

JOINING FORCES



Joining Families

Volume 10, Issue 3 • January 2008

REAL WORLD RESEARCH FOR FAMILY ADVOCACY PROGRAMS

FEATURED INTERVIEW

Healthy Families, Healthy Communities

An Interview with Bruce D. Perry, MD, PhD, by James E. McCarroll, PhD



Bruce D. Perry, MD, PhD

Bruce D. Perry, MD, PhD is the Senior Fellow of The Child Trauma Academy, a non-profit organization based in Houston, Texas, that promotes innovations in service, research and education in child maltreatment and childhood trauma (www.ChildTrauma.org).

Dr. Perry has conducted both basic neuroscience and clinical research. His focus over the last ten years has been integrating concepts of developmental neuroscience and child development into clinical practice. Dr. Perry is the author of over 300 journal articles, book chapters and scientific proceedings, and recipient of numerous professional honors. He attended medical and graduate school at Northwestern University, completed a post-doctoral fellowship in psychiatry at Yale University School of Medicine in 1987, and a fellowship in child and adolescent psychiatry at the University of Chicago in 1989.

Dr. McCarroll: In addition to your clinical and research work, you have been involved with the Army's Family Advocacy Program (FAP) for many years teaching in the Family Advocacy Staff Training program.

Dr. Perry: Most of my FAP teaching is focused on understanding the normal stress response, its implications for people exposed to traumatic events like combat, and how chronic and prolonged stress can impact families that have a deployed parent. I cannot think of any system where understanding stress and the consequences of stress are more important than the military. We think about military stress in terms of exposure to combat and *traumatic* stress, but there are other stressful components for the military family. In the last three or four years the rate of deployment and the stressors on children, spouses, and other family members of the military have been high. Increasingly, our focus has been on intervention strategies and activities that increase resilience of the military

In This Issue

A new and exciting lens for FAP to view and practice its work with high risk children and parents is neuroscience, the frontier and cornerstone for understanding how human experience and human biology influence each other. Neuroscience and its implication for FAP outreach is the theme of this issue, the first *JFJF* of 2008.

Our featured interview is with Bruce D. Perry, MD, PhD, a noted neuroscience researcher and child advocate. His work addresses the relationship of children's needs to the developing brain, and is relevant to our nation's military children, families and family prevention and education programs for healthy and high risk families.

We summarize two articles by Dr. Perry that describe basic principles of brain development and their relationship to maltreatment, as well as two articles on gene-environment interaction that shed light on recent neurobiological research on maltreatment. In our regular statistics article, Building Bridges to Research, we provide an overview of logistic regression, a widely used procedure in social science research. Websites of Interest focuses on the Child Trauma Academy and the Adverse Childhood Experiences studies.

Healthy Families, Healthy Communities, An Interview with Bruce D. Perry, MD, PhD	1
The Role of Genetics in Children's Brain Development.....	3
Bridges to Research: Logistic Regression and Adverse Childhood Experiences Research.....	4
The Effects of Violence on the Brain of the Developing Child	5
Recent Studies in Gene-Environment Interactions on the Biological Basis of Violence.....	6
Websites of Interest	7

Continued on page 2

and on those things that make the military community more vulnerable, especially during deployments.

Dr. McCarroll: Where does one draw the line between psychological stress and psychological trauma?

Dr. Perry: That is an important question for the field of mental health. Two people can have the same experience, but for one person the level of stress is so high that it is traumatic and for the other person it is not. From a neurobiological perspective, events become traumatic when stress response systems are activated in such an extreme way that they go from being adaptive to being maladaptive.

Dr. McCarroll: How would one recognize the change?

Dr Perry: You look for physiological changes such as changes in sleep patterns, irritability, mood and energy levels. When those things happen, you need to step back and say, "My life is too complicated. There is too much stress going on. I am wearing out my body." The stress response system affects the brain, the immune system, the heart, the lungs, the skin, and the gut. People who are under chronic du-

ress end up getting physically run down and are much more likely to get colds, have a hard time recovering from an infection or have cardiac problems. Their underlying genetic tendencies or vulnerabilities will be unmasked by this chronic stress.

One of the challenges is to create systems in education, health care and human services that are responsive to these issues. For example, children may attend a school where there are only a few military children. These children may have difficulty concentrating, and be tired from lack of sleep because of worries about their Dad or Mom. They may look like they have academic problems or an Attention Deficit Disorder.

These children are often misunderstood by the public education system. Their problems go unnoticed because adults who play significant roles in their lives are not trauma-informed or military-sensitive.

Dr. McCarroll: Can some of these problems be prevented? If so, what general principles of prevention do you recommend?

Dr. Perry: One of the most important factors in prevention is group cohesion. If you feel you are part of a supportive community you can sustain a tremendous amount of duress. If all the families left behind when soldiers deploy support and assist each other, that support can be a tremendous help. The people who are most isolated and the most vulnerable are the military families living in the wider community. There may not be another military family living on their block that is experiencing deployment or goes to their church or whose child goes to their child's school.

One lesson we have learned about prevention and dealing with traumatic stress is that relationships matter. Your social network is tremendously important. The more you are isolated and physically or emotionally separated from the rest of the military community, the more vulnerable you become.

Dr. McCarroll: So, your advice to isolated families would be to increase their social support?

Dr. Perry: Yes. Tap into your extended family, into your community, your neighbors, or whatever social network you have. That will help sustain you, and is probably the most important principle. Other important factors are information and education. The more

Continued on p. 3

Traumatic events activate the body's stress response systems often changing them from an adaptive response system to a maladaptive system.

JOINING FORCES
Joining Families

Editor-in-Chief

James E. McCarroll, Ph.D.
Email: jmccarroll@usuhs.mil

Editor

John H. Newby, MSW, Ph.D.
Email: jnewby@usuhs.mil

Joining Forces Joining Families is a publication of the U. S. Army Family Morale, Welfare and Recreation Command and the Family Violence and Trauma Project of the Center for the Study of Traumatic Stress, part of the Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, Maryland 20814-4799. Phone: 301-295-2470.



Editorial Advisor

LTC Ben Clark, Sr., MSW, PhD
Family Advocacy Program Manager
Headquarters, Department of the Army
E-mail: Ben.Clark@fmwrc.army.mil

Editorial Consultants

David M. Benedek, M.D., LTC, MC, USA
Associate Professor and Scientist
Center for the Study of Traumatic Stress
Uniformed Services University of the Health Sciences
dbenedek@usuhs.mil

Nancy T. Vineburgh, M.A.
Director, Office of Public Education
and Preparedness
Center for the Study of Traumatic Stress
Email: nvineburgh@usuhs.mil

The Role of Genetics in Children's Brain Development

By James E. McCarroll, PhD

Promoting greater understanding of the brain and its critical relationship to child development will help the Army Family Advocacy Program (FAP) develop innovative prevention and treatment processes. Dr. Perry's article (see reference) discusses the basic needs of children and the consequences for the child's developing brain if these needs are not met. Generally, the environment of childhood interacts with the child's genetic endowment to produce healthy development. When there is chronic abuse or neglect, lasting damage may result. Dr. Perry's clinical and laboratory experience around chronically neglected children reinforce the need for children's stable emotional attachments, touch from primary adult caregivers, and spontaneous interaction with peers. He describes how developments in modern technology can undermine the strength of the family and the development of peer relationships that promote the growth of cognitive and caring potentials in the developing brains of children.

Prior to birth and during childhood, important processes of brain development necessary for adult cognition occur. The development of the brain proceeds in steps:

- the development of nerve cells,
- movement of the cells to their proper place in the brain,
- the expression of the function of each type of cell,

- loss of cells that are redundant or are not used,
- development of nerve cells so they can connect with different parts of the brain,
- development of cell-to-cell communication,
- development of structural supports for nerve cells, and
- improvement of efficiency of neural transmission.

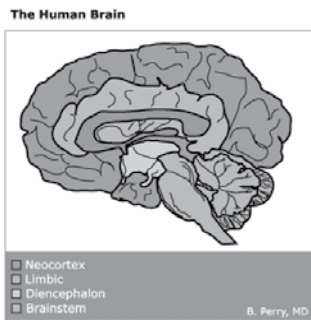
Generally, the environment of childhood interacts with the child's genetic endowment to produce healthy development.

These steps are dependent upon genetic and environmental interaction for their proper development.

Understanding the neuroscientific implications of early childhood brain development lends a greater appreciation of children's needs. During early childhood, when the greatest changes occur, the caregiver has the opportunity to create an environment for the child to maximize the expression of genetic potential. For further illustrations of the interaction of genetics and the environment on the brain as related to maltreatment, see "Recent Studies in Gene-Environment Interactions on the Biological Basis of Violence" in this issue of *JFIF*.

Reference:

Perry BD. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind*, 3:79-100.



Promoting greater understanding of the brain and its critical relationship to child development will help the Army Family Advocacy Program (FAP) develop innovative prevention and treatment processes.

One of the most important factors in the prevention of stress is to maintain group cohesion. If you feel you are part of a supportive community, then you can sustain greater adversity.

Dr. Bruce D. Perry Interview, from page 2

you know about an expected set of events, the more you will be able to deal with them. Information is power. You can tell people what to expect and the anticipated time course. You can tell them, "You are not crazy. Most people experience these things. If it gets worse or it is so prolonged that you cannot manage it, here are some resources. These are the people you can talk to and this is the person who may be able to help you." We find that the combination of information and access to resources can be very helpful.

Dr. McCarroll: If you have a child or adolescent with behavior problems that emerged during a deployment, where do you start?

Dr. Perry: Most people know that a child's main support system is his or her parents. You can have a child overwhelmed by a trauma that also impacts the parent, e.g., the father was killed or wounded in combat. The mother would also be overwhelmed and her ability to help the child would be compromised. Con-

Continued on p. 8

BRIDGES TO RESEARCH

Logistic Regression and Adverse Childhood Experiences Research

By James E. McCarroll, PhD, David M. Benedek, MD, and Robert J. Ursano, MD

Logistic regression is a commonly used statistical procedure for determining the significance of possible risk factors in relation to a particular outcome.

The determination of risk is one of the key aims of Family Advocacy Program (FAP) researchers and clinicians. In this article, we present a brief discussion of logistic regression, a statistical procedure that has become increasingly common in social science research to estimate risk when several possible risk factors are present. Regression is the general name for statistical procedures that examine the relationship between an independent variable (i.e., height) and a dependent variable (i.e., age). In this relationship, both measures are continuous. (A continuous variable is one in which you can count values like 1, 2, 3, ... n.)

Logistic regression is a special type of regression. Its name derives from the type of mathematical function, the logit function, that is used to calculate the relationship between independent variables and a dependent variable. In logistic regression, the dependent variable is dichotomous, as in “yes–no” or “present–absent” as in a diagnosis such as depressed or not depressed. The independent variables in logistic regression can be dichotomous or continuous.

A benefit of the logistic regression procedure is that it allows the investigator to simultaneously control the effects of all the predictor variables on the outcome while examining the predictor variables of interest. For example, one might want to examine the relationship between witnessing domestic violence as a child (independent variable, continuous or dichotomous) and being a perpetrator of domestic violence as an adult (dependent variable, yes or no). In this attempt to estimate risk, one might control for age, gender, marital status, and other variables (called co-variables) that are held constant statistically while examining the effect of the variable of interest — childhood exposure to domestic violence on the risk of domestic violence perpetration as an adult.

One of the main outcomes of interest in logistic regression is the odds ratio (OR). The OR indicates how much risk (if any) is due to each predictor. If there is no effect of the predictor on the outcome, the value of the odds ratio is 1. If the value is statistically significant and greater than 1, it is a risk factor. An OR of

2.0 means that individuals with the risk factor are at twice the risk compared to those without it. The OR can also be statistically significant and be less than 1 in which case it is a protective factor. A protective factor is the opposite of risk, e.g., being employed may be a protective factor against a person becoming an abuser.

An example of the use of logistic regression is taken from a publication on the relation between adverse childhood experiences (ACEs) and negative health outcomes in adulthood, and is based on a collaborative research project between the Kaiser Permanente Health Foundation in San Diego, CA, and the Centers for Disease Control and Prevention (CDC). The logistic regression model was used as the primary analytic technique in which ACEs were independent (predictor) variables and the outcome was measured in adulthood. The predictor variables (ACEs) included emotional, physical, or sexual abuse of the person being evaluated, substance abuse or mental illness of someone in the household, a mother who was treated violently, an incarcerated household member, parental separation or divorce, and their sum (the number of ACEs of each person). The investigators found that the risk of intimate partner violence (IPV) increased as the ACE score increased. The more ACEs, the greater the risk of IPV. The odds ratio of perpetrating IPV increased from 1.8 for persons with one ACE to 5.5 for those with 4 or more ACEs (Anda et al., 2006). When odds ratios are presented, typically confidence intervals (also called confidence limits) are also included. Investigators usually present 95% confidence intervals. These intervals are interpreted to show that the results of the study can allow the investigator to be 95% confident that the OR lies between the lower and the upper boundary. The confidence limits for the OR of IPV given one ACE were 1.2–2.6. Thus, the investigator is 95% confident that the odds of IPV for a person with one ACE is between 1.2 and 2.60 compared to a person with no ACEs.

The logistic regression procedure is appealing because of its apparent simplicity in investigating the effect of a predictor while holding

Continued on p. 8

The Effects of Violence on the Brain of the Developing Child

By James E. McCarroll, PhD

The development of the brain is “use-dependent” meaning that brains develop according to the stimuli they encounter. Because each child’s experience is different, each brain adapts uniquely.

Dr. Perry presented the inaugural lecture in the McCain Lecture Series (www.lfcc.on.ca) in London, Ontario, Canada, on his work on the effects of family violence on children. The lecture describes optimal as well as disrupted child brain development, and provides practical advice on strategies to shape optimal development for children.

Dr. Perry explains that early life experience determines how a child’s genetic potential is expressed. The development of the brain is “use-dependent” meaning that brains develop according to the stimuli they encounter. Because each child’s experience is different, each brain adapts uniquely. Optimal development is achieved when the child experiences consistent, predictable, enriched, and stimulating interaction in attentive and nurturing relationships. Brain development is also susceptible to negative influences. Children who do not have a stable and nurturing environment are subject to damage to their developing brain. Prolonged, chronic stress leads to maladaptive neural systems, which may be adaptive for the child’s survival in the short term, but problematic for later intellectual, emotional, and social development.

Dr. Perry’s lecture addresses points for parents, service providers, and community leaders to foster improved child and family development and functioning. He emphasizes key scientific principles paired with practical suggestions that can be implemented widely in public education programs:

- *Promote education about brain development.* While FAP personnel are not neuroscientists, they can help educate the public about key principles of brain development to help parents understand the long-term importance and implications of their actions.
- *Respect the gifts of early childhood.* High quality early childhood care settings should provide enriching, safe, predictable, and nurturing environments. During early childhood, the brain is developing most rapidly. This phase presents the best opportunity to foster optimal brain development.
- *Address relational poverty in our modern world.* In today’s world of smaller families and frequent deployments for military families, there are fewer opportunities for the development of connections between people. Dr. Perry’s message is to increase the opportunities for children to interact with others: have family meals, play games, increase contact with extended families and neighbors, and limit watching television.
- *Foster health developmental strengths.* Certain skills and attitudes help children meet the challenges of life and may inoculate them against the adverse effects of violence. Dr. Perry presents six core strengths for children, which he calls “a vaccine against violence”. The child who develops these core strengths will be resourceful, successful in social situations, resilient, and may recover more quickly from stressors and traumatic incidents. [See box, *Six Core Strengths for Children*]

Six Core Strengths for Children

Helpful for parents, caregivers, and healthcare providers

1. **Attachment:** ability to form and maintain healthy emotional relationships
2. **Self-regulation:** capacity to contain impulses, notice and control urges as well as feelings such as frustration
3. **Affiliation:** being able to join and contribute to a group
4. **Attunement:** being aware of others, recognizing their needs, interests, strengths, and values
5. **Tolerance:** understanding and accepting differences in others
6. **Respect:** valuing differences and appreciating worth in yourself and others

Perry BD. Maltreatment and the developing child: How early childhood experience shapes child and culture. The Margaret McCain Lecture Series, September 23, 2004. www.lfcc.on.ca

Recent Studies in Gene-Environment Interactions on the Biological Basis of Violence

By James E. McC Carroll, PhD, David M. Benedek, MD, and Robert J. Ursano, MD

There is an expanding body of scientific research exploring the biological basis for the interaction between genetics, the environment, and behavior.

There is an expanding body of scientific research exploring the biological basis for the interaction between genetics, the environment, and behavior. Human behavior can no longer be dichotomized as resulting from either genetic or environmental factors (i.e., the nature-nurture dichotomy). New technologies are allowing for the investigation of the biological mechanisms mediating the interaction between genes and the environment. For example, it has long been observed that childhood victimization increases the risk for becoming a violent offender as an adult.

Two recent articles exemplify the research that is shedding light on the molecular processes mediating this risk. These two studies are based on the function of a gene, which produces an enzyme that breaks down neurotransmitters within the brain. These neurotransmitters are thought to be related to impulsive, aggressive, and violent behavior. The enzyme is monoamine oxidase (MAOA). It was suggested that this enzyme may moderate (through increased or decreased gene activity) the relationship between childhood maltreatment and later antisocial and violent behavior (Caspi et al., 2002). The hypothesis was that maltreated children with low activity of the gene producing MAOA would be at higher risk for conduct problems than children with higher levels of MAOA. Research supported this hypothesis. There was an interaction between maltreatment and gene activity. Of all maltreated children, only those with low activity of the gene that produces MAOA later exhibited conduct and other violent and antisocial problems.

In another study, investigators compared 631 adult victims of substantiated child physical abuse and neglect (Widom & Brzustowicz, 2006). They compared levels of violent antisocial behavior as determined by an index

based on arrest, self-report, and medical records between individuals with high and low activity levels of MAOA. The investigators found that high levels of MAOA activity lowered the risk for abused and neglected white males becoming

violent or antisocial in adult life. The effect was not found for non-white abused and neglected males. The investigators suggested that these differences between white and non-white males may be related to contextual factors in their environments such as different

environmental stressors.

Both studies found that maltreatment during childhood and adolescence is a risk factor for adult antisocial and violent behavior, but the risk is moderated by the gene that produces an enzyme that breaks down neurotransmitters in the brain.

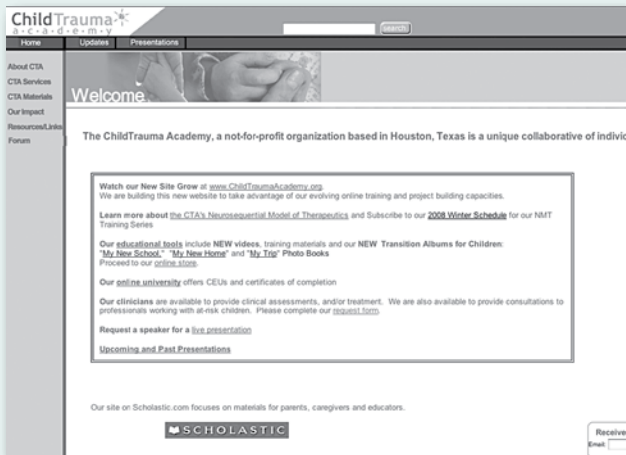
There are many methodological complexities in the investigation of genes, the environment, and behavior. In addition, findings in neuroscience tend to be highly specific. Developments in such research depend on the accumulation of results and replications of the basic research. This field of inquiry, once thought improbable, will continue to develop and shed light on human behavior, human development and the brain.

References

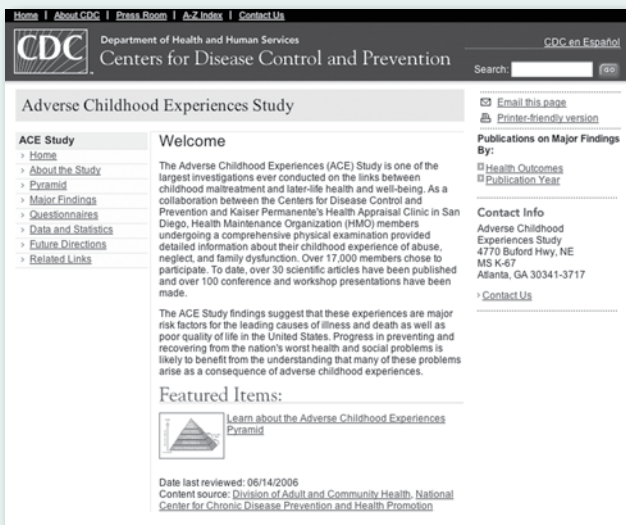
- Caspi A, McClay J, Moffitt TE, Mill J, Martin J, Craig IW, et al (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, 297, 851–854.
- Widom KS & Brzustowicz LM. (2006). MAOA and the “Cycle of violence:” Childhood abuse and neglect, MAOA genotype, and risk for violent and antisocial behavior. *Biological Psychiatry*, 60:684–689.

New technologies are allowing for the investigation of the biological mechanisms mediating the interaction between genes and the environment.

Websites of Interest



- The Child Trauma Academy (CTA) is a non-profit organization based in Houston, Texas. Its goal is to improve the lives of high-risk children through direct service, research, and education. Its website, www.childtrauma.org, includes training packages consisting of web-based and distance learning opportunities, as well as educational materials for educators, caregivers, and clinicians. Free, on-line courses are available including one entitled “Surviving Childhood: An Introduction to the Impact of Trauma.” The CTA also provides clinical, program, and research consultations. The description of the neurosequential model of therapeutics (NMT) is particularly relevant to Dr. Perry’s interview and summary of his recent work. The NMT is a model to help professionals working with high risk children determine their strengths and vulnerabilities and create individualized interventions along a developmental timeline.



- The Adverse Childhood Experiences (ACE) Study is a large-scale investigation of the links between childhood maltreatment and later-life health and well-being. It is a collaboration between the Centers for Disease Control and Prevention and Kaiser Permanente’s Health (KPH) Appraisal Clinic in San Diego, CA. The ACE Study findings suggest that adverse childhood experiences are major risk factors for the leading causes of illness and death as well as poor quality of life in the United States. The study is described in great detail at www.cdc.gov/nccdphp/ace. The site includes a description of the concept of the study and its application to public health and preventive programs. From the links, a wide variety of information and publications can be obtained.



- The Centre for Children and Families in the Justice System (www.lfcc.on.ca) contains Dr. Perry’s McCain Lecture as well as other valuable, free publications and resources. Among the resources are descriptions of clinical programs, applied research, training services, and materials to enhance intervention and prevention efforts. One of their most popular resources is a publication entitled “What About Me?,” a summary of the best evidence to inform better practice on the effects of domestic violence on children.



Dr. Bruce D. Perry Interview, from page 3

sequently, we need to pay attention to the emotional needs of the parent. That is an important place to start. If the mother's needs can be met, she can become stronger and better able to meet the needs of her child(ren). The child's needs must be met also. If you meet the needs of the parent and the needs of the child, you will be more effective than just targeting your interventions to the child. The act of intervening and giving support to the parent and the child can prevent a negative cycle from feeding on itself.

One should also question the health of the community. "Is this a community where there is a support group? Is this a community where there is an isolated National Guard family? Has a family been in this community long enough to make friends?" Your intervention would be to provide a combination of social work, conventional psychiatric or psychological interventions, and the sharing of information about resources. If the family is connected to a healthy community, minor interventions can be extremely helpful.

Dr. McCarroll: How do you work with parents to make them trauma-informed? To what extent can you bring together neurobiological structures and functions with behaviors, needs, and treatments, and do you think it enhances understanding these issues?

Dr. Perry: We do quite a bit of that, and we use materials that we have written for families including slides and mini-lectures. We also have lay teachers. If a parent or a child is killed in a car accident, we will have a client we worked with five years ago who also lost a child help us with that parent. This approach is very helpful because sometimes our typical jargon does not translate well. The information is communicated better by someone who shares the same perspective as the person with whom we are working.

When there is a downturn in factors that would stabilize a community, there is often an increase in neglect and abuse.

If you meet the needs of the parent as well as the needs of the child, you are much more effective than if you just target interventions to the child.

Dr. McCarroll: Our Army statistics reveal that the rates of child neglect have increased since the war started. This has been attributed to lack of (parental) supervision, unkempt homes, and mothers with depression. Have you encountered this?

Dr. Perry: Our colleagues report this. If you look at the waxing and waning of child abuse and neglect complaints, it is very much tied to community cohesion, economics, and mobility. Whenever there is a downturn in factors that would stabilize a community, there is an increase in neglect and abuse.

Dr. McCarroll: Treatments and prevention might extend beyond the issues of community cohesion. How do you help people who enter a system and do not share the same priorities (i.e., cleanliness in one's home and attentive parenting)?

Dr. Perry: Teaching people about parenting is a huge challenge. We used to live as big extended families in which you experienced child-rearing practices. You learned a lot about children because you were around them. Today's families are much more mobile and smaller. It is not unusual for someone to be an only child or have one sibling and grow up in a system in which there is no mechanism for effectively transferring child-rearing practices. People are talking about the need to get some of these practices into public education because we are not teaching them in families any more.

Dr. McCarroll: How does one remediate those families?

Dr. Perry: You can identify high-risk family situations and provide non-punitive education and support services for these families. They would benefit from home visitation models. However, these programs are often inefficient because they are poorly targeted.

Dr. McCarroll: Thank you for your contributions to the military community and for this interview.

Dr. Perry: Thank you for the opportunity.

Building Bridges to Research: Logistic Regression, from page 4

constant the effects of other variables. This approach is preferable to performing individual tests on the outcome of each predictor variable where the other variables are not held constant. The only definite conclusions that can be drawn from using this model are those related to the data in the study. Depending on the study design, the results may or may not be generalizable to other populations. There are many variations of logistic regression. Here, we have outlined the basic procedure. In read-

ing research studies or viewing research presentations, look for the use of this procedure and the nature of the results.

Reference

Anda RA, Felitti VJ, Bremner JD, Walker JD, Whitfield C, Perry BD, Dube SR, & Giles WH. (2006) The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci*, 256:174-186.