Adoption in the U.S., originally focused on placing healthy infants, has evolved to the point that now the majority of children available for placement either have recognized medical problems or are vulnerable to developing a variety of disabilities. This article traces the history of pediatric health care providers in the adoption process and discusses how new knowledge on adversity in early childhood has expanded our understanding of risk factors for medical, developmental, emotional, and behavioral problems in children who have been adopted. Finally, the process of pre-adoption medical evaluation is outlined, the goal of which is to assist parents in making a well-reasoned decision on whether they have the resources to provide for the child's needs.

The Evolution of Adoption in the United States

The First Wave—Normal Healthy Infants

In the late 19th and early 20th centuries, high mortality rates and adverse social outcomes for children who had been institutionalized brought calls from child care professionals for alternative ways to protect children...
deprived of parental care.\textsuperscript{1,2} In 1909, a U.S. Conference for the Care of Dependent Children focused attention on the importance of family-based care, establishing the foundation for child welfare and adoption practice in the U.S.\textsuperscript{3} This era also saw the establishment of the first school for social work, the New York School of Applied Philanthropy (1904), as well as the first private adoption agencies, including Children’s Home Society in St. Paul, MN, The Cradle in Evanston, IL, and the Spence Alumni Society, the Free Synagogue Child Adoption Committee, and the Alice Chapin Nursery in New York City.\textsuperscript{4,5} By the 1930s, adoption had become a well-established method of building a family in the United States for married couples from a broad range of backgrounds.

Health care providers were at the forefront of this movement and assumed an important role in pre-adoption counseling. In 1958 Wallace Grant, M.D., wrote:

“The physician examining a child pre-adoptively owes it as complete an examination as he will give to any other child he sees in his practice. This includes not only a complete physical assessment with especial emphasis on the adequacy of special sense organs (eyes and ears) but also an appraisal of the child’s developmental status. The adoptive parents may thus be adequately informed, and any correctable abnormality that is discovered can be treated.”\textsuperscript{6}

Most parents willing to consider adoption sought healthy infants, and the belief that only “normal” children should be adopted was widely shared within the medical profession of that era.\textsuperscript{7,8} This opinion extended to assessing characteristics of the birth parents with the belief that “blood will tell.”\textsuperscript{9} Children thus labeled as having “special needs”, e.g., older age, racial or social class differences, sibling groups, known sexual or

\textsuperscript{2} Jacobi A. Inaugural address including a paper on infant asylums. \textit{NY Med J.} 1872:1-46.
\textsuperscript{4} Timeline of Adoption History. \textit{The Adoption History Project} \url{http://darkwing.uoregon.edu/~adoption/timeline.html}. Accessed March 15, 2019.
\textsuperscript{5} First Specialized Adoption Agencies. \textit{The Adoption History Project} \url{https://pages.uoregon.edu/adoption/topics/firstspecial.html}. Accessed May 2, 2009.
physical abuse, or an uncorrectable disability, were commonly considered unadoptable.  

The Second Wave—International and Special Needs Adoption

In 1968 an estimated 86,300 unrelated adoption placements occurred but by 1975 the total number had dropped precipitously to 47,700. This change coincided with increasing social tolerance and financial support for single mothers, readily available contraception, as well as legal abortion services. The net result was that fewer infants were born to single mothers and even fewer were relinquished for adoption. Prior to 1973 the percentage of infants relinquished for adoption by never-married women younger than 45 years old was 8.7%. From 1989-95 the figure was 0.9%.  

The shortfall between children available for adoption and the much larger pool of parents seeking children was partially filled by an increase in adoption of children with special needs and children adopted from abroad. During this era, pediatricians promoted the placement of children with special needs but recognized the need to counsel families regarding the effects of caregiver deprivation and abuse as well as caregiving disruptions and to provide appropriate follow-up for this at-risk group of children. During the same period when domestic adoptions decreased 46%, international adoption more than tripled from 1,612 to 5,663. Within this population pediatricians recognized specific medical needs, particularly the presence of serious infectious diseases that posed health risks to not only the adopted child but the adoptive family as well.  

The 1990s brought a deeper understanding of how early childhood experiences in a developmental environment characterized by prenatal risk and postnatal social, nutritional, and medical deprivation, profoundly affect brain development. Within this environment children experience

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unbuffered periods of stress, generally referred to as “toxic stress,” which not only exacts a toll in most developmental areas but is associated with a negative effect on physical and mental health in later life.17-20 Children adopted from abroad during the last decade of the 20th century arrived primarily from orphanages in Eastern Europe, Central Asia, and China. Considering the profound adversity experienced by these children within institutional care settings, the findings that they arrived with significant medical problems as well as short- and long-term developmental, emotional, and behavioral disabilities were not surprising.15,21-23

The Third Wave—At-Risk and Medically Complex Children

The incidence of significant medical issues as well as long-term disabilities in international adoptees continues to increase, as illustrated by the evolution in adoptions from China, the principal sending country to the U.S. since 2004. Following the gradual relaxation and then termination of the one-child policy, an increase in domestic adoptions in China has significantly reduced the number of healthy infants in orphanages.24 Of those who remain institutionalized, 98% have disabilities.25 Based on our own experience reviewing over 2,000 referrals from China during the past 15 years, these conditions range from straightforward correctable problems such as cleft lip and palate to conditions that require complex and often expensive care such as disorders of sexual differentiation and conditions that will likely require future heart or liver transplantation. In addition to changes in special needs status, children from China are now older. In 2004, 6% of children adopted from China were older than...
two years of age vs 83% in 2017. As they are housed within institutions for longer periods of time, adoptees from China are now at greater risk of secondary cognitive, emotional, and behavioral effects related to prolonged deprivations. Similar changes have been observed in most sending countries over the past decade.

Recapitulating the abrupt decrease in white infant adoptions in the late 1960s, the number of international adoptions to the U.S. has fallen 79% since 2004, returning to levels (4,714 in FY 2017) not seen since the 1970s. In contrast, adoptions from U.S. foster care have increased over the past 20 years. Following passage of the Adoption and Safe Families Act of 1997, legislation designed to speed placement of waiting children into permanent homes, the number of adoptions from foster care rose 54% from 36,650 in 1998 to 53,549 in 2015. However, as with institutionalized children, the impact of adversity on the physical and mental health of children prior to and after entering foster care has been increasingly recognized. In addition, children with disabilities are overrepresented in foster care. In the U.S., 31.1% of children and youth 0-18 years of age in the foster care system were determined to have a disability in contrast with 5.8-6.2% of children of similar age in the general population.

As with institutionalized children, the impact of adversity on the physical and mental health of children prior to and after entering foster care has been increasingly recognized.

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Professionals and families involved in adoption now face a situation where a high percentage of children being placed through international adoption or from foster care have either recognized medical problems and/or risk factors that increase the likelihood of developmental, emotional, and behavioral challenges. Even children placed as infants through private adoption may share such risks due to intrauterine illicit drug or alcohol exposure or maternal stress during pregnancy. Therefore, it is more important than ever that prospective adoptive parents are fully and accurately counseled about issues they may face when parenting a specific child.

When Should a Medical Provider Become Involved?

Discussions with health care providers can begin even before a specific child is identified. Many agencies have families complete a checklist indicating which medical conditions they are willing to consider. In these situations, providers can explain the nature of the condition and what care will be required, and can speak in broad terms about expected outcomes. Consultation after a family receives a referral is the most common situation in which medical providers offer counsel. In our clinic, this relationship extends through the process of requesting and evaluating additional information and bringing the child into the adoptive home. The needs of each child differ as do the capabilities of each adoptive family. However, based on over 30 years of experience and over 25,000 referrals, summary guidance is offered in the following sections.

Medical Information (Table I)

The amount and accuracy of a child’s medical and social information varies widely depending on the capabilities of the medical system where the child received care, the quality of translations, as well as the training, experience, and personal biases of the professionals responsible for collecting and reporting this information. The experience of health care professionals who are familiar with diagnostic terminology, common medical practices within specific countries, reliability and optimal timing of diagnostic testing, and the biology of specific disease states, can help families accurately interpret this often confusing information. This expertise is particularly helpful in serious infectious diseases such as hepatitis B and C, HIV, and syphilis, cases in which the timing and

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nature of available laboratory tests may falsely suggest, to the untutored observer, the presence or absence of infection. These same professionals can also assist in and realistically gauge whether additional information should or even could be obtained. However, prolonging the decision-making process with repeated attempts to obtain every scrap of data is rarely in the best interests of either the child or the adoptive family. Delays prolong the period of adversity experienced by the child, and irrespective of how much additional information is obtained, risk will never be completely eliminated and some questions will never be answered. Factors to consider when requesting additional information include how long it will take and whether the results will actually alter the medical opinion or make a difference in the family’s decision to adopt.

Medical information can be loosely divided into two categories: objective and subjective. Objective information is the most informative and includes weight, length/height, and head circumference measurements; laboratory, radiology, operative, and pathology reports; standardized developmental testing administered by a trained individual; photographs and videos of the child’s facial features, anomalies, and disabilities; as well as videos of a child spontaneously playing with other children, demonstrating milestones, or interacting with caregivers. Subjective information, while also important, can be biased, such as narrative descriptions by the child’s caregiver, or general statements that the child is “normal” or “delayed.”

While frequently unavailable, information on the birth mother’s pregnancy and delivery as well as the child’s birth measurements may identify prenatal substance exposure, birth complications, or suggest that a child could have been born prematurely or was growth restricted. All potentially increase the risk of neurodevelopmental compromise. Growth records (height, weight,
and head circumference) beginning at birth and extending through the
time of referral are perhaps the most objective measures of child well-
being. Wasting (low weight) suggests an inadequate diet, stunting (low
length/height) is a sensitive marker of overall adversity, and a small
head circumference indicates poor brain growth. Virtually every referral
contains information on hemoglobin that provides information on
whether or not iron deficiency or inherited anemias might be present
as well as testing for hepatitis B, HIV, syphilis, and often hepatitis C. The
incidence of hepatitis B in adoptees has decreased during the past 30
years due to the institution of universal hepatitis B vaccination in almost
all countries. However, since transmission of the virus from infected
children to adoptive families has been reported, parents need to be aware
when a child is positive for the virus so the entire adoptive family can be
immunized against this infection as soon as possible. The presence of HIV
infection in children adopted to the U.S. has actually increased over the
same time period as new treatments have dramatically improved outcomes
and increased interest in adopting children with this condition. Parents
considering adopting children exposed to or infected with any of these
agents need to arrange appropriate care for their children with experts in
these conditions and investigate insurance coverage particularly for HIV
and hepatitis C, for which drug treatment, while effective, can be very
expensive.

Photographs and videos can be extremely helpful but too often the images
provided are more compelling than informative. While everyone loves
to have a child’s smile brighten their day, such photos obscure facial
features that can suggest prenatal alcohol exposure, a growing problem
worldwide. Close-up photographs with the child looking directly into the
camera, mouth closed and not smiling, are the most informative. Videos
may provide the only objective information on development yet they
should be interpreted with care as the ability to detect moderate to severe
developmental delay by video review is limited.40

Interpreting Information (Table II)

Growth

When interpreting growth we advise using the World Health Organization
(WHO) growth curves to monitor growth in infants and children ages 0 to
2 years born in the U.S. and 0 to 5 years born outside the U.S.41 Centers for
Disease Control (CDC) 2000 growth curves can be used for children ages

40 Boone JL, Hostetter MK, Weitzman CC. The predictive accuracy of pre-adoption video review in adoptees from Russian and Eastern

2019.
2 years and older born in the U.S. and ages 5 years and older born outside the U.S.\textsuperscript{42}

Growth within foster care is expected to be within the normal range. Growth within institutional care settings depends on the quality of care (both food and nurture) provided. Average height and weight of institutionalized children are about 1-1.5 standard deviations below the mean. In other words, these children would be expected to plot in the lower half of standard growth curves. Children who are plotting two standard deviations or more below the mean (below the 3rd percentile on standard growth curves) deserve additional attention as they may be profoundly deprived or have organic illnesses that affect growth. Head circumference reflects brain growth during early childhood. As with height and weight, a head circumference below the range of normal requires additional attention and a head circumference more than three standard deviations below the mean in adopted children is cause for concern.

Table II. Interpreting Information

<table>
<thead>
<tr>
<th>Growth (use World Health Organization curves)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most foster care: normal growth</td>
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<tr>
<td>• Most institutional care: growth impairment</td>
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</table>

<table>
<thead>
<tr>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Foster care: gross motor delays up to ages 8 to 10 months (no &quot;tummy time&quot;)</td>
</tr>
<tr>
<td>• Institutional care:</td>
</tr>
<tr>
<td>• Gross and fine motor delays till ages 8 to 9 months and then catch-up with most children walking by 18 months.</td>
</tr>
<tr>
<td>• Language delays that become more significant with time.</td>
</tr>
<tr>
<td>• Social:</td>
</tr>
<tr>
<td>• Indiscriminate friendliness</td>
</tr>
<tr>
<td>• Institutional quasi-autistic behavior (stereotypes) in profoundly deprived children can be confused with true autism spectrum disorders</td>
</tr>
</tbody>
</table>

Interpretation of laboratory tests
• Name and date of the test are needed for appropriate interpretation

Development

Development in foster care is generally comparable to development in birth families. A notable exception is in Korea where foster mothers carry infants much of the first year of life. In this situation, infants do not get much “tummy time” and lag behind in motor development through the first 8 to 9 months of life. These motor delays are transient, and social and language development is unaffected.

Development within institutional care settings can be quite abnormal. Large and fine motor delays are routine through 8 to 9 months of age, e.g. rolling over at 6 months, sitting at 8 to 9 months, crawling at 10 to 11 months. This

is followed by gradual improvement once the infant acquires enough muscle strength and ability for self-stimulation. An institutionalized child then exhibits a period of developmental catch-up and generally walks independently by 18 months of age. When motor developmental age is less than half of the child’s chronological age it is concerning, particularly after 12 months of age. Language delays are progressive through the first years of life since there is little reciprocal communication with caregivers. In addition, uni- and bilateral hearing loss is more common in post-institutionalized children likely due to the high incidence of chronic ear infections. Inconsistent caregiving and pervasive neglect handicaps social development in most institutionalized children. Experienced adoption medicine providers can assist adoptive families in determining whether behaviors such as rocking, poor eye contact, or disinhibited social engagement with strangers are the result of institutional living alone or signs of a more significant problem.

**Age Determination**

Foundlings (children who were abandoned) are often assigned a birthdate based on the infant’s physical findings at the time of abandonment. Unfortunately, determining the veracity of this birthdate is impractical as there are no objective tests that can truly discriminate slight (months) differences in age. Since adoptive parents prefer to adopt young children, fabricating a birthdate that would make an older child younger is not unheard of. However, determining the actual age of an abandoned older child, for school placement or other reasons, can be daunting. Unfortunately, “objective” parameters such as bone, dental, and developmental age as well as pubertal development not only have a wide normal range but are adversely affected by social, nutritional, and medical deprivation. The common assumption that a child with delayed development should have their age changed after arrival to allow placement in a lower grade may backfire when developmental catch-up and pubertal progression positions the child far ahead of schoolmates. As a general rule, parents should not attempt to reassign age until at least one year after arrival and linear growth rate has stabilized, only in consultation with a knowledgeable pediatric endocrinologist, and only after considering whether age reassignment is clearly in the long-term best interests of the child.

**Predicting the Future (Table III)**

An adoption agency director once jokingly presented a Magic 8 Ball to me in acknowledging the difficulty of predicting the future for a child.
entering an adoptive home. While using this device is often tempting, there are experience- and evidence-based risk factors that can help set appropriate expectations for families. In my dialogue with adoptive parents about the future, I face the inevitable tension between my desire that all children find a permanent family and my professional duty to fully inform families of potential challenges. Finding this balance is not any different than it was 70 years ago when Dr. Grant stated that a physician “should avoid making positive predictions as to future physical and mental capacity which cannot really be made until the child reaches adulthood but is justified in giving a qualified impression as to what the future holds in the light of current findings and a knowledge of the child’s background.”

Optimism is warranted in most situations as recovery within an adoptive home is usually quite striking. However, there are situations that demand caution. Additional exploration of parental expectations is warranted when there is a high risk of severe family stress or disruption, such as adoption of a child with fetal alcohol spectrum disorder, a history of sexual or severe physical abuse, large sibling groups with multiple risk factors, and children with profound cognitive delays or signs of autism spectrum disorder. In such situations, there is a chance that a child may never achieve complete independence and the family must consider whether they have the desire as well as the financial, social, and personal resources to parent a child who requires life-long medical or psychiatric care and direct supervision.

### Additional Considerations

Almost all families who adopt internationally have health insurance[^1] and children adopted from the foster care system often qualify for government-sponsored long-term medical assistance. Nevertheless, families must consider the range of services that their child may require, as not all services may


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### Table III. Factors that Increase the Risk of Identifying Medical, Developmental, and Mental Health Problems after Placement *(Risks are Additive)*

<table>
<thead>
<tr>
<th>Underlying diagnosis</th>
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<tbody>
<tr>
<td>Institutional care during infancy for &gt; 4-6 months</td>
</tr>
<tr>
<td>Low income country</td>
</tr>
<tr>
<td>Age at arrival (&gt; 2 years)</td>
</tr>
<tr>
<td>Birthweight &lt; 2.5 kg</td>
</tr>
<tr>
<td>≥ 2 caregiving disruptions</td>
</tr>
<tr>
<td>Head circumference more than 3 standard deviations below the mean</td>
</tr>
<tr>
<td>Severe developmental delays (developmental age less than one-half chronologic age or clear autistic behavior)</td>
</tr>
</tbody>
</table>
be available in their community or adequately covered by their health insurance (e.g., occupational, speech-language and physical therapy, and psychological/psychiatric inpatient and outpatient services). Families should also be in contact with their school system as many services that enhance development and address needed accommodations in the classroom are provided for free. However, the process of qualification as well as the quality and types of services provided vary greatly among school districts.

Conclusion

Focusing on the best interests of a child mandates that families have the information needed to knowledgeably ascertain whether their access to health care, financial and emotional resources, social networks, and marriage and family structure are congruent with the likely needs of a particular child. Since the majority of children now being placed for adoption have identified medical problems or risk factors for experiencing developmental or mental health challenges, medical providers play an even more crucial role in parent education than in the past.

Establishing appropriate expectations is critical as expectations minus reality equals disappointment—a state that can contribute to adoption dissatisfaction and disruption.\textsuperscript{45,46} Unpublished data from the Minnesota International Adoption Project\textsuperscript{44} confirmed that families who spoke with a medical provider during the preadoption period reported fewer negative feelings about adoption, fewer incorrect expectations, and fewer behavior problems in their children. Unforeseen challenges are a routine part of parenting but a deliberate, well-informed process of decision-making by adoptive parents facilitates the process of family formation and improves the odds of long-term success.
