World Health Organization

Antenatal Corticosteroids for Improving Preterm Newborn Survival in Low-Resource Countries

The WHO ACTION Trials Collaborators

ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

The Panelists

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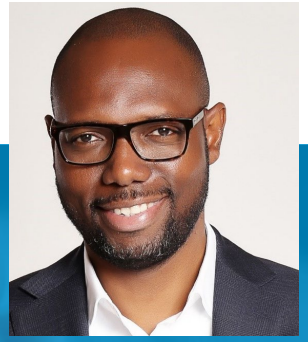

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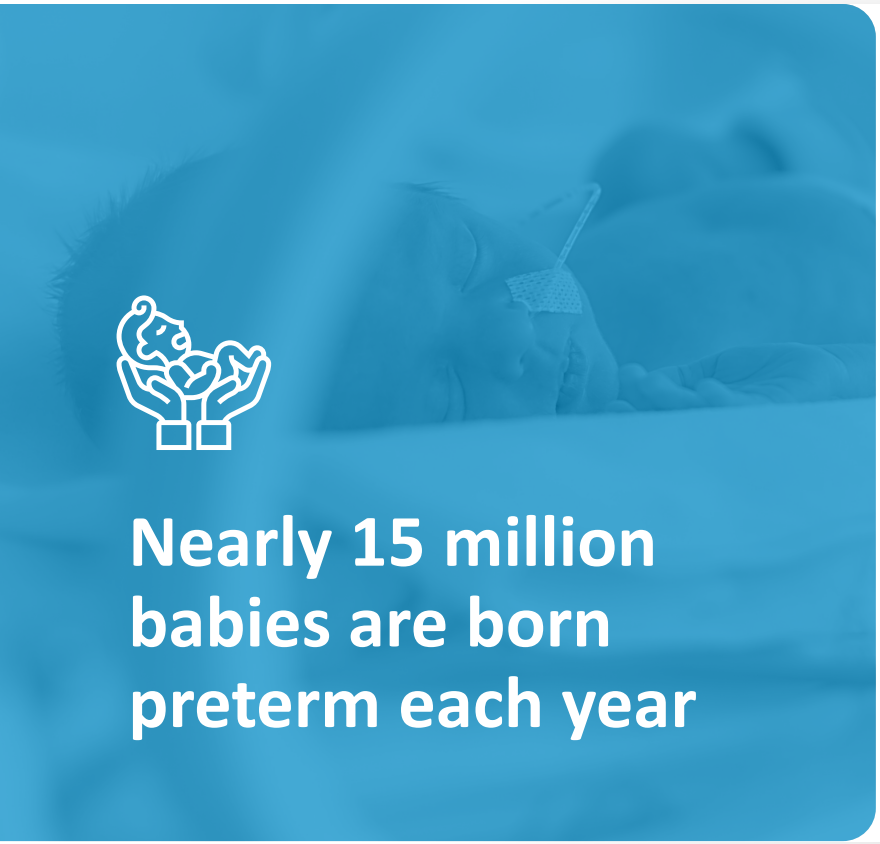
Global burden of preterm birth



Nearly 15 million babies are born preterm each year

Leading cause of neonatal and child mortality

Infants born preterm are at increased risk for a wide range of short-term and long-term respiratory, infectious, metabolic, and neurologic conditions, with higher risks among those born during the early preterm period

Known effects of antenatal corticosteroids

Roberts & Dalziel (2006)

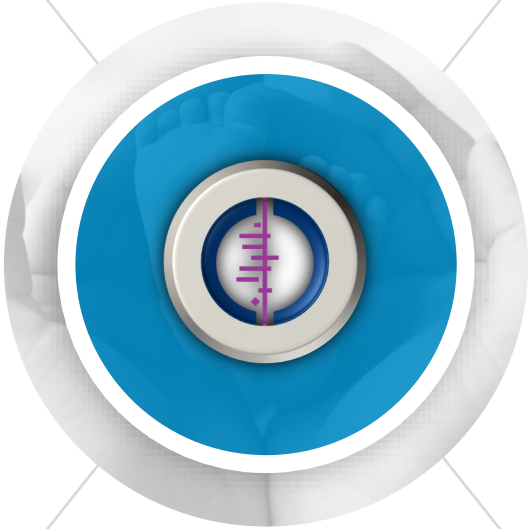
When administered antenatally, corticosteroids (dexamethasone or betamethasone) can cross the placenta and accelerate maturation of fetal lung

Efficacy trials conducted largely in high-resource countries have demonstrated that antenatal corticosteroids for women at risk of preterm birth can reduce risk of:

- **Neonatal deaths** *(RR 0.69, 95% CI 0.59 - 0.81)*
- **Intraventricular haemorrhage** *(RR 0.55, 95% CI 0.40 - 0.76)*
- **Respiratory distress syndrome** *(RR 0.66, 95% CI 0.56 - 0.77)*
- **Necrotizing enterocolitis** *(RR 0.50, 95% CI 0.32 - 0.78)*
- **Moderate and severe RDS** *(RR 0.59, 95% CI 0.38 - 0.91)*
- **Systemic infection in first 48 h** *(RR 0.60, 95% CI 0.41 - 0.88)*

Known effects of antenatal corticosteroids

- Most trials were conducted in tertiary facilities in **high-income countries**
- Often used **heterogeneous or highly selected** populations, which **may not be generalizable**
- Generally **old trials** (most are over 20 years old), where **risk of bias is often unclear**



- Generally **small** (<200 women)
- No trials powered for **neonatal mortality** – often not measured post-discharge from hospital
- **Larger trials** showed **smaller or no clinical benefits**

Antenatal Corticosteroid Trial (2015)

Cluster-randomized trial of a package of interventions to scale up antenatal corticosteroids in low- and middle-income countries

6 countries
Guatemala, Kenya, Argentina, Zambia, India, Pakistan

102
clusters

99,742
mothers enrolled

100,705
babies

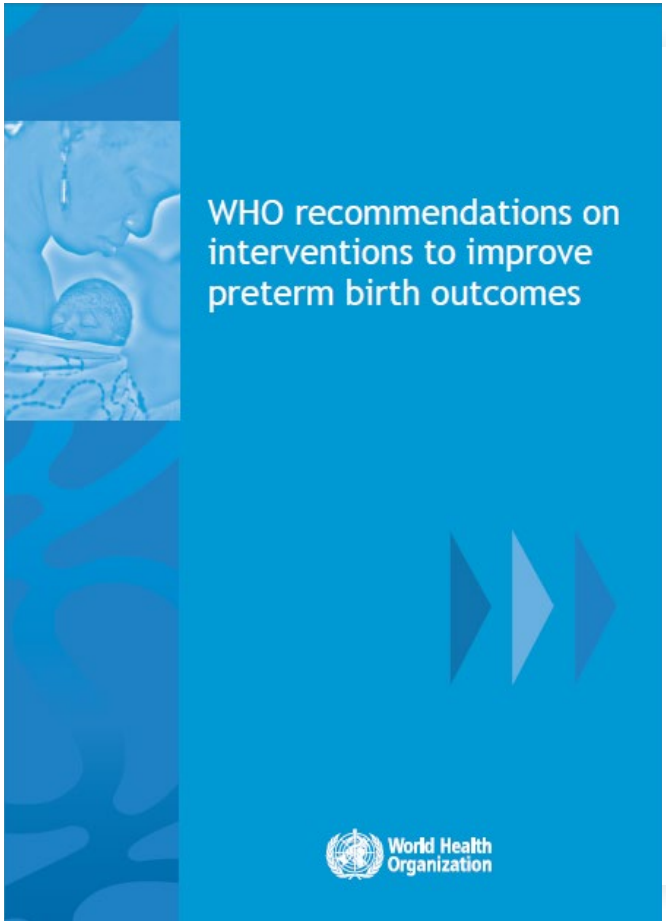
18-month
intervention

Primary outcome:
neonatal death amongst neonates born at less-than-5th-percentile birth weight (as a proxy for preterm birth)

Antenatal Corticosteroid Trial (2015)

Group	Outcome	RR (95% CI)	Interpretation
Among births <5th percentile infants	Neonatal death by 28 days	RR 0.96 (95% CI 0.99 – 1.06)	No benefit/harm
	Stillbirth	RR 0·99 (95% CI 0·90–1·09)	No benefit/harm
	Suspected maternal infection	OR 1·67 (95% CI 1·33–2·09)	Maternal harm
Among all births (population level)	Neonatal death by 28 days	RR 1.12 (95% CI 1.02 – 1.22)	Neonatal harm
	Stillbirth	RR 1.11 (95% CI 1.02 – 1.22)	Fetal harm
	Suspected maternal infection	OR 1·45 95% CI 1·33–1·58)	Maternal harm

WHO recommendations on preterm birth (2015)



Recommendations developed according to WHO Guidelines Review Committee standards, and relevant to all settings

Concerns about harm led to inclusion of consensus-based criteria for antenatal corticosteroids use

WHO recommendations on preterm birth (2015)

Strong recommendation based on moderate-quality evidence for newborn outcomes and low-quality evidence for maternal outcomes

Antenatal corticosteroid therapy is recommended for women at risk of preterm birth from 24 weeks to 34 weeks of gestation when the following conditions are met

- gestational age assessment can be accurately undertaken
- preterm birth is considered imminent
- there is no clinical evidence of maternal infection
- adequate childbirth care is available (including the capacity to recognize and safely manage preterm labour and birth)
- the preterm newborn can receive adequate care if needed (including resuscitation, thermal care, feeding support, infection treatment and safe oxygen use)

ACTION-I trial design

Multicountry, multicenter, parallel group, double-blind, individually randomized, placebo-controlled trial to compare intramuscular dexamethasone with identical placebo in women at risk of imminent preterm birth

Conducted at 29 secondary- and tertiary-level hospitals across six trial sites in Bangladesh, India, Kenya, Nigeria, and Pakistan

Participants

Pregnant women at risk of imminent preterm birth

26 weeks 0 days to 33 weeks 6 days

Intervention

A course of 6mg dexamethasone IM injections every 12 hours, for a maximum of four doses, or until hospital discharge or birth

If undelivered by 7 days and still met the inclusion criteria, a single repeat course was used

Comparison

Identical placebo (saline)

Primary Outcomes

- Neonatal death (until 28 days after birth)
- Any baby death (post-randomization stillbirth or neonatal death)
- Possible maternal bacterial infection – composite outcome defined as maternal fever (≥38°C) or clinically suspected or confirmed infection for which therapeutic antibiotics were used

Secondary outcomes

Maternal and newborn morbidity outcomes

Health care interventions and health service utilization outcomes

Trial setting

Resource-limited hospitals in Bangladesh, India, Kenya, Nigeria and Pakistan, selected based on assessment of available maternal and neonatal services

Minimal out-referral of women at risk of imminent preterm birth, or preterm newborns

Human resource, referral and health service equipment challenges that are common to many low-resource settings

Facilities could reasonably meet the WHO antenatal corticosteroid treatment criteria

- Emergency obstetric care available
- Preterm newborn care available: resuscitation at birth, thermal care, breastmilk feeding support, parenteral infection treatment, safe oxygen use, access to hygiene, access to CPAP

Hospitals were provided with Philips HD5 Ultrasound systems, CPAP systems, pulse oximeters and glucometers to ensure that at least minimum quality of care was received by trial participants

Screening and recruitment

Pregnant women who had confirmed live fetuses between 26 weeks 0 days and 33 weeks 6 days of gestation and who were at risk for preterm birth [defined as planned or expected birth in the next 48 hours (either provider-initiated preterm birth, or after PPROM or spontaneous labour)]

Gestational age must be determined by ultrasound (or an ultrasound was performed at admission),

Excluded if

Clinical signs of severe infection,

Major congenital fetal anomalies

Concurrent or recent (within the previous 2 weeks) use of systemic corticosteroids

Contraindication to corticosteroids

Participating in another trial

Written informed consent was obtained from all the participants before randomization

ACTION-I Trial

Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

RESULTS

Key points

2852 women randomized – 1429 women to dexamethasone arm and 1423 women to placebo

Most common reason for exclusion – “birth not planned or expected in next 48 hours”

>99% completed follow up

Adherence to trial regimen:

- All women (except one) received at least 1 dose
- 57% and 53% of women got all four doses of the first course in dexamethasone and placebo groups, respectively
- Use of repeat course was minimal (<5%)

Characteristics of the Participants at Trial Entry

Indication for trial entry	Dexa vs Placebo
Spontaneous PTB	61.2% vs 60.3%
Provider-initiated PTB	38.8% vs 39.7%
Mean GA at trial entry	30.8 vs 30.7 weeks
Trimester ultrasound performed	
1st trimester	10.9% vs 10.3%
2nd trimester	24.1% vs 23.1%
3rd trimester	65.0% vs 66.5%
Medication before randomization	
Tocolytic prior to randomization	17.6% vs 18.8%
Magnesium sulfate for FNP	9.9% vs 12.6%

ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

Primary Outcomes

Outcome	Dexamethasone n/N (%)	Placebo n/N (%)	Relative risk (95% CI)*	P-value†
Neonatal death	278/1417 (19.6)	331/1406 (23.5)	0.84 (0.72-0.97)	0.03
Stillbirth or neonatal death	393/1532 (25.7)	444/1519 (29.2)	0.88 (0.78-0.99)	0.04
Possible maternal bacterial infection‡	68/1416 (4.8)	89/1412 (6.3)	0.76 (0.56-1.03)	0.002§

> * Relative risks and 95% confidence intervals, calculated from modeling, were adjusted for trial sites and accounted for clustering due to multiple births.

> † P values were adjusted for multiplicity for the three primary outcomes with the use of the false-discovery-rate approach.

> ‡ Possible maternal bacterial infection was defined as the occurrence of fever (temperature ≥38°C) or clinically suspected or confirmed infection for which therapeutic antibiotics were used. Suspected or confirmed infection included obstetrical infection (chorioamnionitis, postpartum endometritis, or wound infection) or nonobstetrical infection (respiratory tract infection [pneumonia, pharyngitis, sinusitis, or a similar infection], urinary tract infection [excluding pyelonephritis], pyelonephritis, acute cholecystitis, or other system infection) captured during hospital admission or admissions only.

> § This P value was calculated for noninferiority.

Neonatal secondary outcomes

Outcome	Dexamethasone n/N (%)	Placebo n/N (%)	Relative risk (95% CI)
Stillbirth	115/1544 (7.4)	113/1526 (7.4)	1.00 (0.78-1.30)
Early neonatal death (≤ 7 days)	218/1417 (15.4)	268/1406 (19.1)	0.81 (0.68-0.96)*
Severe respiratory distress‡	116/1245 (9.3)	141/1223 (11.5)	0.81 (0.64–1.03)
Severe respiratory distress at 24 h	34/1122 (3.0)	58/1065 (5.5)	0.56 (0.37-0.85)*
Neonatal sepsis	183/1284 (14.3)	197/1264 (15.6)	0.92 (0.76-1.11)
Hypoglycaemia‡	301/1242 (24.2)	328/1217 (27.0)	0.91 (0.80–1.04)
Hypoglycaemia at 6 hours	92/1224 (7.5)	123/1194 (10.3)	0.73 (0.56-0.95)*

‡ Measured from the initial postnatal hospitalization until death, discharge, or completed day 7

Neonatal secondary outcomes

Outcome	Dexamethasone n/N (%)	Placebo n/N (%)	Relative risk (95% CI)
Apgar score <7 at 5 min	276/1359 (20.3)	293/1368 (21.4)	0.95 (0.82-1.10)
Major resuscitation at birth	101/1382 (7.3)	144/1383 (10.4)	0.70 (0.55-0.88)*
Use of oxygen therapy‡	726/1429 (50.8)	756/1413 (53.5)	0.95 (0.88-1.02)
Use of CPAP‡	265/1429 (18.5)	337/1413 (23.9)	0.78 (0.67-0.90)*
Use of mechanical ventilation‡	83/1284 (6.5)	103/1264 (8.2)	0.79 (0.59-1.05)
Use of parenteral therapeutic antibiotics	527/1245 (42.3)	494/1175 (42.0)	1.00 (0.91–1.10)
Use of surfactant	9/1284 (0.7)	18/1264 (1.4)	0.49 (0.22-1.08)
Admission to a special care unit	905/1287 (70.3)	897/1268 (70.7)	0.99 (0.94-1.04)
Newborn readmission	39/1429 (2.7)	48/1413 (3.4)	0.81 (0.53-1.25)

‡ Measured from the initial postnatal hospitalization until death, discharge, or completed day 7

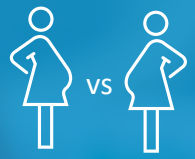
Maternal secondary outcomes

Outcome	Dexamethasone n/N (%)	Placebo n/N (%)	Relative risk (95% CI)
Death	5/1429 (0.4)	4/1423 (0.3)	1.23 (0.33-4.57)
Fever	78/1417 (5.5)	70/1406 (5.0)	1.10 (0.80-1.50)
Chorioamnionitis	17/1429 (1.2)	18/1423 (1.3	0.93 (0.48-1.80)
Endometritis	5/1429 (0.4)	3/1423 (0.2)	1.65 (0.39-6.92)
Wound infection	8/1429 (0.6)	15/1423 (1.1)	0.53 (0.22-1.25)
Nonobstetrical infection	34/1429 (2.4)	42/1423 (3.0)	0.81 (0.52- 1.26)
Use of therapeutic antibiotics	68/1427 (4.8)	89/1422 (6.3)	0.76 (0.56-1.03)
Any antibiotic use	1205/1353 (89.1)	1216/1355 (89.7)	1.00 (0.97-1.02)
Postpartum readmission	14/1429 (1.0)	13/1423 (0.9)	1.07 (0.50-2.26)

Cause of neonatal death

Final cause of death	Dexamethasone (N=1417)	Placebo (N=1406)	Relative risk (95% CI)
Perinatal asphyxia – no. (%)	61 (4.3)	78 (5.5)	0.78 (0.56-1.07)
Respiratory distress synd. – no. (%)	113 (8.0)	156 (11.1)	0.72 (0.57-0.90)*
Neonatal sepsis – no. (%)	77 (5.4)	74 (5.3)	1.03 (0.76-1.41)
Other specific causes – no. (%)	18 (1.3)	12 (0.9)	1.49 (0.73-3.16)
Indeterminate – no. (%)	9 (0.6)	11 (0.8)	0.81 (0.33-1.96)

Subgroup analyses



Prespecified subgroup analyses of the primary outcomes

- whether preterm birth was planned (yes vs no) – **no interaction**
- GA at first dose – **no interaction**
- no. of fetuses – **no interaction**
- study site – **no interaction**
- mode of birth – **no interaction**
- time from first dose to birth – **no interaction**
- use of tocolytic agent before preterm birth – **interaction (P=0.03)**

Summary of findings

- Reduced incidence of neonatal death alone and stillbirth or neonatal death
- No increase in maternal bacterial infection
- No effect on stillbirth
- No evidence of maternal or newborn harms
- Benefits observed even though 45% of participants received less than 4 doses of trial medication
- Need to treat 25 women to prevent 1 newborn death

Reduced risks of the following outcomes support primary outcome findings:

Early neonatal death

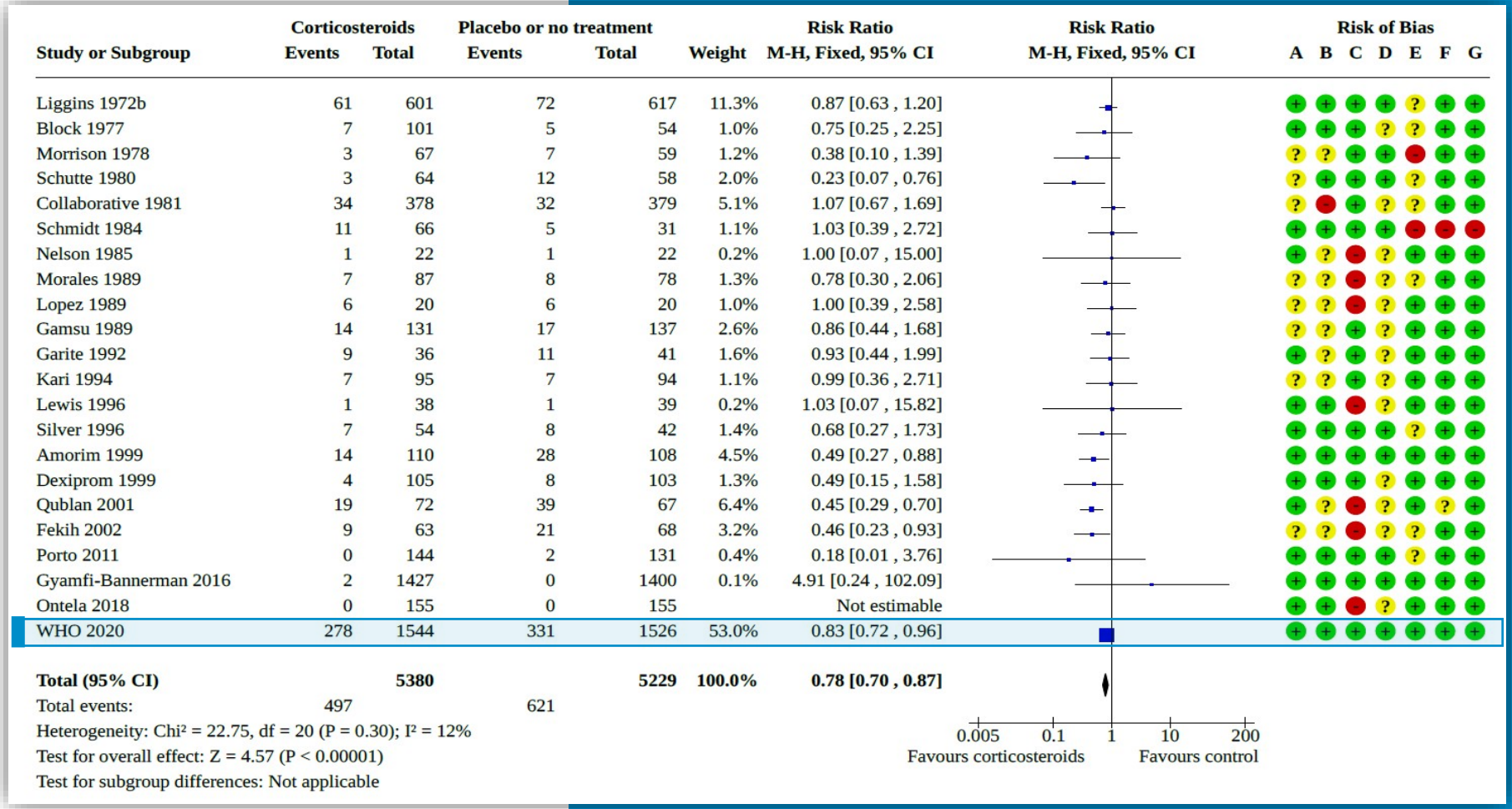
Severe respiratory distress at 24 hours

Resuscitation at birth

Use of CPAP

Neonatal hypoglycemia at 6 hours reduced, but no difference at 36 hours

Updated global evidence base – neonatal death



Study or Subgroup	Corticosteroids Events	Corticosteroids Total	Placebo or no treatment Events	Placebo or no treatment Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Liggins 1972b	61	601	72	617	11.3%	0.87 [0.63 , 1.20]
Block 1977	7	101	5	54	1.0%	0.75 [0.25 , 2.25]
Morrison 1978	3	67	7	59	1.2%	0.38 [0.10 , 1.39]
Schutte 1980	3	64	12	58	2.0%	0.23 [0.07 , 0.76]
Collaborative 1981	34	378	32	379	5.1%	1.07 [0.67 , 1.69]
Schmidt 1984	11	66	5	31	1.1%	1.03 [0.39 , 2.72]
Nelson 1985	1	22	1	22	0.2%	1.00 [0.07 , 15.00]
Morales 1989	7	87	8	78	1.3%	0.78 [0.30 , 2.06]
Lopez 1989	6	20	6	20	1.0%	1.00 [0.39 , 2.58]
Gamsu 1989	14	131	17	137	2.6%	0.86 [0.44 , 1.68]
Garite 1992	9	36	11	41	1.6%	0.93 [0.44 , 1.99]
Kari 1994	7	95	7	94	1.1%	0.99 [0.36 , 2.71]
Lewis 1996	1	38	1	39	0.2%	1.03 [0.07 , 15.82]
Silver 1996	7	54	8	42	1.4%	0.68 [0.27 , 1.73]
Amorim 1999	14	110	28	108	4.5%	0.49 [0.27 , 0.88]
Dexiprom 1999	4	105	8	103	1.3%	0.49 [0.15 , 1.58]
Qublan 2001	19	72	39	67	6.4%	0.45 [0.29 , 0.70]
Fekih 2002	9	63	21	68	3.2%	0.46 [0.23 , 0.93]
Porto 2011	0	144	2	131	0.4%	0.18 [0.01 , 3.76]
Gyamfi-Bannerman 2016	2	1427	0	1400	0.1%	4.91 [0.24 , 102.09]
Ontela 2018	0	155	0	155		Not estimable
WHO 2020	278	1544	331	1526	53.0%	0.83 [0.72 , 0.96]
Total (95% CI)		**5380**		**5229**	**100.0%**	**0.78 [0.70 , 0.87]**
Total events:	497		621			

Heterogeneity: Chi² = 22.75, df = 20 (P = 0.30); I² = 12%
Test for overall effect: Z = 4.57 (P < 0.00001)
Test for subgroup differences: Not applicable

McGoldrick E, Stewart F, Parker R, Dalziel SR. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database of Systematic Reviews 2020, Issue 12. Art. No.: CD004454. DOI: 10.1002/14651858.CD004454.pub4.

ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

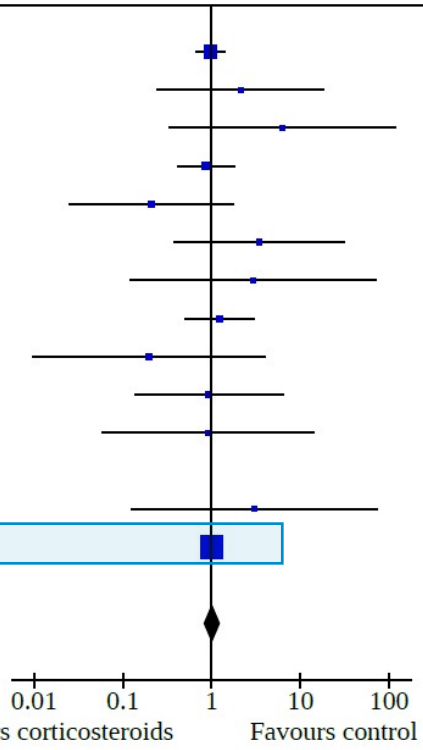
Updated global evidence base – stillbirth

Study or Subgroup	Corticosteroids Events	Corticosteroids Total	Placebo or no treatment Events	Placebo or no treatment Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Liggins 1972b	47	601	50	617	24.6%	0.97 [0.66 , 1.41]
Block 1977	4	101	1	54	0.7%	2.14 [0.25 , 18.66]
Schutte 1980	3	64	0	58	0.3%	6.35 [0.34 , 120.45]
Collaborative 1981	13	378	15	379	7.5%	0.87 [0.42 , 1.80]
Gamsu 1989	1	131	5	137	2.4%	0.21 [0.02 , 1.77]
Garite 1992	3	36	1	41	0.5%	3.42 [0.37 , 31.41]
Kari 1994	1	95	0	94	0.3%	2.97 [0.12 , 71.96]
Amorim 1999	10	110	8	108	4.0%	1.23 [0.50 , 2.99]
Dexiprom 1999	0	105	2	103	1.3%	0.20 [0.01 , 4.04]
Qublan 2001	2	72	2	67	1.0%	0.93 [0.13 , 6.42]
Porto 2011	1	144	1	131	0.5%	0.91 [0.06 , 14.40]
Gyamfi-Bannerman 2016	0	1427	0	1400		Not estimable
Ontela 2018	1	155	0	155	0.2%	3.00 [0.12 , 73.08]
WHO 2020	115	1544	113	1526	56.7%	1.01 [0.78 , 1.29]
Total (95% CI)		**4963**		**4870**	**100.0%**	**1.01 [0.83 , 1.22]**
Total events:	201		198			

Heterogeneity: Chi² = 7.64, df = 12 (P = 0.81); I² = 0%

Test for overall effect: Z = 0.06 (P = 0.95)

Test for subgroup differences: Not applicable



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ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

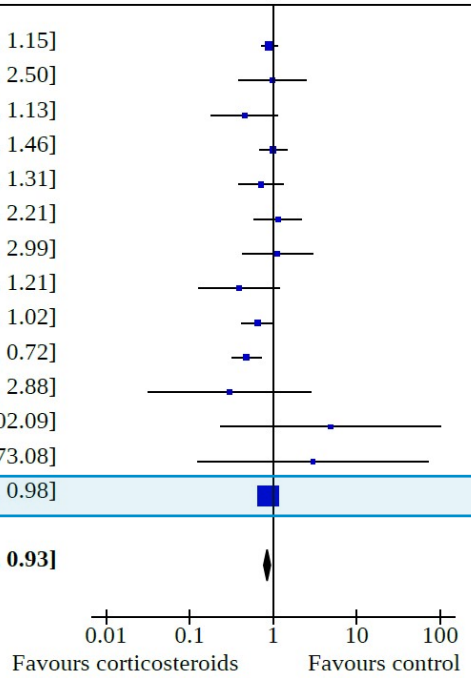
Updated global evidence base – perinatal death

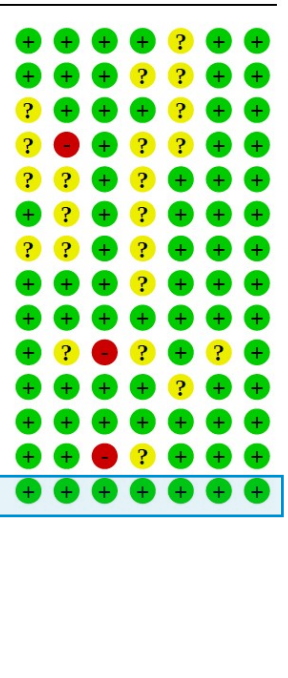
Study or Subgroup	Corticosteroids Events	Corticosteroids Total	Placebo or no treatment Events	Placebo or no treatment Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Liggins 1972b	108	601	122	617	15.7%	0.91 [0.72 , 1.15]
Block 1977	11	101	6	54	1.0%	0.98 [0.38 , 2.50]
Schutte 1980	6	64	12	58	1.6%	0.45 [0.18 , 1.13]
Collaborative 1981	47	378	47	379	6.1%	1.00 [0.69 , 1.46]
Gamsu 1989	15	131	22	137	2.8%	0.71 [0.39 , 1.31]
Garite 1992	12	36	12	41	1.5%	1.14 [0.59 , 2.21]
Kari 1994	8	95	7	94	0.9%	1.13 [0.43 , 2.99]
Dexiprom 1999	4	105	10	103	1.3%	0.39 [0.13 , 1.21]
Amorim 1999	24	110	36	108	4.7%	0.65 [0.42 , 1.02]
Qublan 2001	21	72	41	67	5.5%	0.48 [0.32 , 0.72]
Porto 2011	1	144	3	131	0.4%	0.30 [0.03 , 2.88]
Gyamfi-Bannerman 2016	2	1427	0	1400	0.1%	4.91 [0.24 , 102.09]
Ontela 2018	1	155	0	155	0.1%	3.00 [0.12 , 73.08]
WHO 2020	393	1544	444	1526	58.2%	0.87 [0.78 , 0.98]
Total (95% CI)		**4963**		**4870**	**100.0%**	**0.85 [0.77 , 0.93]**
Total events:	653		762			

Heterogeneity: Chi² = 18.15, df = 13 (P = 0.15); I² = 28%

Test for overall effect: Z = 3.59 (P = 0.0003)

Test for subgroup differences: Not applicable





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ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

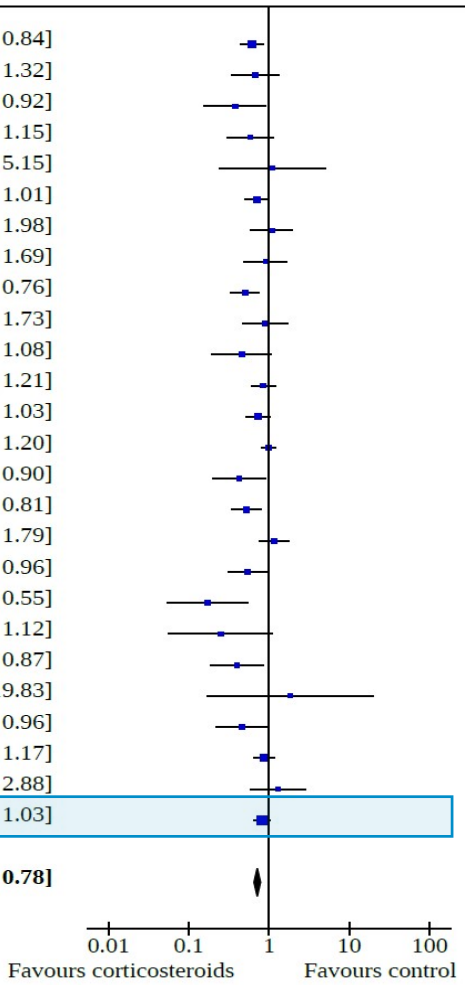
Updated global evidence base – RDS

Study or Subgroup	Corticosteroids Events	Corticosteroids Total	Placebo or no treatment Events	Placebo or no treatment Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Liggins 1972b	53	601	89	617	10.6%	0.61 [0.44 , 0.84]
Block 1977	15	101	12	54	1.9%	0.67 [0.34 , 1.32]
Morrison 1978	6	67	14	59	1.8%	0.38 [0.15 , 0.92]
Schutte 1980	11	64	17	58	2.2%	0.59 [0.30 , 1.15]
Teramo 1980	3	38	3	42	0.3%	1.11 [0.24 , 5.15]
Collaborative 1981	46	378	65	379	7.8%	0.71 [0.50 , 1.01]
Schmidt 1984	23	66	10	31	1.6%	1.08 [0.59 , 1.98]
Nelson 1985	10	22	11	22	1.3%	0.91 [0.49 , 1.69]
Morales 1989	23	87	41	78	5.2%	0.50 [0.33 , 0.76]
Lopez 1989	9	20	10	20	1.2%	0.90 [0.47 , 1.73]
Gamsu 1989	7	131	16	137	1.9%	0.46 [0.19 , 1.08]
Garite 1992	21	36	28	41	3.2%	0.85 [0.60 , 1.21]
Kari 1994	34	95	46	94	5.6%	0.73 [0.52 , 1.03]
Silver 1996	43	54	34	42	4.6%	0.98 [0.81 , 1.20]
Lewis 1996	7	38	17	39	2.0%	0.42 [0.20 , 0.90]
Amorim 1999	23	110	43	108	5.2%	0.53 [0.34 , 0.81]
Dexiprom 1999	32	105	27	103	3.3%	1.16 [0.75 , 1.79]
Qublan 2001	14	72	24	67	3.0%	0.54 [0.31 , 0.96]
Fekih 2002	3	63	19	68	2.2%	0.17 [0.05 , 0.55]
Balci 2010	2	50	8	50	1.0%	0.25 [0.06 , 1.12]
Mansouri 2010	8	100	20	100	2.4%	0.40 [0.18 , 0.87]
Porto 2011	2	144	1	131	0.1%	1.82 [0.17 , 19.83]
Attawattanakul 2015	9	96	20	98	2.4%	0.46 [0.22 , 0.96]
Gyamfi-Bannerman 2016	79	1427	89	1400	10.8%	0.87 [0.65 , 1.17]
Ontela 2018	13	155	10	155	1.2%	1.30 [0.59 , 2.88]
WHO 2020 (1)	116	1544	141	1526	17.1%	0.81 [0.64 , 1.03]
Total (95% CI)		**5664**		**5519**	**100.0%**	**0.71 [0.65 , 0.78]**
Total events:	612		815			

Heterogeneity: Chi² = 47.72, df = 25 (P = 0.004); I² = 48%

Test for overall effect: Z = 7.12 (P < 0.00001)

Test for subgroup differences: Not applicable



ACTION Trials
Antenatal CorticosTeroids for Improving Outcomes in preterm Newborns

McGoldrick E, Stewart F, Parker R, Dalziel SR. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. Cochrane Database of Systematic Reviews 2020, Issue 12. Art. No.: CD004454. DOI: 10.1002/14651858.CD004454.pub4.

Updated global evidence base - summary

Cochrane Pregnancy and Childbirth
Trusted evidence. Informed decisions. Better health.

Antenatal corticosteroids for women at risk of preterm birth

What is this systematic review about?

Antenatal steroids, compared with placebo or no treatment, given to pregnant women at risk of giving birth before 37 weeks.

What evidence did we find?

27 randomised trials including 11,272 women

15 trials: singleton pregnancies only
12 trials: included multiple pregnancies

10 trials: from middle- and lower-income countries
17 studies: high-income countries

19 studies: used a single course of steroids
8 studies: used either single course or repeated doses

What are the effects of antenatal corticosteroids?

For babies: high-certainty evidence

- 2.3% fewer perinatal deaths
- 2.6% fewer neonatal deaths
- 4.3% fewer cases of respiratory distress syndrome

Little to no difference in birthweight

For babies: moderate-certainty evidence

- 1.4% fewer cases of intraventricular haemorrhage

For mothers: moderate-certainty evidence

Probably little to no difference in:

- Maternal deaths
- Chorioamnionitis
- Endometritis

What does this mean?

A single course of antenatal steroids **reduces the risk of serious respiratory illness and death** in neonates in low-middle- and high- income countries.

More detailed data are needed for certain high-risk groups (e.g. multiple pregnancies, pregnant women with diabetes or hypertension).

Evidence up to date: Sept 2020

Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth. McGoldrick E, Stewart F, Parker R, Dalziel S. *Cochrane Database of Systematic Reviews* 2020. Issue 12. Art. No.: CD004454. DOI: 10.1002/14651858.CD004454.pub4

Visual summary created by Fiona Stewart
Designed using resources from Flaticon.com

Implications for national policies and implementation in LMIC

- Firm government commitment to safely scale up ACS administration where ACS treatment criteria can be met
- Well planned and participatory consensus-driven processes of adaptation and implementation
- Development or updating of national guidelines and protocols based on latest research evidence
- Creation of enabling environment for safe ACS use (avoiding stock-outs, upgrading facilities for care of women and preterm newborns
- Training of healthcare staff of determination of GA and clinical features of imminent preterm birth
- Clear referral pathways for women at risk of preterm birth should be established within and across health care facilities

Reduced adverse events from preterm birth will only be achieved through:

Government commitment

Updating of national guidelines

Enabling environment

Health care staff training

Network of care

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