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Good morning. Thank you for the honor of being invited to talk with you about what the science of early child and brain development has to say about children growing up in adversity.

The basic principles of neuroscience and child development tell us that what happens early in life can have a profound impact on what happens later in life, even decades later, both psychologically and biologically. For example, a child exposed to so-called “toxic stress,” which might include things like serious abuse or neglect, living in abject poverty, exposure to violence, or exposure to a parent suffering from serious and untreated mental health problems, raises the risk of that child growing up with psychological problems themselves; in addition, important aspects of biological development may also be compromised – for example, if they are exposed to chronic stress, or experience severe social or emotional deprivation, the parts of the brain that help regulate our response to stress and in regulating our emotions may be compromised.

Advances in neuroscience tell us that although early brain development benefits from good experiences, it can also be disadvantaged by exposure to bad ones. Further, if these bad experiences occur during what neuroscientists refer to as a *sensitive period*, there is the risk that a child's subsequent development may be derailed. And, the longer these bad experiences continue, the more difficult it will be to redirect development back toward normal. Not impossible, just more difficult...*and more costly*. The simple reason

for this is that as the brain continues to develop over the first years of life, its architecture becomes less flexible, making it more difficult to adapt and change.

Let me illustrate these issues with one example of children experiencing profound early adversity – children reared in institutional care. UNICEF estimates that there may be as many as 8 million children living in institutions. Some children wind up in institutions because their parents die, such as occurs in war-torn regions or because of HIV infection. Others are simply abandoned by their parents for a variety of social, cultural, and economic reasons – some of the more common examples include poverty, a baby with a birth defect, and parents who leave behind their children to move to another town or city or increasingly common, another country, so that the parent can find work. Countless studies have demonstrated that children who are brought up in institutions instead of families suffer from a variety of developmental problems; for example, **as you can see in the poster**, such children have IQs in the 60s and 70s (instead of 100, which is average), and show dramatic reductions in their brain activity – and they also have smaller brains.

Importantly, **as can also be seen in this poster**, many of these developmental problems can be remedied if children are removed from institutional care and placed in good families....*with the rule of thumb being the earlier the better*. Thus, children removed from institutional care before their second birthday have IQs that are 15-20 points higher than children placed after their second birthday; similarly, earlier placed children show normative amounts of brain activity instead of marked reductions.

Being abandoned to an institution is but one example of children living in adversity. Other examples include children who experience food insecurity; those experiencing violence in the home or neighborhood; children growing up with an HIV infected parent; and children growing up in regions where armed conflict is prevalent (which affects approximately 1 billion children worldwide). All of these experiences can substantially compromise development.

Why is exposure to early adversity bad for the brain and for the child?

The brief answer is that the developing brain craves experience. If it lacks experience, as occurs with neglect, the brain – to use a metaphor – has no one talking to it, and is thus left to its own devices to wire itself, which it invariably does incorrectly. On the other hand, if it is exposed to overtly adverse experiences, such as the violence that occurs with armed conflict, the brain is constructed in such a way as to lead to a variety of poor outcomes. For example, children exposed to war suffer from high rates of traumatic stress reactions, depression, anxiety and high risk behaviors. Importantly, the sequelae of these adverse early experiences can carry forward to the next generation – after all, the ability of these children to parent their own children is surely compromised.

In summary, we must all be mindful of the environment in which children are reared. Because capacity for change is greater early in life, when the brain is still developing rapidly, rather than after its basic architecture has been established, the best way to ensure healthy brain development is to see to it that children are protected against

exposure to early adversity. If that is not possible, then we must do our best to remove them from these environments as early in life as possible so as to take advantage of the brain's ability to adapt in early childhood. If I can leave you with one message, then, it is that it is the interaction of the **severity**, the **duration** and the **timing** of the adversity that largely accounts for how children will grow and develop.

In closing, permit me to thank you for your leadership and to stand ready to offer the help of the scientific community in any way that I can.