Chapter 2
Best Practices in Care and Treatment of Internationally Adopted Children

Pre-adoption Evaluation of Medical Records

Once parents have been approved for international adoption, they will receive information about a child that is eligible for adoption by either receiving a referral from their adoption agency, by expressing interest in a child identified from an on-line reference list or, in some situations, parents initially travel to the country of adoption where only then are they are presented with an eligible child for consideration. Parents then have a limited amount of time to accept or decline the child being considered, sometimes as little as 24–48 h. In order to make informed decisions about accepting the referral, prospective parents will often seek assistance from a pediatrician, or a pediatric international adoption specialist to review the information to identify potential health risks and conditions.

Typically, information provided to parents will include medical records, photographs and sometimes videos. Depending on the country of origin, the quality of the medical records and the validity of recorded diagnoses are quite variable. Medical terminology varies among countries and translation of medical records into English introduces another potential mechanism for error. Medical records including growth points and laboratory results may be up to date or many months to years out of date. There may or may not be birth history available. Often photos and videos will not be dated. Despite these constraints however, the pediatrician should carefully review all available information to inform parents of possible medical, behavioral, social, or psychological problems that the child may have and the anticipated work-up, treatment and prognosis of those problems. The pediatrician should describe the problems in clear and straightforward language to enable the parents to understand the issues and make informed decisions. The pediatrician does not evaluate whether the child is "normal" or "abnormal", but instead the goal is to interpret the data in terms of risk for morbidity, chronic illness and need for immediate or long-term care. Parents most often want to know if the problems identified might prevent the child from becoming healthy, independent adults.

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Very few children adopted internationally would be classified to be at "low risk" for having future medical, behavioral, social, or psychological problems. Factors associated with being classified as "low risk" are being followed by a pediatrician or healthcare provider since birth, having a history of normal growth and development, living in a community setting as opposed to being institutionalized, and being younger at the time of adoption. A child assessed as being at "average risk" for future issues suggests that the child is at risk of having the known sequelae of institutionalization but no other diagnoses of serious medical conditions. An assessment of a child having a "high risk" for future issues acknowledges that the child is at higher risk for poor outcomes not only because they have been raised in an institution and/or other neglectful environment, but also because of abnormal historical, physical and/or developmental findings. These might include extremely low birth weight, the history of maternal drug or alcohol use, facial characteristics of FAS or other congenital syndrome, microcephaly, extremely delayed or regression of developmental milestones, older age, or a myriad of other factors. Specific issues to address in the medical records are summarized in Table 2.1.

A pre-adoption review gives the pediatrician an opportunity to understand the make-up of the adopting family and their specific preferences about the severity of chronic health problems and disabilities of an adoptive child that would be acceptable to them. Some families specifically request children with special health care needs while other families would prefer a relatively healthy child that would be expected to integrate easily into their adoptive family and require little long-term chronic health care. The pediatrician can then interpret the medical information as it applies to the individual family. The pediatrician attempts to provide the family a problem list that includes known diagnoses and potential problems based upon the history, images and country of origin. Parents should be warned that serious medical issues could be present that medical records, photos and videos cannot capture. It is important for families to know that no definitive diagnoses can be made or confirmed based on the limited information typically provided and that more evaluation will be needed once the child arrives in the new home. Even when specific diagnoses are known such as cleft lip and/or palate, spina bifida or a specific congenital cardiac defect, the prognosis for each child will differ and depend upon a number of different factors including the age of the child, past surgical interventions and/or medical treatments. In cases in which no chronic medical condition is diagnosed, parents must be reminded that there is potential for significant medical and emotional morbidity simply based on the child having spent months to years institutionalized or in a neglectful setting. These problems will often include failure to thrive, feeding problems, developmental delays, behavioral or emotional problems, chronic upper respiratory infections, diarrhea, and skin infections. The older the child and the longer that the child has been in an orphanage, for example, the more likely the child is to have these problems.

Parents should be prepared to expect the anticipated follow-up medical evaluations that will be needed as well as the need for ancillary services that might include physical, occupational and/or speech therapies. Often parents are unaware of the significant time commitment that these services will require particularly in the short term until specific diagnoses and plans of treatment are established.

Table 2.1 Review of Medical History and Previous Records

Birth records	Prenatal blood and urine test results of biological mother
	Exposure to medications, illegal substances, alcohol or tobacco
	Maternal age
	Gestational age, birth weight, length and head circumference
	Apgar scores
	Prenatal concerns, neonatal complications
	Newborn hearing screens
	Newborn metabolic screens
Family history	Maternal illness or death
	Vision or hearing deficits
	Genetic diseases
	Mental health diagnoses
	Concerns related to ethnicity such as sickle cell disease
Previous placement(s)	Institutionalization vs. foster setting—reason for placement; timing, and duration of placement
	Number of prior placements
Reason for placement into adoptive home	Parental death, economic instability
Nutritional history	Any periods of malnutrition
	Nutritional status of other children in the institution
Previous Growth Points	Weight, length/height and head circumference
	Plot on WHO growth charts to reveal somatic growth delays (or, less likely, obesity), microcephaly
	Trends more helpful than a single point
	Often growth measurements out of date
History of abuse or neglect	In the home setting
	In any placement setting, such as an institution
Chronic medical diagnoses	
Reports from previously consulted specialists	
Laboratory test results, radiographic studies, other studies	Ultrasound results (especially head or abdomen)
	Chest x-ray results
	HIV, syphilis, HBV, HCV
	CBC
	Urinalysis
Testing for tuberculosis exposure/infection	
Immunizations	
Environmental risk factors	Lead risks
Developmental milestones	
Behavioral issues	

During the pre-adoption consultation parents can be informed of available community support services for specific pre-adoption diagnoses. Local or regional chapters of national organizations can provide parents with educational information that may facilitate preparation for their child's homecoming.

The pre-adoption visit is also an opportunity to discuss issues that might arise as the child adjusts to life with the adoptive family. These issues, including transition and attachment are discussed in Chapter 3.

Pre-adoption consultation may not be covered by most insurance carriers, but the pediatrician should advise the adoptive parent to seek info from the parents' employers about benefits covered through an adoption subsidy plan or flexible spending account. For 2013, the maximum federal adoption credit was $ 12,970; depending on the family's income. Credits would be taken in the year the adoption is final. Allowable adoption expenses include: court costs, attorney fees, traveling expenses (including amounts spent for meals and lodging while away from home), and other expenses directly related to the legal adoption of an eligible child. For more information please see: http://www.irs.gov/Individuals/Adoption-Benefits-FAQs or consult a lawyer or tax expert.

Pre-travel

Most families will travel to the new child's country of origin to pick up their child. Some countries require additional visits prior to the formal adoption and some others require a prolonged visit at the time of adoption. Adoptive parents may choose to take along other family members such as siblings, or grandparents of the new child. Each traveler should be thoroughly prepared for the trip including visiting a travel clinic for immunization review and updating. Additional recommendations are based on the family's destination and expected duration of travel and should include a discussion of

- management of chronic conditions during travel
- prevention and management of potential travel-related illnesses
- other supplies that may be needed
- food and water safety precautions
- travel safety

The pediatrician can recommend age-specific items to include in their travel kit. The family should be provided with a list of medications and age- or weight-specific dosing recommendations. This list should include basic first aid materials, non-prescription medications for cough, fever and pain. Often antibiotics are prescribed for the family to have on hand in case of respiratory or gastrointestinal infection for the newly adopted child. Topical anti-parasitic medications may also be prescribed in case the child is found to have an infestation with scabies or lice. Clear instructions for the use of all medications as well as indications requiring consultation with a physician should be provided.

It is becoming increasingly clear that even family members who are not traveling to the child's country of origin but who anticipate close contact with the child within the first 4–6 weeks of the child being home should prepare by ensuring that their immunizations are up-to-date for specific infections that can be transmitted from the adopted child to his close contacts. These recommendations are based on the possibility of transmission to close contacts and upon documented outbreaks that can be traced back to an internationally adopted child and may include hepatitis A, hepatitis B, pertussis and measles. These vaccines should be given as soon as possible to ensure adequate immunity prior to the arrival of the child. The entire family should be educated on the concept of universal precautions against infectious diseases that may help protect them against infections such as intestinal pathogens.

During Travel

The physical demands of international travel combined with the emotionally-charged experience of meeting their new child can be an overwhelming experience for families. Some countries do not present a child for consideration until the family is present in country in which case the child's medical record must be reviewed quickly. Occasionally, parents are presented with a child who is seriously ill or is markedly different than described in previous reports. First-time parents have additional challenges that include dealing with the normal demands of a toddler in a foreign setting where communication barriers can exist. In each of these situations parents often find it helpful to get advice from a physician familiar with international adoption. Families should be provided with telephone and dedicated e-mail contact information for contacting a physician while traveling.

Post-adoption

Although a medical examination is required from a US government-approved physician in the child's country of origin before an adoptee can be issued an entry visa for the United Sates, prospective parents should not rely on this examination to detect all possible disabilities or illnesses. This examination is a formality and is limited to screening for serious physical and mental disorders and used to identify infectious diseases in the child, such as TB and syphilis, which would make the child ineligible for a visa because of public health risks. More information regarding the medcial examination for internationally adopted children can be found at http://travel.state.gov/content/adoptionsabroad/en/us-visa-for-your-child/medical-examination.html.

Once home, adopted children need a comprehensive health evaluation to fully identify and address all of their health and developmental needs (Tables 2.2 and 2.3). The American Academy of Pediatrics (Jones 2011) recommends that a

Table 2.2 Initial physical examination

Vital signs	Heart rate, respiratory rate, blood pressure, temperature
	Oxygen saturation (O2 sat)
Growth parameters	Weight, length/height, head circumference
	Plot on World Health Organization growth charts
	Compare to pre-adoption growth records
General appearance	Examine face for features suggestive of genetic disorder, syndromes or congenital anomalies including fetal alcohol syndrome
	Note degree of responsiveness and interaction with adoptive parents
Skin	Bacille Calmette-Guerin (BCG) scar (most often on left deltoid)
	Infectious diseases, rashes (impetigo, etc.) or infestations (scabies, lice, etc.)
	Identify and document any congenital skin abnormalities including hemangiomas, nevi, and blue macules of infancy (Mongolian spots) commonly seen in children of Asian, African and Hispanic ethnicity
	Signs of abuse (bruises, burns)
Musculoskeletal	Rickets
	Scoliosis
	Signs of prior fractures
Genital examination	Ambiguous genitalia
	Tanner staging
	Any abnormality suspicious for prior sexual abuse or genital cutting
	Testing for sexually transmitted infections should be performed if any suspicion of abuse or if patient sexually active
Neurologic examination	Developmental and neurologic abnormalities

Table 2.3 Other screening evaluations

	Evaluation	Notes
Hearing	Age-appropriate screening	Screen all children, particularly those with risk factors for hearing loss (recurrent otitis media, microcephaly, meningitis, genetic syndromes) as well as developmental (speech) delays
Vision	Eye examination as appropriate for age	Screening for refraction error starting at age 3 years
		Funduscopic exam for children with birth weight < 1500 g, and referral to ophthalmologist
Dental	Dental examination for all children > 12 months or older	Earlier referral for children with dental caries or history of mouth trauma
Developmental Screening	Use standardized validated screening instruments	Screening performed soon after adoption may be influenced by language barriers as well as by the lack of previous exposure to the types of materials used for testing

Table 2.3 (continued)

	Evaluation	Notes
		Referrals to early intervention programs for children 0–35 months of age
		Referrals through school system for children 36 months and older with establishment of Individualized Educational Plan (IEP) when appropriate
	Speech/language evaluation	When possible, a speech evaluation within a few weeks of arrival home by a speech therapist fluent in the child's native language is optimal to identify gaps in articulation and language processing skills
	Physical or occupational therapy evaluation	When indicated if any physical developmental delays

comprehensive medical evaluation be completed soon after placement in an adoptive home to

- confirm and clarify existing medical diagnoses
- assess for any previously unrecognized medical issues
- discuss developmental and behavioral concerns
- make appropriate referrals
- determine immune status and determine potential need for immunization

The initial medical evaluation of newly adopted children includes a detailed review of past medical history, a comprehensive physical examination and laboratory screening using a panel of tests for medical disorders and for diseases prevalent in the countries from which the child is adopted. The physical examination should be comprehensive. Table 2.2 lists findings that may be seen in international adoptees.

The most common medical problems identified in internationally adopted children will be infectious in nature. However, these children may have hematologic and metabolic issues as well. Most problems are what have been termed as "silent" or asymptomatic in nature and would not have been identified from the medical history or physical examination (Hostetter et al. 1991). For this reason, comprehensive medical screening for all children adopted abroad has become the standard of care regardless of age, sex or country of origin (Hostetter et al. 1991; Murray et al. 2005). This screening includes laboratory testing for hematologic, metabolic and infectious processes. Additionally, other recommended screens include hearing, vision and dental evaluations as well as developmental and mental health assessments. Table 2.3 lists other recommended tests.

A visit scheduled at 10–14 days of coming home is ideal for both the adoptive family and the child, unless the child has a known unstable or critical condition. Within the first 2 weeks of being home, parents and child will have had a time to recover from international travel. Issues with sleep cycle and eating will have begun to normalize. Parents may then have the opportunity to consider the child within the context of the home routine and have more specific questions about helping the

child adjust to the home environment. The child will have had the opportunity to settle into a predictable daily routine. They will be more comfortable with their new families and a visit to the doctor's office will not be as anxiety provoking.

During this initial post-adoption evaluation, the pre-adoption medical record will be reviewed. If a pre-adoption evaluation has been performed for the child, then any additional medical records should be reviewed. Occasionally additional growth points and laboratory testing results will be provided to parents at the time of picking up the child in the country of origin. Whenever possible, parents should be asked to forward medical records so that the records can be reviewed prior to the visit. Table 2.1 lists the information to be sought from the child's history. In addition, a complete physical examination and comprehensive laboratory screening based on environmental, nutritional, ethnic and infectious disease risks should be performed.

This initial post-adoption visit is critical for assessing the child for medical and mental health issues. This visit also provides adoptive parents an opportunity to ask questions about their own observations from the weeks spent with the child. It is important to have an interpreter available during the visit for older children to give them a chance to ask and answer questions.

Issues to address at this first visit include not only eating, sleeping and elimination but also behavioral and emotional issues that can arise in the immediate post-adoption transition (Schulte and Springer 2005).

Hearing and Vision

Hearing and vision screens are recommended by the AAP as part of routine post-adoption work-up. Hearing and vision screening not only allows early detection and treatment of deficits, it also may prevent associated outcomes such as speech and language disorders, reduced school performance, behavioral problems, decreased psychosocial well-being and poor adaptive skills (Table 2.4).

The prevalence of hearing and vision problems among international adoptees is not known. Among children adopted from Eastern Europe, as many as 78% had abnormal ocular findings including subnormal visual acuity, amblyopia, refractive errors, strabismus, congenital malformations and optic nerve hypoplasia (Gronlund et al. 2004). According to surveys of parents of international adoptees who had received immediate post-adoption care in Minnesota, 24.7–31% of children had later received a diagnosis of or treatment for vision problems, 11.9–12.8% of children had had diagnosis or treatment for hearing problems. Chronic ear infections were reported for 14.6–17.6% and speech disorder or language delay was reported for 19.4–26.0% of children whose parents were surveyed (Eckerle et al. 2014). In this study, hearing problems were associated with increased risk of developmental, learning, cognitive and speech problems. Vision problems were associated with increased risk of developmental problems and among children with combined hearing and vision problems there was an increased risk of social and attention problems (Eckerle et al. 2014).

Table 2.4 Post-adoption diagnostic screening for hematologic, nutritional and metabolic disorders

	Diagnostic test	Note
Anemia	Complete blood count (CBC) with red blood cell indices and white blood cell differential	
Hemoglobinopathy and blood disorders	Sickle cell disease—hemoglobin electrophoresis	
	Thalassemia	
	G-6-PD concentrations	
Toxin exposure	Blood lead concentration	
Rickets screening	Calcium, phosphorus, alkaline phosphatase, 25(OH) vitamin D	If children receive vitamin D supplementation a few weeks to months before testing, 25(OH) vitamin D levels may be normal
	Radiographs of long bones	
Metabolic screen	Newborn screen	
	Thyroid stimulating hormone and Free T4	
	Urinalysis	

Dental

Dental examination is recommended for all international adoptees. Dental disease may be more common in international adoptees because of poor hygiene, fluoride deficiency or feeding practices such as "bottle propping". Malnutrition and/or nutritional deficiencies can lead to serious dental complications. Vitamin D deficiency results in tooth enamel mineralization defects and increased propensity for dental caries. Vitamin D deficiency during gestation and infancy affects primary teeth and during early childhood through age 8 years affects permanent teeth. Dental abnormalities may also reveal hereditary vitamin D deficiencies, other vitamin deficiencies such as hypovitaminosis A, C and E or mineral deficiencies such as phosphorus, magnesium and calcium (Davit-Beal et al. 2014).

Age Determination

For some international adoptees, questions may arise with respect to the accuracy of the child's documented age. For younger children a difference of weeks or months is not likely to be significant in the long term. For older children age determination may be more important particularly with respect to practical issues such as placement in school or eligibility for special education services but can also be important when assessing the timing of pubertal development.

There are no accurate or reliable tests for age determination. Malnutrition and deprivation may affect assessments using standard measurements including radiographic bone age and dental eruption. Onset of puberty may be advanced as a child's

nutritional status rapidly improves. It is usually best to delay changing a birth date until at least 12 months after adoption to allow for catch up growth and prolonged observation of a child's physical and emotional development.

Developmental Screening

In international adoptees, developmental screening soon after adoption may be complicated by language barriers and the fact that the child may have not had exposure to the tools and materials used for testing. Therefore in these children, early scores may not be predictive of later functioning. Children adopted internationally nearly always demonstrate delays in at least one area of development. Referral to a Behavioral and Developmental specialist may be indicated if children continue to demonstrate developmental delays after a reasonable period of adjustment.

Mental Health Review

Children adopted internationally are at increased risk of mental health disorders including socioemotional problems. The risk for mental health disorders among this group of children may be heightened by pre-adoption factors including prenatal drug and alcohol exposure, prolonged institutionalization, history of multiple placements or with a history of previous abuse and neglect.

In-office assessments may be helpful for identifying children with mental health problems

- Pediatric Symptom Checklist
- Brief Infant Toddler Social Emotional Assessment
- Ages and stages questionnaire: Social-Emotional

The American Academy of Pediatrics has many resources for mental health screening and assessment that can be accessed at: http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Mental-Health/Pages/Addressing-Mental-Health-Concerns-in-Primary-Care-A-Clinicians-Toolkit.

Screening for mental health disorders should take place at all medical visits particularly at the time of regular health assessments. Referral to a pediatric mental health specialist is indicated if abnormalities are identified through in-office screening.

Laboratory Evaluations—Hematologic, Nutritional and Metabolic Disorders

Internationally adopted children are at risk for medical disorders that may be caused or exacerbated by pre-adoption living situations that deprives children of adequate nutrition and physical, emotional and intellectual stimulation. In addition, children

are at risk for having had prenatal and childhood exposures to environmental toxins and infectious diseases. Many of the medical problems common to internationally adopted children are diagnosed not by physical signs or symptoms but by deliberate screening examinations. Therefore all children should be screened routinely as a part of the medical evaluation of internationally adopted children regardless of age, sex and country of origin (Hostetter et al. 1991).

Rickets

Inadequate Vitamin D levels have been found to be common among international adoptees. They are at risk for inadequate prenatal nutrition that may result in inadequate vitamin D stores. Additionally, many children have inadequate caloric and/or vitamin D intake prior to adoption. Institutionalized children may not spend much time outdoors and may lack adequate sun exposure. Results from a prospective cohort study of children evaluated shortly after adoption revealed low levels of vitamin D (vitamin D insufficiency) in 27% and vitamin D deficiency in 7% of adoptees. Vitamin D insufficiency was correlated with lower BMI and longer length of time in an institution, but was not found to be associated with birth country, giardia, tuberculosis or parasitic infections (Gustafson et al. 2013).

Early case reports of children with vitamin D deficiency rickets in children adopted from the former Soviet Union illustrate the physical findings that may be observed, some of which may be atypical (Reeves et al. 2000). Classically, rickets is manifested in widening of the distal metaphyses of the radii and ulnae and bowing of the long bones in the leg. Among institutionalized children with gross motor delay and minimal weight bearing, the bowing may be apparent in the distal tibiae in the ankle area instead of near the knee as is seen in weight bearing children. Many of the rachitic features typically resolve over 12–24 months with vitamin D and calcium supplementation.

Because children generally experience rapid catch-up growth in the first year with their adoptive families, they may need larger amounts of dietary or supplemental iron and other nutrients than would a normally growing child of the same age.

Referral for Subspecialty Care

During the health assessment of an adopted child health concerns not previously diagnoses may be identified. Following a review of any previous medical testing it is appropriate to make referrals to pediatric medical subspecialists. The pediatrician should play a key role in coordinating the health care management of adopted children with special health care needs. Although timely referral is important, one may take into consideration that the child is adapting to a new home and parents are adapting to the child. Carefully planning of referrals is critical to ensure successful adjustment and to encourage the family to establish a medical home for ongoing continuity of care.

Laboratory Evaluations—Infectious diseases

Although the prevalence of infectious diseases in a given internationally adopted child will reflect the prevalence of the infection in their country of origin, there is great variability in adoptees from a given country possibly related to age of adoptee at the time of arrival, pre-adoption setting, overall health of the child as well as changes over time in national institutional vaccination and/or screening policies and practices. In general, latent TB infection and intestinal parasites are the most common infectious diseases in internationally adopted children (Table 2.5).

The early screening of newly adopted children for infectious diseases is essential to identify and treat infections acquired in their home countries and also to protect their adoptive parents and families from becoming ill. Equally important is the timely evaluation of immunization status for vaccine preventable diseases so that vaccines can be updated as necessary. One consequence of failing to identify infectious processes in adopted children is the potential for outbreaks of infections that have been traced back to children adopted internationally have been reported over the past decade.

The potential for infectious diseases to be transmitted to adoptive families has been recognized. A recent retrospective study examined the medical records of children adopted internationally in France from 2009–2011. In 142 children, 171 potentially transmissible infections were identified. Twenty (12%) infections were

Table 2.5 Prevalence of infectious diseases in newly arrived internationally adopted children. (http://www.uptodate.com/contents/international-adoption-infectious-disease-aspects?source=search_result&search=infectious+diseas+international+adoption&selectedTitle=2~150. Accessed 6/8/2014, Data from: Abdulla et al. 2010, p. el039; Stadler et al. 2008, p. 1223; Trehan et al. 2008, p. e7; Staat et al. 2011, p. e613, 2012)

Condition	Country or region				
	Russia (%)	China (%)	Guatemala (%)	Korea (%)	Africa (%)
Hepatitis A					
Acute	<1	0	0	0	2
Past	18	9	32	0	68
Hepatitis B					
Chronic	<1	2	0	0	3
Past recovered	2	6	2	6	9
Hepatitis C	<1	0	0	0	0
Syphilis	<1	<1	<1	0	5
HIV	0	0	0	0	2
Latent tuberculosis	22	18	32	6	27
Intestinal parasites (pathogen)	44	14	10	0	49
Giardia intestinalis	30	11	6	0	32
Helminths	<1	<1	<1	<1	15

HIV human immunodeficiency virus

transmitted to a member of the adoptive family including Hepatitis A, giardiasis, and MSSA. Hepatitis B and latent tuberculosis were also diagnosed in this group of children without subsequent transmission (Sciauvaud et al. 2013). Failure to identify these infections contracted by children in their country of origin may have several consequences:

- Outbreaks (hepatitis A, TB, measles)
- Potential for progression of severe chronic infections within the adopted child–hepatitis B, TB, HIV
- Infections considered to be benign may be severe HAV
- Carriage of drug-resistant pathogens such as *Staphylococcus aureus,* TB, multidrug resistant salmonella

Even if a child has been tested for HIV, hepatitis A and B and syphilis prior to adoption, these serologic tests have to be performed soon after arrival in the United States and repeated in 6 months.

Even with most internationally adopted children being medically evaluated within 1 month of arrival, transmission within the family may have already occurred. Therefore as mentioned previously, prevention against potential transmission can be achieved by vaccination of the entire family and not only those who travel to the country of origin of the child and by timely screening of the child on arrival.

HIV

HIV test results are typically provided in the pre-adoption records. Although HIV prevalence may be high in countries from which children are commonly adopted, the incidence of HIV among international adoptees is low. Routine screening tests detect antibodies to HIV. Repeatedly positive antibody tests are diagnostic for HIV infection in children older than 18 months. Children younger than 18 months may have positive tests due to the presence of circulating maternal antibodies without being infected. If these screening tests are positive, then confirmatory testing to detect HIV nucleic acid is performed. Children should be tested for HIV in their initial post-adoption evaluation and retested at 6 months. HIV-infected adoptees should be referred to a pediatric infectious disease or HIV specialist for follow-up.

Hepatitis A

Internationally adopted children should be routinely tested for acute hepatitis A virus (HAV) infection as well as for evidence of past infection. HAV typically causes an acute, self-limited illness associated with fever, malaise, jaundice, anorexia and nausea. Older children and adults are more likely to have symptomatic (icteric) illness whereas children younger than 6 years of age the infection may be asymptomatic or have nonspecific manifestations. This illness may last up to two months

though in as many as 10–25% of symptomatic people will have prolonged or relapsing disease lasting as long as 6 months. [American Academy of Pediatrics Red Book 2012]

Hepatitis A virus is most commonly transmitted from person to person through the fecal-oral route because the virus is shed in the stool. Because young HAV-infected children are frequently asymptomatic, spread of the virus to close contacts may occur without recognition of the source. Most international adoptees originate from HAV-endemic countries. The incidence of HAV infection among international adoptees varies between countries and with increasing age. Approximately 30% of international adoptees had positive antibodies to HAV, presumably resulting from natural infection since HAV vaccines are not routinely given in countries from which international adoptees originate. Significantly, acute HAV infections have been identified in between 1 and 4.6% of international adoptees (Abdulla et al. 2010; Raabe et al. 2014). Children with acute HAV infection were indistinguishable from uninfected adoptees and most of the cases of acute infections were in children younger than 2 years of age. In the largest study, the prevalence of acute HAV infection was highest in children adopted from Ethiopia and almost all adoptees found to be acutely infected had emigrated from countries classified by the CDC as having intermediate or high HAV endemicity (Raabe et al. 2014).

Shedding of HAV among asymptomatic children is important because HAV outbreaks have been described among the primary and secondary contacts of children adopted recently from countries in which the virus is endemic (Fischer et al. 2008; Pelletier et al. 2010; Sweet et al. 2011). Because many cases occurred in contacts that had not traveled to the endemic country, in 2009, the Advisory Committee on Immunization Practices (ACIP) has recommended routine HAV vaccination for household members and other personal contacts of adopted children newly arriving from countries with high or intermediate HAV endemicity. ACIP recommends that persons anticipating close contact with IA children within 60 days after arrival from a country with intermediate or high rates of HAV infection should be vaccinated with a 2-dose series against HAV. Those who travel to Hepatitis A-endemic countries should receive HAV vaccine or immune globulin prior to travel (Centers for Disease Control and Prevention 2007, 2009; Committee on Infectious Diseases 2011).

Hepatitis B

The prevalence of chronic hepatitis B infection in international adoptees has varied over time due to more widespread immunization programs, pre-adoption screening and depending on geographic origins. Although hepatitis B serologic tests are performed routinely in most countries from which children are adopted, post-adoption screening is routinely recommended because pre-adoption testing may be incomplete and/or children may have become infected after testing.

One retrospective evaluation of international adoptees demonstrated that among 1228 internationally adopted children screened for hepatitis B infection as part of their initial post-adoption assessment, 380 (31%) had negative serologies, 798

(65 %) had been vaccinated (HBsAg-negative, anti-HBs-positive and anti-HBc-negative), 14 (1.1 %) were found to be infected (HBsAg-positive, anti-HBs-positive and anti-HBc-positive) and 36 (2.9) were found to have serologies consistent with recovery from hepatitis B infection (HBsAg-negative, anti-HBc-positive) (Stadler et al. 2008). On repeat testing of those children with negative serologic results initially, one child was found to be acutely infected and three children had serologies consistent with recovery from infection.

All internationally adopted children should be tested for HBsAb to assess immunization status and tested for HBV surface antigen (HBsAg) and HBV core antibody (anti-HBc) to identify cases of HBV infection. If HBsAg is positive, perform hepatitis B early antigen (HBeAg), anti- hepatitis B early antigen (HBeAb), and quantitative HBV DNA PCR. Also test AST, ALT, bilirubin, alkaline phosphatase and albumin levels. Chronic infection is associated with the development of serious liver disease and requires long-term follow-up with a hepatologist.

Hepatitis B has a long (45–160 days with an average of 90 days) incubation period. The development of positive serologic tests upon repeat testing in children who had negative test results initially reinforces the recommendation to repeat Hepatitis B serologic testing 6 months later to identify those individuals who may have been infected just prior to emigration who had not yet mounted an immune response on that initial assay.

Although Hepatitis B is typically transmitted through activities that involve percutaneous or mucosal contact with infectious blood or body fluids, Hepatitis B also has been shown to be transmitted to household contacts of infected individuals. HBsAg has been found intermittently in saliva of HBV infected individuals even in the absence of visible blood. HBV remains viable and infectious on contaminated surfaces for at least 7 days. Contamination of toys, toothbrushes and candy or chewing gum with infectious saliva may be important routes of infection within families (Villarejos et al. 1974). If a child is found to be an HBsAg carrier, immunization is recommended for all susceptible family members (Table 2.7).

Hepatitis C

Because the prevalence of hepatitis C viral (HCV) infection is increased in the countries from which many adoptees originate, routine screening for HCV is recommended for all internationally adopted children. Screening is performed by testing for HCV antibody. Hepatitis C antibody may be present in infants born to HCV-infected mothers for up to 18 months after birth without the infant being infected. Therefore if the HCV antibody is positive, HCV RNA PCR should be done to confirm infection. Children with HCV infection should be immunized against Hepatitis A and B and referred to a gastroenterologist/hepatologist for further management. Children who have negative HCV serology on initial screening should be retested 6 months later.

Although almost all HCV transmission is by parenteral or percutaneous routes, case reports suggest that transmission among close family contacts can occur

through viral exposure from blood and other body fluids from the infected individual. To prevent transmission of HCV within the family, family members should be warned to avoid contact with objects contaminated with blood of an infected individual including personal hygiene items (toothbrushes, razor blades, towels, nail-grooming equipment). Hepatitis C virus infectivity in blood persists after exposure to drying and storage at room temperature (Kamili et al. 2007). It has been suggested that saliva may be a potential source for transmission within families. Up to 50 % of saliva samples from patients infected with HCV may contain HCV RNA therefore, sharing of personal hygiene items and food (chewing gum, sweets, and partially eaten food) should be discouraged (Indolfi et al. 2013).

Tuberculosis

Although the United States has witnessed an overall decline in TB incidence since 1993, the proportion of TB cases occurring in foreign-born individuals continues to increase and in 2013 was 13 times greater than the incidence rate among US born individuals (Alami et al. 2014). In proportion to the incidence rates of active infection in their countries of origin, children then are at risk of having had TB exposure and active or latent TB infection (LTBI). Because tuberculosis may be more severe in young children and may reactivate in later years, screening with the tuberculin skin test (TST) in all children or an interferon-gamma release assay in children 5 years of age or older is important in this high-risk population (American Academy of Pediatrics 2012).

Because of the high prevalence of tuberculosis in countries from which children are adopted, the threshold for positive PPD skin test is greater than or equal to 10 mm induration. The risk of a "false-positive" skin tested associated with prior BCG immunization is considered low if the skin test is placed at least 1 year following the vaccine. It is now recognized that shortly after immigrating to the United States some children will have negative TST but will have reactive tests upon retesting 3–6 months later. It is not clear whether the initial negative test in those children found to have positive results in subsequent TST may be attributed to factors such as malnutrition, concomitant infection, receipt of live vaccines, immunosuppression, or anergic response limiting the delayed type hypersensitivity reaction necessary to elicit a positive TST result. Therefore it is recommended that children with a negative TST in the initial evaluation be retested 3–6 months later. All children with positive TST should undergo evaluation for active TB. If there are no clinical signs on physical examination and a negative chest x-ray, children should be treated with isoniazid for 9 months as preventive therapy.

Syphilis

Children are frequently adopted from countries where syphilis may be prevalent and perinatal screening is suboptimal. Children with congenital syphilis may be

asymptomatic. Results for syphilis tests are variably provided in pre-adoption medical records. Syphilis (also known as lues) screening tests may be listed as the Wassermann reaction (RW or WR) in records from Eastern Europe and as TRUST in Chinese records. Serologic testing should be performed for all international adoptees because untreated syphilis has significant long-term complications. Screening tests include the Venereal Disease Research Laboratory (VDRL), rapid plasma reagin (RPR) and automated reagin tests (ART). Positive results must be confirmed using more specific treponemal tests such as the fluorescent treponemal antibody absorption (FTA-ABS) or the *T. pallidum* particle agglutination (TP-PA) tests. Infected children should undergo lumbar puncture for VDRL testing of the cerebrospinal fluid to exclude neurosyphilis as well as a complete blood count, hepatic transaminases, long bone radiographs and vision and hearing screening.

Gastrointestinal Pathogens

Intestinal Parasites

Intestinal parasites are common in internationally adopted children and may be found in as many as 49% of children adopted from Africa (Staat et al. 2011). Pathogen infestation is often asymptomatic so all children should be screened. Parasites, particularly protozoa, are frequently transmitted by contaminated drinking water and can also be spread through fecal-oral contact. The prevalence of intestinal parasitosis varies with age and country of origin. In a large study of 1042 children evaluated within 120 days of arrival in the US, 27% had at least one pathogen identified with *Giardia* being the most common followed by *Blastocystis hominis*, *Dientamoeba fragilis*, and *Entamoeba histolytica*. The prevalence varied according to the country of origin; South Korea had the lowest prevalence (0%) and Ethiopian and Ukranian children had the highest prevalence of 55% and 74% respectively. Children older than 1 year of age were more likely than younger children to be infected (Staat et al. 2011). The association with intestinal parasitic infection with symptoms of diarrhea, history of malnutrition or pre-adoption institutionalization is less clearly defined (Table 2.6).

Testing multiple stool samples increases the sensitivity of microscopic evaluation for ova and parasites. The probability of identifying a pathogen is close to 100% with testing three separate stool samples. (Staat et al. 2011) The stool specimens should be collected in the morning 48–72 h apart in appropriate preservative-containing collection containers. One stool sample is usually sufficient for *Giardia* and *Cryptosporidium* direct fluorescent antibody. It is recommended that international adoptees receive treatment for infections with *Giardia, Hymenolepsis, Ascaris lumbricoides*, *Trichuris trichiura*, *Dientamoeba fragilis* and *Blastocystis*. After treatment follow-up stool samples should be examined to confirm eradication of infection and to assess emergence of additional parasites.

Table 2.6 Post-adoption diagnostic testing for infectious diseases

	Diagnostic test	Note
Infectious diseases, routine		
Viral hepatitis	Hepatitis B surface antigen (HBsAg), anti-hepatitis b surface antigen (anti-HBs) and anti-hepatitis B core antigen (anti-HBc)	If HBsAg is positive, perform hepatitis B early antigen (HBeAg), anti- hepatitis B early antigen (HBeAb), and quantitative HBV DNA PCR. Also test AST, ALT, bilirubin, alkaline phosphatase and albumin levels
	Hepatitis C antibody (IgG)	
	HAVantibody total antibody (IgM plus IgG); obtain IgM if total is positive	
HIV	HIV-1 and -2 serologic testing, if positive, obtain HIV Nucleic acid amplification testing (NAAT) for confirmation	Positive serologic results for children younger than 18 months of age may represent maternal antibodies, confirm with HIV NAAT
Syphilis	Nontreponemal test (RPR, VDRL or ART)	If positive, confirm by obtaining treponemal test (MHA-TP, FTA-ABS, TPPA)
Tuberculosis	PPD skin test	≥10 mm induration positive threshold for international adoption
	Interferon-gamma Release Assays (IGRA's) (Quantiferon-Gold, T-Spot)	For children ≥5 years of age
Stool parasites	Ova and parasites	Three stool samples are recommended for ova and parasite testing and one sample for giardia and cryptosporidium direct fluorescent antibody. After treatment, obtain three samples for re-testing to confirm clearance of pathogens
	Giardia	
	Cryptosporidia	
Infectious disease, special circumstances		
Bacterial enteric infection	Stool bacteria culture	Particularly for children with bloody diarrhea or diarrhea with fever
Tissue parasites	Strongyloides serologic testing	For children adopted from endemic areas, particularly those with eosinophilia
	Schistosoma serologic testing	
Lymphatic filiariasis	Filarial serologic testing	For children≥2 years of age adopted from endemic areas in the tropics and sub-tropics of Asia, Africa, the Western Pacific, and parts of the Caribbean and South America, especially if signs of lymphedema (fluid collection and swelling of the legs, arms, breasts), hydrocele of the scrotum, bacterial infections in the skin or lymph system, or tropical pulmonary eosinophilia syndrome: cough, shortness of breath, wheezing, and high levels of immunoglobulin E (IgE) -though most people develop these clinical manifestations years after being infected.

Table 2.6 (continued)

	Diagnostic test	Note
Chagas	*Trypanosoma cruzi* serologic testing	For children adopted from endemic areas in the Americas (mainly, in rural areas of Latin America where poverty is widespread), especially if there are **acute phase** symptoms like fever, fatigue, body aches, headache, rash, loss of appetite, diarrhea, and vomiting, or signs of enlargement of the liver or spleen, swollen glands, or local swelling (a chagoma) of the eyelids on the side of the face near the bite wound, myocarditis, or meningoencephalitis; or symptoms of the **chronic phase:** cardiomyopathy, heart failure, altered heart rate or rhythm, megaesophagus or megacolon, or difficulties with eating or with passing stool.

Table 2.7 Interpretation of Hepatitis B Virus serologic tests. (Adapted from http://www.cdc.gov/hepatitis/hbv/pdfs/serologicchartv8.pdf accessed 6/8/2014)

HBsAg	Negative	Susceptible to infection
Anti-HBc	Negative	
Anti-HBs	Negative	
HBsAg	Negative	Immune as a result of natural infection
Anti-HBc	Positive	
Anti-HBs	Positive	
HBsAg	Negative	Immune due to hepatitis B vaccination
Anti-HBc	Negative	
Anti-HBs	Positive	
HBsAg	Positive	Acutely infected
Anti-HBc	Positive	
IgM anti-HBc	Positive	
Anti-HBs	Negative	
HBsAg	Positive	Chronically infected
Anti-HBc	Positive	
IgM anti-HBc	Negative	
Anti-HBs	Negative	
HBsAg	Negative	Interpretation unclear; four possibilities: Resolved infection (most common) False-positive anti-HBc, thus susceptible "low level" chronic infection Resolving acute infection
Anti-HBc	Positive	
Anti-HBs	Negative	

Other pathogens may be identified as well. Under ordinary circumstances, *Entamoeba coli*, *Entamoeba hartmanii*, *Entamoeba polecki*, *Entamoeba dispar*, *Cryptosporidium* species, *Microsporidium* species, *Cyclospora* species, *Isospora* species, *Iodamoeba buetschlii* and *Endolimax nana* are considered nonpathogenic and do not require treatment.

Bacterial Enteric Pathogens

In children presenting with gastrointestinal symptoms such as diarrhea, flatulence and abdominal pain, stool also should be cultured for *Salmonella* species, *Shigella* species, *Campylobacter* species, *Yersinia enterocolitica* and enteropathogenic *Escherichia coli*.

Helicobacter pylori

Although it is not recommended that all children be screened for H. pylori infection, this infection should be considered for children with symptoms such as dyspepsia, abdominal pain, growth delays or anemia.

Evaluation of Vaccination Status

The World Health Organization (WHO) estimates that immunization programs save the lives of more than 2.5 million people each year and protects many millions more from illness and disability (http://www.who.int/immunization/monitoring_surveillance/burden/estimates/en/). The vaccination status of internationally adopted children is highly variable and seems to depend on the country of origin, the pre-adoptive setting (institutional or community) and the number of vaccine doses documented as given (Verla-Tebit et al. 2009). In their countries of origin, most children will have had the opportunity to receive BCG; diphtheria, tetanus and pertussis; polio; hepatitis B and measles (with or without mumps and rubella) immunizations. Pneumococcal conjugate, rotavirus, hepatitis A, influenza and varicella vaccines are less commonly available in the countries from which international adoptees originate.

Determining which vaccines an adoptee needs can be challenging. Verification of immunization records of adoptees is challenging because immunization schedules and vaccine preparations vary by birth country. Immunization records are considered to be valid if the vaccines, dates of administration, number of doses, intervals between doses and the age of the patient at the time of immunization are comparable with the US or WHO schedules. Even when valid by the criteria listed above, immunization records may overestimate the prevalence of protective immunity by documenting vaccines that were not effective in eliciting protective antibody responses. Several studies have reported discrepancies between pre-adoption immunization records and serologic testing results after adoption. Several reasons for these discrepancies have been postulated including

- Errors in documentation
- Handling of vaccines i.e. cold chain integrity
- Concerns about vaccine administration, storage, potency, expiration
- Altered immunity in child due to malnutrition, stress

There are many approaches and caveats for determining which vaccines to administer to the newly adopted child and whether to accept vaccine records from the adoptee's home country. The primary goal is to ensure that the child has immunity to vaccine preventable infections which in turn also protects the community.

Children without valid pre-adoption immunization records should receive all age-appropriate immunizations according to the current recommendations.

For children with valid (by the above criteria) pre-adoption immunization records, if older than 1 year of age, titers to confirm diphtheria, tetanus, polio, hepatitis A and B, measles, mumps, rubella, varicella and Hib vaccination can be drawn (Table 2.8). If the titers are positive, then the documented vaccination dates can be accepted. Re-immunization is recommended for pneumococcal vaccine since the vaccine has 13 serotypes, making serologic testing impractical. Most children will be outside the age range for rotavirus vaccine and influenza vaccine is given annually.

Obtaining titers is expensive and requires that a relatively large amount of blood be drawn. Providers may therefore consider the number of documented vaccine doses when deciding whether to draw titers to confirm receipt of or to re-immunize for a particular vaccine. The number of documented doses is the best predictor of protective antibody levels (Staat et al. 2010; Stadler et al. 2010). Protective antibody levels are more likely in children for whom ≥ 3 doses of diphtheria, tetanus, pertussis, polio, hepatitis and/or Hib are documented; and in children older than 12 months of age, if at least one dose of measles, mumps, and rubella and varicella vaccines has been documented (Stadler et al. 2010). In cases where fewer vaccine doses are documented, the provider may decide to re-immunize as though no previous vaccine doses had been given. To assure long-term protection children with confirmed vaccine doses but whose vaccination record is not up-to-date, catch-up immunizations or booster doses should be given as appropriate for their age.

In children younger than 1 year of age, vaccines should be repeated regardless of the immunization record since the possible persistence of passively-transferred maternal antibodies might make interpretation of positive antibody titers difficult.

Repeating immunizations that have already been given is generally safe. There is an increased rate of local adverse reactions after the fourth and fifth doses of DTaP. If a child who is being re-vaccinated develops a severe local reaction, serologic testing for specific IgG antibody to tetanus and diphtheria toxins can be performed before giving additional doses. Protective concentrations indicates that additional doses are not necessary and subsequent vaccination should occur as age-appropriate (Centers for Disease Control and Prevention 2011).

Table 2.8 Evaluation of vaccination status

Pathogen	Assay	If negative or non-reactive	If positive or reactive
Hepatitis A	HAV total antibody (IgM and IgG) if age ≥ 12 months	Give age-appropriate immunization	Not necessary to immunize
Hepatitis B	Quantitative Hepatitis B surface antibody	Give age-appropriate immunization	If necessary, complete age appropriate immunization series
Diphtheria	Diphtheria antitoxoid antibody	If any component is negative, restart immunization series using the vaccine preparation appropriate for age	To assure long-term protection, children who have protective antibody levels and are younger than the recommended age for booster doses, should receive the booster dose(s) at the recommended age
Tetanus	Tetanus antitoxoid antibody		
Pertussis[a]	Not routinely recommended. If available, B. pertussis toxin (PT) IgG; Filamentous Hemaglutinin (FHA) IgG, Ig		
Poliovirus	IgG to poliovirus types 1, 2, and 3	If any type is negative, restart immunization series	
Measles	IgG to measles if age ≥ 12 months	Give two doses of measles-mumps-rubella (MMR) vaccine if the child lacks protective levels of antibody to either measles or mumps even if they have protective levels to the other antigen and to rubella. Only one dose of MMR is necessary if the child has protective levels of antibody to measles and mumps but lacks protective antibody to rubella	
Mumps	IgG to mumps if age ≥ 12 months		
Rubella	IgG to mubella if age ≥ 12 months		
Varicella	IgG to varicella	Give age-appropriate immunization	If necessary, complete age appropriate immunization series
Hemophilus influenza type b (Hib)[b]	Not routinely recommended Hib immunoglobulin G (IgG) if age ≥ 12 months	Give age-appropriate immunization	If necessary, complete age appropriate immunization series
Pneumococcal[b]	Not routinely recommended IgG to Streptococcus pneumoniae	Give age-appropriate immunization	If necessary, complete age appropriate immunization series

[a] Serologic testing for pertussis antigens is not widely available. When available, titers do not reliably determine pertussis immunity. Documented immunity to diphtheria and tetanus can be used as a surrogate marker for immunity to pertussis because diphtheria, tetanus and pertussis usually are administered together in combination vaccines

[b] Since Hib and pneumococcal vaccines typically are uncommon in many countries from which children are adopted, presumptive vaccination without pre-vaccine testing may be considered

Summary and Conclusions

- Pediatricians and other providers experienced in the evaluation of internationally adopted children should support adopting families by providing evaluation of pre-adoption medical information, pre-travel advice and guidance while traveling.
- Because many problems seen in internationally adopted children are asymptomatic, the newly adopted child should receive comprehensive medical evaluation and screening for medical, developmental and mental health problems within 2 weeks after arrival.
- Screening for HIV, viral hepatitis, syphilis and tuberculosis should be done at the initial post-adoption visit regardless of any reported testing performed prior to adoption and repeated 6 months after adoption to detect infection that may have occurred around the time of adoption.
- Internationally adopted children should be immunized according to the United States' recommendations. Immunization records from the country of origin must be carefully examined to determine whether the documented vaccines are valid.

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