Maternal COVID-19 in pregnancy *did not* impair growth or development in term-born children up to age 2

Who
66,285 term infants in Israel (22,096 exposed, 44,189 unexposed)

What
Compared growth & developmental milestones up to age 2 in infants **exposed vs. unexposed** to maternal COVID-19 during pregnancy

When
Births between March 2020 – March 2022, across all COVID-19 waves

ABSTRACT

Background
The impact of maternal SARS-CoV-2 infection during pregnancy on early child development is uncertain.

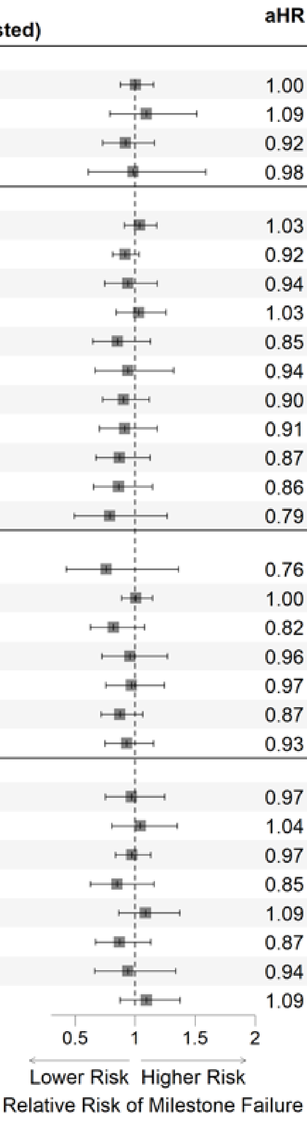
Methods
Nationwide matched cohort of **66,285 term infants** in Israel (22,096 exposed, 44,189 unexposed) born between March 2020–March 2022. Growth (weight, head circumference) and developmental milestones were assessed through standardized Ministry of Health well-child clinic data up to age two.

Results
No significant differences were found in growth trajectories, milestone attainment, or specialist referrals between exposed and unexposed children, regardless of sex, trimester of infection, or maternal disease severity.

Conclusion
Maternal COVID-19 infection during pregnancy was **not associated with impaired growth or developmental outcomes** among term-born children through two years of life.

Figure 3: Relative Risk of Milestone Failure in Term Infants by Maternal Infection Status During Pregnancy.

Milestone (expected age range)	Maternal Infection Failure% (tested)	Uninfected Failure% (tested)	aHR (99%CI)	p-value
Personal Social				
Smiles responsively (6w-3m)	3.77 (18967)	3.46 (37810)	1.00 (0.88,1.15)	0.952
Responds when addressed by name (9m-12m)	1.83 (10280)	1.72 (22519)	1.09 (0.79,1.51)	0.485
Vocalizes in a dialogue (9m-12m)	3.34 (10288)	3.26 (22594)	0.92 (0.73,1.16)	0.349
Squeezes and sticks out lips to give a kiss (18m-24m)	0.74 (10799)	0.78 (22939)	0.98 (0.61,1.59)	0.919
Language				
Vocalizes in response to human voice (6w-3m)	4.40 (18974)	3.84 (37825)	1.03 (0.91,1.18)	0.496
Makes various sounds including consonants (ie Mm rr gg) (3m-6m)	5.50 (17104)	5.24 (34878)	0.92 (0.81,1.03)	0.057
Responds to rattling sound (3m-6m)	2.14 (13745)	2.12 (28648)	0.94 (0.75,1.18)	0.486
Makes repetitive syllables-consonant or vowels (6m-9m)	1.91 (17349)	1.70 (35432)	1.03 (0.84,1.26)	0.717
Says 1 word or pronounces meaningful sounds (9m-12m)	1.72 (12124)	1.99 (26270)	0.85 (0.64,1.13)	0.140
Understands simple instructions (9m-12m)	1.37 (11759)	1.33 (25506)	0.94 (0.67,1.32)	0.629
Expresses will vocally or with gestures (12m-18m)	2.40 (13814)	2.53 (29160)	0.90 (0.73,1.12)	0.210
Points at familiar objects to request (12m-18m)	1.51 (15663)	1.59 (32396)	0.91 (0.70,1.18)	0.361
Says 2-3 words (12m-18m)	1.42 (15813)	1.62 (32393)	0.87 (0.67,1.12)	0.154
Familiar with at least 1 body part (18m-24m)	1.42 (12874)	1.62 (27094)	0.86 (0.65,1.14)	0.174
Has a vocabulary of over 10 words (18m-24m)	0.78 (10152)	1.02 (21569)	0.79 (0.49,1.26)	0.197
Gross Motor				
Raises head (6w-3m)	0.21 (18835)	0.26 (37796)	0.76 (0.42,1.36)	0.224
Head and chest up in prone position (3m-6m)	4.08 (18422)	4.03 (37195)	1.00 (0.88,1.14)	0.916
Rolls over from abdomen to back and back to abdomen (6m-9m)	1.04 (17291)	1.19 (35403)	0.82 (0.62,1.07)	0.059
Crawls (9m-12m)	1.00 (17486)	1.01 (35709)	0.96 (0.72,1.27)	0.686
Gets into sitting position without support (9m-12m)	2.59 (11916)	2.30 (26043)	0.97 (0.75,1.24)	0.735
Climbs stairs with assistance (18m-24m)	5.71 (8620)	5.48 (19018)	0.87 (0.71,1.06)	0.074
Walks without assistance (18m-24m)	4.23 (9206)	4.26 (20093)	0.93 (0.75,1.15)	0.379
Fine Motor				
Grasps an object (3m-6m)	1.25 (18218)	1.10 (36799)	0.97 (0.75,1.25)	0.742
Visually follows a moving object vertically (3m-6m)	1.77 (13788)	1.58 (28719)	1.04 (0.80,1.35)	0.688
Transfers an object from one hand to the other (6m-9m)	3.80 (15698)	3.70 (32728)	0.97 (0.84,1.13)	0.622
Taps 2 objects playfully (9m-12m)	0.97 (16333)	1.00 (33868)	0.85 (0.62,1.16)	0.171
Feeds self (9m-12m)	3.81 (10269)	3.78 (22565)	1.09 (0.86,1.37)	0.350
Uses thumb-finger to grasp (9m-12m)	2.37 (11069)	2.48 (24146)	0.87 (0.67,1.13)	0.165
Builds a tower of cubes (18m-24m)	1.48 (10437)	1.35 (22420)	0.94 (0.66,1.33)	0.646
Eats independently with a spoon (18m-24m)	4.27 (8545)	3.91 (18950)	1.09 (0.87,1.37)	0.312



This figure illustrates the relative risk of developmental milestone failure in children born at term, based on maternal SARS-CoV-2 infection status during pregnancy, categorized into four domains: personal-social, language, gross motor, and fine motor. The table presents the percentage of milestone failures for maternal infected (documented positive RT/PCR or an institutionally administered rapid antigen tests for SARS-CoV-2 during pregnancy) vs. uninfected groups, the number of children tested (n) in each group, and adjusted hazard ratios (aHR) with 99% confidence intervals (CI) for each milestone. The forest plot visualizes the aHRs, with points representing the aHR for each milestone and horizontal lines indicating the 99% CIs. The multivariable analysis adjusts for maternal age at delivery, gestational age at delivery, parity, child sex, multifetal gestation, birthweight, vaccination status, Marital status, Nationality and Country of origin. The ages at which milestones are assessed are shown in months.

Maternal SARS-CoV-2 Infection During Pregnancy and Early Child Growth and Development: A Nationwide Cohort Study in Israel

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