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Global Implications of Vaccination and Rising Infant Mortality in the Philippines

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ABSTRACT

Background and Objectives: Few metrics depict a nation's health more accurately than the infant mortality rate. Globally recognized as a barometer of population health, infant mortality reflects the effectiveness of health systems and policies. The infant mortality rate in the Philippines fell from 15.69 (2000) to 11.05 (2020) but then rose by 37% to 15.11 by 2024. Such a stark reversal in infant mortality patterns in just 5 years warrants an urgent investigation.

Methods: Primary data sources included Philippines Statistics Authority vital statistics (41.7M births/0.55M infant deaths 2000-2024) annual cause-of-death patterns (2015-2024), and annual infant cause-of-death across the first year of life (2020-2024). These were supplemented by the Philippines Department of Health Field Health Services Information System Annual Reports (2000–2024) which provide data on vaccination coverage, to support this detailed examination of Filipino infant mortality. Infant mortality trends were analyzed via linear/chi-square tests; correlations with vaccines; cause-of-death peaks were mapped to the National Immunization Program infant vaccination schedule; and confounders eliminated. Given the absence of pregnancy-specific COVID-19 vaccination records, population-level adult vaccination timelines and pregnancy-vaccination recommendations were temporally aligned with infant mortality, congenital abnormality trends, and monthly death patterns to assess possible associations.

Results: Infant mortality in the Philippines dropped steadily from 2000 (15.69) to 2005 (12.83), held steady up to 2019 (average 12.59, range 11.89 - 13.09), dropped to 11.05 (-14.9%) in 2020 but then rose to 15.11 (+37%) by 2024 ($p < 0.0001$). The rapid rise in infant mortality from 2020 to 2024 indicates serious declines in infant health. Births rose by 0.14% annual average growth from 2000 to 2012, peaking at 1.79 million in 2012, fell by annual averages of 1.0% to 1.67 million by 2019, and further by annual averages of 3.9% to 1.36 million in 2024, representing a highly significant 24% decline ($p < 0.0001$) in registered live births since 2012. Postnatal vaccines demonstrate mixed temporal associations with infant mortality trends: higher uptake of live vaccines correlated with declines in infant mortality, while inactivated vaccines correlated with rising infant mortality. The small sample size necessitates further analyses to further investigate and corroborate these findings. Between 2015 and 2023, excluding 2020 which had atypically low infant mortality, the correlation between Pneumococcal Conjugate Vaccine and the infant mortality rate was highly statistically significant ($r=0.93$, $P=0.00074$). While this correlation dropped with the addition of 2024 data, it was still significant ($r=0.77$, $p=0.016$), indicating a strong association between increasing Pneumococcal Conjugate Vaccine coverage and the observed infant mortality rise. Peaks in infant mortality across the first year of life match the timing of administration of the nation's standard vaccines. Further, the timing of the infant mortality rate inflection aligns with the national COVID-19 vaccination rollout. After two decades of declining infant mortality, the sharp post-2020 rise coincided with widespread maternal exposure beginning in 2021. Congenital abnormality deaths increased by 46% from 2020–2024. Several infant cause-of-death categories rose sharply including respiratory diseases (+124%), infectious and parasitic diseases (+125%), nervous system diseases (+11%), and unexplained sudden deaths (+106%). Synchronized

increases across multiple cause-of-death categories and fetal-development linked outcomes are evident in the first birth cohorts gestated after large-scale population and maternal COVID-19 vaccination.

Conclusion: Our analysis of infant mortality trends in the Philippines identifies temporal associations between increased infant mortality and specific aspects of the national vaccination program. Notably, early neonatal deaths show a temporal link with birth-dose administration of Hepatitis B and Bacillus Calmette-Guerin vaccines, warranting careful re-evaluation of this policy. Similarly, rises in infant mortality coincide with expanded uptake of the Pneumococcal Conjugate Vaccine (co-administered with pentavalent and polio vaccines), suggesting the need to reassess its role and the potential impacts of multiple concurrent vaccinations in the standard schedule. Further research is needed to investigate possible vaccine-related risks to fetuses and infants, including evidence of mRNA vaccine transfer to placental and reproductive tissues alongside infant mortality inflections temporally aligned with maternal COVID-19 vaccination rollout.

Keywords: Births, Infant mortality, Cause of Death, Infant Schedule, COVID-19 Pandemic

Introduction

Globally recognized as a barometer of national health, infant mortality provides evidence of the efficacy of national health systems and policies. The trend of a population's infant mortality rate (IMR) is a critical indicator of infant health over time. Mortality, underlaid by a larger burden of failing health, is the worst outcome of infectious, congenital, developmental or immunological disorders, as well as iatrogenic or accidental harms. Patterns of infant morbidity and mortality provide important feedback for public health systems, guiding implementation of research, interventions, and strategies, to ensure optimal health and wellness outcomes.

While the World Health Organization (WHO) and the U.S. Centers for Disease Control (CDC) credit vaccines with saving millions of lives, some experts disagree, citing concerns of vaccine safety and pharmaceutical/ governmental conflicts of interest, and data manipulation. Pfizer, one of the world's largest pharmaceutical companies, made a record-breaking settlement of $2.3 billion over fraudulent marketing practices with the charges being illegal promotion, kick-backs and bribes, and false claims.[1] The Philippines has long-standing, multi-stakeholder partnerships[2,3] with the WHO and United Nations Children's Fund (UNICEF) for the development and delivery of its National Immunization Program (NIP)[4]. NIP vaccines include Hepatitis B (HepB) and Bacille Calmette-Guerin (BCG) at birth, 3 doses of DPT-Hib-HepB (as part of the pentavalent protocol), Oral Polio Vaccine (OPV), and Pneumococcal Conjugate Vaccine (PCV) at 6, 10, and 14 weeks, Inactivated Polio Vaccine (IPV) at 14 weeks and 9 months, and doses of Measles Containing Vaccine (MCV) at 9 and 12 months. These 27 vaccines by the end of the first year of life are in addition to prenatal vaccines which routinely include tetanus toxoid-containing vaccines (Td or Tdap),[5,6] may include flu vaccines,[7,8] and included COVID-19 vaccines between 2021 and 2023.[9-11] The COVID-19 vaccination program wound down in the third quarter of 2023 following the lifting of the State of Public Health Emergency in July 2023, and with the expiry of vaccine stocks and waning public demand. [12,13]

Routine NIP vaccines procured through UNICEF and Philippines Department of Health (DOH) bidding, include maternal Diphtheria-Tetanus (DT), Pentavalent, HepB, and OPV from the Serum Institute of India.[14] DT, HepB, and Pentavalent contain both aluminum adjuvants and thimerosal preservatives. PCV10 (Synflorix) and PCV13 (Prevnar) are aluminum adjuvanted. While PCV13 (Prevnar) was recommended for use from 2020, PCV10 is still in use.[15] Comparing infant vaccination coverage pre-and post-pandemic from 2015-2019 with 2020-2024, BCG uptake fell 6%, Pentavalent rose 2%, newborn HepB rose 3%, and PCV rose by 68%. First dose IPV coverage was only reported from 2019, and second dose from 2022 with the 2-dose annual coverage rising to 67% by 2024.[16] Between 2023 and 2024 coverage fell for birth BCG (7%) and HepB (5%), pentavalent (17%), and PCV (31%) but rose for MCV (1%), IPV (2%), and OPV (7%). The falling uptake in 2024 may be attributed to rising vaccine hesitancy but also to limited availability of PCV and pentavalent in 2024 despite Government "catch-up vaccination campaigns".[17-19] From its introduction in 2015, PCV coverage (3 doses) rose annually from 24% to 76% in 2023 but fell to 53% in 2024. The annual step increases in PCV coverage provided a unique opportunity to assess the relationships between increasing PCV coverage, IMR, and pneumonia deaths.

Methods

Data Sources:

All data used for this study came from official published Philippines Government and Malaysian Government sources. Data sources included:

1) National vital statistics; births, deaths, cause-of-death (COD), and population health data published by the Philippine Statistics Authority (PSA) covering 41,665,002 million registered births and 546,130 registered infant deaths from 2000 to 2024. [20,21]
2) Infant vaccination by eligible infant uptake under the NIP as provided in the Philippines Department of Health (DOH) Field Health Services Information System (FHSIS) annual reports from 2000 to 2024.[16] Data includes individual vaccine doses as well as the categories of CPAB (Child Protected at Birth – child whose mother received recommended number of TD vaccines during pregnancy) and FIC (Fully Immunized Child – a child who has received all recommended NIP vaccines by 12 months of age). Where multiple doses of any vaccine were administered, average annual uptake was referenced.
3) The Philippines National Immunization Program / Expanded Immunization Program which includes WHO/UNICEF endorsed BCG (from 2001), HepB at Birth (from 2009), DTP-HiB-HepB (Pentavalent) (from 2014, replacing DTP), OPV (from 2001), and PCV (from 2015) at 6, 10, and 14 weeks, IPV at 14 weeks and 9 months (from 2019), and MCV at 9 and 12 months (from 2001).[4]
4) National vital statistics; infant births and deaths up to 2024 published by the Department of Statistics Malaysia.[22]
5) Malaysian infant vaccination schedule published by the Malaysian government.[23]
6) Published reporting on post-COVID-19 pandemic lockdowns targeted catch up immunization campaigns conducted by DOH with the support of WHO / UNICEF in 2022 and 2023.[24.25]

This paper takes the unique approach of combining public domain government statistical data from multiple sources to conduct a forensic epidemiological search for the factors contributing to rising infant mortality in the Philippines. All raw data is used directly as published with no manipulation other than computation of mortality rates using annual birth data.

Overall infant deaths, ICD-10 categorized annual deaths from leading COD (2015 – 2024), deaths across the first year of life by cause and age of infant (2020 – 2024), and infant deaths by month (2020 – 2024) were standardized to give mortality data using the number of registered live births in each relevant year. Annual infant mortality rate (IMR) is reported as deaths per 1,000 live

births. Monthly mortality is provided as infant deaths per 100,000 live births. Annual COD mortality is reported as deaths per million live births. Mortality across the first year of life was examined as average monthly mortality for each month of age. Mortality within the first month of life was analyzed in greater detail as average daily mortality per million births for each time interval (daily for days 0–7, followed by weekly intervals through day 27). Linear trend tests and chi-square tests were used to assess changes in infant mortality over time. For precision, r = correlation coefficient; $r > 0$ means positive correlation, $r < 0$ negative; $p < 0.05$ indicates statistical significance.

Cause-of-death spikes were mapped against the NIP/Expanded Program on Immunization (EPI) schedule: HepB/BCG at birth, pentavalent/PCV/OPV at 6 and 10 weeks, pentavalent/PCV/OPV/IPV at 14 weeks, and IPV/MCV at 9 months. Monthly death rates from 2020 to 2024 were examined for any effect of focused national immunization "catch-up" campaigns which were run from the end of April to the end of June in both 2022 and 2023, but not in 2024. Philippines infant mortality was compared with Malaysian infant mortality and schedule, both populations receiving the same vaccine antigens but with different timing of administration.

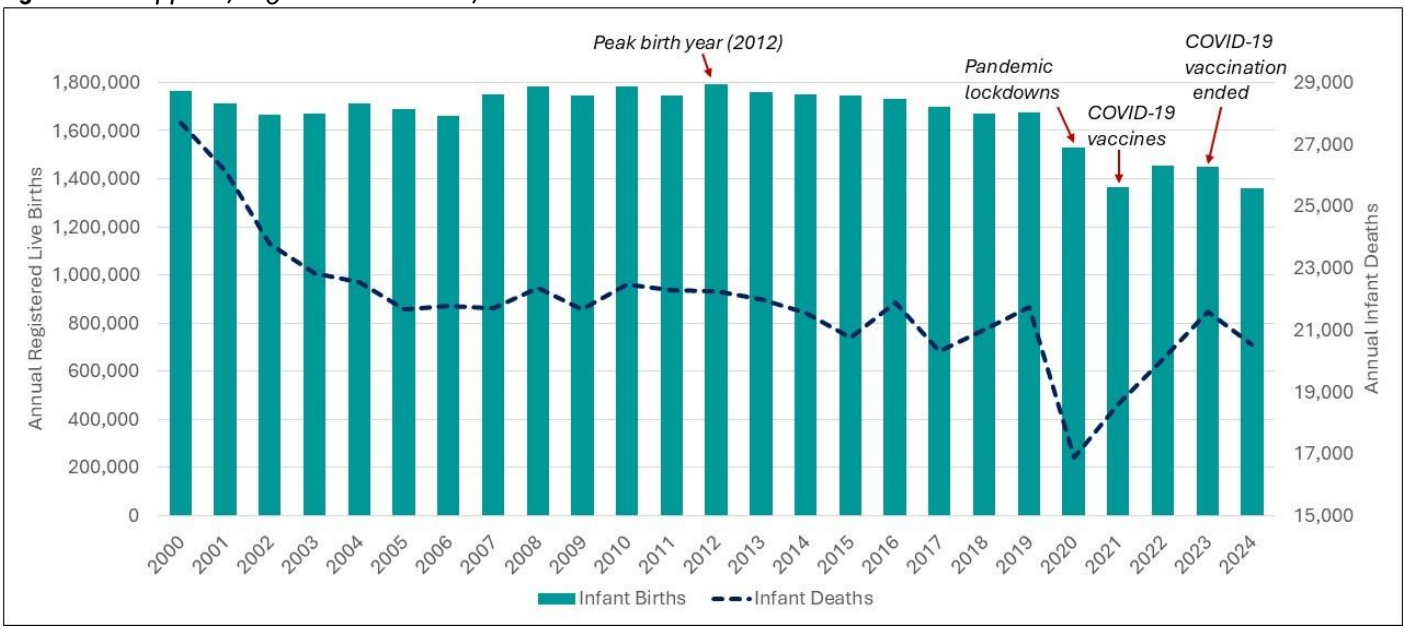
COVID-19 vaccination analysis: Because no pregnancy-specific vaccination data are published in the Philippines, we analyzed COVID-19 vaccination only at the population level. We identified the timing of the national vaccine rollout, adult vaccination coverage milestones, and the introduction of recommendations for vaccination in pregnancy, and then aligned these temporal exposure windows with annual IMR, congenital abnormality trends, age-specific infant mortality patterns, and monthly infant death counts from 2020–2024 to assess temporal associations. No population-level maternal vaccination data were available, and no adjustments or imputations were performed.

Statistics were computed in Microsoft Excel (Microsoft 365), cross-checked using R (version 4.3.2) and Python (version 3.12) using scripts generated with assistance from Grok (xAI, 2026), a large language model, and using MedCalc® Statistical Software version 23.4.8 (MedCalc Software Ltd, Ostend, Belgium; https://www.medcalc.org; 2026).

Results

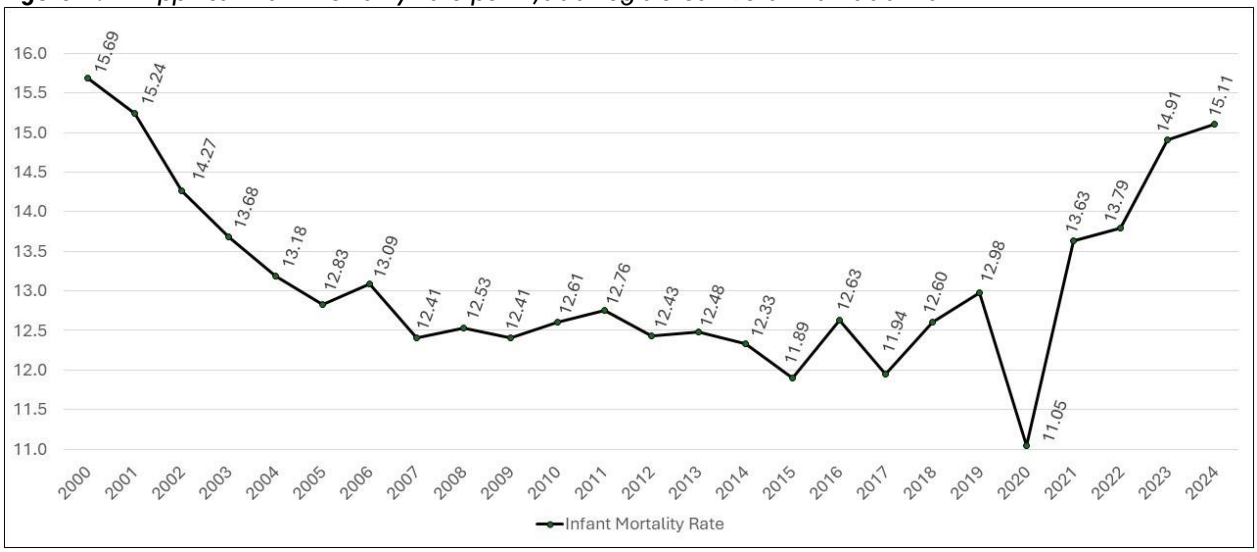
The Philippines had an estimated population of approximately 112.7 million in 2024.[26] Annual births increased at an average rate of 0.14% from 1,766,440 in 2000 to a peak of 1,790,367 in 2012. Births then declined between 2012 and 2019 at an average annual rate of 1.0%, falling to 1,673,923, followed by a steeper average decline of 3.9% per year to 1,358,989 in 2024. There was a 18.8% relative reduction in births from 2019 to 2024 (95% CI 0.809-0.815, Z statistic -170, $p << 0.00001$). The total fertility rate (TFR) decreased from 2.7 in 2017 to 1.9 in 2022 and 1.7 in 2025.[27,28] Annual births and infant deaths from 2000 to 2024 are presented in Figure 1, with pandemic start and vaccination start and end marked.

Figure 1. *Philippines, registered live births, and infant deaths 2000-2024*



Annual infant deaths fell from 27,714 in 2000 (IMR 15.69) to 21,723 in 2019 (IMR 12.98), dropped to lowest registered level of 16,885 in 2020 (IMR 11.05), but rose steadily to reach 20,529 in 2024 (IMR 15.11). This represents a 36.8% increase in IMR from 2020 to 2024 ($p << 0.00001$, 95% CI 1.34-1.396, Z statistic 29.983), reversing more than two decades of declining IMR in just 5 years. The trend of rising IMR in the context of increasing infant vaccination uptake is unexpected given consistent economic and public health gains and rapid recovery from COVID-19 pandemic restrictions post-2021.[29] IMR is set out in Figure 2.

Figure 2. *Philippines infant mortality rate per 1,000 registered live births 2000-2024*



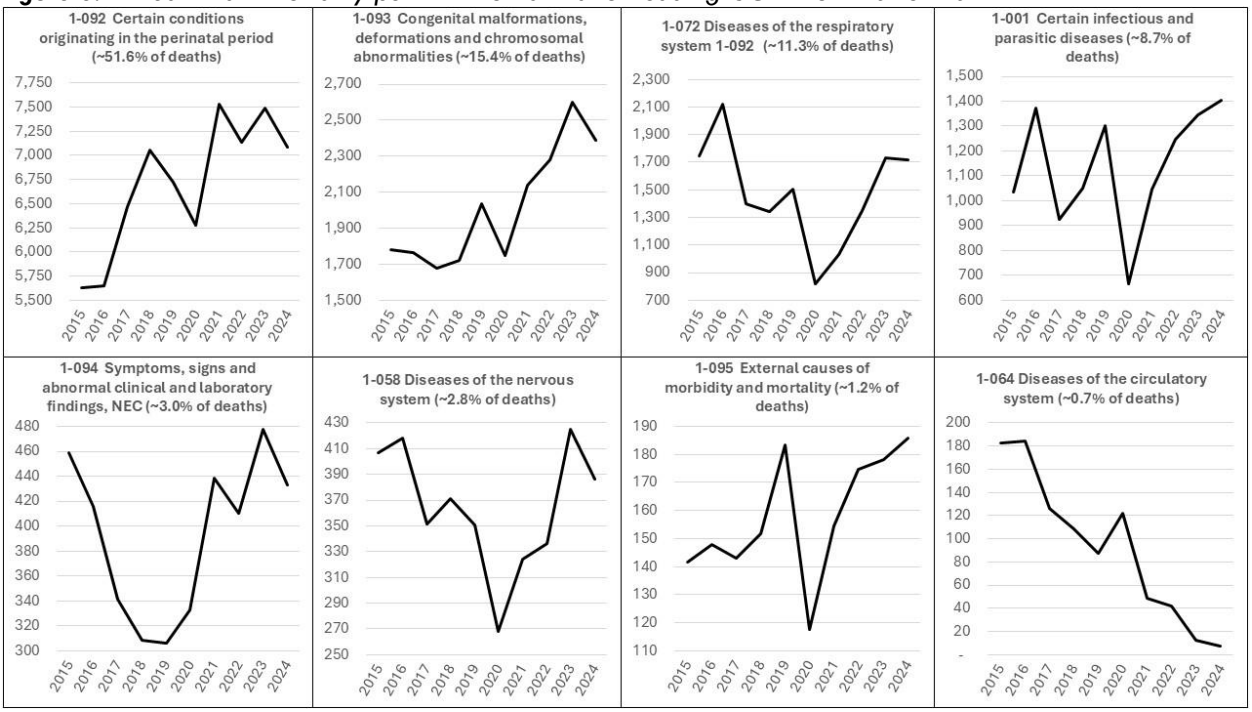
Key infant COD depicted by ICD-10 codes between 2015 and 2024 included perinatal conditions (code 1-092, on average, 51.6% of infant deaths), congenital malformations, deformations and chromosomal abnormalities (code 1-093, 15.4% of deaths), diseases of the respiratory system (code 1-072, 11.3% of deaths), and certain infectious and parasitic diseases (code 1-001, 8.7% of deaths). Lesser contributors included symptoms, signs, abnormal clinical and laboratory findings not elsewhere classified (1-094, 3.0% of deaths), diseases of the nervous system (1-058, 2.8% of deaths), and external causes of morbidity and mortality (1-095, 1.2% of deaths). Diseases of the circulatory system (1-064) contributed < 1% of deaths in this period.

Infant death rates (adjusted for annual registered live births) rose by 27.0% between 2015 and 2024. By cause, death rates from respiratory disease fell 1.5%, circulatory disease fell by 96.0%, nervous system disease fell by 5.0%, and abnormal findings fell by 5.7%. Death rates from other causes rose: congenital malformations and chromosomal abnormalities by 34.3%, perinatal conditions by 25.8%, infectious and parasitic disease deaths by 35.6%, and external causes by 31.2%.

At the outset of the pandemic in 2020, strict lockdowns in the Philippines saw all infant COD drop except for circulatory disease (1.1% of deaths), and symptoms and signs and abnormal findings (3.0% of deaths). COVID-19 was introduced as a new infant COD in 2020 when it was recorded as being responsible for 2.4% of infant deaths. COVID-19 attributed deaths peaked in 2021 at 3.2% of registered deaths and dropped to 0.5% in 2023 and 0.3% in 2024.

All infant COD mortality, except Respiratory conditions and COVID-19, rose between 2020 and 2024, and overall COD rose by 37%. Respiratory system disease rose by 112.3%, infectious disease by 102.1%, nervous system disease by 58.6%, external causes by 51.3%, congenital conditions by 48.5%, symptoms, signs and abnormal findings by 43.5%, and perinatal conditions by 19.3%.

Figure 3: *Annual infant mortality per 1 million births for leading COD from 2015–2024*



Pneumonia (ICD10 3-032) accounted for 8.5% of infant deaths between 2015 and 2024. PCV vaccination was added to the NIP in 2015 with 3-dose uptake rising from 23.5% in 2015 to 76.3% by 2023 but dropping to 52.8% in 2024. Infant mortality from pneumonia per million live births fluctuated from 1,008 and 1,666 between 2015 and 2019 with no significant relationship between rising PCV uptake and pneumonia deaths. The pneumonia death rate dropped sharply to 528 in 2020, the first pandemic year, but then rose annually to reach 1,353 in 2024, its highest level since 2016. There was also no significant relationship between annual PCV uptake and annual pneumonia mortality between 2020 and 2024. After negligible pneumonia deaths in the first month of life (2020-2024 average of 1.3 per million births), deaths rose to 216/million births in the second month of life. Approximately half of all pneumonia deaths occur in months 2-4, and another 10% in month 5. While pneumonia deaths were consistently higher in month 5 than month 4 between 2000 and 2024 (increase range of 5-77%), they fell by 26% in 2024. Following the NIP as recommended by public health, PCV series administration is completed by 14 weeks (3.5 months) of age.

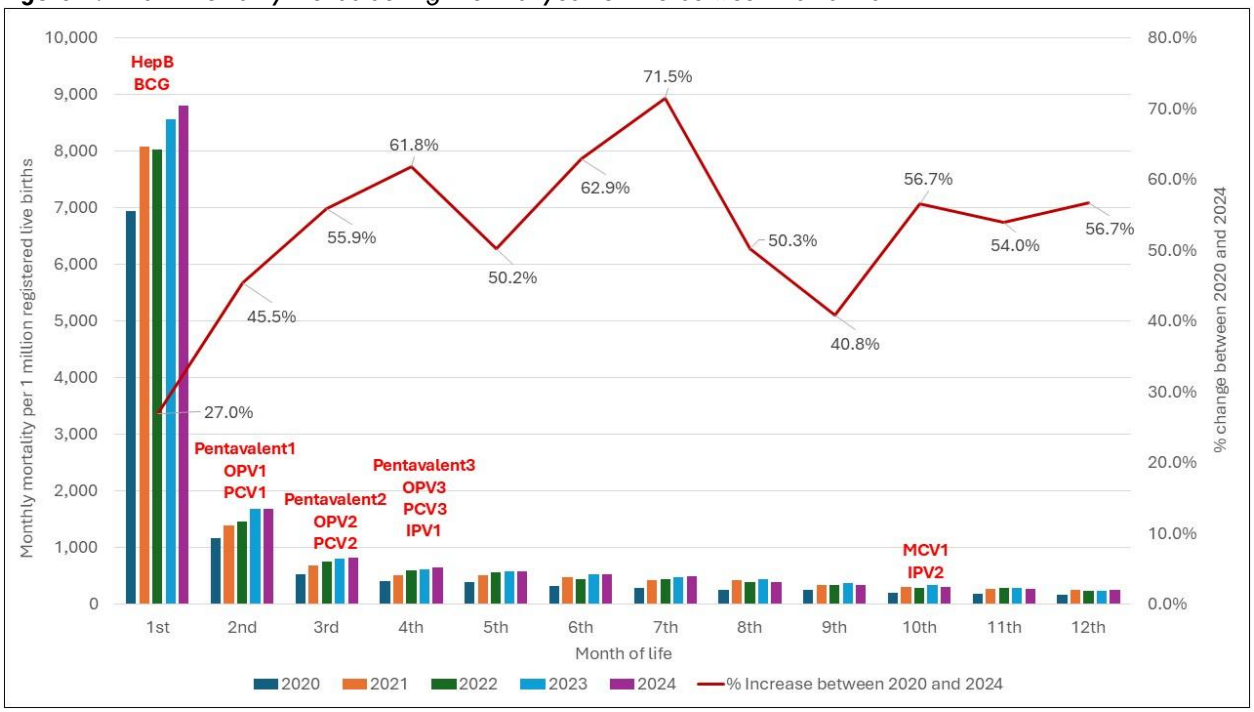
Detailed Breakdown of Perinatal Causes for 2018, and 2020 to 2024

Referencing the detailed breakdown of annual infant COD available for 2018, and 2020-2024: between 2018 and 2024 SIDS increased by 105.6%, respiratory distress of newborn increased by 77.5%, external causes - other accidental threats to breathing increased by 53.4%, bacterial sepsis of newborn increased by 11.6%, diseases of the nervous system increased by 11.0%, and sepsis increased by 5.8%.

Infant Mortality Across the First Year of Life (2020–2024)

COD across the first year of life by infant age, showed distinctive mortality patterns with increasing trends between 2020 and 2024. Between 2020 and 2024, the rise in mortality was lowest among infants in their first month of life (+27.0%), peaked in the 4th month (+61.8%), fell in the 5th month (+50.2%) but then had its largest increase in the 7th month (71.5%). While mortality increase dropped in the 8th and 9th months it rose again in the 10th month (56.7%), remaining elevated to the end of the first year of life. Assessing relative contributions of neonatal (first month of life) and post-neonatal deaths (second to 12th month of life) to total infant deaths, neonatal deaths fell from 62 .8% in 2020 to 58.3% in 2024, while post-neonatal deaths rose from 37.2% to 41.2% of total deaths respectively.

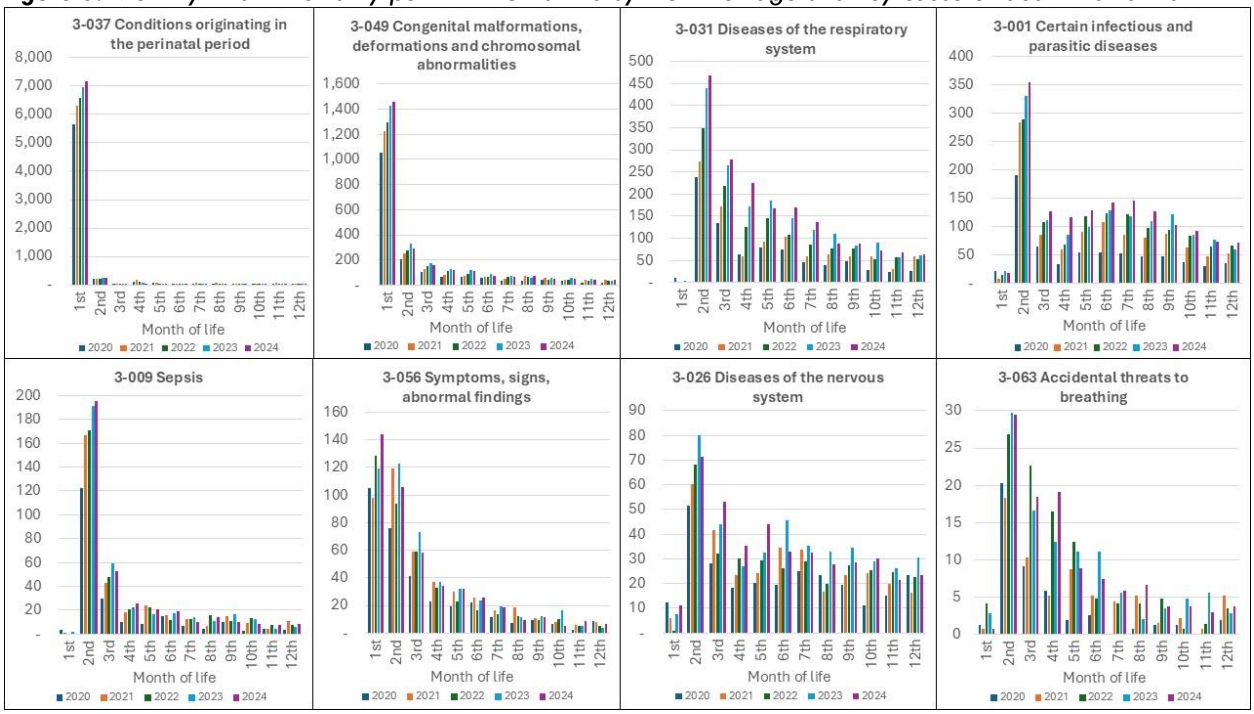
Figure 4: *Infant mortality trends during the first year of life between 2020-2024*



Leading COD in the first month of life included perinatal conditions, congenital conditions and abnormalities, and symptoms, signs, and abnormal findings, under which category sudden infant death syndrome (SIDS) contributed 52% in 2020, rising to 75% in 2024. The absolute increase in SIDS mortality from 2020-2024 was 172 infants per million live births, a relative increase of 99.4%.

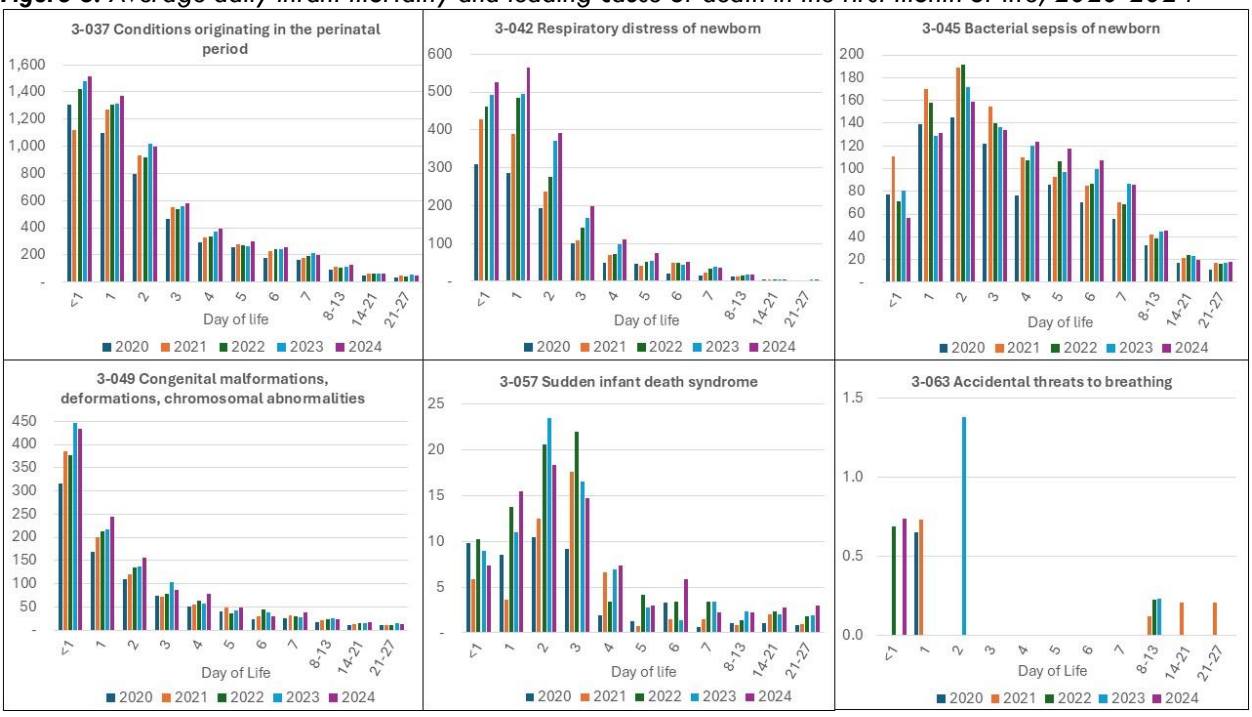
Patterns of COD changed in the second month of life, with a sharp rise in infection and parasitic diseases, nervous system diseases, respiratory system diseases, and sepsis. Symptoms, signs, and abnormal findings (including SIDS) remained elevated in the second month of life, and accidental threats to breathing increased.

Figure 5: *Monthly infant mortality per 1 million births by month of age and key cause of death 2020-2024*



Across the first month of life, deaths from congenital conditions peaked on the first day of life and dropped thereafter. Respiratory failure deaths were spread across the first two days of life falling rapidly after the third day, sepsis peaked on the third day, and SIDS peaked on the third to fourth day. Mortality from perinatal causes rose steadily from 2020 to 2024. More than 95% of infants are born in health facilities, and more than 99% are born with medical or traditional birth attendants. Hepatitis B and BCG vaccinations are mandatory in the first 24 hours of life.[30]

Figure 6: *Average daily infant mortality and leading cause of death in the first month of life, 2020-2024*



Percent uptake of various vaccines by eligible infants, and the broad categories of Child Protected at Birth (CPAB) referring to infants whose mothers received all recommended doses of tetanus containing vaccines during pregnancy, and Fully Immunized Child (FIC) referring to child who had received all recommended vaccines by 1 year of age, are laid out in Table 1. Comparing the periods of 2015-2019 and 2020–2024, the coverage of CPAB, FIC and BCG at birth declined, and uptake of HepB at birth, Pentavalent, OPV, IPV, PCV and MCV increased. Both pentavalent and PCV uptake fell in 2024. Note that "-" refers to no data available, and "n/a" indicates the vaccine was not on the NIP schedule in that year. Few cases of SIDs are reported in the first month of life.

Table 1: *2020-2024 annual infant mortality rate following eligible infant vaccination uptake by product administered with recommended number of doses*

Year	IMR	FIC	CPAB	BCG	HepB (birth)	OPV (1-3)	IPV (1)	DPT (1-3)	Pentavalent (1-3)	PCV (1-3)	MCV (1-2)
2000	15.689	0.865	-	-	n/a	-	n/a	-	n/a	n/a	-
2001	15.244	0.817	-	0.661	n/a	0.717	n/a	0.724	n/a	n/a	0.739
2002	14.266	0.767	-	0.793	n/a	0.728	n/a	0.753	n/a	n/a	0.760
2003	13.684	0.837	-	0.795	n/a	0.789	n/a	0.778	n/a	n/a	0.810
2004	13.184	0.848	-	0.823	n/a	0.795	n/a	0.814	n/a	n/a	0.834
2005	12.833	0.837	-	0.824	n/a	0.827	n/a	0.820	n/a	n/a	0.841
2006	13.087	0.829	-	0.817	n/a	0.808	n/a	0.809	n/a	n/a	0.832
2007	12.412	0.827	-	0.795	-	0.787	n/a	0.783	n/a	n/a	0.817
2008	12.526	0.811	-	0.796	-	0.804	n/a	0.805	n/a	n/a	0.792
2009	12.408	0.894	0.776	0.887	0.297	0.885	n/a	0.883	n/a	n/a	0.906
2010	12.606	0.856	0.863	0.886	0.346	0.871	n/a	0.920	n/a	n/a	0.874
2011	12.757	0.754	0.813	0.788	0.332	0.802	n/a	0.718	n/a	n/a	0.768
2012	12.430	0.749	0.823	0.758	0.292	0.820	n/a	0.628	n/a	n/a	0.800
2013	12.484	0.746	0.831	0.784	0.107	0.766	n/a	0.544	n/a	n/a	0.767
2014	12.335	0.754	0.832	0.735	0.444	0.763	n/a	n/a	0.749	n/a	0.637
2015	11.893	0.700	0.844	0.725	0.486	0.766	n/a	n/a	0.584	0.235	0.714
2016	12.635	0.698	0.852	0.698	0.521	0.697	n/a	n/a	0.839	0.390	0.681
2017	11.943	0.675	0.824	0.651	0.517	0.706	n/a	n/a	0.690	0.364	0.655
2018	12.600	0.662	0.860	0.606	0.499	0.664	n/a	n/a	0.693	0.435	0.628
2019	12.977	0.691	0.603	0.705	0.599	0.800	0.708	n/a	0.720	0.572	0.719
2020	11.05	0.652	0.602	0.680	0.568	0.782	0.730	n/a	0.763	0.740	0.750
2021	13.634	0.629	0.538	0.589	0.490	0.688	0.672	n/a	0.692	0.640	0.686
2022	13.791	0.599	0.584	0.658	0.556	0.774	0.741	n/a	0.761	0.758	0.688
2023	14.907	0.623	0.574	0.670	0.574	0.710	0.722	n/a	0.775	0.763	0.713
2024	15.106	0.649	0.547	0.625	0.544	0.758	0.718	n/a	0.640	0.529	0.718

Abbreviations: Infant Mortality Rate (IMR); Percent of Fully Immunized Child (FIC); Child Protected at Birth (CPAB); Hepatitis B Vaccine (HepB) at birth; Oral Polio Vaccine (OPV); Inactivated Polio Vaccine (IPV); Diphtheria, Pertussis, Tetanus Vaccine (DPT); Diphtheria, Tetanus, Pertussis, Hepatitis B, and Haemophilus influenzae type B (Pentavalent); Pneumococcal Conjugate Vaccine (PCV); Measles Vaccine (MCV)

Only CPAB (N=15, r=-0.84, P < 0.0001), and PCV(1-3) (N=10, r=0.766, P<0.016) demonstrated significant correlations with IMR. While the live vaccines (BCG, OPV, MCV) revealed weak to moderate correlations with falling IMR, and the other attenuated vaccines (HepB, Pentavalent, IPV) showed weak to moderate correlations with rising IMR, these relationships were not statistically significant. Results are laid out in Table 2. DPT was excluded from these correlation studies because it was replaced by Pentavalent in 2014.

Table 2: *Pearson r & P-values (IMR vs. Variable), earliest year to 2024, excluding 2020*

Variable	Earliest year	Data points (N)	*r* with IMR	*P*-value	Significance
FIC	2000	24	-0.063	0.770	NS
CPAB	2009	15	-0.843	0.000	Strong negative
BCG	2001	23	-0.365	0.087	Marginal negative
HepB	2001	15	0.433	0.107	NS
OPV (1-3)	2001	23	-0.307	0.154	NS
IPV (1)	2019	5	0.317	0.603	NS
Pentavalent (1-3)	2014	10	0.122	0.737	NS
PCV (1-3)	2015	9	0.766	0.016	Strong positive
MCV (1-2)	2001	23	-0.098	0.658	NS

Abbreviations: Infant Mortality Rate (IMR); Percent Fully Immunized Child (FIC); Child Protected at Birth (CPAB); Hepatitis B Vaccine (HepB) at birth; Oral Polio Vaccine (OPV); Inactivated Polio Vaccine (IPV); Diphtheria, Pertussis, Tetanus Vaccine (DPT); Diphtheria, Tetanus, Pertussis, Hepatitis B, and Haemophilus influenzae type B (Pentavalent); Pneumococcal Conjugate Vaccine (PCV); Meningococcal Conjugate Vaccine (MCV)

Malaysian Infant Mortality Contrasted with Philippines Infant Mortality

The Philippines and Malaysia, two bordering Southeast Asian countries with similar demographics, administer identical vaccine antigens though on a different schedule. Infants from both countries receive BCG and HepB at birth and MMR/MCV at 9 and 12 months. Filipino infants complete primary series earlier receiving Pentavalent, OPV and PCV at 6, 10, and 14 weeks, and IPV at 14 weeks and 9 months, while Malaysian infants receive Hexavalent (DTaP-IPV-HepB-Hib) at 2, 3, and 5 months, and PCV separately at 4 and 6 months. [4,23]

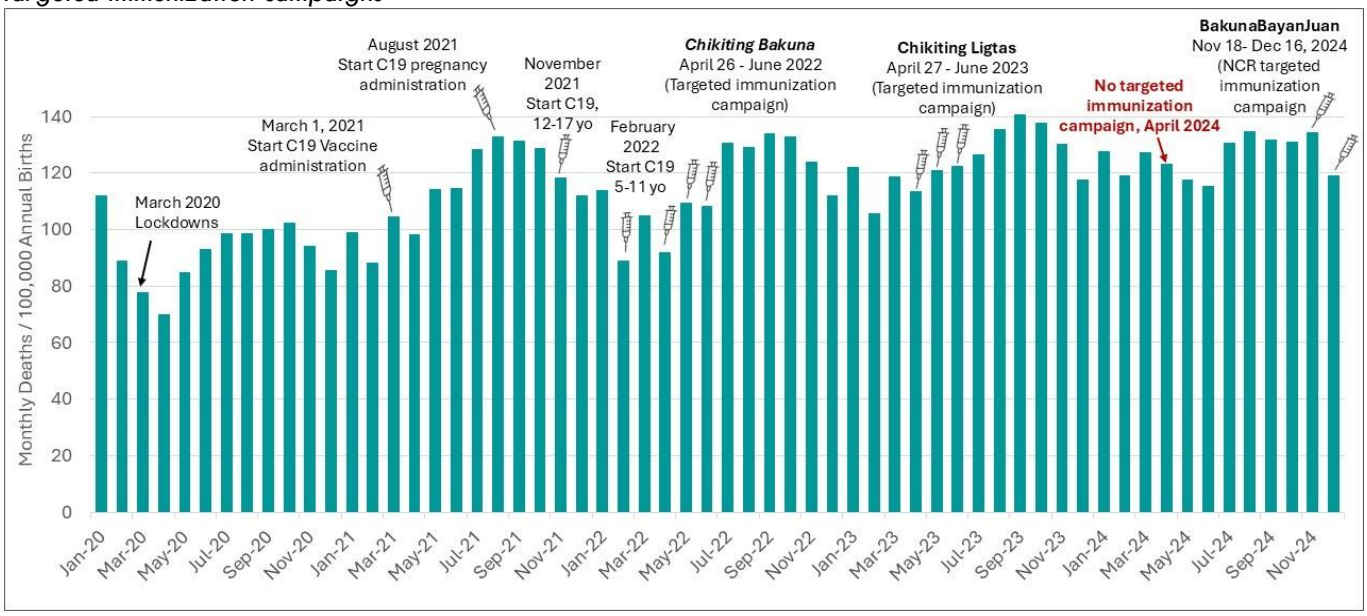
Filipino infants had 2.1x the IMR of Malaysian infants between 2020 and 2024. IMR in Malaysia rose from 5.9 to 7.2 (+22.0%) between 2020 and 2024.[22] At the same time IMR in the Philippines rose from 11.05 to 15.11 (+36.7%). Separating neonatal (first month) and post-neonatal mortality (second to twelfth month), Filipino neonatal (first month) mortality was 1.92x that of Malaysian neonates, while the mortality rate for Filipino post-neonates (2-12 months) was 2.39x that of Malaysia. Contrasting neonatal and post-neonatal mortality, on average 64.3% of Malaysian infant deaths were neonatal compared to the Philippines' 59.4%. Further, despite sharply rising Filipino infant mortality between 2020 and 2024, there was a consistent decline in Filipino neonatal deaths (62.8% to 53.3% of total annual infant deaths) and a rise in post-neonatal deaths (37.2% to 41.7%).

Catchup Vaccination Campaigns are Followed by Mortality Spikes

Monthly infant mortality rose concurrent with and immediately following the April-June 2022 Chikiting Bakuna and April-June 2023 Chikiting Ligtas, which were targeted immunization campaigns conducted by Philippines DOH/WHO/UNICEF for children who missed recommended vaccination(s) during the pandemic and following the easing of pandemic restrictions.[24,25]

Figure 7 reveals monthly infant mortality per 100,000 births, annotated with the timing of COVID-19 vaccination campaigns and the 2022 Chikiting Bakuna and 2023 Chikiting Ligtas Campaigns. Monthly infant mortality in 2022 and 2023 rose in May and June following these vaccination drives and reached its highest annual level by September. Notably in 2024, a year without the immunization campaigns, infant deaths fell from April to June. The highest mortality numbers then shifted to August with overall peak monthly mortality lower than 2023 peak levels.

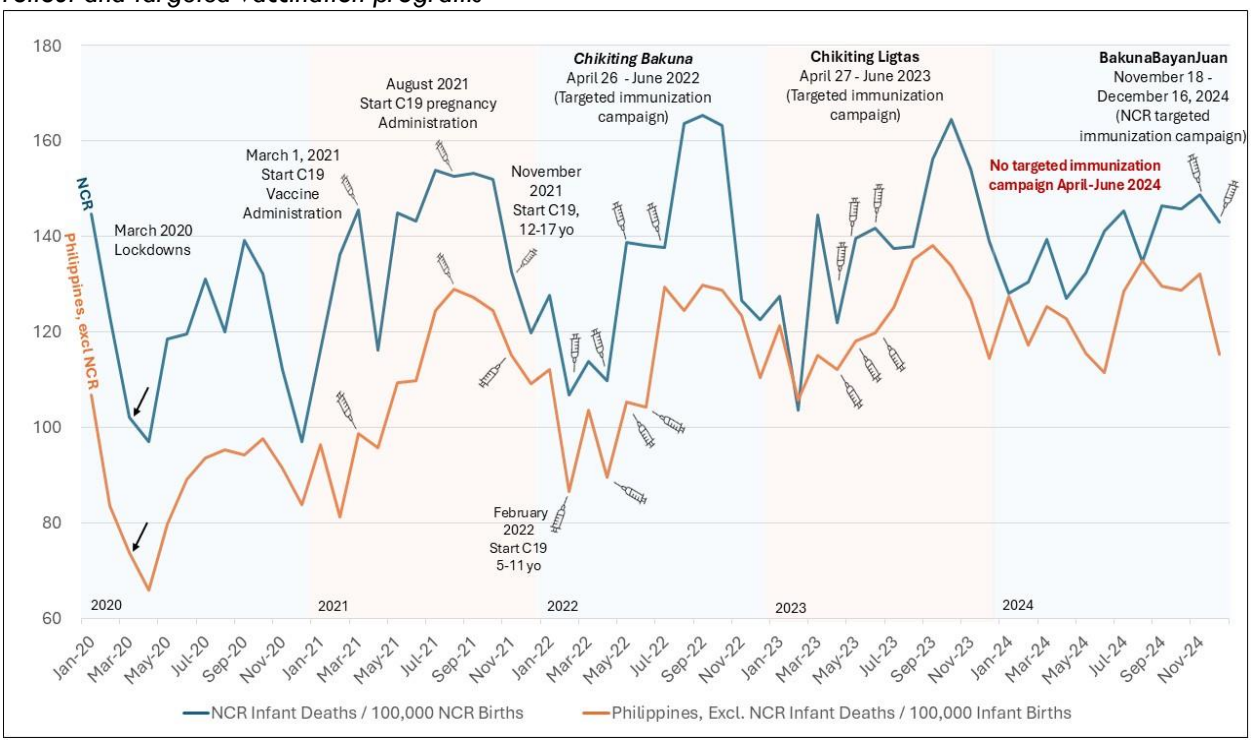
Figure 7: *2020-2024 monthly infant deaths per 100,000 annual births corresponding to COVID-19 vaccination rollout and targeted immunization campaigns*



While there was no nationwide targeted immunization campaign in 2024, there was a localized vaccination drive known as *BakunaBayanJuan* in National Capital Region (NCR) from November 18, 2024 to December 16, 2024.[31] Monthly infant mortality in NCR during the last two months of 2024 declined by 4% as compared to a 12.7% overall decline for all other regions combined, with the higher December mortality rates demonstrating a close temporal relationship to the timing of the vaccination campaigns.

Figure 8 presents infant mortality in National Capital Region (NCR) compared to Infant mortality in all other regions. Infant mortality in NCR between 2000-2024 was 20.5% higher than in all other regions. NCR is among the wealthiest regions in the Philippines and has the lowest patient-physician-ratio (~917:1) compared to the national average (~2,000:1).[32]

Figure 8: *Monthly infant deaths per 100,000 annual births in NCR and Philippines showing timing of COVID-19 vaccination rollout and targeted vaccination programs*



Comparing annual average vaccination uptake in NCR and nationwide, uptake in NCR was generally higher particularly for pregnancy and early life doses; CPAB by 17.8% (range:12.1-24.1%), BCG by 24.8% (19.3-35.1%), birth HepB by 37.0% (32.0-47.3%), Pentavalent by 3.3% (-10.9-12.6%), OPV by 5.0% (-4.5-10.3%), IPV by 4.4% (-12.9-9.6%), and MCV by 4.7% (-15.8-16.1%). Only average PCV uptake was lower -6.9% (-24.9-9.6%).[16] Private pediatrician-provided vaccination is not captured by NIP uptake data, and this may make uptake of later vaccines appear lower.

Between 2001 and 2009, a fully immunized child received BCG, OPV, DPT and measles vaccines. Administration of maternal TD vaccines and Hepatitis B at birth was reported from 2009, DTP was changed to Pentavalent (DTP-HiB-HepB) in 2014, and PCV was added in 2015. The full current NIP schedule includes early introduction of pentavalent/OPV/PCV vaccines at 6 weeks of age, with a compressed spacing of 4 weeks between doses. Table 3 sets out the NIP immunization schedule.

Table 3. *Philippine National Immunization Program (NIP) schedule for Infants up to 12 months of age*

Vaccine / Antigen	Disease	Doses	Schedule
BCG (Bacillus Calmette-Guerin)	Tuberculosis	1	Birth (within 24 hours)
HepB (monovalent)	Hepatitis B	1	Birth (within 24 hours)
Pentavalent vaccine (DPT-HepB-HIB)	Diphtheria, tetanus and pertussis Hepatitis B Hemophilus influenzae type b meningitis	3	6, 10, 14 weeks
OPV (Oral polio vaccine)	Poliomyelitis	3	6, 10, 14 weeks
IPV (Inactivated polio vaccine)		2	14 weeks, 9 months
PCV (Pneumococcal conjugate vaccine)	Pneumococcal infections	3	6, 10, 14 weeks
MCV (Measles containing vaccine) MMR (Measles, mumps, rubella)	Measles, mumps, rubella	2	9-12 months 1st dose may be given as early as 6 months

Source: Pediatric Infectious Disease Society of the Philippines, 2019

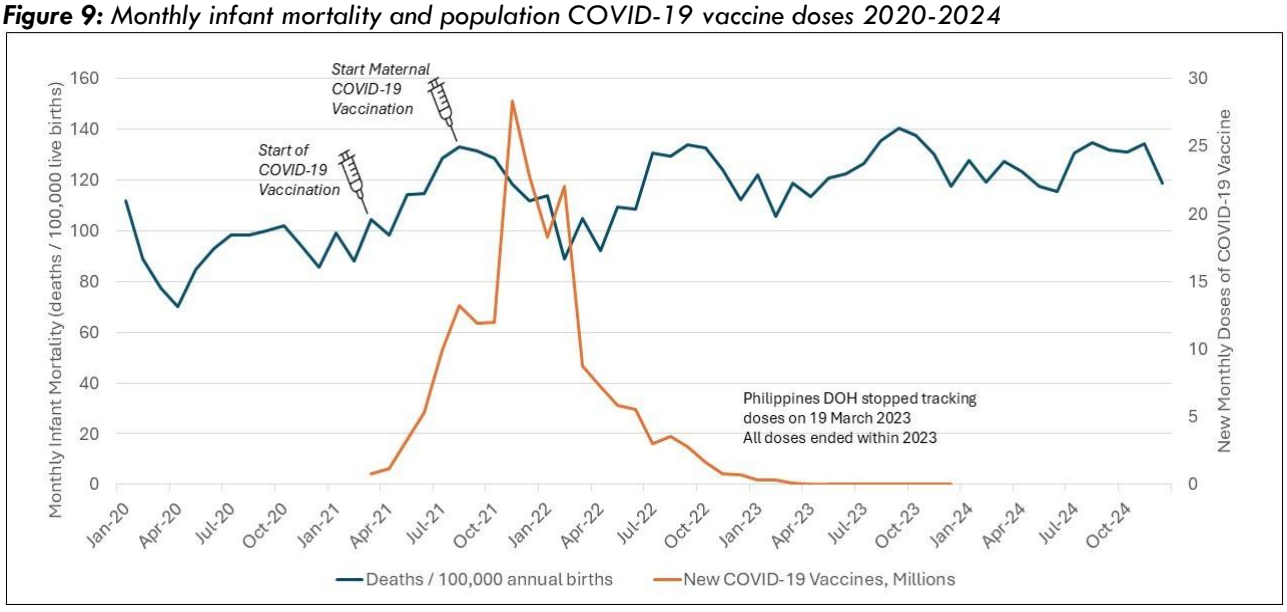
An infant following the NIP schedule, receiving vaccines sourced from Serum Institute of India for HepB and Pentavalent, and Synflorix PCV will receive 100 mcg of thimerosal and 4.55 mg of aluminum adjuvant between birth and 14 weeks of age.

Temporal Correlation Between COVID-19 Vaccination and Rising Infant Mortality, Congenital Abnormalities, and Cause-of-Death Shifts (2021–2024)

Although pregnancy-specific COVID-19 vaccination rates were not published in the Philippines, national vaccination totals demonstrate that by March 2023 78.4 million individuals were fully vaccinated against COVID-19 corresponding to 70.3% of the eligible population. 88.8% of adults aged 18-59 received this vaccination implying very high coverage among adults of reproductive age.[33,34] Because nearly all pregnant women fall within this adult demographic, maternal exposure to COVID-19 vaccination became widespread from late 2021 onward, after the national rollout began on March 1, 2021 and professional societies issued guidance endorsing vaccination in pregnancy. When the timing of the national vaccination rollout is compared with infant health indicators, a clear temporal alignment emerges across infant mortality, congenital abnormalities, and multiple rising cause-of-death categories.

Infant mortality, which had steadily declined for two decades and reached a historic low in 2020 (IMR 11.05), abruptly reversed after COVID-19 vaccination began. IMR rose to 13.63 in 2021, 13.79 in 2022, 14.91 in 2023, and 15.11 in 2024, a cumulative increase of approximately 37% relative to the 2020 baseline. This inflection point occurred immediately after vaccination of the general population commenced and during the period in which COVID-19 vaccination was actively promoted for pregnant women. No similar sustained multi-year rise in IMR is evident in the preceding 20 years of the dataset, underscoring the distinctiveness of this period. Figure 9 contrasts monthly COVID-19 vaccination and infant mortality between 2020 and 2024.

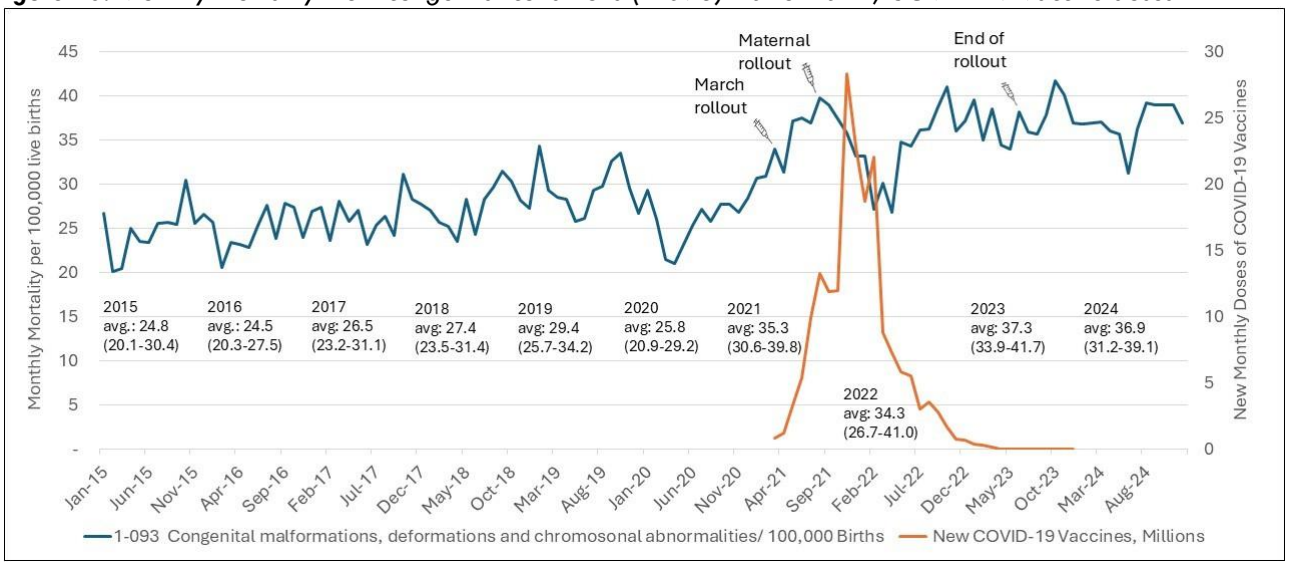
Figure 9: *Monthly infant mortality and population COVID-19 vaccine doses 2020-2024*



A comparable pattern is seen for congenital and chromosomal abnormalities. These deaths were mostly stable between 2015 and 2020, but then rose annually between 2020-2023, culminating in a 48.5% higher congenital abnormality death rate in 2023 as compared to 2020. The death rate in 2024 saw a slight decline to 45% as compared to 2020. The 58.5% increase in mean rate of congenital abnormalities between 2015-2019 and 2021-2024 was highly significant (P<0.001).

Because congenital anomalies originate during fetal development, the timing of this progressive increase aligns with the first birth cohorts gestated after COVID-19 vaccination of pregnant women was introduced. Importantly, this upward trend occurred despite stable or improving indicators for major confounders, including high facility-birth and skilled-attendance rates, modest shifts in maternal age, and declining malnutrition deaths, suggesting the involvement of a new maternal exposure rather than a deterioration in basic obstetric or socioeconomic conditions. In contrast to the United States where many fetal malformations are terminated, abortions are illegal in the Philippines. Figure 10 sets out monthly population-wide congenital abnormality deaths, from 2015 to 2024.

Figure 10: *Monthly mortality from congenital conditions (1-093) 2015-2024, COVID-19 vaccine doses*



Across the same period, several other infant cause-of-death categories rose sharply in ways consistent with immune dysregulation, inflammatory injury, or impaired neonatal resilience. Between 2020 and 2023, mortality from respiratory system diseases increased by 124.3%, infectious and parasitic diseases by 125.0%, nervous system diseases by 53.6%, external causes (including accidental threats to breathing) by 68.1%, congenital conditions by 45.5%, symptoms, signs and abnormal findings (including SIDS) by 43.5%, and perinatal conditions by 20.3%. These categories were relatively stable before the pandemic and then rose concomitantly in the immediate post-2020 period, paralleling the expansion of both maternal COVID-19 vaccination and intensive early-life vaccine exposures.

Rises in mortality in 2024 were noted in infectious disease (11%), respiratory distress of newborn (11%), as well as respiratory disease (6%). While overall mortality from congenital conditions fell by 2% from 2023 to 2024, subcategories of other congenital malformations of the nervous system and circulatory system rose by 18% and 22%, respectively. Active COVID-19 vaccination of the population ended by mid-2023.

The distribution of infant deaths also shifted in a manner consistent with heightened vulnerability after birth. Within the 2020–2024 window, the relative contribution of neonatal deaths (0–27 days) to total infant mortality fell from 62.8% to 58.3%, while post-neonatal deaths (28–364 days) rose from 37.2% to 41.7%. The most pronounced increases in mortality occurred during months two through five of life, the same period in which Filipino infants receive the densest cluster of routine immunizations at 6, 10, and 14 weeks. Post-neonatal deaths in this window were driven disproportionately by infectious and parasitic diseases, respiratory system diseases, sepsis, nervous system diseases, and unexplained sudden deaths, all of which rose substantially and progressively after 2020.

Confounders were systematically eliminated through direct data verification. These included > 99% access to medical care during delivery (2000 – 2024), low contribution of vaccine preventable disease (VPD) COD (2015-2024), steady infant deaths from malnutrition (2015 - 2024) as a proxy for changes in poverty that might affect infant outcomes, maternal age optimal. Breast feeding rates were stable showing slight improvements over time.[35] While there was a slight downward shift in infant birth weight > 2.5 kgs from 87.1% in 2019 down to 86.2% in 2024, due to falling birth cohort size there were 23,022 fewer low birth weight babies born in 2024 than 2019. None of these are sufficient to explain the patterns of infant mortality and the rising infant mortality over time.

Taken together, the convergence of these findings—an abrupt and sustained rise in IMR following years of decline, a 46% increase in congenital abnormality deaths versus 2020, large increases in multiple cause-of-death categories related to infection, respiratory failure,

neurological disease, perinatal compromise, and unexplained collapse, a shift toward higher post-neonatal mortality, and mortality elevations synchronized with COVID-19 and pediatric vaccine campaign phases reveals a consistent temporal pattern. Comparison of pre-2020 trending (2015-2019) with post-2020 trending (2021-2024) reveals a 15.7% rise in mean IMR ($p=0.0069$) and large significant increases in mortality from perinatal conditions (40.2%, $p=0.006$), congenital malformations (58.5%, $p=0.0002$), symptoms/signs NEC (45.9%, $p=0.0016$), external causes (36.7%, $p=0.0022$), and infectious/parasitic diseases (34.3%, $p=0.0206$).

While the absence of pregnancy-specific vaccination data precludes direct stratification of infant outcomes by documented maternal vaccination status, the magnitude, timing, and internal consistency of these changes across independent infant health indicators are compatible with a synergistic effect from widespread maternal COVID-19 vaccination compounded by the Philippines' early and dense infant immunization schedule.

Discussion

Our analysis of infant mortality trends in the Philippines reveals a strong association between increased infant mortality and certain elements of the nation's vaccination program. The observed association between early neonatal deaths and vaccine administration at birth merits careful re-examination of the current policy of Hepatitis B and Bacillus Calmette-Guérin vaccination in neonates. The strong temporal correlation between rising infant mortality and increasing uptake of Pneumococcal Conjugate Vaccine (co-administered with pentavalent and polio vaccines), necessitates reassessment of the Pneumococcal vaccine's inclusion in the immunization program, and reconsideration of the concentrated nature and concurrent use of multiple vaccines as administered on the standard infant schedule, during a time of critical development. The temporal association fulfills some of the Bradford Hill Criteria for causation.

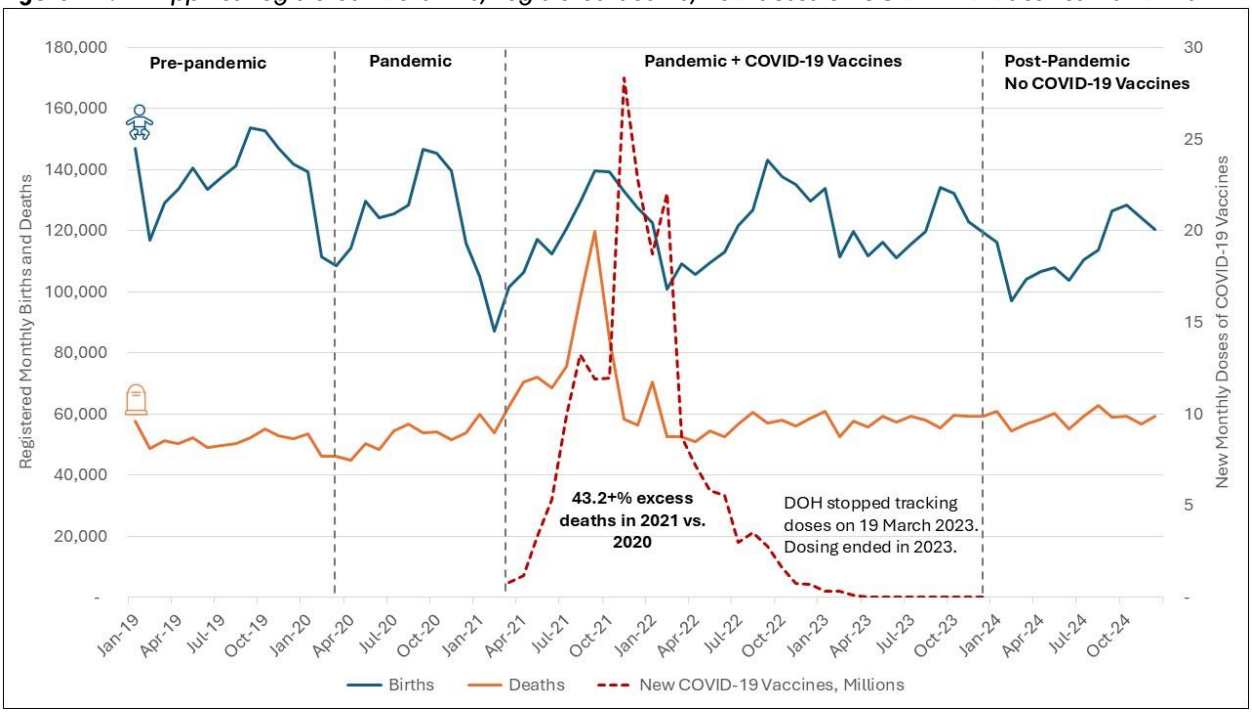
The IMR is a public health metric reflecting the overall health of a society including healthcare systems, maternal care, and socio-economic conditions. It is calculated using the number of first year of life infant deaths per 1000 live births. The same factors contributing to infant death affect entire populations, reflecting health inequities within a community. Some of these factors include access to medical services, sanitation, vaccinations, ethnicity, poverty, education, and availability of critical resources.[36] Being a standardized measure, infant mortality is not expected to change rapidly over time.[37] Improvements would typically reflect effective public health measures and improving population socioeconomic conditions. Worsening IMR, particularly over multiple years or with sharp declines, must be the result of external influences including socioeconomic or health-related factors.[38]

Rising infant mortality in the Philippines was unexpected in the context of general improvements in public health infrastructure (water, sanitation, hygiene) and steady efforts to reduce poverty and enhance access to healthcare in the Philippines.[39] Higher infant mortality in NCR, one of the wealthiest regions with highest access to medical care and higher infant vaccination uptake, particularly maternal and birth vaccines, compared to the rest of the nation, requires investigation. Significant socioeconomic progress has been made over the past decade, marked by a steady GDP growth and improvements in various economic indicators, with a cumulative GDP growth of approximately 38% between 2015 and 2023 despite the severe socioeconomic impacts of the early pandemic years.[40] Maternal and infant vaccination programs, in collaboration with the WHO and UNICEF, are part of public health programs focused on improving maternal, infant and child health outcomes.[41]

The first author initially hypothesized that rising infant mortality must be related to pandemic measures. However, in the first year of the pandemic Philippines overall deaths dropped by 1% vs. 2019, and infant deaths dropped by 22.3%. In addition to a lack of excess mortality in 2020, influenza and pneumonia deaths dropped sharply following the declaration of the pandemic and these deaths, even when combined with reported COVID-19 deaths, were still lower than typical levels.[20] Strict lockdowns from March 2020 through to 2022 restricted healthcare access for the population. While this was detrimental for those with serious health conditions, it also potentially reduced iatrogenic deaths, a leading cause of mortality globally.[42,43] It is plausible that a reduction in iatrogenic deaths contributed to lower overall deaths seen in 2020. This observation is consistent with the study led by Makary documenting a staggering 250,000 iatrogenic deaths per year in the U.S., the third leading cause of death, following heart disease and cancer.[44]

Deaths rose by 43.2% in 2021, with the sharply rising deaths temporally aligned with and immediately following the rollout of COVID-19 vaccination. Infant mortality rates in 2020 were unusually low. This could be attributed to a true drop in mortality, or it might reflect under-registration of births and deaths during this unprecedented time. Because of the many variables that could potentially skew the research results, the correlation studies omitted data from 2020. Figure 11 shows registered live births, registered deaths, and monthly COVID-19 vaccine uptake.

Figure 11: *Philippines registered live births, registered deaths, new doses of COVID-19 vaccines 2019-2024*



COVID-19 vaccination commenced in the Philippines on March 1, 2021, targeting elderly, vulnerable, and healthcare workers before expanding to the general population by mid-year 2021.[45] COVID-19 vaccination of pregnant women was actively recommended from August 2021 onward by the Philippines Obstetrics Gynecological Society (POGS) in its third update on COVID-19 Vaccination of Pregnant and Breastfeeding Women issued on August 9, 2021, providing a blanket recommendation for administration of COVID-19 primary series vaccination during pregnancy and breastfeeding.[9] This was updated in Practice Bulletin 4th update (January 2022) to include recommendation for pregnant and breastfeeding women to receive a first COVID-19 booster dose at least three months after their second primary series dose.[10] In the Practice Bulletin 5th Update September 28, 2022, the recommendation was shortened to less than 8 weeks from the first to the second booster.[11] While discrete data on COVID-19 vaccination during pregnancy were not available, several factors suggest that the number of infants born to unvaccinated women was small. These factors include the strong POGS recommendation for vaccination during pregnancy and the restrictions on travel, work, and access to public spaces imposed on unvaccinated individuals in the Philippines from 2021 through the end of 2022. Children under 5 years of age were never authorized for COVID-19 vaccination. COVID-19 vaccines remained available in the Philippines until the end of 2023 with 88% of adults aged 18-59 (110.89% of the government's 80.08% adult target) receiving at least the primary series as of March 19, 2023.[34]

While there has been a decrease in Philippines' annual births since 2012, the downwards inflection and large decline in births during and since the pandemic years (2020 - 2024) reflect a significant unexpected change in fertility given the young 2020 median age of 25.3 in the Philippines.[46] Although the low registered births in 2020 may be attributed to pandemic-related disruptions affecting registrations, the continuation of far lower than typical births in the years since raises a red flag for possible population fertility impacts from COVID-19 vaccination. International data sources also suggest a significant reduction in live births and successful pregnancies.[47]

Human behaviors do not change rapidly, and the acceleration of birth losses from 2020 to 2023, and continuing into 2024 (6.2% additional loss), suggest an external contributing factor that continued to exert strong pressure on births even after pandemic restrictions were lifted.[48,49] Literature references concerns with lowered fertility and poorer outcomes for infants born to COVID-19 vaccinated mothers.[50-54] The relationship between the sharp fertility decline in the 5 years from 2017 to 2022 (2.7 declined to 1.9) and administration of COVID-19 injection requires scrutiny. The health of children in a population contraction scenario becomes even more critical for national development. Total population deaths in the Philippines rose from 366,931 (2000) to 701,884 (2024), after peaking at 879,429 (+43.2%) in 2021. Post-2021 deaths remain above pre-pandemic trend. Declining fertility in combination with sustained high mortality rates, signal a profound demographic transition.

In the U.S. infant deaths per 1,000 live births across nearly three decades are noted and these have trended steadily downward reflecting advances in maternal care, neonatal medicine, and socioeconomic improvements.[55] There was an unprecedented reversal of this 25-year downward trend in 2021 with the neonatal and post-neonatal mortality abruptly rising, coincident with the rollout of the COVID-19 vaccinations.[56] CDC data shows babies are now dying at a 77% excess rate years after mass mRNA injection of young women.[57]

U.S. Centers for Disease Control's National Center for Health Statistics data on all natural causes of death in children aged 0 to 4 years of life born to COVID-19 vaccinated-at-any-time mothers shows an inflection in

and steadily rising deaths from early 2021 through into 2025 available data.[58] This inflection and rise is not observed in the age 5 cohort, born prior to 2021, indicating that the effect is confined specifically to the generations whose mothers had been exposed to the mRNA vaccine. This emergent pattern suggests not merely an immediate pharmaceutical effect but interjects the concerning possibility of developmental and epigenetic inheritance. This resembles but dwarfs the nightmarish disasters caused by diethylstilbestrol and by thalidomide – drugs ironically marketed to pregnant women. Both of these pharmaceutical disasters inflicted death and injury upon an untold number of lives that never consented to it. This potential multigenerational effect of mRNA COVID-19 vaccines is supported by studies demonstrating that mRNA in the vaccine is reverse transcribed into the human DNA;[59] freely crosses the placenta into fetal circulation;[60,61] can be found in the placenta, even in women who were vaccinated prior to pregnancy[62]; freely crosses from the maternal circulation into breast milk[63-65]; may be associated with shedding from vaccinated to unvaccinated persons[66]; and perhaps of most concern may be incorporated into germ cells and thus into future generations, although this has not been proven.

PCV Vaccine and Pneumonia Deaths

PCV vaccines were added to the infant schedule in 2015. Interestingly, PCV is the most expensive vaccine on the Philippines infant schedule accounting for more than 60% of NIP vaccine cost allocation.[67] Available uptake data from 2015–2024 demonstrates increases in dose coverage from 23.5% in 2015 to 76.3% in 2023 but falling to 52.9% in 2024. Examination of infant mortality from pneumonia found that deaths per 1 million live births nearly quadrupled from 528 in 2020 to 1,839 in 2024. While there were negligible pneumonia deaths in the first month of life (1.3/million births), deaths surged in the second month of life (216/million births) matching the timing of the first dose of PCV at 6 weeks. Approximately half of all pneumonia deaths occurred during the primary series administration (months 2-4), with a secondary rise comprising about 10% of annual pneumonia deaths consistently observed in the fifth month following the third dose and series completion. The inclusion and utility of PCV vaccines must be reconsidered given the lack of efficacy noted in pneumonia death reduction as well as rising all-cause mortality during a time of increased PCV uptake.

In the United States, attorney Aaron Siri has argued that the clinical trials used to license pneumococcal vaccines administered at 2, 4, and 6 months of age raise significant safety concerns.[68] The first Prevnar vaccine (PCV7, a pneumococcal conjugate vaccine) was licensed on February 17, 2000, and was approved for routine pediatric use by the Advisory Committee on Immunization Practices soon after. Its approval and licensure were based on a randomized, controlled, prospective trial; however, the study was small and did not use a true placebo, instead comparing the vaccine to another vaccine. Subsequent pneumococcal conjugate vaccines—PCV13, PCV15, and PCV20—were similarly licensed using clinical trials that did not include placebo control groups but rather compared each new vaccine to a previously licensed pneumococcal vaccine. Siri cites data indicating an 8.2% rate of serious adverse events in the study group, compared with a 7.2% rate in the control group that received the prior licensed vaccine. He argues that these rates represent a high level of risk for healthy infants.

Malaysian and Filipino mortality outcomes were examined due to their administration of identical vaccine antigens but with different timing. While Filipino IMR is more than double that of Malaysian infants, of particular interest are differences between neonatal and post-neonatal deaths, with the difference being 1.9x in the first month of life but rising to 2.4x for infants aged between 2 and 12 months. The proportions of infants dying after their first month of life are considerably higher in the Philippines, with deterioration between 2020 and 2024, and also coinciding with rising PCV uptake. This indicates worsening outcomes for Filipino infants, particularly those aged 2 - 12 months. The possible association between early and aggressive PCV dosing and the rising post-neonatal IMR deserves investigation.

The Philippines uses WHO-endorsed vaccine products, many sourced from Serum Institute of India still containing thimerosal (DT - pregnancy, HepB, Pentavalent). Thimerosal has been banned from use in US infant vaccines since 2001,[69] and was recommended for removal from multi-dose flu shots in June 2025.[70] An infant whose mother accepted 2 doses of DT during pregnancy, vaccinated on schedule, will have received 6 exposures to combined aluminum adjuvants / thimerosal preservative exposures by age of 3.5 months via 2x maternal DT, 1x HepB (birth), and 3x Pentavalent and PCV. The administration of so many adjuvanted and thimerosal-containing vaccines within the first 3.5 months of life raises serious concerns for synergistic and cumulative toxicity particularly in vulnerable infants with an underdeveloped nervous system.[71-73]

Examining COD causes by month: perinatal conditions; congenital conditions and abnormalities; and symptoms, signs, abnormal findings (including SIDs) are noted as the most common COD in the first month of life. Certain other conditions rise notably in the second month of life including infection and parasitic diseases; nervous system diseases; respiratory system diseases; and sepsis. The deaths linked to symptoms, signs, abnormal findings (including SIDS) diagnosis remain elevated in the second month of life, and accidental threats to breathing tragically rise. It is curious that older, more active infants are suddenly reported as having suffocated in their second month of life particularly in the Philippines, a tropical climate where infants are not bundled in heavy clothes or bedding. The rise of infectious diseases, sepsis, nervous conditions, and respiratory diseases COD are suspicious for non-specific immunological harm precisely matching the 6-week vaccination schedule. These findings mirror the Guinea-Bissau findings of non-vaccine preventable disease (VPD) increased mortality among DTP vaccinated children.[74] Detrimental non-specific effects (NSEs) beyond the target diseases have been identified with other vaccines, specifically pentavalent, IPV, and HepB, and PCV.[75]

The patterns of infant mortality over years, and specifically across the first year of life, appear to indicate that deaths are triggered by external factors. While deaths from congenital malformations peaked on day 0 and dropped sharply thereafter, as would be expected if severely affected infants died early, respiratory deaths of newborn were highest on day 0 and day 1, and bacterial sepsis of newborn and SIDS both peaked days 2–3. These peaks raise concern of a birth-associated trigger and aligns with the mandatory administration of thimerosal and aluminum-containing Hepatitis B vaccination at birth. Unsanitary birth conditions as contributory to these deaths are unlikely in the context of nearly all babies being delivered in medically supported settings. While it appears that infectious and neurological diseases are negligible contributors to COD in the first month of life, that trend changes with cases spiking in the second month of life and continuing thereafter, temporally matching the administration of multi-dose vaccines.

Congenital abnormality death rates, mostly stable between 2015 and 2020, but then rising annually through 2023 (+48.5% vs. 2020) followed by a decrease in 2024 (+45.5% vs. 2020) implicates an ongoing new contributor to genetic anomalies. The push for population-wide and pregnancy COVID-19 vaccination ended with the lifting of the State of Public Health Emergency in the Philippines on July 22, 2023, though vaccines were still available through to the end of 2023 when the current stock of vaccines expired.[76] While lack of figures on annual maternal COVID-19 vaccination uptake prevents any assessment of its correlation with rises in congenital abnormalities, 88% of working age adults were vaccinated. Such sharp rises in congenital abnormalities, particularly in the context of known genetic integration of COVID-19 vaccine products, require further investigation.[77]

Emerging biodistribution and mortality data support both in-utero teratogenic and transgenerational epigenetic concerns. Thorp et al published two separate population-based retrospective cohort studies discussing Pfizer's biodistribution data which demonstrate vaccine components cross the maternal-placental-fetal barrier within hours of inoculation.[50,78] A human study by Mordechay et al detected Pfizer mRNA in maternal blood, placental tissue, sperm, and even in 50% of unvaccinated pregnant women tested. These findings demonstrate that synthetic mRNA can cross the placenta, persist in reproductive tissues for over 200 days, and possibly be transferred to close contacts, providing a direct mechanism for fetal exposure.[79]

Strengths

This population-based study leverages comprehensive national vital statistics and registry data across the entire Philippines over a 25-year span (2000-2024). The approach offers several key strengths, including high generalizability to real-world settings by capturing trends in the full population rather than a limited sample, thereby minimizing selection bias and enhancing the detection of subtle, widespread effects such as the observed temporal associations between vaccine rollouts, IMR fluctuations, and cause-of-death shifts. The large-scale dataset provides substantial statistical power to identify significant correlations (e.g., $r=0.93$ for PCV and IMR to 2023, $r=0.77$ for PCV and IMR to 2024) and trends (e.g., $p<0.0001$ for IMR rise), enabling robust hypothesis generation about population-level health signals, like the alignment of mortality peaks with vaccination schedules or maternal COVID-19 exposure. Additionally, this approach is cost-effective and efficient, utilizing existing administrative data sources for longitudinal analysis that can reveal divergent patterns (e.g., live vs. inactivated vaccines) and synchronized increases across multiple outcomes (e.g., +46% in congenital abnormalities, +124% in respiratory diseases), fostering a holistic view of demographic and health dynamics that supports urgent policy reevaluation.

Limitations

The limitations of this study primarily relate to the transparency and completeness of governmental and public databases. All data is *as available* from PSA and DOH published reports with no adjustment for possible under registration of births and deaths, and infant vaccination rates. DOH vaccination data only includes infants vaccinated under the Government NIP and does not include data on infants receiving vaccines via the private sector. In addition, possible unmeasured confounders in this study that could impact infant survival include access to medical care during delivery, incidence of low-birth-weight infants, incidence of malnutrition deaths (as a marker of poverty and as a possible explanation for low birth weight), age of mother at delivery, and breastfeeding. Additionally, the accuracy of ICD10 COD assignment, particularly in the Philippines setting of limited diagnostics, may impact COD designation. Upon detailed review and direct verification of the available data, these potential confounders were systematically assessed and ruled out as plausible explanations for the observed findings. Nevertheless, future studies could further strengthen causal inference by explicitly adjusting these factors in the statistical analysis.

Conclusion

The risk of most vaccine-preventable deaths in healthy populations with access to quality basic supportive care and appropriate medical treatment remains low in the Philippines. Blanket vaccination of all infants rather than stratifying at-risk infant populations creates potential unnecessary harms. PCV vaccination, administered in combination with pentavalent and OPV at 6, 10, and 14 weeks, and first dose of IPV at 14 weeks, are strongly correlated with rising infant mortality. Contribution of maternal COVID-19 vaccination to these rising harms cannot be excluded given the notable sharp increase in congenital abnormalities as well as in non-VPD infectious and parasitic diseases from 2021 to 2024. Together, these findings suggest potential population-wide risks from current immunization schedules in pregnant women and infants, particularly thimerosal-containing vaccines which may be dramatically amplified by intensive missed-dose initiative campaigns in infants.

Postnatal vaccine associations reveal divergent patterns: live vaccines are linked to IMR reductions while inactivated vaccines correlate with increased mortality.

Specifically, greater infant uptake of PCV was strongly correlated with higher infant mortality. Peaks in mortality during the first year of life correspond temporally to NIP vaccine administration schedules. Moreover, the sharp rises in congenital abnormality deaths, respiratory diseases, infectious and parasitic diseases, neurological diseases, and unexplained sudden deaths from 2020 to 2024 further implicate vaccine-related factors. The authors propose reasonable vaccination schedule reforms to include stratified hepatitis B vaccination of infant only after positive pre-natal screening in pregnant mothers, a dose delay for 6-week-old infants, prioritizing single antigen administration, spacing multi-antigen administration, as well as postponing vaccination in preterm and low birth weight infants. A moratorium is recommended for the PCV product until clarification of the mechanisms underlying the identified signal of serious adverse events is elucidated.

In conclusion, our analysis of infant mortality trends in the Philippines demonstrates a reversal following two decades of steady decline, with a statistically significant rise in IMR from 2020 to 2024, signaling a marked deterioration in infant health outcomes. This inflection point temporally aligns with the national rollout of COVID-19 vaccinations, particularly affecting birth cohorts exposed to maternal vaccination from 2021 onward. Our research has major implications for WHO and UNICEF-led global vaccination programs that heavily influence blanket national immunization policies in low- and middle-income countries like the Philippines. In the context of globally falling birth rates and identified epidemics of chronic poor health in children, the findings of this paper identify a concerning population-wide safety signal that demands an urgent reevaluation of infant immunization policy in the Philippines.

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