

- 1 **Supplemental Table 1. Evaluation of the Reliability of Each Infant Feature and Characteristic Observed by Wadman et al.**
 2 **(2023) in the MATernaL and Infant clinical Network (MAT-LINK)**

Infant Feature or Characteristic	Reliably Present in MAT-LINK¹	Present in MAT-LINK, but Potential Reliability Concerns²	Not Present in MAT-LINK³
Cholesterol (precursor) levels			X
Genetic information/ Smith-Lemli-Opitz		X	
Corpus callosum abnormalities		X	
Phenotypic facial features			X
Cleft palate with or without cleft lip	X		
Micrognathia		X	
Genital anomalies		X	

Adducted thumb			X
Single palmar crease			X
2,3 Toe syndactyly		X	
Talipes/ rocker bottom feet / foot positioning deformities		X	
Microcephaly		X	
Gestational age	X		
Birth weight/ length	X		
Feeding difficulties		X	

1 ¹These infant features are often documented in the electronic health record (EHR) upon observation, and MAT-LINK contains
2 variables that explicitly ask for this information, or it will be captured among the ICD-9/10-CM and CPT codes that MAT-LINK
3 systematically collects on live born infants.

4 ²There are variables within MAT-LINK capable of capturing this type of information; however, there are likely instances where the
5 feature is underreported or misclassified in the EHR (i.e. conditions are often underdiagnosed, not systematically documented within
6 the EHR, or ICD-9/10-CM codes are non-specific). Severity of the feature might influence whether the feature is documented in the
7 EHR. Clinical sites also varied in their ability to capture specialist and genetic testing information, which might affect our ability to
8 ascertain these features.

³There are no corresponding variables within MAT-LINK designed to capture this type of information. These infant features are too specific or are not systematically looked for and documented within the EHR.

1 **Supplemental Table 2. Ascertainment Methodology to Identify Each Infant Feature and Characteristic in the MATernaL and**
 2 **Infant clinical NetworkK (MAT-LINK)**

Feature or Characteristic	ICD-10 Codes	ICD-9 Codes	CPT codes	Birth Defects Free Text Search Terms¹	Additional Variables
Smith-Lemli-Opitz syndrome	E78.72: Smith-Lemli-Opitz syndrome	N/A	N/A	Smith SLOS Opitz	Specialist Referral data: Free text search “Specialist Findings” and Reason for Referral” when Specialist = Geneticist ²
Gestational age	N/A	N/A	N/A	N/A	Calculated as the “ <i>Date of Pregnancy Outcome</i> ” – (“ <i>Estimated Date of Delivery</i> ” - 280)/7,

					rounded down to the nearest integer.
Birthweight	N/A	N/A	N/A	N/A	Newborn Labor and Delivery Data: Provided by clinical sites in grams, rounded to 2 decimal places. ³
Birth length	N/A	N/A	N/A	N/A	Newborn Labor and Delivery Data: Provided by clinical sites in cm, rounded to 1 decimal place. ³
Microcephaly	Q02: Microcephaly	742.1: Microcephalus	N/A	Microcephal	Definition #1: Identified infants using ICD-9/10-CM codes

					Definition #2: Utilized newborn head circumference recorded at birth;³ Provided by clinical sites in cm, rounded to 1 decimal place. Infants with head circumferences $\leq$3rd percentile, according to INTERGROWTH-21ST standards, were defined as having microcephaly.⁴
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Cleft palate with or without cleft lip	Q35.1: Cleft hard palate Q35.3: Cleft soft palate Q35.5: Cleft hard palate with cleft soft palate Q35.7: Cleft uvula Q35.9: Cleft palate, unspecified Q37.0: Cleft hard palate with bilateral cleft lip Q37.1: Cleft hard palate with unilateral cleft lip Q37.2: Cleft soft palate with bilateral cleft lip	749.0X: Cleft palate 749.2X: Cleft palate with cleft lip	42200: Palatoplasty for cleft palate, soft and/or hard palate only 42205: Palatoplasty for cleft palate, with closure of alveolar ridge soft tissue only 42210: Palatoplasty for cleft palate, with closure of alveolar ridge with bone graft to alveolar ridge 42215: Palatoplasty for cleft palate major revision	Cleft Orofacial AND NOT CONTAINING: Gluteal Natal cleft Family history of cleft Posterior gum cleft	N/A
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	Q37.3: Cleft soft palate with unilateral cleft lip Q37.4: Cleft hard and soft palate with bilateral cleft lip Q37.5: Cleft hard and soft palate with unilateral cleft lip Q37.8: Unspecified cleft palate with bilateral cleft lip Q37.9: Unspecified cleft palate with unilateral cleft lip		42220: Palatoplasty for cleft palate secondary lengthening procedure 42225: Palatoplasty for cleft palate attachment pharyngeal flap 42235: Repair of anterior palate, including vomer flap 21083: Impression and custom preparation palatal lift prosthesis	Cleft lip and alveolus	
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			42280: Maxillary impression for palatal prosthesis 42281: Insertion of pin-retained palatal prosthesis 30460: Rhinoplasty for nasal deformity secondary to congenital cleft lip and/or palate 30462: Rhinoplasty for nasal deformity secondary to congenital cleft lip and/or palate		
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Micrognathia a	M26.09: Other specified anomalies of jaw size Q67.4: Other congenital deformities of skull, face and jaw Q87.0: Congenital malformation syndromes predominantly affecting facial appearance	524.09: Major anomalies of jaw size, other specified anomaly 756.0: Anomalies of skull and face bones		Jaw Micrognathia Mandibular AND NOT CONTAINING: Mandibular fracture Jaw pain Jaw px Double jaw surg Jaw swelling	N/A

				Temporomandibular	
Genital anomalies (male)⁵	Q53.00: Ectopic testis, unspecified Q53.01: Ectopic testis, unilateral Q53.02: Ectopic testes, bilateral Q53.10: Unspecified undescended testicle, unilateral Q53.111: Unilateral intraabdominal testis	752.51: Undescended testis 752.61: Hypospadias 752.62: Epispadias 752.63: Congenital chordee 752.64: Micropenis 752.65: Hidden penis	54550: Exploration for undescended testis (inguinal or scrotal area) 54560: Exploration for undescended testis with abdominal exploration 54640: Orchiopexy, inguinal or scrotal approach 51840: Anterior vesicourethropey, or urethropey (eg, Marshall-	Penile torsion Cryptorchidism Hypospadias Penile web Small phallus Undescended testes Scrotum Penoscrotal	N/A

	Q53.112: Unilateral inguinal testis	752.69: Other penile anomalies	Marchetti-Krantz, Burch) simple	Chordee	
	Q53.12: Ectopic perineal testis, unilateral	752.7: Indeterminate sex and	51841: Anterior vesicourethropey, or urethropey (eg, Marshall-	AND NOT	
	Q53.13: Unilateral high scrotal testis	pseudohermaphroditism	Marchetti-Krantz, Burch) complicated (eg, secondary repair)	CONTAINING:	
	Q53.20: Undescended testicle, unspecified, bilateral	752.81: Scrotal transposition	53450: Urethromeatoplasty, with mucosal advancement	Edema of testes	
	Q53.211: Bilateral intraabdominal testes	752.89: Other specified anomalies of genital organs	53460: Urethromeatoplasty, with partial excision of distal urethral segment		
	Q53.212: Bilateral inguinal testes		(Richardson type procedure)		

	Q53.22: Ectopic perineal testis, bilateral Q53.23: Bilateral high scrotal testes Q53.9: Undescended testicle, unspecified Q54.0: Hypospadias, balanic Q54.1: Hypospadias, penile Q54.2: Hypospadias, penoscrotal	752.9: Unspecified anomaly of genital organs	54300: Plastic operation of penis for straightening of chordee (eg, hypospadias), with or without mobilization of urethra 54304: Plastic operation on penis for correction of chordee or for first stage hypospadias repair with or without transplantation. 54308: Urethroplasty for second stage hypospadias repair (including urinary diversion) less than 3 cm		
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	Q54.3: Hypospadias, perineal		54312: Urethroplasty for second stage hypospadias repair (including urinary diversion) greater than 3 cm		
	Q54.8: Other hypospadias				
	Q54.9: Hypospadias, unspecified		54316: Urethroplasty for second stage hypospadias repair (including urinary diversion) with free skin graft obtained from site		
	Q64.0: Epispadias				
	Q54.4: Congenital chordee		54318: Urethroplasty for third stage hypospadias repair to release penis from scrotum (eg, third stage Cecil repair)		
	Q55.62: Hypoplasia of penis				
	Q55.64: Hidden penis				

	Q55.5: Congenital absence and aplasia of penis Q55.61: Curvature of penis (lateral) Q55.63: Congenital torsion of penis Q55.69: Other congenital malformation of penis Q56.0: Hermaphroditism, not elsewhere classified Q56.1: Male pseudohermaphroditism		54322: 1-stage distal hypospadias repair (with or without chordee or circumcision) with simple meatal advancement 54324: 1-stage distal hypospadias repair (with or without chordee or circumcision) with urethroplasty by local skin flaps 54326: 1-stage distal hypospadias repair (with or without chordee or circumcision) with		
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	Q56.3: Pseudohermaphroditism, unspecified Q56.4: Indeterminate sex, unspecified Q55.23: Scrotal transposition Q55.0: Absence and aplasia of testis Q55.1 Hypoplasia of testis and scrotum Q55.20: Unspecified congenital malformations of testis and scrotum		urethroplasty by local skin flaps 54328: 1-stage distal hypospadias repair (with or without chordee or circumcision) with extensive dissection to correct chordee 54332: 1-stage proximal penile or penoscrotal hypospadias repair requiring extensive dissection to correct chordee and urethrop...		
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	Q55.21: Polyorchism Q55.29: Other congenital malformations of testis and scrotum Q55.3: Atresia of vas deferens Q55.4: Other congenital malformations of vas deferens, epididymis, seminal vesicles, or prostate NOS Q55.7: Congenital vasocutaneous fistula		54336: 1-stage perineal hypospadias repair requiring extensive dissection to correct chordee and urethroplasty by use of skin graft 54340: Repair of hypospadias complication(s) (ie, fistula, stricture, diverticula) by closure, incision, or excision, simple 54344: Repair of hypospadias complication(s) (ie, fistula, stricture, diverticula) requiring		
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	Q55.8: Other specified congenital malformations of male genital organs Q55.9: Congenital malformation of male genital organ, unspecified		mobilization of skin flaps and ur... 54348: Repair of hypospadias complication(s) (ie, fistula, stricture, diverticula) requiring extensive dissection, and urethra... 54352: Revision of prior hypospadias repair requiring extensive dissection and excision of previously constructed structures		
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Genital anomalies (female)	Q50.01: Congenital	752.0: Anomalies		Ovar	
	absence of ovary,	of ovaries		Vulva	
	unilateral			Uterus	
	Q50.02: Congenital	752.1:		Cervix	
	absence of ovary, bilateral	Unspecified		Vagina	
	Q50.1: Developmental	anomaly of		Clit	
	ovarian cyst	fallopian tubes		Labia	
	Q50.2: Congenital torsion	and broad			
	of ovary	ligaments		AND NOT	
	Q50.31: Accessory ovary	752.11:		CONTAINING:	
	Q50.32: Ovarian streak	Embryonic cyst		Bacterial vagin	
	Q50.39: Other congenital	of fallopian tubes			
	malformation of ovary	and broad		Short cervix	
		ligaments			
		752.19:		Smear of cervix	
		Other			

	Q50.6: Other congenital malformations of fallopian tube and broad ligament	anomalies of fallopian tubes and broad ligaments		Smear cervix	
	Q50.4: Embryonic cyst of fallopian tube	752.2:		Polycystic ovarian	
	Q50.5: Embryonic cyst of broad ligament	Doubling of uterus		Specimen from cervix	
	Q50.6: Other congenital malformations of fallopian tube and broad ligament	752.31: Agenesis of uterus		Leiomyoma of uterus	
		752.32:		Cyst of left ovary	
		Hypoplasia of uterus		Biopsy of cervix	
	Q51.10: Doubling of uterus with doubling of	752.33:		Ovarian cyst	
		Unicornuate uterus			

	cervix and vagina without obstruction	752.34: Bicornuate uterus		Boil of vulva	
	Q51.11: Doubling of uterus with doubling of cervix and vagina with obstruction	752.35: Septate uterus		Baginal deliver	
	Q51.20: Other doubling of uterus, unspecified	752.36: Arcuate uterus		(LEEP) of cervix	
	Q51.21: Other complete doubling of uterus	752.39: Other anomalies of uterus		Incompetent cervix	
	Q51.22: Other partial doubling of uterus	752.4: Unspecified anomaly of cervix, vagina, and external female genitalia		Bicornuate uterus	
	Q51.28: Other doubling of uterus, other specified			Vaginal bleeding	
				Incompetent cervix	
				Baginal birth	

	Q51.0: Agenesis and aplasia of uterus	752.41:		Delivered vagin	
	Q51.81: Other congenital malformations of uterus	Embryonic cyst of cervix, vagina, and external female genitalia		Cyst of right ovary	
	Q51.810: Arcuate uterus			ASCUS of cervix smear cervix	
	Q51.811: Hypoplasia of uterus	752.42: Imperforate hymen		Yeast infection of the vagina	
	Q51.818: Other congenital malformations of uterus	752.43: Cervical agenesis		Dysplasia of cervix	
	Q51.4: Unicornuate uterus	752.44: Cervical duplication		Cervical shortening	
	Q51.3: Bicornuate uterus	752.45: Vaginal agenesis		NL cervix	

	Q51.2: Other doubling of uterus	752.46: Transverse vaginal septum		Cyst of left ovary	
	Q51.0: Agenesis and aplasia of uterus	752.47: Longitudinal vaginal septum		Vulvovaginal candidiasis	
	Q51.7: Congenital fistulae between uterus and digestive and urinary tracts	752.49: Other anomalies of cervix, vagina, and external female genitalia		Vaginalis infection	
	Q51.9: Congenital malformation of uterus and cervix, unspecified			Cysts of both ovaries	
	Q51.828: Other congenital malformations of cervix			Cervix complicating pregnancy	
				Papillomavirus of vagina	

	Q51.82: Other congenital malformations of cervix			Rupture of uterus	
	Q52.4: Other congenital malformations of vagina			Ovarian cancer	
	Q52.70: Unspecified congenital malformations of vulva			Enlarged uterus	
	Q52.79: Other congenital malformation of vulva			Congenital talipes	
	Q52.8: Other specified congenital malformations of female genitalia			Pap smear abnormality of cervix	
				Cyst of ovary	

	Q52.9: Congenital malformation of female genitalia, unspecified Q51.6: Embryonic cyst of cervix Q52.4: Other congenital malformations of vagina Q52.79: Other congenital malformations of vulva Q52.3: Imperforate hymen Q51.5: Agenesis and aplasia of cervix			Neoplasm of both ovaries Carcinoma in situ of cervix Enlarged uterus Yeast infection - vaginal Vaginal symptoms Vaginal pain Vaginal itching	
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	Q51.821: Cervical hypoplasia			Vaginal spotting	
	Q51.820: Cervical duplication			Foreign body in vagina	
	Q52.0: Congenital absence of vagina			Vulvar dysplasia	
	Q52.11: Transverse vaginal septum			Vaginal sore	
	Q52.120: Longitudinal vaginal septum, nonobstructing			Vaginal candidiasis	
	Q52.121: Longitudinal vaginal septum, obstructing, right side			Labial lesion	
				Vaginal yeast	

	Q52.122: Longitudinal vaginal septum, obstructing, left side Q52.123: Longitudinal vaginal septum, microperforate, right side Q52.124: Longitudinal vaginal septum, microperforate, left side Q52.129: Other and unspecified longitudinal vaginal septum Q51.9: Congenital malformation of uterus and cervix, unspecified			Acute vaginitis Vulvar abnormality in pregnancy Vaginal prolapse Ovarian carcinoma Vagina bleeding Vulvar discomfort Vaginal tear Vaginal laceration Irritations on vulva Vaginal pruritis	
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	Q52.10: Doubling of vagina, unspecified				
	Q52.2: Congenital rectovaginal fistula				
	Q52.4: Other congenital malformations of vagina				
	Q52.5: Fusion of labia				
	Q52.6: Congenital malformation of clitoris				
	Q52.70: Unspecified congenital malformations of vulva				
	Q52.71: Congenital absence of vulva				

	Q52.79: Other congenital malformations of vulva				
	Q52.8: Other specified congenital malformations of female genitalia				
	Q52.9: Congenital malformation of female genitalia, unspecified				
	Q56.2: Female pseudohermaphroditis m, not elsewhere classified				

Toe syndactyly	Q70.2: Fused toes Q70.20: Fused toes, unspecified foot Q70.21: Fused toes, right foot Q70.22: Fused toes, left foot Q70.23: Fused toes, bilateral Q70.3: Webbed toes	755.13: Syndactyly of toes without fusion of bone 755.14: Syndactyly of toes with fusion of bone	28345: Reconstruction, toe(s) syndactyly, with or without skin graft(s), each web	Web Toes Syndactyly AND NOT CONTAINING: Penoscrotal Esophageal web Webbed penis Overlapping toes	N/A

	Q70.30: Webbed toes, unspecified foot Q70.31: Webbed toes, right foot Q70.32: Webbed toes, left foot Q70.33: Webbed toes, bilateral				
Talipes equinovarus or rocker bottom foot or other foot	<u>Talipes equinovarus codes:</u> Q66.0: Congenital talipes equinovarus	<u>Talipes equinovarus codes:</u> 754.50: Talipes varus	<u>Talipes equinovarus codes:</u> 29450: Application of clubfoot cast with molding or manipulation, long or short leg	Club Rocker Heel Foot	N/A

positioning deformities ⁶	<u>Rocker bottom feet</u>	754.51: Talipes	29750: Wedging of clubfoot	Feet	
	<u>codes:</u>	equinovarus	cast	Talipes equinovarus	
	Q66.80: Congenital	<u>Other foot</u>	<u>Other foot positioning</u>	AND NOT	
	vertical talus deformity,	<u>positioning</u>	<u>deformity codes (Also</u>	CONTAINING:	
	unspecified foot	<u>deformity codes</u>	<u>includes those above)</u> ⁶	Syndactyly of toes	
	Q66.81: Congenital	<u>(Also includes</u>		of both feet	
	vertical talus deformity,	<u>those above)</u> ⁶		Syndactyly, toes	
	right foot	745.59: Other varus		Injury of toes	
	Q66.82: Congenital	deformities of feet		Bilateral feet	
	vertical talus deformity,	754.62: Talipes		(acquired) NL right	
	left foot	calcaneovalgus		foot	
	<u>Other foot positioning</u>			Abrasion foot	
	<u>deformity codes (Also</u>				
	<u>includes those above)</u> ⁵				

Q66.89: Other congenital deformities of feet	28130: Talcotomy (astragalectomy)	NL ankle or foot
Q66.1: Congenital talipes calcaneovarus	27605: Tenotomy, percutaneous, Achilles tendon (separate procedure)	Osteomyelitis of right foot
Q66.4: Congenital talipes calcaneovalgus	local anesthesia	Ingrown toenail
Q66.3: Other congenital varus deformities of feet	27606: Tenotomy, percutaneous, Achilles tendon (separate procedure) general anesthesia	Foot pain
	28260: Capsulotomy, midfoot medial release only (separate procedure)	Foot and mouth
		Callus of foot
		Tourniquet of toe
		Injury of right foot
		Abscess of toe

			28261: Capsulotomy, midfoot with tendon lengthening 28262: Capsulotomy, midfoot extensive, including posterior talotibial capsulotomy and tendon(s) lengthening 28264: Capsulotomy, midtarsal (eg, Heyman type procedure) 28272: Capsulotomy interphalangeal joint, each joint (separate procedure)	Displaced fracture of fifth metatarsal bone Fluid collection (edema) in the arms NL legs NL hands and feet Tinea pedis Pain in both feet NL left foot Insect bite of right foot Wheelchair	
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			29740: Wedging of cast (except clubfoot casts)	Fracture of left foot Swelling of feet Hammer toe Foot injury Foot swelling Clubbing of nail Hand, foot, mouth disease Polydactyly Foot px Mouth/foot concern	
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				Foot ganglion	
				Right foot surgery	
				Feet swelling	
				Foot nerve pain	
				Blisters on feet	
				Feet pain	
				Pain in both of her feet	
				Foot-skin	
				Ulcer on right foot	
				Heel fx	
				Foot inj	

				“Right foot” Foot ultrasound Hand foot syndrome Cellulitis of foot Toe of right foot Hand foot mouth “L foot” Left foot surgery Laceration of right foot	
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				Chronic pain in left foot Weakness of left foot	
Hypoplastic corpus callosum	Q04.0: Congenital malformations of corpus callosum	742.2: Congenital reduction deformities of brain		Corpus callosum	Specialist Referral data: Free text search “Specialist Findings” and Reason for Referral” when Specialist = Neurologist ²
Feeding difficulties	Z93.1: Gastrostomy status	V44.1: Gastronomy status	43750: Placement of the gastronomy tube	N/A	Delivery Hospitalization data: Yes/No abstracted

	P92.9: Feeding problem of newborn, unspecified P92.8: Other feeding problems of newborn P92.2: Slow feeding of newborn P92.3: Underfeeding of newborn	779.31: Feeding problems in newborn	43246: Esophagogastroduodenoscopy Procedure 49440: Under initial placement procedures on the abdomen, peritoneum, and omentum 43760: Replacement of a gastronomy tube 43761: Repositioning of stomach feeding tube		indicator of whether poor feeding occurred in the newborn at any time within 28 days of birth. This information may come from the Finnegan scoring tool or from any indicator of symptoms from an assessment, such as the Eat, Sleep, and Console approach. Information could also come from notes specifically related to the
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			43762: Replacement of a gastrostomy tube		diagnosis of neonatal abstinence syndrome (NAS) or neonatal opioid withdrawal syndrome (NOWS). ⁷
			43763: Introduction Procedures on the stomach		
			43752: Naso- or oro-gastric tube placement, requiring physician's skill and fluoroscopic guidance		

1 ¹This information is abstracted from the electronic health record. Clinical sites were asked to indicate (Yes/No) whether the infant had
2 a birth defect documented during the delivery hospitalization. If yes, a free text variable captured the final diagnosis or diagnoses.
3 Some sites elected to submit free text birth defect descriptions only on non-live births (not included in this analysis), whereas others
4 provided free text birth defect descriptions on both live and non-live births.

5 ²Specialist referral data was contributed by 6/7 clinical sites. Clinical sites had various experiences in their ability to access specialist
6 referral information, so this is likely not an exhaustive capture of specialist referral information for all infants.

7 ³Newborn labor and delivery information was submitted by 6/7 clinical sites. This includes information on infant sex, birth weight,
8 birth length, and head circumference. This data is extracted from electronic health records.

9 ⁴INTERGROWTH-21st Standards produce percentiles standardized by infant sex and gestational age. Implemented with this R
10 package: Anthropometric Growth Standard Calculations: [growthstandardshttps://ki-tools.github.io/growthstandards/](https://ki-tools.github.io/growthstandards/).

⁵Wadman et al. (2023)'s supplemental file specifically mentions penile torsion, cryptorchidism, hypospadias, chordee, penile web, small phallus, bilateral undescended testes, bifid scrotum.

⁶Talipes codes are presented separately; Rocker bottom feet codes are presented separately; The other foot positioning deformity codes includes those already presented as talipes and rocker bottom feet, in addition to other foot position deformities such as congenital talipes calcaneovalgus.

⁷This delivery hospitalization information is abstracted from the electronic health record.

Supplemental Table 3. International Classification of Disease (ICD) Codes (Version 9 and 10) to Identify Prenatal Exposure to Substances¹

Alcohol	ICD-9-CM Diagnosis
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	291.X: Alcohol-induced mental disorders 303.X: Alcohol dependence syndrome 305.0X: Nondependent alcohol abuse 980.0: Toxic effect of ethyl alcohol 980.1: Toxic effect of methyl alcohol E860.X: Accidental poisoning by alcohol not elsewhere classified
	ICD-10-CM Diagnosis² F10.X: Alcohol related disorders T51.0X: Toxic effects of ethanol T51.1X: Toxic effects of methanol O99.31X: Alcohol use complicating pregnancy, childbirth, and the puerperium
Cannabis	ICD-9-CM Diagnosis 304.3X: Cannabis dependence 305.2X: Nondependent cannabis abuse
	ICD-10-CM Diagnosis² F12.X: Cannabis related disorders

	T40.7X: Poisoning by, adverse effect of and underdosing of cannabis (derivatives)
Nicotine	ICD-9-CM Diagnosis 305.1: Tobacco Use Disorder 989.84: Toxic effect of tobacco
	ICD-10-CM Diagnosis² F17.2X: Nicotine dependence T65.2X: Toxic effects of tobacco and nicotine O99.33X: Tobacco use disorder complicating pregnancy, childbirth, and the puerperium
Sedatives	ICD-9-CM Diagnosis 304.1X: Sedative, hypnotic or anxiolytic dependence 305.4X: Nondependent sedative, hypnotic or anxiolytic abuse 966.X: Poisoning by anticonvulsants and anti-parkinsonism drugs 967.X: Poisoning by sedatives and hypnotics 969.1: Poisoning by phenothiazine-based tranquilizers
	969.2: Poisoning by butyrophenone-based tranquilizers 969.3: Poisoning by other antipsychotics, neuroleptics, and major tranquilizers

	969.4: Poisoning by benzodiazepine-based tranquilizers 969.5: Poisoning by other tranquilizers E851: Accidental poisoning by barbiturates E852X: Accidental poisoning by other sedatives and hypnotics E853X: Accidental poisoning by tranquilizers E855.0: Accidental poisoning by anticonvulsant and anti-parkinsonism drugs E950.1: Suicide and self-inflicted poisoning by barbiturates E950.2: Suicide and self-inflicted poisoning by other sedatives and hypnotics E950.3: Suicide and self-inflicted poisoning by tranquilizers and other psychotropic agents E980.1: Poisoning by barbiturates, undetermined whether accidentally or purposely inflicted E980.2: Poisoning by other sedatives and hypnotics, undetermined whether accidentally or purposely inflicted E980.3: Poisoning by tranquilizers and other psychotropic agents, undetermined whether accidentally or purposely inflicted
	ICD-10-CM Diagnosis² F13.X: Sedative, hypnotic or anxiolytic related disorders

	T42.X: Poisoning by, adverse effect of and underdosing of antiepileptic, sedative- hypnotic and antiparkinsonism drugs
Stimulants	ICD-9-CM Diagnosis
	304.2X: Cocaine dependence
	304.4X: Amphetamine and other psychostimulant dependence
	305.6X: Nondependent cocaine abuse
	305.7X: Nondependent amphetamine or related acting sympathomimetic abuse
	969.7X: Poisoning by psychostimulants
	970.0: Poisoning by analeptics
Stimulants	970.8X: Poisoning by cocaine
	E854.2: Accidental poisoning by psychostimulants
	E854.3: Accidental poisoning by central nervous system stimulants
	E855.2: Accidental poisoning by local anesthetics
	ICD-10-CM Diagnosis²
	F14.X: Cocaine related disorders
	F15.X: Other stimulant related disorders

	T40.5X: Poisoning by, adverse effect of and underdosing of cocaine T43.6X: Poisoning by, adverse effect of and underdosing of psychostimulants
Other substance	ICD-9-CM Diagnosis 304.5X: Hallucinogen dependence 304.6X: Other specified drug dependence 304.8X: Combination of drug dependence excluding opioid type drug 304.9X: Unspecified drug dependence 305.3X: Nondependent hallucinogen abuse 305.8X: Nondependent antidepressant type abuse 305.9X: Nondependent other mixed or unspecified drug abuse 960.X: Poisoning by antibiotics 961.X: Poisoning by other anti-infectives 962.X: Poisoning by hormones and synthetic substitutes 963.X: Poisoning by primarily systemic agents 964.X: Poisoning by agents primarily affecting blood constituents 965.1: Poisoning by salicylates

	965.4: Poisoning by aromatic analgesics, not elsewhere classified
	965.5: Poisoning by pyrazole derivatives
	965.6X: Poisoning by antirheumatics (antiphlogistics)
	965.7 Poisoning by other non-narcotic analgesics
	965.8 Poisoning by other specified analgesics and antipyretics
	965.9 Poisoning by unspecified analgesic and antipyretic
	968.X: Poisoning by other central nervous system depressants and anesthetics
	969.0X: Poisoning by antidepressants
	969.6: Poisoning by psychodysleptics (hallucinogens)
	969.8: Poisoning by other specified psychotropic agents
	969.9: Poisoning by unspecified psychotropic agent
	970.1: Poisoning by opiate antagonists
	970.9: Poisoning by unspecified central nervous system stimulant
	971.X: Poisoning by drugs primarily affecting the autonomic nervous system
	972.X: Poisoning by agents primarily affecting the cardiovascular system
	973.X: Poisoning by agents primarily affecting the gastrointestinal system

	974.X: Poisoning by water mineral and uric acid metabolism drugs
	975.X: Poisoning by agents primarily acting on the smooth and skeletal muscles and respiratory system
	976.X: Poisoning by agents primarily affecting skin and mucous membrane ophthalmological otorhinolaryngological and dental drugs
	977.X: Poisoning by other and unspecified drugs and medicinal substances
	978.X: Poisoning by bacterial vaccines
	979.X: Poisoning by other vaccines and biological substances
	E850.3: Accidental poisoning by salicylates
	E850.4: Accidental poisoning by aromatic analgesics, not elsewhere classified
	E850.5: Accidental poisoning by pyrazole derivatives
	E850.6: Accidental poisoning by antirheumatics (antiphlogistics)
	E850.7: Accidental poisoning by other non-narcotic analgesics
	E850.8: Accidental poisoning by other specified analgesics and antipyretics
	E850.9: Accidental poisoning by unspecified analgesic or antipyretic
	E854.0: Accidental poisoning by antidepressants
	E854.1: Accidental poisoning by psychodysleptics [hallucinogens]

	E854.8: Accidental poisoning by other psychotropic agents
	E855.1: Accidental poisoning by other central nervous system depressants
	E855.3: Accidental poisoning by parasympathomimetics [cholinergics]
	E855.4: Accidental poisoning by parasympatholytics [anticholinergics and antimuscarinics] and spasmolytics
	E855.5: Accidental poisoning by sympathomimetics [adrenergics]
	E855.6: Accidental poisoning by sympatholytics [antiadrenergics]
	E855.8: Accidental poisoning by other specified drugs acting on central and autonomic nervous systems
	E855.9: Accidental poisoning by unspecified drug acting on central and autonomic nervous systems
	E856: Accidental poisoning by antibiotics
	E857: Accidental poisoning by other anti-infectives
	E858.X: Accidental poisoning by other drugs
	E950.0: Suicide and self-inflicted poisoning by analgesics, antipyretics, and antirheumatics
	E950.4: Suicide and self-inflicted poisoning by other specified drugs and medicinal substances
	E950.5: Suicide and self-inflicted poisoning by unspecified drug or medicinal substance

	E980.0: Poisoning by analgesics, antipyretics, and antirheumatics, undetermined whether accidentally or purposely inflicted E980.4: Poisoning by other specified drugs and medicinal substances, undetermined whether accidentally or purposely inflicted E980.5: Poisoning by unspecified drug or medicinal substance, undetermined whether accidentally or purposely inflicted
	ICD-10-CM Diagnosis² F16.X: Hallucinogen related disorders F18.X: Inhalant related disorders F19.X: Other psychoactive substance related disorders T36.X: Poisoning by, adverse effect of and underdosing of systemic antibiotics T37.X: Poisoning by, adverse effect of and underdosing of other systemic anti-infectives and antiparasitics T38.X: Poisoning by, adverse effect of and underdosing of hormones and their synthetic substitutes and antagonists, not elsewhere classified
	T39.X: Poisoning by, adverse effect of and underdosing of nonopioid analgesics, antipyretics and antirheumatics

	T40.8X: Poisoning by and adverse effect of lysergide [LSD] T40.9X: Poisoning by, adverse effect of and underdosing of unspecified psychodysleptics [hallucinogens] T41.X: Poisoning by, adverse effect of and underdosing of anesthetics and therapeutic gases T43.0X: Poisoning by, adverse effect of and underdosing of tricyclic and tetracyclic antidepressants T43.1X: Poisoning by, adverse effect of and underdosing of monoamine-oxidase-inhibitor antidepressants T43.2X: Poisoning by, adverse effect of and underdosing of other and unspecified antidepressants T43.3X: Poisoning by, adverse effect of and underdosing of phenothiazine antipsychotics and neuroleptics T43.4X: Poisoning by, adverse effect of and underdosing of butyrophenone and thiothixene neuroleptics T43.5X: Poisoning by, adverse effect of and underdosing of other and unspecified antipsychotics and neuroleptics T43.8X: Poisoning by, adverse effect of and underdosing of other psychotropic drugs T43.9X: Poisoning by, adverse effect of and underdosing of unspecified psychotropic drug T44.X: Poisoning by, adverse effect of and underdosing of drugs primarily affecting the autonomic nervous system
	T45.X: Poisoning by, adverse effect of and underdosing of primarily systemic and hematological agents, not elsewhere classified

	T46.X: Poisoning by, adverse effect of and underdosing of agents primarily affecting the cardiovascular system T47.X: Poisoning by, adverse effect of and underdosing of agents primarily affecting the gastrointestinal system T48.X: Poisoning by, adverse effect of and underdosing of agents primarily acting on smooth and skeletal muscles and the respiratory system T49.X: Poisoning by, adverse effect of and underdosing of topical agents primarily affecting skin and mucous membrane and by ophthalmological, otorhinolaryngological and dental drugs T50.X: Poisoning by, adverse effect of and underdosing of diuretics and other and unspecified drugs, medicaments and biological substances
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¹These case definitions were based partly on CDC's Drug Overdose Surveillance and Epidemiology (DOSE) system (<https://www.cdc.gov/drugoverdose/nonfatal/dose/about.html>) and previous CDC publications (<https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf>; <https://pubmed.ncbi.nlm.nih.gov/39645154/>)

²ICD-10-CM child codes indicating adverse effects and underdosing were excluded; ICD-CM child codes indicating a substance use disorder in remission were excluded

Positive Fentanyl Laboratory Test^{1,2}	Abstracted Information³	Fentanyl-Specific International Classification of Disease Code⁴	Frequency Among Analytic Sample (%)
-	-		4,386
-	Yes	-	224 (33.6%)
Yes	-	-	210 (31.5%)
Yes	Yes	-	233 (34.9%)

1 ¹Positive fentanyl lab test was documented 1) among infants, or 2) among the mother between the last menstrual period through two
2 days after the infant's birth.

3 ²Among the 443 dyads with a positive fentanyl laboratory test, 416 (93.9%) had either a positive infant test or a positive maternal test
4 during pregnancy prior to the infant's date of birth. If we changed our definition of prenatal fentanyl exposure to only include positive
5 infant tests and positive maternal tests through the day prior to the infant's date of birth, our overall number of dyads with
6 documented prenatal fentanyl exposure would change from 667 to 650.

7 ³Abstracted information includes documented reports of fentanyl prior to initiation of opioid use disorder (OUD) treatment, during
8 any prenatal care visit or contact with healthcare, or during an overdose, if applicable, during the respective pregnancy.

9 ⁴Fentanyl-specific codes included T40.411, T40.412, T40.413, T40.414. In 30 mother-infant dyads, at least one of these codes were
10 documented, but all were following the date of infant's birth, so they were not classified as having documented prenatal fentanyl
11 exposure.

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12 **Supplemental Table 5. Additional Outcomes Among Infants with and Without Documented Prenatal Fentanyl Exposure**

	With Documented Prenatal Fentanyl Exposure	Without Documented Prenatal Fentanyl Exposure
Gestational age (weeks) Median [IQR]	38 [37, 39]	38 [37, 39]
Birth weight percentile ¹ Median [IQR]	36.5 [15.4, 63.8]	37.0 [15.0, 65.2]
Birth length percentile ² Median [IQR]	51.9 [16.6, 83.8]	58.2 [21.9, 87.9]
Feeding difficulties³ % (95% confidence interval)	64.6 (62.4, 66.8)	48.2 (47.0, 49.4)

1 ¹785 infants were missing infant sex or birth weight and 11 infants had a gestational age out of range for INTERGROWTH-21st
2 standards (≥ 43 weeks or ≤ 24 weeks).

3 ²767 infants were missing infant sex or birth length and 10 infants had a gestational age out of range for INTERGROWTH-21st
4 standards (≥ 43 weeks or ≤ 24 weeks).

5 ³See Supplemental Table 2 for methods on ascertainment of feeding difficulties; Values bolded to indicate non-overlapping confidence
6 intervals.