indicator implies, however, that it only reflects dropouts and that there are no young adults who never went to school. It is proposed therefore that this indicator is not calculated according to the total number of children in a specific age range, but rather according to the total number of children in that age range *who have at some point in the past been enrolled in school*. The proposed calculation is as follows:¹¹²
 - **Status dropout rate:** The number of children in a given age range who have dropped out, irrespective of when they dropped out, divided by the total number of children in that age range who have at some point in the past been enrolled in school.
 - The *event dropout rate* measures the proportion of individuals in a specified age range or grade who were enrolled at the start of the school year and dropped out before the end of the school year. The dropout rate by grade calculation is as follows:
 - **Dropout rate by grade:** $100\% - (\text{promotion rate} + \text{repetition rate})$.
 - *The cohort dropout rate* measures the dropout rate of a cohort of students following a specified period of time.

¹¹² <http://glossary.uis.unesco.org/glossary/en/term/2000/en>

Event dropout rate (may also be referred to as the annual rate or incidence rate)	Measures the proportion of individuals who drop out <i>in a single year</i> .	5 per cent of 6- to 16-year-olds enrolled in school in October 2012 dropped out before October 2013.
Status dropout rate (may also be referred to as the prevalence rate)	Measures the proportion of individuals who have dropped out, irrespective of when they dropped out.	On 1 October 2012, 7 per cent of 16- to 24-year-olds who were enrolled in school in the past have not completed compulsory education.
Cohort dropout rate (may also be referred to as the longitudinal rate)	Measures what happens to a single group (or cohort) of students <i>over a period of time</i> .	9 per cent of 6- to 16-year-olds were reported as dropouts four years later.

- **Total estimated OOSC:**
 - **Definition:** The total number of children and adolescents of compulsory school age who have dropped out or have never enrolled in school.¹¹³
 - **Indicator calculation:** Number of children of compulsory school age – number of children of compulsory school age enrolled in school. (See also ‘Compulsory-school-age population’ above).
- **Never-enrolled OOSC:**
 - **Definition:** The total number of children of compulsory school age who have never enrolled in school.
 - **Indicator calculation:** Number of children of compulsory school age – number of children of compulsory school age currently enrolled in school – number of compulsory-school-age children who have dropped out. (See also ‘Compulsory-school-age population’ above).
- **5DE indicators:** Dimensions 1 to 3 are part of the Five Dimensions of Exclusion (5DE) model discussed in the Introduction.
 - **Dimension 1:**
 - **Definition:** Percentage and number of children one year younger than the official primary-school entrance age who are not in pre-primary or primary school.
 - **Indicator calculation:**
 - **Percentage:** 100% – (number of children one year younger than the official primary-school entrance age enrolled in pre-primary or primary education, divided by the number of children one year younger than the official primary-school entrance age).
 - **Number:** Dimension 1 percentage (from the calculation above) × number of children one year younger than the official primary-school entrance age.

¹¹³ Note: Being ‘in school’ refers to participating in formal education programmes or non-formal education programmes which are considered equivalent to formal programmes by the ministry of education. The levels of education considered are participation in compulsory education, as well as pre-primary, upper-secondary (where it is not compulsory) and tertiary education. Note that UIS does not consider primary-age children enrolled in pre-primary education to be counted as ‘in school’. For more information on what levels are considered to be ‘in school’ for calculations of out-of-school children statistics, see the UNICEF and UIS OOSCI Operational Manual available at <http://allinschool.org>

- **Dimension 2:** (Primary-age out-of-school children)
 - **Definition:** Rate and number of children of primary-school age who are not in primary or secondary school.
 - **Indicator calculation:**
 - **Percentage:** $100\% - \text{primary ANER}$ (see the calculation for primary ANER above).
 - **Number:** Dimension 2 percentage (from the calculation above) \times number of children of primary-school age.
- **Dimension 3:** (Lower-secondary age out-of-school children)
 - **Definition:** Percentage and number of children of lower-secondary-school age who are not in primary or secondary school.
 - **Indicator calculation:**
 - **Percentage:** $100\% - \text{lower-secondary ANER}$ – percentage of children of lower-secondary-school age attending primary education (see the calculation for lower-secondary ANER above).
 - **Number:** Dimension 3 percentage (from the calculation above) \times number of children of lower-secondary-school age.
- **Early school leavers:**
 - **Definition:** The percentage of the population of a given age range (such as 15 to 24) with at most lower-secondary education, which is no longer enrolled in education or training. It is based on the Eurostat ‘early leavers from education and training’ indicator.¹¹⁴
- **OOSC indicators by level of visibility:** The indicators below correspond to the three levels of visibility of OOSC introduced in this Monitoring Framework: *Visible OOSC*, *Semi-invisible OOSC* and *Invisible OOSC*. For the definitions, please see *OOSC Visibility Model*.
 - **Visible OOSC:**
 - **Indicator calculation:** Number of dropouts of compulsory school age plus the number of children of compulsory school age who were never enrolled (if recorded).¹¹⁵
 - **Data source:** EMIS (or other official government education database).
 - **Notes:** These are ‘visible’ OOSC because they are recorded in the EMIS.
 - **Semi-invisible OOSC:**
 - **Indicator calculation:** The total number of *Semi-invisible OOSC* = the number of *Semi-invisible OOSC* in school-level records + the number of *Semi-invisible OOSC* in government records. The calculation of these two kinds of *Semi-invisible OOSC* is specified below:
 - **Semi-invisible OOSC in school-level records:** The total number of dropouts of compulsory school age identified through school truancy records – the total number of dropouts of compulsory school age based on school reporting of dropout.
 - **Semi-invisible OOSC in government records:** The total number of children of compulsory school age as derived from individual person records in available government databases – the number of compulsory-school-age children recorded (as either enrolled or dropped out) in the EMIS.

¹¹⁴ http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_40&plugin=1

¹¹⁵ Children who dropped out but are no longer of compulsory school age would not be included in this figure. For example, twenty-year-olds who dropped out when they were of compulsory school age, but now are no longer of compulsory school age, would not be included in the figure.

- **Data sources:**
 - For *Semi-invisible OOSC* in school-level records: Available school truancy records.
 - For *Semi-invisible OOSC* in government records: Available government databases, which include, for example, the civil registry, ministry of health database, database of children with disabilities, database of children from families receiving social welfare and community-level population registers.
 - **Notes:** It is possible that a child who goes to school is not recorded in the EMIS. Aside from being out of school, there could be several other reasons why a child is not recorded in the EMIS. For example, enrolment in certain types of schools (perhaps run by different ministries, or non-governmental actors) may not be included in the EMIS. Some children who live and attend (or do not attend) school outside the country could still be in the civil registry, and without accurate record-keeping could be included in the national out-of-school population. It is of course also possible for children to be registered in the EMIS, but not in the civil registry or other database being linked. There are also other potential issues with linking person records in the EMIS with other databases. Errors in the unique ID code for a child in one of the two databases being linked will lead to a mismatch. In addition, if the date of birth is incorrectly recorded, then a child may be considered as compulsory school aged when she or he is not or, vice versa, not considered as compulsory school aged when this is in fact the case. Therefore, the *Semi-invisible OOSC* figures do not always only reflect OOSC, but also inaccuracies in the database and other issues, as discussed in Step 2. Identifying *Semi-invisible OOSC* (as well as *Invisible OOSC* discussed below) is therefore very much an exercise in improving data quality.
- **Invisible OOSC:**
 - **Indicator calculation:** *Total estimated OOSC – Visible OOSC – Semi-invisible OOSC.*
 - **Notes:** If no *Semi-invisible OOSC* indicator can (yet) be calculated, *Invisible OOSC* is calculated as *Total estimated OOSC – Visible OOSC*. Please note that this calculation just estimates the number of *Invisible OOSC*. Actually identifying *Invisible OOSC* would require working with NGOs and other community-level organizations, door-to-door visits, and/or other initiatives to improve the accuracy (and completeness) of government database records for school-age children, such as the civil registry. See also ‘Tracking Invisible OOSC’ in Step 5.

Levels of disaggregation

As discussed in Step 1, it is important to be able to analyse data at different levels of disaggregation to better understand the characteristic links to exclusion from education. The following levels of disaggregation for each indicator would enable the monitoring of OOSC and children at risk of dropping out by sex, age, grade, type of school and ethnicity/language over time and by administrative units (regions, districts, etc.). Levels of disaggregation can be developed as part of the EMIS reporting and filtering tools, with multiple options to specify multiple levels of disaggregation as shown below. For more details on how this could be implemented, see Appendix 3. First-level disaggregation, for each school year:

- By single year of age.
- By sex.
- Type of school (for example special school, mainstream school, home school, special boarding school, regular boarding school).
- By location (rural/urban).

- By type of impairment, and by ability to participate and learn in class as a consequence of this disability (see Table 4. Children with disabilities by type of impairment)Table 3. Example indicators for measuring dropout risk.
- By first-, second- and (if relevant) third- and fourth-level administrative divisions¹¹⁶ (for example regions, provinces, districts, municipalities, communes).
- By ethnicity, religion and/or language (if available).
- By grade and level of education (not applicable for out-of-school indicators).
- By education level – primary and lower secondary (not applicable for out-of-school indicators).

Second-level disaggregation:

- By single year of age, further disaggregated by:
 - Sex
 - Type of school
 - Etc.

Third-level disaggregation (example):

- By single year of age, further disaggregated by:
 - Sex, further disaggregated by:
 - Type of school
 - Region
 - Etc.

Disaggregating Disability Data

All indicators produced to monitor the experience of children in the education system should be disaggregated by disability. If possible, they should also be disaggregated by type and degree of impairment. Disability is a very heterogeneous phenomenon and children may experience it very differently based on the type and degree of disability they have. Other social factors could interact with disability, and so should be included in the disaggregation. The two most obvious factors are sex and region of residence. Attitudes and expectations of girls are often different to those of boys, and some research shows that disability can have particularly negative impacts on girls (WHO and the World Bank, 2011). Also, the level of infrastructure and the capacity of the educational system in rural and urban areas can differ dramatically, so that children with certain impairments might face higher barriers depending on where they live.

School-level indicators

Monitoring schools' ability to accommodate the needs of children with disabilities

Student-level indicators that keep track of the number of children with disabilities and their experience in school are important, but it is also important that schools are monitored in terms of their ability to accommodate the needs of children with disabilities. Data should therefore be collected not just on individual students, but also on the school environment. The monitoring of such indicators is crucial to identify schools which need support for becoming inclusive for children with disabilities, and identify children with disabilities whose needs are not being met, so that action can be taken before children drop out from school.

¹¹⁶ http://en.wikipedia.org/wiki/Table_of_administrative_divisions_by_country

Data should be collected on potential barriers to education facing children with disabilities. This data can help in identifying key bottlenecks that should be addressed by public policy. There are several types of key barriers, all of which are addressed in the UNICEF guide on including disability in EMISs, including sample templates (UNICEF). They include:

Inaccessible facilities. For example, the most obvious form of inaccessibility is for physical spaces. Data could be collected on the existence of ramps, lifts, accessible entrances, accessible toilets, etc.

Inaccessible materials. For example, children with vision problems may not be able to read signs or may not be able to use computers without special software. They may require books in Braille or audio books. Children who are unable to hear require sign-language interpretation. Children with cognitive difficulties might need simplified forms of information, etc.

Teacher training on inclusive education is at the very core of full inclusion (Ferguson, 2008; Odom, Buysse, Soukakou, 2011), but very few teachers in developing countries have much exposure to inclusive education through pre- or in-service training. Data can be collected on both pre- and in-service training, as well as children's access to various professionals who can provide services such as speech therapy, physical therapy and occupational therapy, as well as teaching assistants. Data can also be collected on the availability of teaching support for teachers, for example the existence of a resource centre servicing a school/group of schools.

Other barriers to participation exist, relating to the availability of assistive devices, flexible curricula, and parental and teacher attitudes, but they are not well suited towards collection via administrative data.

In addition, schools could be ranked in terms of their ability to meet the needs of students with disabilities based on the student-level disability indicators (see Step 6: 'Student-level disability indicators'). A 'Participation and learning index for children with disabilities' could be calculated for each type of disability (vision, hearing, etc.). For each type of disability, the school-level index would be the average value across all students with this type of disability (if any) based on the participation and learning value (where 0 = none, 1 = some, 2 = a lot, 3 = unable to). The school index would therefore range from 0 (no difficulties) to 3 (most difficulties) for each type of disability, and in addition, an average could be calculated across all types of disabilities. This would enable the identification of schools that are doing very well in meeting the needs of children with disabilities, and schools that are struggling to do so, based on a subjective evaluation by the teachers and other staff completing this information.

Special considerations for monitoring children with disabilities

Within regular schools, children with disabilities may be segregated into self-contained special classrooms. Data on children with disabilities attending school should be disaggregated by the type of setting in which they are being educated. What percentage is attending regular schools as opposed to special schools? Within, regular schools what percentage is attending regular classes?

Moreover, it should be noted that some special schools may not have grades per se, but operate on more of an open-classroom/mixed-grade model. This means that it may be impossible to have grade-by-grade breakdowns. Reporting on children in special schools may thus have to focus on age when it is not possible to determine/report by grade.

Student-level disability indicators aggregated at the school-level

The student-level disability indicators discussed in Step 6 could be summarized at the school level as shown in Table 6 (Mont, 2013). This summary format enables school-level monitoring of how many children have difficulties in each functional area, as well as the total number of children with any disability. Once these determinations are made, this information can be incorporated in other EMIS data elements, namely new entrants, repeaters, transfers and dropouts. In most if not all EMIS, that information is disaggregated by sex. It should be disaggregated by disability as well. Children with some difficulty in at least one of these categories should be considered to have a disability. In reporting the data, though, it is important to provide breakdowns by severity of impairment.

Quality of education indicators

Education quality and access are closely linked; the ability of schools to attract and retain students depends to a large extent on the quality of education they provide. Monitoring the quality of education is beyond the scope of the Framework; therefore, this section only briefly discusses some of the key indicators of the quality of education.

Indicators used to monitor the quality of education typically include instruction time, teacher qualification, teacher experience, pupil-teacher ratio, pupil-textbook ratio, and school resources including sanitation and health facilities (Saito and Van Cappelle, 2010). In addition to these indicators, it is important to also include the kinds of support that are available to children – in particular for disadvantaged children who are most at risk of dropping out. This includes the availability of health and counselling services, facilities and services for children with disabilities as discussed above, the availability of a school psychologist, availability of local-language books and learning materials, provision of hot meals and other sources of support for disadvantaged children, and community participation indicators which are looked at in more detail below. Unfortunately, what is arguably the most important quality indicator – the quality of teaching – is very difficult to capture and monitor.

Besides inputs it is also essential to monitor learning outcomes, through national learning assessment programmes as well as non-official assessments at the school level. Person-level indicators of learning outcomes need to be included in the EMIS and/or other education databases, not only to monitor and analyse the quality of education, but also to help determine the causes of dropout and identify the kinds of support needed by different schools.

Community participation indicators

Community participation is crucial to attracting and retaining children in schools, and creating an engaging school environment conducive to learning. This includes the participation of civil society, youth, families and parents, teachers and the students themselves. It is therefore important to include also quantitative and qualitative indicators of community participation and engagement at both the school and child level, such as:

- Number of students participating in different kinds of extra-curricular activities (such as clubs and sports).
- Existence of student associations or councils and their activities.
- Composition of school board (local government representative, teachers, parents, etc.).
- Frequency of meetings of school board.
- Existence and composition of a parent-teacher association and its activities.

Table 7. Indicators for children with disabilities aggregated at the school level									
Compared with children of the same age, how many children enrolled in school have difficulties in the following areas (a child can be counted in more than one area):									
	Vision	Hearing	Gross Motor (e.g. walking or climbing steps)	Fine Motor (e.g. writing or fastening clothes)	Intellectual	Communication (understanding and being understood by others)	Behaviour and socialization		
	Difficulty participating and learning in class (some, a lot, or unable to)								
	Some	Unable to	Some	Some	Some	Some	Some	Some	Some
	A lot	A lot	A lot	A lot	A lot	A lot	A lot	A lot	A lot
	Unable to	Unable to	Unable to	Unable to	Unable to	Unable to	Unable to	Unable to	Unable to
Boys									
Girls									
Total									
How many children enrolled in school have difficulties in the following number of areas, as recorded above									
	1 area	2 area	3 area	4 area	5 area	6 area	7 area	Total	
Boys									
Girls									
Total									

- Frequency of meetings of the parent-teacher association.
- Community financial contributions.
- Other contributions by the community (for example books and other materials, and services such as tutoring).
- Other community organizations connected to the school (for example parent councils, teacher networks, student government bodies).
- Child level indicators, such as membership of clubs and associations and participation in extra-curricular activities.

It is also important to monitor that, for example, parents and children belonging to ethnic minorities, or parents of children with disabilities and children with disabilities¹¹⁷, are well represented in these activities and associations.

Benchmarks

The indicators listed in the beginning of this appendix need to be measured against national and international benchmarks. The list below indicates potential national benchmarks. However, specific regional- or local-level targets may be useful or even necessary to meet the national target as well as reduce inequalities between regions and communities. Cross-national comparisons of education indicators are useful to assess the current state as well as progress over time in a regional and international context. For example, see the benchmarking of international progress towards the Millennium Development Goals through the UN Integrated Implementation Framework.¹¹⁸

- **Benchmarks for pre-primary-age children not in pre-primary education:** The EU 2020 benchmark is that at least 95 per cent of children between the age of four and the age for starting compulsory primary education should participate in early childhood education.¹¹⁹ In 2010, the EU average was 92.4 per cent.
- **Benchmarks for OOSC:** The long-term benchmark for OOSC can be set to 'no children out of school', but shorter-term benchmarks are important in order to work towards a long-term benchmark. For example, reducing the proportion of OOSC by 50 per cent within the next five years.
- **Benchmark for dropout rates:** As above, long-term and short-term benchmarks may be set. A useful example is the publicly accessible Dropout Explorer of the Netherlands Ministry of Education, Culture and Science. It visually shows both the target set for each year and the actual figure: <http://www.vsvverkenner.nl/english/national-figures>.
- **Benchmark for early school leavers:** Although the Framework focuses on compulsory education, it is important to also look at the next level beyond compulsory education and monitor how many adolescents are continuing their education after the lower-secondary level. The EU benchmark is that by 2020 the share of early school leavers should be less than 10 per cent.¹²⁰ In 2011, the EU average was 13.5 per cent.
- **Benchmark for registering children with disabilities:** The WHO/World Bank *World Disability Report* of 2011 provides a global estimate of 5.1 per cent of children 0-14 years of age who have a moderate or severe disability, and an estimate of 0.7 per cent in this age range who have a severe disability. For

¹¹⁷ There could even be a specific organization of parents of children with disabilities to work with the school on the needs of their children.

¹¹⁸ <http://iif.un.org/content/interactive-map>

¹¹⁹ http://ec.europa.eu/education/policy/strategic-framework_en and http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_social_policy_equality/education_and_training_programme/benchmarks_et2020

¹²⁰ http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_social_policy_equality/education_and_training_programme/benchmarks_et2020

European countries, the estimate is 4.2 per cent and 0.8 per cent, respectively. If the national disability figures for children are significantly lower than this estimate, this suggests that many children with disabilities are not registered and thus not accessing the services they need. For example, in the CEE/CIS region around 3.6 million children with disabilities are estimated as not being officially recognized, out of a total of 5.1 million children with disabilities. The disability estimates can be used as a benchmark for comparing the current percentage of children in the population registered as having a disability, with the aim of achieving 100 per cent registration of children with disabilities in order to ensure their needs are met by ensuring availability of services. Disability is one of the biggest risk factors, along with (and in combination with) poverty, for not going to school. Disability is often not identified and as a result many children with disabilities remain invisible in the data. In many countries, there are no accurate figures or estimates on how many children with disabilities there are, and how many of them are not in school.

- **Benchmark for achievement:** Participation in international studies such as TIMMS and PISA can enable benchmarking for achievement in an international context. The EU benchmark is based on PISA achievement levels. The 2020 benchmark is that the share of 15 year olds who perform below the low international benchmark in reading, mathematics and science should be less than 15 per cent.¹²¹

¹²¹ http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_education#Acquiring_the_relevant_skills_for_the_knowledge_society

Appendix 2: Data quality management, questionnaire design and data cleaning

Without adequate data quality management procedures, it is likely that many errors will be introduced in the data. Needless to say, evidence-informed decision-making will not be very good decision-making if the evidence is incorrect.

Errors can be introduced at various stages of data collection and management and hence data quality procedures are required at each stage. Preventing data inaccuracies is always better than fixing them once they have occurred; however, both are important. The following data quality management procedures are based on standard practices employed by organizations such as IEA (International Association for the Evaluation of Educational Achievement) and SACMEQ (The Southern and Eastern Africa Consortium for Monitoring Educational Quality), and have been used for cleaning large databases.

Data quality and validation procedures

- Forms or questionnaires should be consistent with each other; for example, a region should not be indicated with an abbreviation or ID in one questionnaire and spelled out in full in another questionnaire.
- For numerical data (including numerical data representing labels as described above), the fields should only allow numbers to be entered.
- Date fields (for example date of birth) should only allow numbers to be entered in the special date format.
- Numerical fields should have minimum and maximum values; for example, for the school grade it should not be possible to enter grade '21' or grade '0'.
- Maximum field lengths should also be set, except for open-ended text fields (notes, comments, etc.). For example, the 'Identification number of taxpayers' field should have a maximum number of characters set according to the maximum length for this ID.
- Multiple-choice fields should always be used instead of open-answer fields, unless open-answer fields cannot be avoided. For example, instead of an open-answer field for 'region', make it multiple choice, i.e. a list of regions from which one needs to select the correct one. Open-answer fields result in more errors because of different interpretations of what to fill in and spelling errors.
- For multiple-choice fields, numbers (0, 1, 2, 3 etc.) can be assigned to each option. This is standard practice for ease and speed of data entry, as typing numbers is faster and easier than having to select each option from a dropdown list. On paper-based forms being entered, categorical information would have a number displayed next to each category. Data enterers then type in numbers corresponding to the category selected for each item, and can enter forms very efficiently. There is a risk, however, that a data shift occurs; this is where the data enterer accidentally skips an item in the form and all subsequent items then contain information meant for the previous item. To prevent this, 'check codes' need to be introduced, where the data enterer is forced to enter a code which is not a number (for example A, B, C etc.) after every 10 or 20 items in a form.

- When data are missing the field should not be left blank, but instead given a missing code, usually '9' for a one-digit field, '99' for a two-digit field, '999' for a three-digit field, etc.
- Forms or questionnaires need to have a logical and consistent layout which is not confusing to the person completing the form. Areas which need to be completed should be clearly identified so that they are not accidentally missed. The font size also needs to be large enough to be easy to read.
- It needs to be clear what is expected, avoiding the possibility of ambiguous interpretations. For example, 'days absent' is vague and should indicate since when (for example 'days absent since the beginning of the school year'). Date-of-birth fields should indicate which field is for days, months and years.
- Each field in a questionnaire that needs to be filled in should have a guidance note providing additional information on how to complete this item, especially where the nature of what needs to be filled in may be ambiguous. This can be indicated directly below the question or as a footnote.
- Directly after forms or questionnaires have been completed, they need to be checked for errors and missing fields by someone other than the person who filled in the form.
- Computer-based data-entry forms need to have the values of each field restricted to the expected parameters of data entered. For example, an ID field which always consists of exactly 8 numbers should be restricted to allow only 8-digit numbers to be entered, and date-of-birth fields should only accept valid dates.
- Computer-based data-entry forms should not allow empty fields with no data (if data are missing in a form, it should be allocated a missing data code).
- Built-in validation checks should be implemented where possible, such as the detection of a duplicate ID (an ID being entered which already exists in the system), or the detection of inconsistent information (for example the same or similar information for the same student recorded in different places which does not match, such as date of birth and age).

Data-cleaning procedures

Data cleaning is the process of finding and fixing errors which have been introduced in data. Data-cleaning procedures include:

- Removing duplicates, by identifying records which have duplicate IDs (which can consist of a single ID, or a combination of IDs, e.g. a primary student ID and secondary school ID).
- Fixing incorrect IDs, which can be identified by using a secondary identification field, e.g. a student ID which does not match a student name.
- Fixing records which have missing but required data.
- Fixing discrepancies between records entered twice by different data enterers (a procedure to improve data quality, referred to as 'double data entry').
- Fixing incorrect data entered, which can be identified if data are entered twice and the two versions are compared with each other, as well as via data-consistency checks (see below).
- Fixing data-validation errors, where data are out of the expected range; for example, a student's age is indicated as 90 years (it is possible to have students who are significantly overage, but students who are for example more than 5 or 10 years overage could be flagged to verify if the data is correct).
- Fixing data-consistency errors, where data from different fields or possibly different forms (questionnaires) are not consistent with each other. For example, the student age may be recorded in different forms, so

consistency checks can be carried out to check if this information is the same across the different forms. It is also possible to carry out a consistency check on different but related information. For example, if a student has no parents but the parent details are completed, this information is not consistent (either the student does have parents, or the parent details are not correct).

It is good to have multiple common items between databases which can be used to verify the accuracy of the data and resolve data-entry inaccuracies. For example, if a social security card number matches in another database, but the name does not, there is a data-entry error which could be further resolved by examining additional fields in common. In spite of all these checks it is still possible for many errors to be introduced. It is recommended that at least some of the records are entered twice by independent data enterers to verify that data is being entered correctly. No data enterer is perfect, so unless all data is entered twice and verified, it is not possible to prevent errors from happening. Automatic scanning of forms is now becoming more common, which both greatly speeds up the process and reduces the likelihood of errors.

There are some errors which cannot be prevented by any of the above procedures – the kinds of errors which are introduced purposely, such as over-reporting of enrolment in order to get more funding, and under-reporting of dropouts and absentees to demonstrate good performance. In these cases incentives are required to report accurate data, which counter any incentives that may exist for not reporting accurate data.

Appendix 3: EMIS example specifications

This appendix outlines the specifications for an example EMIS which includes an SMIS component. Although it describes many general EMIS characteristics, it incorporates specific functionalities for monitoring OOSC and children at risk of dropping out, including the identification of *Semi-invisible OOSC* through information sharing with other government databases.

General characteristics

- **Database:** The database should be able to handle detailed individual person records for the entire school-age population of the country.
- **Security:** A strong security system is needed to prevent unauthorized access to sensitive data. Different levels of access to data need to be set according to user role (type of user) and corresponding permissions, as described below.
- **Unique ID field(s):** A person record generally requires at least two unique ID fields. The first is a national ID, which would enable a person in the EMIS to be linked with their records in other government databases that make use of the same unique ID – for example, a birth certificate ID, passport ID, or other personal ID card. It should, however, be possible to record details of persons who have no national ID (for example due to lack of a birth certificate). *This ID field should therefore not be compulsory.* If there is no ID, this could set off an ‘alert’ for follow-up action, which is further described below. The second ID would be an ‘education ID’ or ‘student ID’, which may be used, for example, to track a student who is transferred from one educational institution to another. This second ID could be generated automatically when a new student record is created, and would be assigned to any person in the EMIS, including those without a national ID.
- **Customizability:** An EMIS system is never complete: it needs to be able to adapt to new technologies, software, changes in the education system, changing requirements of users, and so on. It therefore needs to be built from the ground up to be easily customizable and extendable. For example, it may consist of a series of modules (teacher module, student module, e-school module, e-portfolio, etc.) with the possibility of extending the EMIS with new modules in the future. The modules themselves should also be customizable, as well as any forms, search screens and reporting screens, for example through a template system which determines the basic layout and fields for key components. For an example, see OpenEMIS, which encompasses a range of customizable components called ‘products’ (<https://www.openemis.org/>).

User-specific roles, permissions and options

The EMIS needs to allow for different kinds of user roles with different levels of permissions to (i) access/view the data, (ii) enter or upload new data, and (iii) modify or edit existing data. This is to ensure that access to sensitive data is restricted to users with access permission, and also to change the display and information provided to meet different user needs. It is useful for different types of users to have easy access to different levels of data and types of reports, which are defined according to their user role. For example, an administrator at regional level could have a different view from a teacher at the school level, and again a different view from an administrator at the national level.

EMIS data therefore needs to be accessible to users at different levels, such as in the ministry of education, regional education offices and schools. For improving transparency and accountability, non-sensitive information (such as data aggregated at the school level or beyond) could also be made available to the public through a web portal. A good example is the Indian Unified District Information System for Education, which makes available almost all reported education data from 1.5 million schools in India (as described in Step 7).¹²² Examples of different ways of reporting data are provided in the next section.

Reporting and indicator disaggregation

Reports need to focus on particular issues, such as trends in OOSC by region over time, progress made towards benchmarks, characteristics of OOSC, identified dropout risk factors, absenteeism and truancy trends, and types of support received and required by dropouts. Such reports may take the form of a web-based dashboard rather than a static report, where users can select indicators, areas of the country, and a specific presentation format (for example table, chart or map) depending on their needs. Special reports following a specific template could also be automatically produced on a routine basis, for key stakeholders at various administrative levels – national, regional, local and school – with information and level of disaggregation relevant to those levels.

The following are specific reporting features which turn the EMIS into a more effective tool for monitoring, analysis and evidence-informed decision-making:

- **Automatic reporting:** The EMIS needs to incorporate automatic reporting mechanisms which would enable routine monitoring and analysis. Reports on key indicators need to be presented in a meaningful way for easy interpretation, with options to view information in the form of charts, maps and summary tables. For examples of automatic reporting of data, please see:
 - (i) **Netherlands – Dropout Explorer** – <http://www.vsvverkenner.nl/english/>: Netherlands Ministry of Education, Culture and Science, data and maps on dropout which can be filtered by region and municipality.
 - (ii) **OpenEMIS** – <https://www.openemis.org/products/dashboard>: OpenEMIS is an open-source EMIS conceived by UNESCO. It has many built-in features which are customizable, including a dashboard for monitoring selected data.
 - (iii) **StatSilk** – www.statsilk.com/gallery: Examples of maps and visualizations from UN agencies and government agencies using StatPlanet. This is a web-based tool for automatically creating interactive visualizations and maps, for selected indicators or for a complete database.
 - (iv) **DHIS** – <http://www.dhis2.org/data-management>: The District Health Information Software (DHIS) data management and analytics component is a good example of a highly customizable reporting system.
- **Filtering:** Filtering or ‘drill-down’ functionality is needed to enable selected indicators to be disaggregated according to several criteria. The screen could, for example, consist of the following two sections:
 - (i) An indicator selection menu (for example with indicators organized by category).
 - (ii) Several filter selection dropdowns in order to view indicators with several levels of disaggregated data, as described below.
- **Disaggregation:** Indicator disaggregation options are important to better monitor and analyse education indicators. For example, disaggregation can be used to identify where in the country dropout is highest and for which specific groups of children (for example rural adolescent girls in specific regions), allowing one to identify the possible causes of dropout. The following disaggregation (filtering) criteria are recommended to be included, for each school year:

¹²² See www.schoolreportcards.in, and select ‘Report Module’ from the top menu.

- (i) By single year of age.
 - (ii) By sex.
 - (iii) By grade and level of education.
 - (iv) By type of school (regular school, special school, part-time school, home school, special boarding school, regular boarding school, etc.).
 - (v) By type of disability, and by ability to participate and learn in class as a consequence of this disability (as listed in the 'Children with disabilities by type of impairment' above).
 - (vi) By first-, second- and (if possible) third-level administrative divisions¹²³ (region, municipality, commune or school zone).
 - (vii) By ethnicity, religion and/or language (if available).
 - (viii) By a combination of the above, for example by:
 - Single year of age, further disaggregated by:
 - Sex, further disaggregated by:
 - Region, etc.
- **Determine enrolment by single years of age to automatically calculate and report on out-of-school rates:** Based on student-level data, the EMIS would need to calculate each student's age for a specific reference date, for example the age of each student at the start of the school year. This would be used to determine the number of children enrolled, by single year of age, on a specific reference date. Population figures by single year of age would be needed to calculate the out-of-school numbers and rates (see also Step 1 and Appendix 1).
 - **Data aggregation mechanisms:** To be able to report *disaggregated* indicators, person-level data would need to be *aggregated*. Some data needs to be 'counted' (for example, categorical fields such as 'yes/no', or 'enrolled/not enrolled'). Some data needs to be 'summed' (for example, the amount of financial assistance received per child could be summed to a total amount by district). Some data needs to be 'averaged out' (for example, number of siblings per child would become an average number of siblings when aggregated). Some data cannot be aggregated, such as text fields which cannot be (easily) categorized. When viewing aggregated data, a useful option is to be able to explore the individual person-level data which was aggregated. For example, the aggregated view could display 'number of children from families who are receiving financial assistance' by district. For a user with the required access permission, clicking on that field for a particular district would lead to a list of children in that district who are receiving financial assistance.

Recording of dropout

For the recording of dropout, the following functionality is required:

- An option to change the status of a student to dropout.
- An option to record one or multiple reasons for dropout (see Step 6: 'Recording of absenteeism and non-continuation of education').
- An option to record a status change corresponding to an exclusionary condition for dropout – that is, the student (i) leaves the school/education institution where she/he is enrolled, but (ii) does not drop out, because an exclusionary condition for dropout is met. A list of exclusionary conditions for dropout which could be selected may include migrating abroad, graduation from the last grade of compulsory education, or transfer to another school/educational institution (see Step 1: Establishing definitions of OOSC, dropout and late entry).

¹²³ http://en.wikipedia.org/wiki/Table_of_administrative_divisions_by_country

Monitoring students at risk of dropping out

Required EMIS functionality for monitoring students at risk of dropping out include:

- Options to create and customize indicators for determining dropout risk based on available student information, such as: low academic achievement in terms of failing grades, chronic absenteeism in terms of days absent, repeater, overage, etc.
- Automatically generating a dropout risk index for each student based on the defined dropout risk indicators.
- Automatically generating reports which summarize dropout risk details (including the dropout risk index) for each student determined to be at risk of dropping out.

For more details, see Step 6.

Export and API query system

The platform needs to be able to export data from the database in spreadsheet format, such as the results from a search/query as specified above. At a minimum, it should support the CSV (Comma-Separated Values) data export format, as this is a standard data format that is often used to exchange information between different applications – and works also with older applications which might not accept newer formats such as XML (Extensible Markup Language). Increasingly, government data platforms also make their data accessible through an API (Application Programming Interface). This enables other databases or systems to query the EMIS and obtain selected data according to the query. Systems external to the EMIS can thereby automatically obtain current, up-to-date data from the EMIS – for example database systems from other ministries or education departments. Likewise, the EMIS could query other databases through their API. Different database systems can thus exchange and compare information, which can be used to update out-dated information or fix errors. For example, information could be exchanged to track who has left the country, or where in the country they have moved to – to be shared and synchronized across databases according to the most up-to-date records available. Similarly, it can be used to identify Semi-invisible OOSC – children who should be in school but are not in the EMIS and for whom records exist in another government database system. Through the automatic exchange of relevant information at the individual child level across government databases, these *Semi-invisible OOSC* could be identified. Strict security measures need to be in place for the exchange of confidential information. APIs are also an important feature for making database systems more open and transparent. For example APIs of databases with publicly available, open data, see:

- OECD database API: <https://data.oecd.org/api/>
- United Nations data API: <http://data.un.org/Host.aspx?Content=API>
- U.K. Government open data API: <http://data.gov.uk/data/api>
- U.S. Government open data API: <https://www.data.gov/developers/apis>
- World Bank database API: <http://data.worldbank.org/developers/api-overview>

User interface and data-entry requirements

As indicated in Step 3, it is worthwhile to invest in making the EMIS as easy to use as possible. By making the EMIS easy to use, the training and support requirements can be reduced, and these are among the most costly aspects of implementing a new EMIS. There are many other advantages as well. An easy-to-use EMIS reduces the chance of errors being made, gets users up-to-speed more quickly, reduces potential anxieties and frustrations with the introduction of a new system, and helps users get maximum benefit from all the new features available.

Some key aspects to consider in making the EMIS easy to use are:

- Keeping the interface as clean and simple as possible by:
 - Ensuring different screens are consistent with each other in terms of design and layout.
 - Minimizing clutter, such as by hiding help text in mouse-over popups.
 - Using spacing and colour to clearly group similar or related features and items.
 - Using highlights, bold and colour to emphasize important aspects.
- Including guidance and documentation. Besides general documentation, it can be very helpful to have help links or popups for every single page or page type in the database platform. In addition, guidance or explanatory notes can be provided as a popup or as text below different input fields, such as in the staff or student data-entry form. A help page could include a technical support phone number, e-mail address and/or support form.
- Including an option to show/hide more advanced options or features, which are only relevant to more 'advanced' users such as school administrators, to simplify the default interface.

Data-entry screens have special requirements for data to be entered efficiently and to minimize errors, in particular:¹²⁴

- It should be possible to customize the data-entry screen according to the role of the user, for example, to hide certain fields or variables which are not relevant or allowed to be seen by the current user role. This would allow different data-entry views for different user roles such as EMIS administrators, school administrators, teachers and staff at different levels – district, regional, etc.
- If there are schools with limited or unreliable Internet connectivity, it should be possible to enter data in offline mode, which can be uploaded once an Internet connection is available.
- It is important that to minimize data-entry or spelling errors, standard data should be entered with numerical codes or abbreviations as far as possible, or selected through a dropdown menu, rather than text - where spelling errors can easily be introduced. For a field with fixed choices, these could also be entered using numbers assigned to the labels, for example:
 - 0 = Living with both parents
 - 1 = Living with one parent only
 - 2 = Not living with natural parents
- Data validation checks should be in place. For example, setting maximum field lengths, allowing only numbers in certain fields, etc. (see also Appendix 2 for details).

Database schema

In the example database schema represented below each school records for each student the following: for each year that she or he is enrolled (i) a person ID such as the birth certificate number if available¹²⁵, (ii) school year, (iii) name, (iv) school ID, (v) grade/class and (vi) number of days absent. This data could be entered at the school level and transferred to the district, regional or national level, where data can be directly merged without risk of duplication or mix-ups as long as each child has been assigned unique ID. Alternatively it could be entered directly into a nation-wide web-based EMIS or SMIS, as discussed in Step 3. Redundant information (i.e. the same information recorded in different databases) is avoided as it makes data more error-prone. For example, in Georgia the EMIS and civil registry database are linked via a unique person ID to

¹²⁴ See also the Best Practice Guidelines from the Australian National Audit Office, which includes some useful general tips for creating user-friendly forms: http://www.anao.gov.au/~media/Uploads/Documents/user_friendly_forms.pdf

¹²⁵ Being able to provide legal documentation such as a birth certificate should not be a requirement for school entry.

enable population data to be retrieved directly from the civil registry database and displayed within the EMIS. However, some duplicate information is useful for verification purposes, which is further discussed on table 8.

An example presentation of this database in a flat spreadsheet is shown below, for three children: A. Roe –

<i>School- level Pupil records</i>	<i>National- level School records</i>	<i>National- level Person records</i>	<i>National- level Population records</i>
<ul style="list-style-type: none"> - Education ID - National ID (e.g. birth certificate number) - Name - School year - School ID - Grade / class - Number of days absent 	<ul style="list-style-type: none"> - School ID - School name - District code - Region code 	<ul style="list-style-type: none"> - National ID (e.g. birth certificate number) - Name - Sex - Date of birth 	<ul style="list-style-type: none"> - District code - Region code - Population: by single years of age and sex

dropped out after the 2010-2011 school year, B. Doe – repeating Grade 6 in the 2011-2012 school year, and C. Doe – who never attended school. This information, if collected for all school-age children, is sufficient to calculate most of the key education participation and progression indicators, including enrolment rates (net, adjusted net and gross), dropout rates, transition rates, survival rates, repetition rates, promotion rates, overage students, underage students, absenteeism/attendance figures, and OOSC figures, by region, year, age, grade and sex.

Once the databases are linked in order to create a flat spreadsheet as shown above, the key education

Education ID	National ID	Name	Sex	DOB	School ID	School name	Region code	School year	Days absent	Grade
73751	652341	A. Roe	F	02/11/01	53123	Hill Primary	SOU	08-09	3	5
73751	652341	A. Roe	F	02/11/01	53123	Hill Primary	SOU	10-11	2	6
67231	731402	B. Doe	M	04/09/00	49100	Tree Primary	WES	08-09	0	5
67231	731402	B. Doe	M	04/09/00	49100	Tree Primary	WES	10-11	5	6
67231	731402	B. Doe	M	04/09/00	49100	Tree Primary	WES	11-12	11	6
59788	510623	C. Doe	M	12/04/03	-	-	WES	-	-	-

indicators could be calculated automatically. In addition, reports as well as tables, charts, graphs and thematic maps summarizing the information could be generated automatically from the raw data (see the examples discussed in ‘Reporting and indicator disaggregation’ above).

Appendix 4: Four Ministry Cooperation Agreement, Albania¹²⁶



REPUBLIC OF ALBANIA

Ministry of Education and Science	Ministry of Interior	Ministry of Labor, Social Affairs and Equal Opportunities	Ministry of Health
No. _____ Prot, dated _____.____.____	No. _____ Prot, dated _____.____.____	No. _____ Prot, dated _____.____.____	No. _____ Prot, dated _____.____.____

**COOPERATION AGREEMENT AMONG
MINISTRY OF EDUCATION AND SCIENCE,
MINISTRY OF INTERIOR,
MINISTRY OF HEALTH
AND
MINISTRY OF LABOR, SOCIAL AFFAIRS AND
EQUAL OPPORTUNITIES**

**‘ON IDENTIFICATION AND REGISTRATION IN SCHOOL OF ALL COMPULSORY SCHOOL AGE
CHILDREN’**

Based on Article 57 of the Constitution of the Republic of Albania, Law no. 69/2012, dated 21.06.2012 ‘On Pre-university Education in the Republic of Albania’, the Ministry of Education and Science, the Ministry of Interior, the Ministry of Health and the Ministry of Labor, Social Affairs and Equal Opportunities, hereinafter referred to as ‘parties’, enter into this Agreement for coordination of work for the identification and registration in school of all compulsory-school-age children.

¹²⁶ Original document in Albanian: http://www.qbz.gov.al/botime/fetore_zyrtare/2014/PDF-2014/133-2014.pdf Original English translation: http://www.unicef.org/albania/M4M_Agreement_OOSC_Agusut2013_English.pdf See also the three-Ministry regulation for the implementation of the cooperation agreement: http://www.unicef.org/albania/U3M_Agreement_OOSC_5Jan2015_English.pdf

I. Scope of the agreement

The scope of this agreement is:

1. Involvement of all the following institutions in accomplishing basic education attendance by all children of compulsory school age.
2. Coordination of the Regional Education Directorates (RED)/Education Offices (EO) and schools with the local government basic units, the Registry Offices, the Child Protection Units and the Health Centers for enrolling children in compulsory education.

II. Purpose of the agreement

This agreement aims at identification and school enrollment of all children of compulsory school age.

III. Common obligations

1. Parties communicate constantly through employees charged with this responsibility.
2. Parties organize joint meetings every six months, to analyse problems encountered and to provide solutions to them.
3. Parties shall send each other information in hard and/or electronic copy about problems that arise during the implementation of the Agreement.

IV. Obligations of the parties

IV.1 Obligations of the Ministry of Education and Science

The Ministry of Education and Science charges the REDs/EOs and basic education schools with the following tasks:

1. The REDs, as regards the territory where their EOs are not included, and the EOs compile a single list of names of the children who should start the first grade in the next school year, by matching the two lists submitted from the relevant registry office and the pertaining medical center.
2. RED and EO send the list provided for in paragraph 1 to all the schools in their jurisdiction (public and private) within May.
3. At the end of the registration period in public schools, the principals of basic education schools, both public and private, send to the relevant RED/EO the lists with the names of the children enrolled in their schools.
4. REDs/EOs compile the list of children who are not enrolled either in public or private schools in their jurisdiction.
5. REDs/EOs shall, by September, send the list referred to in point 4, to the reeve¹²⁷/elder of the area concerned and to the local police inspector.
6. REDs/Eos, until October 15 send to public schools the data collected by the reeves and the local police inspectors.
7. Public schools identify children who belong to their area, and by the end of October of the new academic year undertake enrollment of the pupils and officially inform the respective RED/EO.
8. REDs/EOs and schools collaborate with non-profit organizations operating in the field of education, for the implementation of Law No. 69/2012 , dated 21.06.2012 'On pre-university education in the Republic of Albania', for compulsory education.

¹²⁷ The reeve (elder of the village) is the head of the advisory board of the village.

IV.2 Obligations of the Ministry of Interior

The Ministry of Interior charges the registry offices, reeves and local police inspectors with the following tasks:

1. In April, the Registry Office sends to REDs, as regards the territory where its EOs are not included, and to EOs, the list of names of the children who should start the first grade in the next school year, given the date of the beginning of the school year.
2. The reeve finds in the list of children not yet enrolled, which is sent to the reeve by the RED/EO, children belonging to the area the reeve covers and who must enrol in the first grade in a school of the RED/EO. The names of the children are associated with their locations.
3. The Police Inspectorate finds in the list of children not yet enrolled, sent by RED/EO, those children who belong to the area covered by it and sends to the relevant RED/EO the names of the children together with their locations.

IV.3 Obligations of the Ministry of Labor, Social Affairs and Equal Opportunities

The Ministry of Labor, Social Affairs and Equal Opportunities, through the State Agency for Child Rights Protection, charges the Child Protection Unit at the municipality/commune with the following duties:

1. To collaborate with schools and help identify children who have reached the age of compulsory education, but do not attend school.
2. To cooperate with public schools for enrolling children who have reached the age of compulsory education, but do not attend school and officially inform respective RED/EO.

1.4 Obligations of the Ministry of Health

1. In April, the relevant health center sends a list of the children who should start the first grade in a given school year to the Department of Public Health, which it depends on, taking into account the date of the beginning of this school year.
2. In April, the Department of Public Health sends to the RED, as regards the territory that is not included in its EOs and to EOs, the list of the names of the children who should start the first grade in a given school year.

V. REPEAL OF ACTS

Any previous agreements made between the parties, which run contrary to this Agreement, shall be repealed.

VI. DURATION, SIGNING AND RESOLUTION OF AGREEMENT

1. The Agreement is signed for a four year period: xx August 2013 to xx July 2017.
2. The agreement is signed in quadruplicate, in Albanian.
3. The agreement can be terminated upon written request to each of the signatory parties, but only after 30 days' notice.

Signed on _____.

MINISTER OF EDUCATION AND SCIENCE

<Name of Minister>

MINISTER OF INTERIOR

<Name of Minister>

MINISTER OF HEALTH

<Name of Minister>

MINISTER OF LABOUR, SOCIAL AFFAIRS
AND EQUAL OPPORTUNITIES

<Name of Minister>

Appendix 5: Establishing a country's current status and gaps in monitoring out-of-school children

Example guiding questions

These questions can be used by education professionals to understand and map the current status of data, legislation, processes and practices pertaining to monitoring out-of-school children and children at risk of dropping out in a country.

Questions concerning indicators, definitions and legislation (see also Step 1)

- What is the age range for compulsory school attendance according to national legislation? In addition:
 - At what age is a child legally mandated to enrol in school and is there a specific reference date by which the child must be the given age?
 - How strictly is the age of school entry enforced (i.e. can a child enter any time after reaching school entry age, or is there a specified time period after reaching school entry age when a child must enrol in school? What is the procedure when a child does not enrol within this specified time period after reaching school entry age? Is late enrolment monitored so that action can be taken when this occurs?
- Does the ministry of education collect data on all compulsory school-age children?
 - Certain groups for which data may not be available in the ministry of education include: children attending any type of special school for children with disabilities, children in justice centres (in conflict with the law), children who are home schooled, children in non-formal education courses and children attending community/NGO-run schools, etc.
 - For which of these groups is information not available, and from where could it be obtained?
 - For children with disabilities, please provide some additional details (see also a more complete list of questions pertaining to children with disabilities below). With respect to the kinds of schools and institutions for children with disabilities:
 - What is the education programme – if any – and does it follow the regular school curriculum?
 - Which ministry collects/manages the data on children with disabilities attending/residing in each of these schools/institutions, and how can it be obtained?
 - What kind of enrolment and dropout data are collected?
- Is there an official indicator and definition for OOSC? In particular:
 - How is this figure calculated – what is the formula used and what are the data sources?
 - Does it include children who have never been to school, or only dropouts? If it includes children who have never been to school, at which stage is a late entrant considered to be out of school (for example in terms of a child's age in relation to the official school entry age)? What action is taken by the government, if any, when a child is late in starting primary school?
 - Does the OOSC indicator include all groups of school-age children, or does it exclude particular

groups as indicated above – such as children with disabilities who do not go to regular schools?

- At what point is a child legally considered to have dropped out and what is the reporting procedure?
In addition:
 - Does the dropout definition include a certain period of absenteeism after which a child is considered to have dropped out?
 - Is it the same for all grades and all ages? (for example the definition or reporting procedure might change between compulsory and non-compulsory school grades or when the child is no longer of compulsory school age).
- How many days of school is a child allowed to miss before having to repeat the year or take an exam to continue to the next year?
- More specifically, what kind of data are recorded at the school level and are they recorded electronically?
In particular:
 - Is the reason for absenteeism recorded? Is a distinction made between excused reasons (for example suspension, medical, switching schools) and unexcused reasons (for example to work)? Which reasons are considered to be excused?
 - Is the reason for dropout recorded? Which ones?
 - Is a distinction made between dropout and 'exclusionary conditions' for dropout, such as migrating abroad? (see Step 1)
 - Which kind of information (if any) is recorded for children who are potentially at risk of dropping out?
- Are the definitions of out-of-school children and dropouts (and their interpretation) consistent between different ministries, as well as across national, regional and local levels?
- What are the support mechanisms available to schools/municipalities when children are unable to go to school for various reasons (financial hardship, family circumstances, disability, etc.)?
- For enrolment data, which levels of disaggregation are available in the EMIS or other education database at the national level? And how is the data merged or aggregated at different levels (for example, at district or regional level)? Levels of disaggregation may include, for example:
 - Female/male.
 - Rural/urban.
 - Region.
 - Grade.
 - Single year of age (i.e. age 6, 7, 8 etc.).
 - Specific age ranges only (not available by single year of age).
 - Any multiple levels of disaggregation; for example, the number of children enrolled by single year of age - female and male.
 - Other (for example ethnicity, type of school, etc.).

Questions concerning how institutions manage information relevant to OOSC

Which institutions manage information relevant to OOSC and at which level (national, regional, district, school, etc.) with respect to:

- Pre-school enrolment/attendance.
- School enrolment/attendance, and associated student characteristics.
- Civil registry (birth certificates, social number).

- Disability status/special needs.
- Ethnic, religious and linguistic minorities.
- Health.
- Juvenile delinquency.
- Social protection/social security.
- Street children.
- Household survey data.

Questions concerning the type and format of data available and how it is recorded at different levels

- Who is responsible for entering the data at different levels?
- Is data on individual children recorded electronically (for example name, date of birth, enrolment status), and if yes, where could this data be obtained (for example from the school only, from the school and regional education department only, from the school and the EMIS)?
- Is there data available on other (country-specific) characteristics associated with OOSC, e.g. poverty, children with no birth certificate, early marriage, children of migrants, ethnic minorities, etc. (possibly from household surveys)?
- What is the periodicity/frequency with which data are received/updated?
- What is the type/format of questionnaires (paper/electronic) used?
- What is the format and structure of the data recorded?
- Is this consistent for all types of schools (private vs public schools, special schools, schools with/without Internet connectivity – SMIS)?
- How is data (for example on enrolment) verified (for example through school inspections, data cleaning)?
- What are the existing (or potential) data-sharing arrangements between the ministry of education and other institutions and relevant databases? More specifically:
 - Which unique identifiers are used (or potentially available) to enable the linking and merging of data (for example, a birth certificate number used to link child-level data between the EMIS and the civil registry)?
 - What are the sharing agreements, policies, protocols?
 - How does the arrangement operate in practice?
- In which databases are the data recorded (multiple/separate databases)?
- What are the information flows from one institution to another and how is information transferred (for example SMIS, electronic forms, paper-based)? How is migration into and out of the country recorded?
- What is the technical capacity of staff in various agencies to harmonize, analyse and use the data?

Questions concerning children with disabilities

- Are disabilities identified by both type (physical, mental, sensory, psychosocial) and degree (for example mild, moderate, severe)?
- To what extent are children with disabilities located in day-care centers, institutions or other specialized facilities (excluding special schools)?
- To what extent are children with disabilities included in special schools?
- To what extent are children with disabilities included in regular schools?
- To what extent are children with disabilities included in regular classrooms within regular schools?
- What is the process for determining where children with disabilities are placed (for example home

schooling, special schools, boarding schools, regular schools)?

- What is the status of inclusive education? (For guidelines on assessing inclusive education, see the UNICEF rating system for inclusive education systems).
- What information relevant to monitoring the situation of children with disabilities is collected at the school/institution level, for example: (i) the availability of services such as speech, physical and occupational therapy, (ii) accessibility of school facilities for children with disabilities, (iii) whether teachers are trained in inclusive education and/or have support from specialists, and (iv) availability of adaptive materials (for example Braille books, communication boards)?
- Does the ministry of education have enrolment data for all children with disabilities, or is some of this data managed by other ministries (as some schools for children with disabilities may not fall under the responsibility of the ministry of education)?
- Are there children with disabilities who are considered to be ‘unteachable’?
- Are there (many) ‘invisible’ children with disabilities who are not registered/recorded anywhere (for example due to the social stigma associated with disability)?

Questions concerning legal issues

- What legal mechanisms exist to enforce school attendance (for example fines/penalties, school attendance order/prosecution)?
- Can children without legal documentation/birth certificate enrol in school? What is the process?

Questions concerning the school level

- School processes: in terms of recording, reporting, follow-up – what is the process for dealing with children who:
 - Are late entrants into primary school.
 - Are absent from school without an excused reason for a short period of time.
 - Are absent from school without an excused reason for a long period of time (see also the ‘truancy’ indicators above).
 - Drop out from school (are absent from school beyond a certain period of time).
 - Are at risk of dropping out from school.
 - Transfer to another school or out of the country.
- Is there an official or recommended procedure for schools to take action in relation to the above?
- Are ‘children at risk of dropping out’ identified/supported? For example, is there someone at the school level who records information on risk factors such as family issues, language difficulties, behavioural problems, psychological problems, etc., and provides support to students facing such problems?
- Does the school identify school-age children in the area starting school in the upcoming school year (for example via the civil registry) – does it follow-up on children expected to enrol who end up not enrolling in school?
- Are any difficulties faced in recording/reporting information (for example lack of clarity in what is required, high work load/complexity of data entry)?
- What mechanisms/options exist at the school level to support (and seek help in supporting) OOSC and children at risk of dropping out (for example school board, PTAs, school pedagogue/psychologist, community social workers, local NGOs)? Does anyone conduct household visits?
- To what extent are these processes official and compulsory, or established informally and independently by schools?

Questions concerning monitoring and data usage

- Who are the end-users of the data on OOSC and children at risk of dropping out?
- At the national/regional/school level, what is being done to track and monitor those who have dropped out?
- At the national/regional/school level, what is being done to track and monitor those who are late entrants and should be in school?
- How is the data monitored and analysed?
- Which kind of interventions exist for OOSC/at risk children? How is the data used in this process?
- What are the information needs of various institutions at different levels and are they being met (kind of data, timeliness of data)?

Questions concerning possible improvements to current approaches

- Are there any particular challenges faced with the current system/approach?
- Do you have any suggestions or recommendations for improving the current system/approach?

Example sources of information

- Institutes/departments which manage statistics directly related to or relevant to OOSC, for example:
 - EMIS staff, ministry of education.
 - Education monitoring and evaluation department.
 - Institute for statistics staff.
 - Civil registry staff (for population, school-age children statistics).
- Ministries/departments concerned with children with disabilities (for example ministry of labour and social protection, ministry of social development).
- Other ministries/departments relevant to children who are particularly at risk of being out of school, for example:
 - Department which manages information related to ethnic, religious and linguistic minorities.
 - Other (for example related to social protection, social services/social assistance, children's rights).
- Ministry of education departments/institutes:
 - Pre-school education department.
 - Department for basic education (primary, lower secondary).
- Cross-sector committees at national/regional/district level on child rights, OOSC.
- Any organizations whose work is relevant to monitoring out-of-school children, for example the World Bank, INGOs and NGOs working with vulnerable children.
- Regional/district education department/statistics staff/social workers.
- Focus groups with parents and children in a few areas with a high number of OOSC (ideally with actual OOSC, for example via local NGOs).
- Focus groups with school staff in different types of school settings, for example one school with children with disabilities, one urban primary school and one rural primary school, preferably schools in areas with a large number of OOSC (if known).

United Nations Children's Fund (UNICEF)

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