

THE LANCET

May, 2023

www.thelancet.com

Small Vulnerable Newborns

An Executive Summary for *The Lancet's* Series



“The fact that every fourth baby in the world is born too soon or born too small is a concern for human rights, public health, the national economy, and development. By not addressing this priority, we are jeopardising our collective future.”

Small Vulnerable Newborns

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Vulnerable women, vulnerable newborns, vulnerable societies¹

The foundations of human wellbeing are laid before birth. Unfortunately, many babies experience adversities during this intrauterine period. As a result, they can be born preterm or suffer fetal growth restriction and be born small for gestational age (SGA). Both preterm birth and fetal growth restriction can result in low birthweight (LBW).

Children who are born preterm, SGA, or with LBW have a markedly increased risk of stillbirth, neonatal death, and later childhood mortality. Additionally, these conditions are associated with multiple morbidities with short-term and long-term adverse consequences, for newborns, their families, and society at-large, resulting in a major loss of human and economic capital. Prevention of preterm and SGA births is thus critical for global child health and for societal development. Progress in primary prevention has, however, been slow, despite several global commitments and targets since 1990. The lack of progress is related to the global community's failure to prioritise preventive interventions and address all vulnerable newborns, including those who are not low birthweight. We propose a new conceptual framework, bringing preterm birth, SGA, and LBW together under the term of "small vulnerable newborns" (SVN). This framework can inform programming for SVN prevention and care, and contribute to healthier and thriving women, newborns, children, adults, and societies (figure 1).

Every fourth baby is born too soon or too small²

We estimated national-level prevalence for three mutually exclusive SVN types (preterm-nonSGA, term-SGA, and preterm-SGA) using individual-level data for 195 countries and areas for the year 2020. We found that

8·8% (50% credible interval [CrI] 6·8–9·0) of global livebirths were preterm-nonSGA (11·9 million, CrI 9·1–12·2 million), 16·3% (14·9–18·9) were term-SGA (21·9 million, 20·1–25·5 million) and 1·1% (0·9–3·1) were preterm-SGA (1·5 million, 1·2–4·2 million). Together, these three vulnerable newborn types accounted for 99·5% of the world's 20 million LBW babies. Worldwide, 35·3 million (50% CrI 33·4–38·8) were small vulnerable newborns in 2020, more than one in four of all livebirths. Nearly two-thirds (63·9%) of the world's term SGA newborns were in Southern Asia (14·0 million, 38·8% of livebirths). Preterm birth rates had less regional variation but were also highest in Southern Asia (13·3%).

Just over half of all neonatal deaths (1·4 million, 55·3%) worldwide were attributable to small vulnerable newborn types in 2020. Mortality risk was highest for preterm newborns, especially those who were both preterm and SGA. Of all the SVN-associated neonatal deaths, 73·4% were attributable to preterm-SGA (0·19 million deaths) or preterm-nonSGA (0·82 million deaths) and the remainder were term-SGA (0·37 million) babies (figure 2).

For 12 middle-income and high-income countries with individual-level data, over three-quarters of all stillbirths were preterm with some being both preterm and SGA. Around a fifth of term stillbirths were SGA, varying by country. More data are needed, especially from contexts with a high prevalence of SGA births. There are an estimated 1·9 million late gestation stillbirths per year, associated with similar vulnerability pathways to those leading to neonatal deaths; hence including stillbirths in SVN statistics will be crucial for complete assessment of the public health burden of being born too soon or small.

Given that more than 80% of births worldwide now happen in facilities, routine national data collection can

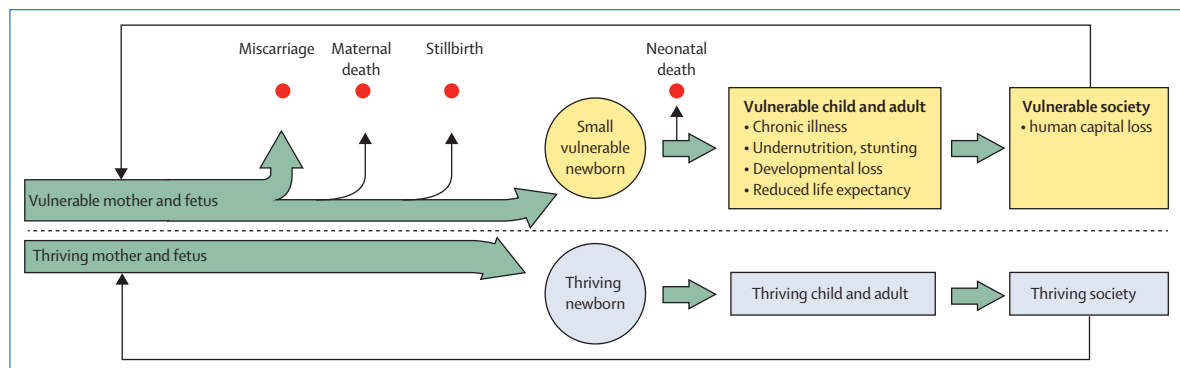


Figure 1: The vicious cycle of vulnerability

Vulnerable mothers are at increased risk of miscarriage, maternal death and delivering a stillborn infant or small vulnerable newborn (SVN). The SVNs, in turn, are at increased risk for lifetime health and developmental problems, leading to loss of human capital and vulnerable societies. SVN=small vulnerable newborn.

Panel 1: Proven and potential antenatal interventions to reduce the number of small vulnerable newborns and associated neonatal deaths

Proven interventions to prevent SVN births, targeted to all women

Screening and treatment for asymptomatic bacteriuria
Screening and treatment for syphilis
Multiple micronutrient supplements

Proven interventions to prevent SVN births, targeted to subgroups*

Psychosocial interventions for smokers
Balanced energy and protein dietary supplements
Insecticide-treated bednets
Low dose aspirin
Progesterone (provided vaginally)

Proven interventions to improve outcomes among preterm infants

Antenatal corticosteroids
Delayed cord clamping

Potential interventions to prevent SVN births, targeted to all women

Omega-3 fatty acid supplements

Potential interventions to prevent SVN births, targeted to subgroups

Calcium supplements
Zinc supplements

*Applicable in selected contexts or target-groups.

be improved, to advance programmes. Of the 195 countries and areas, only 113 (58%) had usable national LBW routine data in 2020, 64 (33%) had preterm data, and only eight reported having national SGA data. Countries need electronic individual-level data on gestational age, sex, and birthweight to calculate SGA. More investment would enable every birth (including stillbirths) everywhere to be counted and weighed and classified by small vulnerable newborn types, improving individual care, tracking of outcomes, and accountability for progress (figure 2).

Prevention of SVN births is possible^{3,4}

WHO recommends a package of care for all pregnant women within eight scheduled antenatal care (ANC) contacts. Some interventions for reducing and managing SVN outcomes exist within the WHO package and need to be more fully implemented, but additional effective interventions are needed and recommended in this Series. Evidence from systematic reviews identified ten proven antenatal and intrapartum interventions (up to clamping the umbilical cord) of which eight can prevent SVN and two can improve outcomes from vulnerable births (figure 3). Three additional preventive

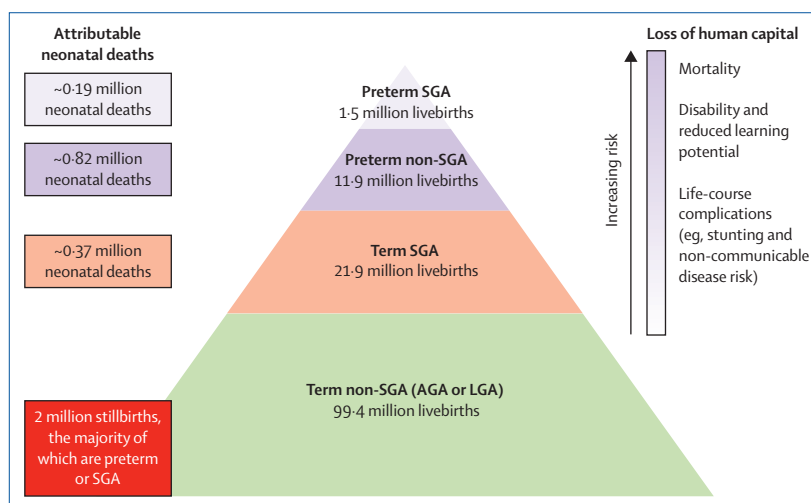


Figure 2: Population-level implications of the burden of SVNs and neonatal mortality by SVN type
AGA=appropriate for gestational age. LGA=large for gestational age. SGA=small for gestational age. SVN=small vulnerable newborn.

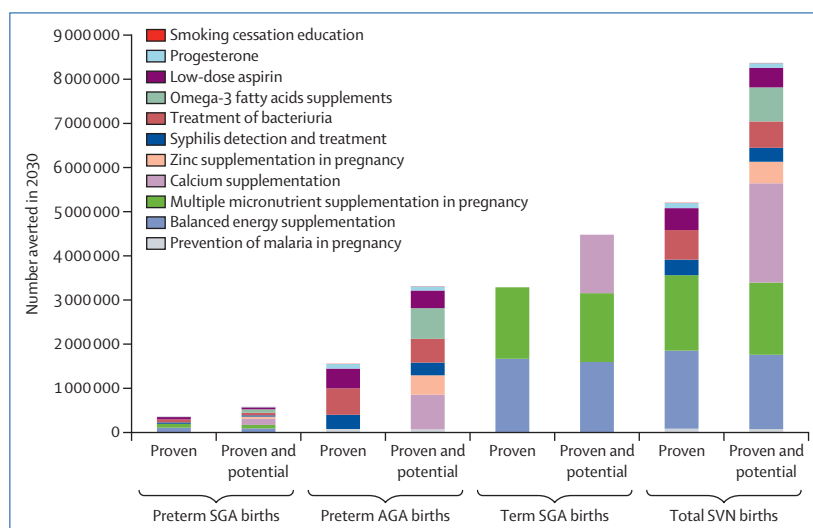


Figure 3: Impact of interventions on SVN types in 81 low-income and middle-income countries
AGA=appropriate for gestational age. SGA=small for gestational age. SVN=small vulnerable newborn.

interventions require further evidence to confirm whether they confer benefit (panel).

We estimated, using the Lives Saved Tool, that the eight proven preventive interventions, if fully implemented in 81 low-income and middle-income countries, could prevent 5.202 (sensitivity bounds [SB] 2.398–7.903) million SVN births and 0.566 (0.208–0.754) million stillbirths per year at a cost of about \$1.1 billion in 2030. These interventions, along with two that can reduce the complications of preterm births (antenatal corticosteroids and delayed cord clamping) could avert 0.476 (0.181–0.676) million neonatal deaths per year. Ultimately, high effective coverage with these interventions, alongside access to family planning

	National action	International action
Problem recognition: make SVN prevention a health priority	Develop or integrate within other national action plans, budget and invest to meet targets and contribute to SDG acceleration	Update guidelines for SVN prevention, and support context-sensitive adaptation
Intervention implementation: scale-up high-quality care for women, particularly during pregnancy and at birth	Ensure early start of high-quality antenatal and childbirth care for all pregnant women Scale up proven interventions* integrated with WHO recommended ANC, and include in Universal Health Coverage planning	Allocate sufficient funding to support national ANC and childbirth programmes Increase research investment into potential interventions* for SVN prevention
Increased accountability: improved measurement and monitoring	Date all pregnancies and weigh all newborns and stillbirths and collate data nationally on rates of preterm birth, and SGA Promote societal level action with a multi-sectoral approach using health in all policies	Improve international statistics and ensure regular reporting on the incidence of different SVN types Agree on approaches and a possible governance structure for international support to country activities on SVN and stillbirth prevention

SVN=small vulnerable newborn. ANC=antenatal care. *Proven and potential interventions described in detail in the *Lancet* 2023 Small Vulnerable Newborn Series⁵

Table: Suggested global strategy for accelerating SVN and stillbirth prevention: pillars and national and international actions

services and improved newborn care services with measures addressing underlying health inequities is necessary to achieve global targets for reduction of LBW and neonatal mortality, plus longer-term benefits on growth and human capital.

A call for action⁵

We call for action to prevent SVN and stillbirths. Action should be based on three pillars: problem recognition, intervention implementation, and increased measurement and accountability. Under these pillars, there are ten concrete actions for key stakeholders (table).

Countries and national governments must lead in implementation, but international and global investments should also play their part.

The burden of SVN and stillbirth is highest in South Asia, Sub-Saharan Africa, and in humanitarian contexts—hence activities need to focus especially on these settings. However, this call is also relevant to high-income countries, since they, too, are affected and making little progress in SVN prevention.

The fact that every fourth baby in the world is born too soon or born too small is a concern for human rights, public health, the national economy, and development. By not addressing this priority, we are jeopardising our collective future. We can reverse this trajectory, if national leaders, with global partners, prioritise action, and invest and hold themselves accountable. Together we can act now to ensure that every baby has a chance to be born alive, at the right time, and the right size. Everywhere.

References

- 1 Ashorn P, Ashorn U, Muthiani Y, et al. Small vulnerable newborns—big potential for impact. *Lancet* 2023; published online May 8. [https://doi.org/10.1016/S0140-6736\(23\)00354-9](https://doi.org/10.1016/S0140-6736(23)00354-9).
- 2 Lawn JE, Ohuma EO, Bradley E, et al. Small babies, big risks: global estimates of prevalence and mortality for vulnerable newborns to accelerate change and improve counting. *Lancet* 2023; published online May 8. [https://doi.org/10.1016/S0140-6736\(23\)00522-6](https://doi.org/10.1016/S0140-6736(23)00522-6)
- 3 Hunter PJ, Awoyemi T, Ayede AI, et al. Biological mechanisms leading to the birth of a small vulnerable newborn. *Lancet* 2023; published online May 8. [https://doi.org/10.1016/S0140-6736\(23\)00573-1](https://doi.org/10.1016/S0140-6736(23)00573-1)
- 4 Hofmeyr GJ, Black RE, Rogozińska E, et al. Evidence-based antenatal interventions to reduce the incidence of small vulnerable newborns and their associated poor outcomes. *Lancet* 2023; published online May 8. [https://doi.org/10.1016/S0140-6736\(23\)00355-0](https://doi.org/10.1016/S0140-6736(23)00355-0).
- 5 Mohiddin A, Semrau KEA, Simon J, et al. The ethical, economic, and developmental imperative to prevent small vulnerable newborns and stillbirths: essential actions to improve the country and global response. *Lancet* 2023; published online May 8. [https://doi.org/10.1016/S0140-6736\(23\)00721-3](https://doi.org/10.1016/S0140-6736(23)00721-3)

