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# **Closing the Evidence Gap in the Economic and Social Benefits of CRVS Systems: A Systematic Review**

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**WHY  
CRVS SYSTEMS  
MATTER**



**CRVS  
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This paper was authored by Rebeca Revenga Becedas,<sup>1,2</sup> Carmen Sant Fruchtmann,<sup>1,2</sup> Irina Dincu,<sup>3</sup> Don de Savigny,<sup>1,2</sup> and Daniel Cobos Muñoz<sup>1,2</sup>. The research was commissioned by the Centre of Excellence for Civil Registration and Vital Statistics (CRVS) Systems. Originally drafted in English, the Centre of Excellence is publishing this paper in both English and French. The aim is to make these research findings widely accessible for discussion, debate, and use by the global CRVS community of practice.

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## Executive summary

The role that civil registration and vital statistics (CRVS) systems have in providing accurate, reliable, and timely data to monitor the United Nations Sustainable Development Goals is undeniable. Despite the existence of CRVS systems over decades in most low- and middle-income countries, they generally remain undervalued and underfunded. As a result, civil registration systems are not being utilized, neither as the major source of information on a person's vital events, nor for producing vital statistics. Even though there is a substantial body of knowledge looking at interventions to improve the performance of CRVS systems, the theoretical benefits of CRVS systems have not been properly evaluated. The objective of this systematic review is to compile and analyze all the benefits of a functioning CRVS system on individuals, communities, or societies.

Studies published until June 2019 were included in this systematic review following standard methods. Experts in the field of CRVS contributed with grey literature and cases studies. Published and grey literature that matched the inclusive criteria were selected. The online software EPPI-Reviewer was used to manage the review process.

From the 17 studies included in this systematic review, 2 were qualitative studies, 11 quantitative studies, and 4 mixed methods studies. Furthermore, 12 studies assessed the effects of either registering a birth or having a birth certificate, 3 evaluated the impact of marriage registration, and 2 measured the benefits of having vital statistics. None of the articles focused on death or divorce registration or certification. The most frequently reported benefits for individuals, governments, and societies were increased access to health or education, followed by access to the fulfilment of civil rights or social protection.

Although there is evidence showing positive effects of CRVS systems, this evidence is limited. There is a need to better document the impact of these systems with robust study designs that represent different regions, and in different population groups, using an intersectional lens. Some studies proposed the idea that vital event registration and certification has an aggregate effect, showing the effect on individuals and on their future generations.

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## Introduction

The Sustainable Development Goals (SDGs) set out the crucial importance of providing legal identity for all, including birth registration by 2030 (Mills et al. 2017). Civil registration and vital statistics (CRVS) systems are a target in themselves but also play a key role in supporting and facilitating the achievement of many of the SDG targets. As defined by the United Nations (UN), civil registration is 'the continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events in a population', in accordance with a country's legal requirements (UNSD 2014). CRVS systems are responsible for capturing, registering, and compiling the events in a person's life — from birth to death, including marriage and divorce. Recording these events allows a country to produce reliable and timely statistics (UNICEF 2019). CRVS systems are also the foundation for providing legal proof of identity and age, enhancing protection, and facilitating the inclusion of the most vulnerable population groups which is essential to meet the global aspiration to leave no one behind (Mikkelsen et al. 2015).

Some of the social and economic benefits of strong and functional CRVS systems are well-documented (Mikkelsen et al. 2015; Schmider 2010; Peters 2016), but knowledge gaps remain in this area. Unlike other information sources, a strong CRVS system produces up-to-date demographic and health indicators, providing information to assess changes in population dynamics, inequities in service delivery, or access to medical and healthcare programs (AbouZahr et al. 2019). Information such as the number of people who live in a country, their lead causes of death, fertility rates, or life expectancy enhances public administration and provides decision-makers with the information they need to respond to the needs of citizens through more effective, efficient, and directed policies at the national and local levels (Mills et al. 2017; Wickremasinghe et al. 2016).

Real-time monitoring of cause-of-death statistics is essential for policymaking to prevent premature mortality. CRVS systems allow countries to monitor trends in mortality by age, sex, and geographic location, and also track causes of death in populations (AbouZahr et al. 2019). Within the context of the COVID-19 pandemic, there is a clear need for vital registration data to monitor the scale and severity of the virus. A number of regional or national statistics offices have accessed this data to assess the impact of different strategies to tackle the pandemic. Particularly in European countries where vital statistics are accessible to all, these data have not been available due the current crisis. The lack of an agreed common strategy to assess data during the pandemic constrained the use of vital information (EuroMOMO 2020; Setel et al. 2020).

The legal functions of CRVS systems also have benefits for different populations. For instance, documenting marriages and divorces is essential for women and their families to protect their right to own properties, access pensions, and maintain the custody of children (AbouZahr et al. 2019).

Although the body of evidence around CRVS systems is considerable and continues to grow, it focuses mainly on how to strengthen CRVS systems. Most research efforts have primarily looked at intermediate outcomes such as increases in birth and death registration, barriers to registration, and others. They have not considered the final impact of CRVS systems. However, to our knowledge, no recent systematic review has identified and summarized the economic and social benefits of state-of-the-art CRVS systems.

With the aim of compiling empirical evidence on the benefits of a functioning CRVS system and using standard methodology for systematic literature reviews (Higgins and Green 2011; Moher et al. 2009), we have searched and reviewed all peer-reviewed and grey literature assessing the benefits of the products of a functioning CRVS system (e.g., birth, death, marriage, and divorce certificates, or vital statistics) on individuals, communities, or societies.

## Results

The search strategy yielded 111,802 records to review. After applying inclusion and exclusion criteria, 17 studies met the eligibility criteria. These included 2 qualitative studies, 11 quantitative studies, and 4 mixed methods studies conducted on 4 continents (Africa, America, Asia, and Europe). The main characteristics of the studies can be seen in Table 1.

From the 17 studies included in this systematic review, 12 assessed the effects of either registering a birth or having a birth certificate, 3 evaluated the impact of marriage registration, and 2 measured the benefits of having vital statistics. None of the articles focused on death or divorce registration or certification. The most frequently reported benefits for individuals, governments, and societies were increased access to health or education, followed by access to the fulfilment of civil rights or social protection.

We report the results of the studies in three sections:

- ▶ Benefits of birth registration and certification
  - Increased access to education and educational attainment
  - Improved health outcomes
  - Access to social protection services
  - Positive impact on economic outcomes for individuals and governments
- ▶ Benefits of marriage registration and certification
- ▶ Benefits of vital statistics
- ▶ The benefits from each vital event are shown in Figure 1.



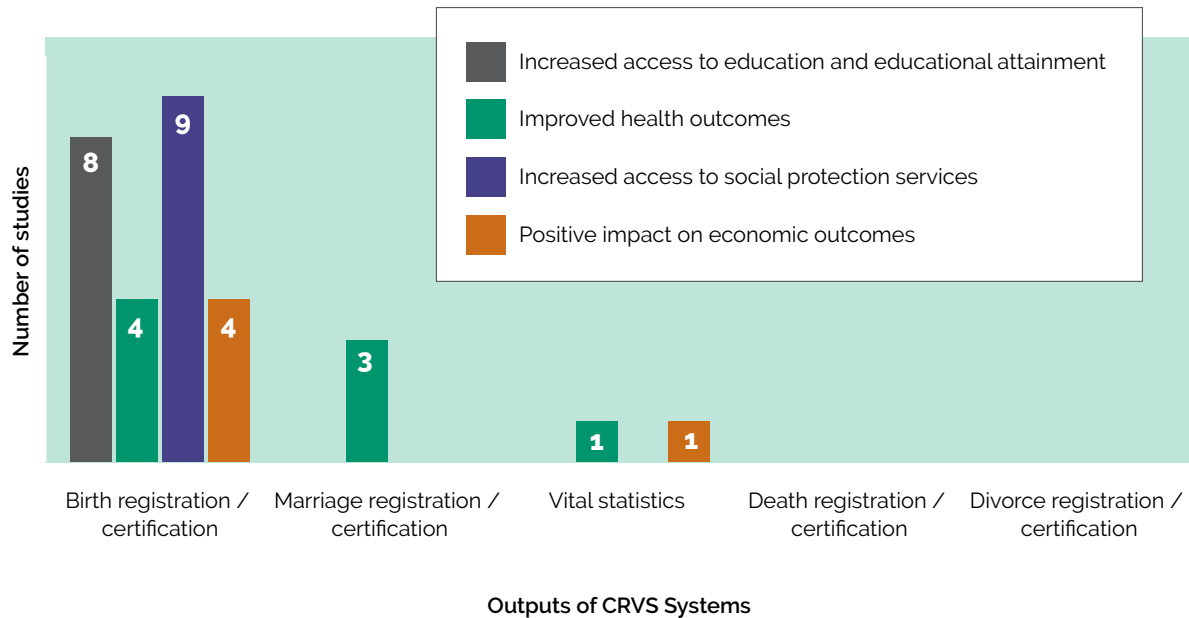
Table 1: Description of the 17 studies included in the systematic review.

Title	Reference	Location	Year of data collection	Study type	Study population	CRVS output
Birth registration and children's rights: A complex story	Apland et al. 2014	India, Kenya, Sierra Leone, Vietnam	2005–2012	Mixed methods	Children in rural and urban areas	Birth certificate and/or registration
Birth registration and protection for children of transnational labor migrants in Indonesia	Ball et al. 2017	Indonesia	2014	Qualitative	22 families, and 54 adults, children aged 9 to 14 years in rural areas	Birth certificate and/or registration
Identifying the rich: Civil registration and state-building in Tanzania	Bowles 2018	Tanzania	2008–2015	Quantitative	4,000 households	Birth certificate and/or registration
Does birth under-registration reduce childhood immunization? Evidence from the Dominican Republic	Brito et al. 2017	Dominican Republic	2007	Quantitative	Children under 59 months of age	Birth certificate and/or registration
Underlying dynamics of child birth registration in Zimbabwe	Chereni 2016	Zimbabwe	2014	Mixed methods	Children and parents/guardians in 105 households in Bindura district	Birth certificate and/or registration
Birth registration and child undernutrition in sub-Saharan Africa	Comandini et al. 2015	37 sub-Saharan African countries	2014	Quantitative	Children under 5 years of age	Birth certificate and/or registration
Birth registration and the impact on educational attainment	Corbacho 2012	Dominican Republic	2007	Quantitative	Children under 5 years of age	Birth certificate and/or registration

Title	Reference	Location	Year of data collection	Study type	Study population	CRVS output
Papers, please! The effect of birth registration on child labor and education in early 20th century USA	Fagnäs 2014	U.S.	1910–1930	Quantitative	Children from 12 to 15 years of age	Birth certificate and/or registration
Protection through proof of age. Birth registration and child labor in early 20th century USA	Fagnäs 2011	U.S.	1910–1930	Quantitative	Children from 12 to 15 years of age	Birth certificate and/or registration
Who says I do: The changing context of marriage and health and quality of life for LGBT older adults	Goldsen et al. 2017	U.S.	2014	Quantitative	LGBT older adults	Marriage registration and/or certification
Associations between birth registration and early child growth and development: evidence from 31 low- and middle-income countries	Jeong et al. 2018	31 LMICs	2010–2014	Quantitative	Children aged 36–59 months	Birth certificate and/or registration
Data for the Sustainable Development Goals: Metrics for evaluating civil registration and vital statistics systems data relevance and production capacity. Illustrations with Nigeria	Maduekwe et al. 2018	Nigeria	2003, 2008, 2013	Qualitative	CRVS data	Vital statistics

Title	Reference	Location	Year of data collection	Study type	Study population	CRVS output
Integrated human rights and poverty eradication strategy: The case of civil registration rights in Zimbabwe	Musarandega 2009	Zimbabwe	2005–2006	Mixed methods	Individuals who were 13 years and older without any other restriction in their socio-demographic factors	Birth certificate and/or registration
Are well functioning civil registration and vital statistics systems associated with better health outcomes?	Philipps 2015	144 countries	2010	Quantitative	CRVS performance data from 144 countries	Vital statistics
Difference-in-differences analysis of the association between state same-sex marriage policies and adolescent suicide attempts	Raifman et al. 2019	U.S.	1999–2015	Quantitative	Adolescents who participated in the Youth Risk Behaviour Surveillance System in 47 states	Marriage registration and/or certification
Impact of civil marriage recognition for long-term same-sex couples	Riggle et al. 2017	U.S.	2013	Quantitative	Adults who identify as members of female, male same-sex couples	Marriage registration and/or certification
The work of inscription: Antenatal care, birth documents, and Shan migrant women in Chiang Mai	Seo 2017	Thailand	2010–2012	Mixed methods	Shan migrant women from Myanmar in Chiang Mai	Birth registration and/or certification

Figure 1: Benefits of CRVS systems.



## Benefits of birth registration and certification

### Increased access to education and educational attainment

Over the last decades, much of the existing research on birth registration has focused on describing the barriers to register a birth, and less on establishing the relationship between having a birth certificate and the population's ability to access government services. Eight studies indicated a positive relationship between the possession of a birth certificate and the child's ability to access education.

According to an analysis conducted in India, Kenya, and Sierra Leone, the authors found that children with a birth certificate were 37 percent, 50 percent, and 67 percent more likely to attend school respectively, compared to those without a birth certificate (Apland et al. 2014). In India and Kenya, data showed that education outcomes (for example, being enrolled in school at the age of 6 and an increased likelihood of staying in school) were significantly affected by the child's sex, marginalizing girls, and the mother's presence. The authors also pointed out that the lack of a birth certificate did not affect everyone equally. Those with privilege and resources could influence the system to obtain a certificate and eliminate barriers.

*"...birth certificates are a basic requirement. But if you have the money and influence you can solve anything. Money is given and the rules are easily broken." — Youth in Mumbai, India (Apland et al. 2014)*

Lack of birth certification affects already marginalized children even more. To date, birth registration information is not linked to migration services in Indonesia, which have a major influence on the experience of migrant parents and the status of their children's birth registration. Birth registration is seen by migrant families as a pathway to enable a child to access the education system and facilitate documented migration when the child becomes an adult.

*"(...) the government subsidies she received for rice covered only a small amount of the children's needs. Because the children do not have birth certificates and her family (household) card is incomplete, she does not formally get government-issued rice supplements for the children (relatives and neighbours help out)" — Grandmother caring for her daughter's two children in rural Indonesia (Ball et al. 2017)*

In line with those results, a historical analysis of the impact of birth registration laws in the United States demonstrated that birth registration was not only instrumental in the successful application of the minimum working age law, but was also associated with a higher likelihood of children attending school (6.5 percentage points higher in children born after the registration law) (Fagernäs 2011; Fagernäs 2014). Similar results were found in Tanzania, where having a birth certificate was associated with being more literate, starting school younger, and completing more years of education. In this same study, compulsory birth registration policies were associated with a 41 percentage point increase in the probability of English literacy (Bowles 2018).

Some studies also investigated the association between having a birth certificate and the educational attainment of children. In the Dominican Republic, researchers followed the progression of children throughout the education system. They found that not having a birth certificate was associated with lower educational attainment. Children without a birth certificate had a lower probability of passing the first schooling cycle (Corbacho et al. 2012). Similarly in the U.S., the enactment of the birth registration law resulted in an increase of 2.3 years in educational attainment for children born under the law, and coverage of the registration law rose from 25 to 100 percent for the same cohort (Fagernäs 2014). This effect was also reported in a study in Zimbabwe. When respondents were specifically asked if birth registration had a negative effect on their education, 67.2 percent believed it had (Musarandega 2009). In Tanzania, having a birth certificate was associated with being more literate, starting school younger, and completing more years of education with a 41 percentage point increase in the probability of English literacy (Bowles 2018).

## Improved health outcomes

Four studies focused on the association of birth registration with improved nutrition and immunization having a direct effect on children.

### *Child development and nutrition*

In a recent cross-sectional study, researchers used data from 31 low- and middle-income countries (LMICs) to estimate the association between the lack of birth registration and early child nutrition and development outcomes, including

- ▶ height-for-age z-scores (HAZ);
- ▶ weight-for-age z-scores (WAZ);
- ▶ weight-for-height z-scores (WHZ); and
- ▶ early child development index z-score among children aged 36–59 months.

They showed that having a birth certificate was associated with lower HAZ, WAZ, and early child development index (Jeong et al. 2018). Similar results were documented in a study by Comandini et al., who found a negative relationship between the birth registration and child's undernutrition in 37 sub-Saharan African countries. In this same study, the authors found a potential for selection bias in surveys favouring registered children, or children with a valid date of birth, that could lead to an underestimation of the prevalence of undernutrition of up to 28 percent in some cases (Comandini et al. 2016).

Evidence from India and Kenya supports these findings, where children with a birth certificate are less likely to be stunted (up to 0.7 and 0.8 times less likely, respectively) and underweight (up to 0.8 and 0.7 times less likely, respectively) (Apland et al. 2014).

### *Immunization*

Studies conducted in the Dominican Republic, India, Kenya, Sierra Leone, and Vietnam consistently reported a positive correlation between being registered at birth and vaccination outcomes. Respondents from all countries placed great importance on knowing the precise age to provide age-appropriate care (Apland et al. 2014; Brito et al. 2017).

In the Dominican Republic, researchers focused on the association between having a birth certificate and the number and timing of vaccines delivered to children (Bruto et al. 2017). Children between 0 and 59 months of age who did not have birth certificates were behind by nearly 1 vaccine (out of a total of 9), compared to those who had birth certificates (Bruto et al. 2017). Similar results were also found in the study conducted in India, Kenya, Sierra Leone, and Vietnam where having a birth certificate showed a positive relationship with being vaccinated.

In Kenya and India, children who have a birth certificate have a 1.2 to 3.8 higher chance of being vaccinated, depending on the type of vaccine (Apland et al. 2014).

## Access to social protection services

In many countries, social protection programs such as conditional cash transfers, food subsidies, or education supports are not available to children without a birth certificate. The association between birth registration and access to social protection programs was found in nine studies.

In Zimbabwe, researchers reported a significant relationship between access to the basic education assistance module (BEAM), which provides school fee assistance for children in need who have a birth certificate (Chereni 2016). In their mixed-methods study, participants emphasized the importance of birth certification to identify individuals and allow them to access social protection programs, including conditional cash transfers and school feeding schemes. Similar results were found in Vietnam, where being registered to a specific household was essential to access state social protection programs (Apland et al. 2014). Study participants believed these effects last through an individual's lifetime.

*"The birth certificate is the first certificate in your life. Birth certificates are very useful in so many cases in Vietnam: even when people become 80 years old, they will need a birth certificate to get a pension." — Parents in FGD commune, Vietnam (Apland et al. 2014)*

## Access to rights and properties

In Tanzania, researchers assessed the returns of birth registration for citizens evaluating a number of district-level reforms as a natural experiment and using historical data (Bowles 2018). These reforms encouraged individuals born into relatively richer families to get a birth certificate, leading to inequalities in birth registration. It was argued that richer individuals were self-selected into registration due to the perceived benefits of having a birth certificate. The author showed a positive effect of birth registration on gaining access to social security systems, formal employment, formal property rights, and better house quality. Moreover, formal property rights, such as "possessing a property deed, license, or rental contract" and ownership of agricultural goods are effects resulting from birth registration that increase access to social and civil rights.

Having proof of age of children is an essential element in government-run child protection programs. It can also help defend children in situations where their rights have been violated (Apland et al. 2014; Fagernäs 2011; Fagernäs 2014).

*"If you don't have a birth certificate, and you are abused, no one will know if you are a child or not, so they can't do anything." — PLAN program staff, urban Sierra Leone (Apland et al. 2014)*

This was also described in an analysis of the introduction of birth registration, child labour, and schooling laws at the beginning of the 20th century in the U.S. The study demonstrated how instrumental birth registration laws were for enforcing child labour and schooling laws between 1910 and 1930 in the U.S. (Fagernäs 2014). This study provided evidence that birth certificates were a formal proof of age, which facilitated the enforcement of child labour and schooling laws and thus reduced under-aged employment and raised the school attendance of school aged children (Fagernäs 2014). Under-aged male children born after the approval of the birth registration law were 9 percentage points less likely to work than under-aged children before the law. In the U.S., this effect was also seen across ethnicities (under-aged Black children being

7.8 percentage points less likely to work), and geographical locations after introducing the registration law (3.6 percentage points reduction in urban areas compared 5.9 percentage points reduction in rural areas) (Fagernäs 2011). These results were consistent with those reported in studies in India, Kenya, and Sierra Leone (Apland et al. 2014).

### *Legal identity*

Birth registration can enable access to other legal identity documents, such as passports, national identity cards, or voting cards. In Sierra Leone, having a birth certificate was linked with a person's ability to obtain a passport and, as a consequence, have access to better economic opportunities. In Thailand, having a birth certificate gives rights and citizenship to migrant children from Myanmar (Shan migrants):

*“When he reaches 15 years, he can apply for a Thai identification card, because we already have both his birth registration and have prepared all the documents required of him. This is the most valuable thing that we can give him as parents. When we are all gone, he will have his Thai nationality and can have his own car and house in his name. We could never have these things, but his future will be different from what we experienced.” — 35-year-old woman who migrated to rural Thailand (Seo 2017)*

### *Early and forced marriage*

Birth registration could play a significant role in preventing early and forced marriage through proof of age. Early and forced marriage is the result of a complex interplay of social and cultural factors. Nevertheless, birth and marriage registration seemed to play an important role in preventing them. In India, Kenya, and Sierra Leone, the lack of a universal birth registration is a major obstacle to the enforcement of child marriage laws (Apland et al. 2014). The Birth registration, child protection issue brief (UNHCR 2013) stated that “without birth certificates, the age of marriage candidates cannot be accurately verified, leaving children at risk.”

However, the data suggested that until the “(...) systemic social, cultural, and economic issues are addressed,” the role of registration within a functioning regulatory system will have a broader impact on marriage and child labour.

*“Participant reveals another reason why (lack of) possession of a birth certificate may have little relationship to a child's risk of early marriage in practice. This is because, whilst legal marriage requires candidates to prove their ages, the overwhelming majority of marriages in (large parts of) India, Kenya and Sierra Leone take place through customary and religious ceremonies.” – Mothers' focus group discussion, Mumbai, India (Apland et al. 2014)*

*“(...) early marriage happens because of dowry. Parents marry off their daughters in the early stages so that they don't have to give a higher dowry payment. Sometimes if the girl is underage and the man is old, he might even give money to buy the girl!” — Fathers' focus group discussion, Mumbai, India (Apland et al. 2014)*



## Positive impact on economic outcomes for individuals and governments

### *Access to employment*

In a multi-country study, having a birth certificate improved access to the formal employment sector and to jobs that are better paid and more stable. In India and Sierra Leone, participants in a mixed-method study reported that employers and companies complying with existing regulations about proof of age are the ones with higher salaries and more stable jobs. Among these companies, they identified international organizations and government bodies (Apland et al. 2014).

*“Are birth certificates required for getting a job? They are only applicable for the business class. For the government jobs they want them. They want to know your age so that they can know when you are going to retire.” — Family interview participants, Uttar Pradesh, India (Apland et al. 2014)*

There seems to be a positive relationship between having a birth certificate and working in the formal private sector as a paid employee in Tanzania (Bowles 2018). In addition, having access to a formal labour contract relates to higher incomes and probable improvement in the socioeconomic status of those individuals (Bowles 2018). The same study also showed a 47.7 percentage point increase in the probability of having a bank account for those registered in Tanzania. These results were explained by the need to prove your identity to access those services and systems. In their analysis, the authors repeatedly raised concerns about governments with an interest in increasing tax revenue, which could lead to targeting specific population groups in their efforts to strengthen birth registration. They concluded that the registration system reform mostly targeted prosperous and urban districts where formal sector employees live, stressing the danger of increased inequity (Bowles 2018).

### *Tax revenues*

From a government standpoint, a functioning CRVS system will likely increase the amount of tax citizens pay (Bowles 2018). In Tanzania, citizens whose birth is registered were 22.9 percentage points more likely to pay council taxes. They identified two pathways through which this effect can occur: indirect income effects or formal employment. However, even though the increase in tax revenues is an attractive argument for governments, the authors raised concerns about how this could also be a barrier or disincentive for registration in LMICs.

### *Poverty reduction*

In Zimbabwe, researchers explored the impact of having civil registration documents, particularly birth registration, on the poverty eradication strategy. Using the human rights framework, they assessed a number of dimensions from the barriers to access civil registration documents to the economic effects of possessing them (Musarandega 2009). There is a clear value to obtaining civil registration documents such as birth certificates. Even though the authors found that citizens had to make 8 to 10 attempts to collect the documents, 81.4 percent stated they would still go through that process to obtain them (Musarandega 2009).

## Benefits of marriage registration and certification

### Mental health outcomes for LGBTQI people

The evidence around the association between civil registration and mental health outcomes is primarily focused on marriage registration of LGBTQI people (Goldsen et al. 2017; Raifman et al. 2017; Riggle et al. 2017). In the U.S., an analysis of the survey Aging with Pride showed that legally married couples were advantaged over unmarried partners and singles across different social, economic, and health dimensions (Goldsen et al. 2017). Authors concluded that legally married men and women showed a greater physical and environmental quality of life and mental health compared to their unmarried counterparts. Other studies showed similar results and confirmed that civil marriage has a positive impact on the wellbeing of individuals in long-term same-sex couples across all U.S. states (Riggle et al. 2017). At the community level, state recognition of a marriage was associated with feeling less vigilant in daily interactions and feeling less isolated (Riggle et al. 2017).

### Suicide attempts

Researchers investigated the association between state same-sex marriage policies and adolescent suicide attempts (Raifman et al. 2017). By examining the Youth Risk Behavior Surveillance System in the U.S. from 1999 to 2015, they examined how changes in marriage laws for same-sex couples influenced the mental health outcomes among adolescents. The application of same-sex marriage policies was associated with a reduction of 0.6 percentage points in suicide attempts among high school students. This accounts for a 7 percent relative reduction in the proportion of high school students who attempted suicide. The effects were concentrated among students who identified as sexual minorities, with a reduction of 4 percentage points in suicide attempts, equivalent to a 14 percent relative decline (Raifman et al. 2017).

Marriage registration is an important procedure included in CRVS systems. An interesting finding of this review is the cumulative impact and interdependency of the different products of CRVS systems. Chereni investigated the effects of death or marriage recording on birth registration and the intergenerational consequences of missing the vital registration documents of the deceased parent (Chereni 2016). As one study participant pointed out:

*“The main barrier (...) was getting the registrar general's office to issue her mother's death certificate, which was a requirement for a successful application. Mai's (...) parents, I learnt, had either divorced before she was born or her father had refused paternity. Consequently, Mai (...) had to adopt her maternal surname at school. After six years in primary school, she dropped out.” — 35-year-old mother of four, Zimbabwe (Chereni 2016)*

*“When Mai's (...) son started grade 7, she knew that a birth certificate was needed to register his candidacy for public examination that school year.” (Chereni 2016)*

Another example of interdependency was captured in migrant populations in Indonesia. The lack of marriage certificate was considered a barrier in registering the birth of a newborn, which has adverse consequences during a child's lifetime. Those challenges are reinforced by existing religious and cultural norms that prevent the most vulnerable groups (for example, single mothers, unmarried couples, children with a parent abroad, those having a parent with a disability, women working overseas, etc.) from obtaining legitimate birth registration (Ball et al. 2017).

*“A government midwife in one of the villages (...) was ‘not brave enough’ to accept unmarried couples or single mothers as clients due to stigma at the village level against children born out of wedlock. Women who become pregnant out of wedlock in Indonesia or while working overseas cannot get official statements of birth, impeding their access to a legitimate birth certificate for their newborn.” (Ball et al. 2017)*

In Zimbabwe, the lack of parental documents affects children's birth registration. It was suggested that non-registration influences the decision to continue education due to the barriers caused by not having registration documents. It seems that there is a clear connection between the lack of birth registration and early marriage or early employment (Musarandega 2009).

From an operational perspective, this dependency among birth, death, and marriage registration means that strengthening just one area of a CRVS system or focusing only on one of the vital events will not yield the full potential of CRVS systems to improve the lives and wellbeing of individuals, including those neglected by the system.

## Benefits of vital statistics

Researchers compared the vital statistics performance index (a performance measure of CRVS systems) with national estimates of healthy life expectancy (HALE), maternal mortality ratio (MMR), and child mortality risk (5q0) in 144 countries. They aimed to demonstrate that well-performing CRVS systems are associated with positive health outcomes (Phillips et al. 2015). There seems to be a positive relationship between the vital statistics performance index and HALE and a negative relationship with MMR and 5q0 (Phillips et al. 2015).

## Access to programs and services

Further studies have identified birth certificates as gateway documents to access health services or national health insurance programs. In Vietnam, registration and birth certification were compulsory to obtain a health insurance card, which provides health care access at no cost for children (Apland et al. 2014).

*“Having a birth certificate is essential for getting health insurance, which means that a child can get free health care under 6.” — Department of Health representative, district level, Vietnam (Apland et al. 2014)*

Having accurate information about the number of births, deaths, and causes of death is essential for governments to make policy decisions. CRVS systems are critical for monitoring and achieving 12 of the 17 SDGs, by providing information for 67 SDG indicators (Mills et al. 2017) of the total 231 (United Nations 2017).

## SDGs and indicators

A recent study in Nigeria argued that data recorded in CRVS systems are essential to measure multiple SDG indicators and instrumental in achieving some of the SDGs (Maduekwe et al. 2017). Authors combined the relevance of CRVS data with the capacity of national statistics offices to calculate SDG indicators to assess the potential impact of CRVS systems in monitoring and reporting SDG indicators. Governments in LMICs face challenges in generating and gathering data and transforming it into relevant and timely information in the form of vital statistics (Maduekwe et al. 2017). One interesting feature of the chosen metric is that it could be used "to compare developmental data capacities and performance across countries" (OECD 2013). In their analysis, the authors concluded that CRVS systems could provide relevant data for up to 25 percent of the SDGs' needed data. However, this would only be fulfilled if countries, and specifically their national statistics offices, have the capacity to produce the indicators. Their analysis of the Nigerian CRVS system showed that, in principle, the design would allow reporting on 21 SDG targets. However, given the system's current performance, it could not be used to this end.

## Planning and decision-making

Further analysis showed links between registration data and government planning from the state's perspective. Government officials participating in key informant interviews for this study stated that accurate data gathered by civil registration offices is essential at the central, district, and local levels in India, Kenya, Sierra Leone, and Vietnam. Respondents described the benefits of the data gathered through CRVS systems and how it could be used in policymaking:

*"Our planning depends on the total number of newborn children, on population growth, on sanitation and the environment, on the number of children under 1 year, and then number of children under 5 years." — Department of Health representative, Hanoi Province, Vietnam (Apland et al. 2014)*

*"If you can't measure, you can't count (...) If you don't know how many deaths occur as a result of childbirth or you do not know the magnitude of the intervention. You need data, you need information (...) a lot of the information that is routine in developed countries is not routine here." — Ministry of Planning representative, Freetown, Sierra Leone (Apland et al. 2014)*

The same study showed that better information leads to better policy decisions to leave no one behind:

*“We need to know the region the child comes from. This is important to ensure that resources are allocated correctly. We have some areas that are disadvantaged in the northeast regions. We have a programme that targets these regions – girls are provided for when they go to secondary school.” — Ministry of Education representative, Kenya (Apland et al. 2014)*

*“When you know the population size, you are able to plan – you know the population. You can demark political boundaries, you determine development priorities (such as rural education problems), and you can address socio-economic problems.” — Assistant chief, community near Nairobi, Kenya (Apland et al. 2014)*

Disaggregated data from vital statistics (for example, sex, age, and geographical location) remains a critical element to be addressed in many countries. Research has shown that it is a priority for governments working towards development outcomes and improved health and education, including the appropriate allocation of resources (Apland et al. 2014).

## Final remarks

This review shows that a functioning CRVS system impacts individuals, governments, and societies through multiple mechanisms and pathways. Even though there is evidence showing positive effects of CRVS systems, this evidence is scarce and uses study designs that limit their extrapolation and representativeness. The studies cited here primarily focused on the benefits of having birth and/or marriage registration and certification, and vital statistics. It is especially concerning that we could not find a single study investigating the impact of having a functional death registration system.

There is a need to better document the impact of functioning CRVS systems with robust study designs that represent different regions. It is also essential to assess the effects of CRVS systems in different population groups using an intersectional lens.

This review strengthens the idea of systemic approaches to reinforcing CRVS systems since a number of studies proposed that vital event registration and certification have an aggregate effect. Guaranteeing a suitable, well-functioning system that can establish proper CRVS systems with adequate services to register all vital events will impact the lives of individuals over several generations.

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## Appendix A: Summary of the benefits of functioning CRVS systems

Effect	Results as reported by authors
Access to civil and social rights	<p><b>Eliminates child labour</b></p> <ul style="list-style-type: none"> <li>• When born with a birth registration law in place, children below the minimum age were 9 percentage points less likely to work (Fagernäs et al. 2014).</li> <li>• When born prior to a birth registration law, under-aged children were only 3.4 percentage points less likely to work (Fagernäs et al. 2014).</li> <li>• Under-aged children born after the approval of the birth registration law were less likely to work than the under-aged children before the law, resulting in a 2.8 percentage point reduction in urban areas, compared to a 1.6 percentage point reduction in rural areas (Fagernäs et al. 2011).</li> <li>• In urban areas, under-aged children born before the registration laws were 2.8 percentage points less likely to work (Fagernäs et al. 2011).</li> <li>• In rural areas, under-aged children born before registration laws were 1.6 percentage points less likely to work (Fagernäs et al. 2011).</li> </ul> <p><b>Prevents early marriage</b></p> <ul style="list-style-type: none"> <li>• Through the proof of age, birth, and marriage registration seemed to play an important role in preventing early marriage (Apland et al. 2014).</li> </ul> <p><b>Improves access to legal identity documents</b></p> <ul style="list-style-type: none"> <li>• Birth registration can provide access to other legal identity documents, such as passports, national identity cards, or voting cards. "Participants underscored the use of a birth certificate not only for identification purposes, but also for accessing other vital documents including the national identity card." (Chereni 2016)</li> <li>• Vital registration impacts migrant populations. It is a pathway to enabling a child to access the school system, and to facilitate documented migration when the child would become an adult (Ball et al. 2017).</li> <li>• "When he reaches 15 years, he can apply for a Thai identification card, because we already have both his birth registration and have prepared all the documents required of him. This is the most valuable thing that we can give him as parents." — Shan, woman in her mid-30s (Seo et al. 2017)</li> </ul>

Effect	Results as reported by authors
Improved education outcomes	<p><b>Increases access to education</b></p> <ul style="list-style-type: none"> <li>• There is a positive relationship between the possession of a birth certificate and the ability of the child to access education (Corbacho et al. 2012).</li> <li>• Children with a birth certificate were 37%, 50%, and 67% more likely to attend school in India, Kenya, and Sierra Leone respectively compared to those without birth certificates (Apland et al. 2014).</li> <li>• In the U.S., the increased likelihood of children attending school was 6.5 percentage points higher in children born after the birth registration law (Fagnäs et al. 2014).</li> <li>• This effect on the population, who were induced to register by the reform, birth registration is associated with a 41 percentage point increase in the probability of English literacy as an education outcome in Tanzania (Bowles et al. 2018).</li> </ul> <p><b>Increases educational attainment</b></p> <ul style="list-style-type: none"> <li>• Birth registration was generally seen as a pathway to enabling a child to take the primary school-leaving exam (Ball et al. 2017).</li> <li>• An unregistered child would have a probability of between 20 and 40 percentage points lower of passing the first cycle of primary school (Corbacho et al. 2012).</li> <li>• For individuals born in the U.S. between 1896 and 1925, the average educational attainment increased from 8.7 to 11 years (Fagnäs et al. 2014).</li> <li>• A 0.09 year increase in attainment due to birth registration laws would account for 3% of the total increase (Fagnäs et al. 2014).</li> <li>• The impact of the recording of other vital events (death or marriage) on birth registration and the intergenerational consequences of missing the vital registration documents of the deceased parent consequently affect educational attainment (Chereni 2016).</li> </ul>

Effect	Results as reported by authors
Improved health outcomes	<p><b>General</b></p> <ul style="list-style-type: none"> <li>• There seems to be a positive relationship between the VSPI and HALE (1.044 on a 0–1 scale), and a negative relationship with MMR (0.721) and 5q0 (0.418) (Phillips et al. 2015).</li> <li>• Registration and birth certification were necessary to obtain a health insurance card (health care access at no cost for children) (Apland et al. 2014).</li> </ul> <p><b>Improves nutrition</b></p> <ul style="list-style-type: none"> <li>• Having a birth certificate was associated with lower HAZ, WAZ, and early child development index (Comandini et al. 2015).</li> <li>• Registered children presented a better nutritional status, with significantly higher HAZ mean values in 40 cases out of 140 comparisons (28.6%), higher WAZ mean values in 51 cases (36.4%) and higher WHZ mean values in 38 cases (27.1%) (Comandini et al. 2015).</li> <li>• In Kenya, a child with birth registration is approximately 0.7 times less likely to be underweight (Apland et al. 2014).</li> <li>• In Kenya, a child with birth registration is approximately 0.8 times less likely to be stunted (Apland et al. 2014).</li> <li>• In Uttar Pradesh, India, a child with birth registration is approximately 0.8 times less likely to be underweight (Apland et al. 2014).</li> <li>• In Uttar Pradesh, India, a child with birth registration is approximately 0.7 times less likely to be stunted (Apland et al. 2014).</li> </ul> <p><b>Improves vaccination outcomes</b></p> <ul style="list-style-type: none"> <li>• There is a positive correlation between being registered at birth and vaccination outcomes (Brito et al. 2017).</li> <li>• Children between 0 and 59 months of age who do not have a birth certificate are behind by nearly 1 vaccine (out of a total of 9) (Brito et al. 2017).</li> </ul> <p><b>Improves mental health and quality of life</b></p> <ul style="list-style-type: none"> <li>• The reduction in suicide attempts by high school students (ages 15 to 19) in the U.S. represents a 7% relative reduction in the proportion of high school students attempting suicide owing to same-sex marriage implementation. These results are equivalent to a 14% relative decline in the proportion of adolescents who were sexual minorities reporting suicide attempts in the past year (Raifman et al. 2017).</li> <li>• There is a positive impact at the individual level that comes from having a marriage certificate. There are higher levels of LGBTQI positive identity and more LGBTQI people perceive their partner as more supportive (Riggle et al. 2019).</li> <li>• At the community level, state recognition of a marriage was associated with feeling less vigilant in daily interactions and feeling less isolated.</li> <li>• Married men showed advantages over unmarried partnered men in physical health–quality of life (Goldsen et al. 2017).</li> </ul>

Effect	Results as reported by authors
<b>Access to social protection services</b>	<ul style="list-style-type: none"> <li>• There is a significant relationship (<math>p = 0.03</math>) between access to BEAM and possession of birth certificate, which provides school fee assistance (Chereni 2016).</li> <li>• Being registered to one specific household was essential to having any social protection program from the state (Bowles et al. 2018).</li> <li>• There is a positive causal outcome when someone possesses a birth certificate, such as access to welfare, including state pensions and health insurance schemes (Bowles et al. 2018).</li> <li>• There is a causal effect between birth registration and access to the formal labour market and the financial sector due to the requirement of proof of identity (Bowles et al. 2018).</li> <li>• Birth registration was associated with a 47.7 percentage point increase in the probability of having a bank account for those registered (Bowles et al. 2018).</li> </ul>
<b>Better information for better decisions</b>	<ul style="list-style-type: none"> <li>• A CRVS system has “a latent and active production capacity and evidence” that the mechanism can be used regularly for gathering information on data types (Maduekwe et al. 2017).</li> <li>• A CRVS system has the capacity to produce data for the SDGs (Maduekwe et al. 2017).</li> <li>• There is an association between registration data and government planning (Apland et al. 2014).</li> <li>• Planning is based on statistical information collected at local registration offices (Apland et al. 2014).</li> </ul>



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