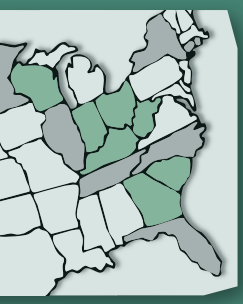
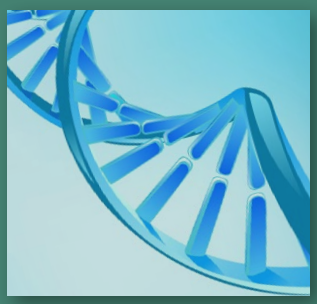
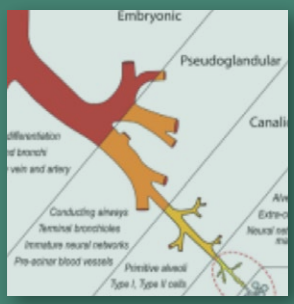
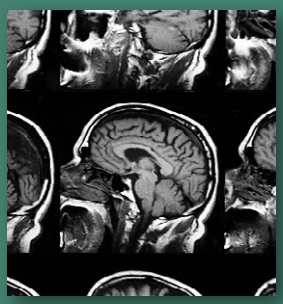
# A Story of Health







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*We gratefully acknowledge the following people who reviewed draft sections of a Story of Health, noting that their review does not constitute an endorsement of the findings or conclusions. Any errors or misrepresentations that remain are entirely the responsibility of the authors.*

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A Story of Health

# HELP PAGE How to Navigate Our eBook

THE INDIVIDUAL STORIES OF HEALTH in this eBook are written to address many audiences. For example, some sections are more technical than others – you can skip sections if you wish.

(Note: underlined words or phrases link to online information, prompt down-loads or navigate to a related page.)

Each of the eBook stories is embedded with a wide range of resources. These help further explain possible environmental and/or genetic "risk factors" – (contributors to the development of a disease, or factors that might make a disease worse) – and how these factors interact.

We also provide links for additional resources, including actions you can take to prevent disease, and "tools you can use."

RESOURCES INCLUDE videos, slides with audio commentary, tables, charts, and graphics. Some 'pop-up' in the story, and some connect online. Through these links, you can choose to dig deeper and learn more. Refer to the icons (above) for guidance.

REFERENCES AND CITATIONS: Certain references are cited in the text where we believe they are most warranted. Full references by topic can be found at the end of each story.



## Getting Started

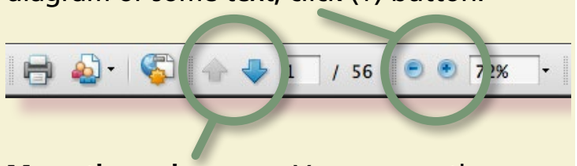
**Our eBook Navigation:** Click on selections in the bar at the top of each page to move between stories, navigate back to this 'Help Page', and to find out more in the References section.

If you lose your place, use the 'Go Back' selection in the navigation bar to return to your previous screen.

### Adobe Acrobat Tools

**This interactive pdf document is best viewed on a laptop or desktop, down-loaded and opened in a current version of Adobe Acrobat Reader.** Refer to the top Adobe menu bar for features including:

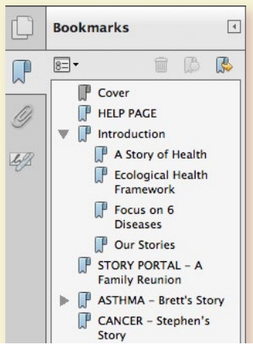
**Magnify** - If you want to enlarge a diagram or some text, click (+) button.




**Move through pages** - You can use the up and down arrows to move through pages.

You can also move through pages using the scroll up and down feature to the right of your screen.

**Note: Navigation features may not work properly using other pdf reader platforms.**




### Table of Contents

**Use the sidebar Bookmark Tools** as a table of contents to skip to a section of interest, find your place, or return to this Help page.

### Icons

Click on icons that appear throughout the stories for pop-ups, videos, and links to more information as described.

key concept

watch a video

additional resources, tools

technical details for health professionals

skip this section

definition

**Skip this section** - If you wish to skip a technical section, choose the "Skip this section" arrow and you will jump to the page after the technical sections ends.

You can skip this section and continue to the Story of Health introduction.

# INTRODUCTION

This is a story about health.

It is a story of how our own health is intimately connected with the health of our families, friends and communities.

It is a story about how human health is interdependent with our surroundings.

Our overall story is told through the personal stories of a number of fictional people of various ages attending a family reunion.

These individual stories highlight the many ways our health is influenced by the complex environments where we live, eat, work, play, volunteer, gather and socialize.

# INTRODUCTION

Our stories explore how many aspects of our lives, and what we are exposed to in our environments, influence health across the lifespan—from the beginning of fetal development to elder years—and how they can promote health and resilience, or disease and disability.

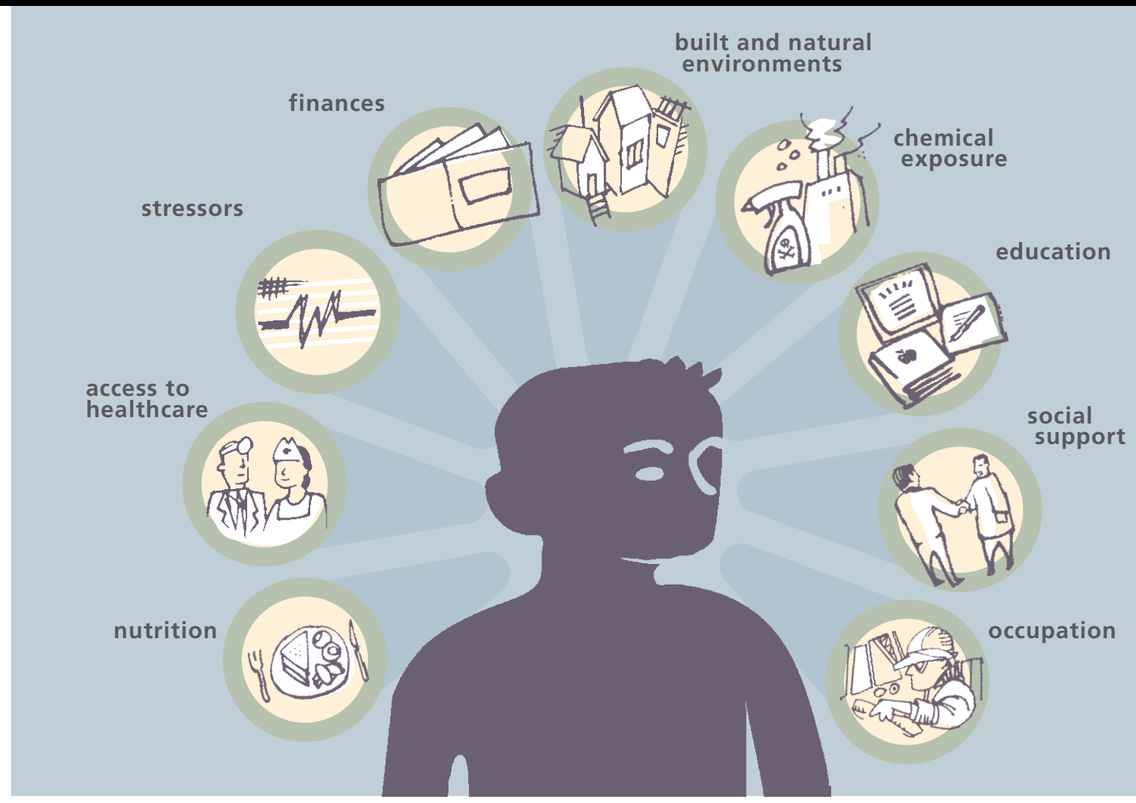
Important determinants of health come from the natural, built, chemical, food, economic, and social environments.

These environments are further expressed through such things as education, housing, nutrition, access to health care, social supports and more.

Many of them interact to create the conditions for health and wellness, or vulnerability to disease.


**Watch: Pediatrician Larry Rosen addresses the environment and family health. (2 min.)**

**Lawrence D. Rosen MD is an integrative pediatrician and founder of the Whole Child Center.**




Complex interactions occur among many variables and across individual, community, and societal levels.

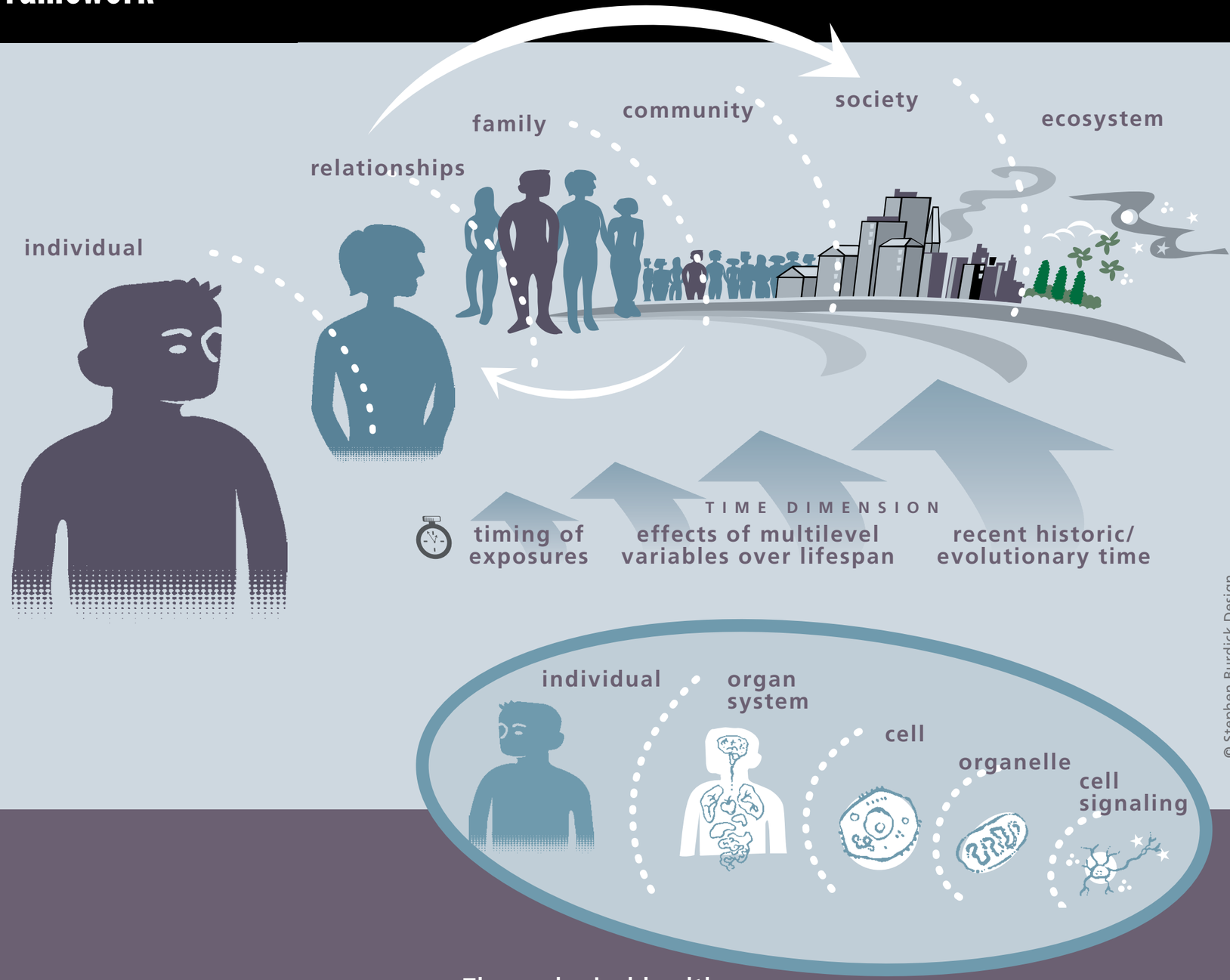
Rarely is one particular thing responsible for health or disease, so we refer to this as a multifactorial (or ecological) approach, the best way to promote health and prevent disease.

# INTRODUCTION Ecological Health Framework

The ecological framework can include multiple levels from sub-cellular to societal.

It is not hierarchical in the sense that one level is more important than another, but rather in the sense that individual biology is progressively nested within the person, family, community, society and ecosystem.

The interactions and feedback loops within, across, and among these levels are complex and variable. They exert their influences on health across time.




The ecological health framework also extends to the sub-cellular level.

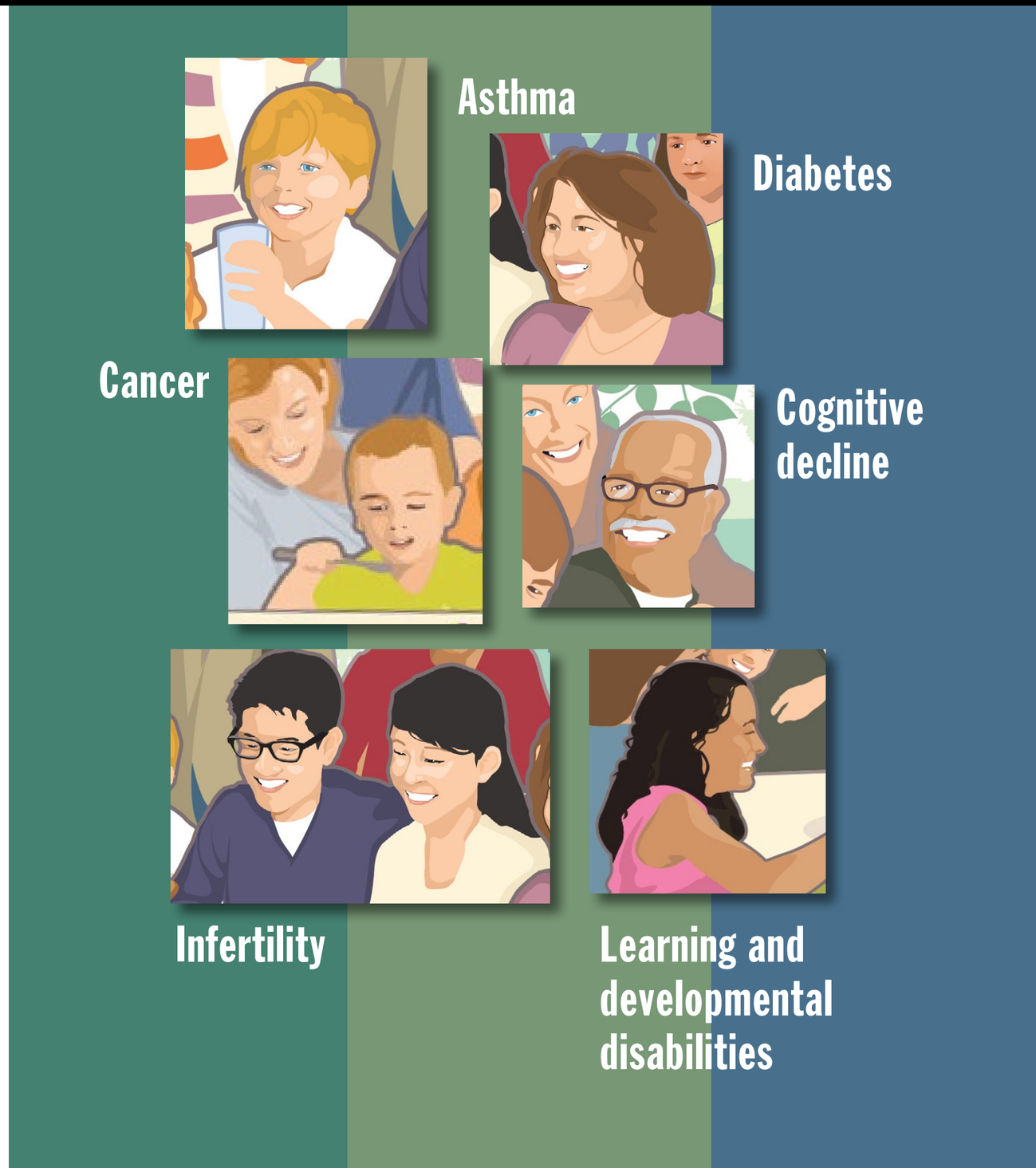
# INTRODUCTION Focus on Six Diseases

Following are stories of people like you and me, our partners, families and friends, our mothers and fathers, sisters and brothers, children, grandparents, cousins, and aunts and uncles.

The personal health stories we will explore include some of the most common and troubling diseases and disorders of our time.

They include:

- Asthma
- Cancer (childhood leukemia)
- Diabetes
- Infertility
- Learning and developmental disabilities
- Cognitive decline



# INTRODUCTION Our Stories

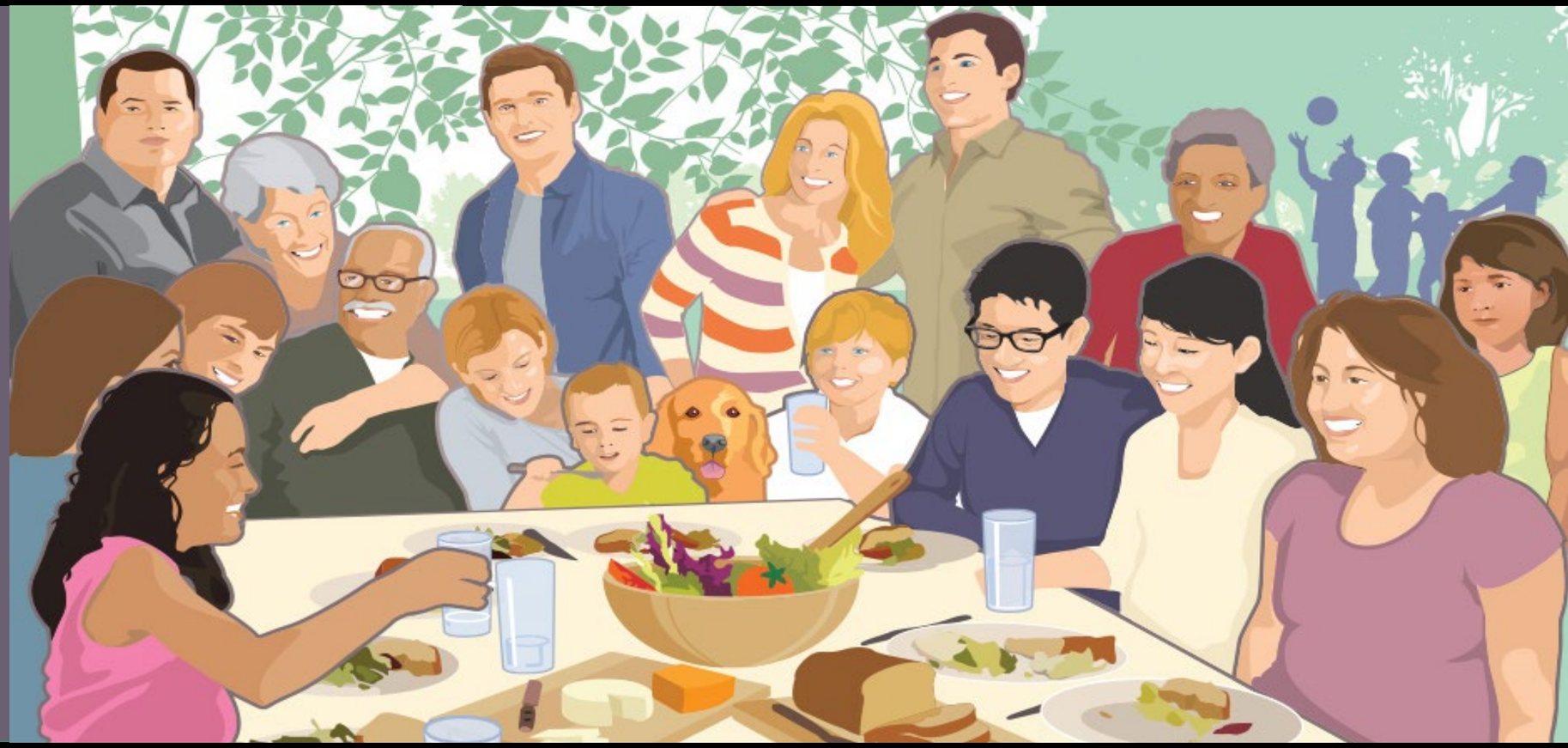
These stories are not meant to be an exhaustive accounting of every variation of a disease or every possible cause.

Rather, we present current, authoritative scientific evidence to enable you to better understand environmental contributors and make more informed decisions and take action to help improve your health, and the health of your family, friends, community, and patients.

# A FAMILY REUNION Six Stories

This page is your portal to six stories of health.

It is recommended that you read through the introduction first and then choose stories in the order you wish.



Choose stories in the order you wish. Select a disease term to highlight the affected person. Click the arrow button to read his or her fictional story of health.

Asthma | Cancer | Learning/ Developmental Disabilities | Diabetes | Infertility | Cognitive Decline

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

A single variable, such as birth trauma or prenatal exposure to alcohol, may sometimes be the cause of a developmental disability.

More commonly, however, multiple risk factors combine to alter brain development and/or function in a variety of ways, resulting in a developmental disability.

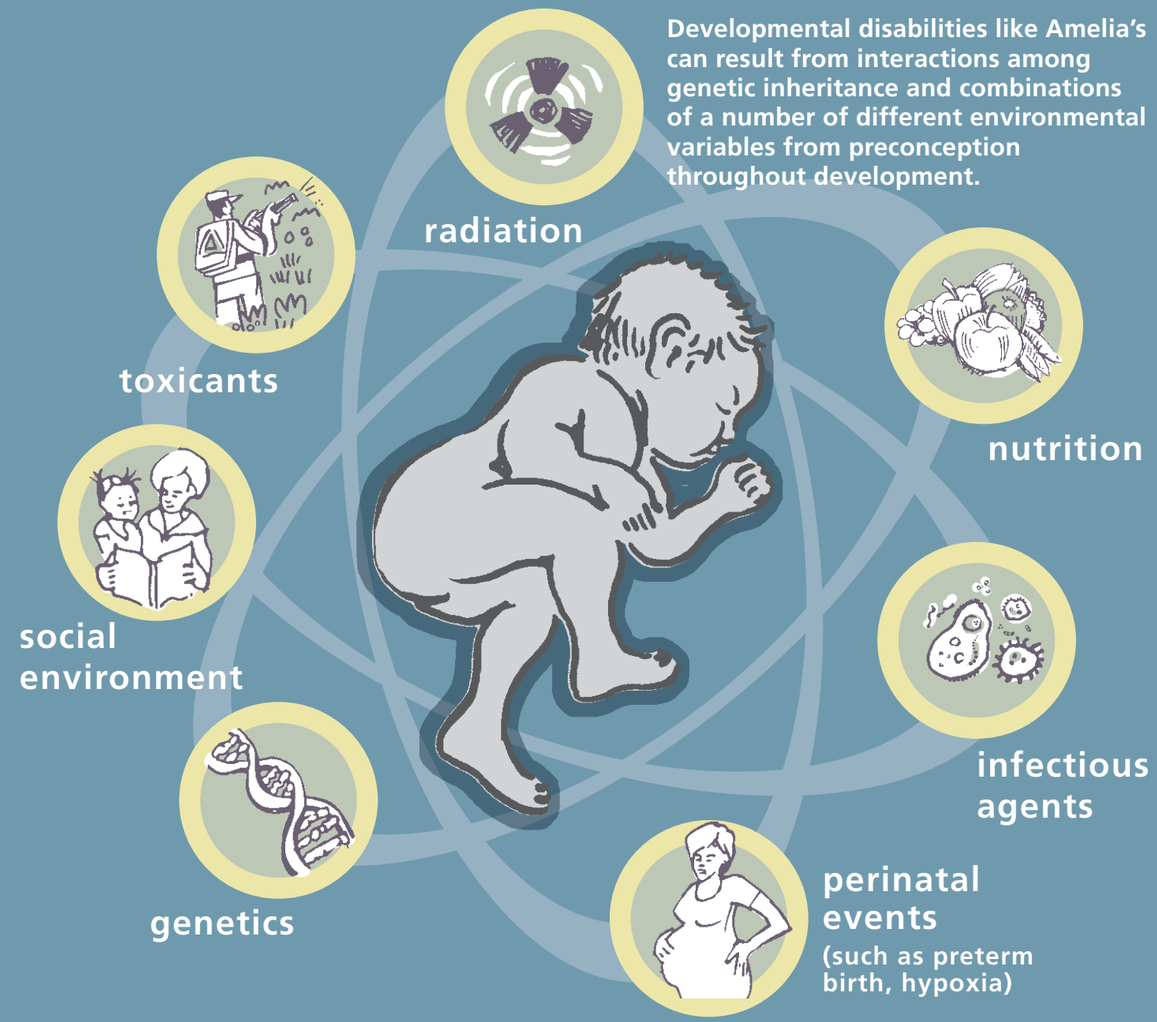
Developmental disorders are generally better conceptualized as heterogeneous (different) conditions arising from interactions among genetic and environmental factors. (See "More" below for in-depth information.)

**More on environmental and genetic contributors to developmental disabilities**

**Environmental factors reported to be associated with ADHD***

## Multiple Contributors to Developmental Disabilities

**Developmental disabilities like Amelia's can result from interactions among genetic inheritance and combinations of a number of different environmental variables from preconception throughout development.**






*Thapar A, Cooper M, Jeffries R, Stergiakouli E. What causes attention deficit hyperactivity disorder? Arch Dis Child. 2012;97:260–265

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## DEVELOPMENTAL MILESTONES

Amelia's developmental disability was not particularly noticeable at a young age. Her developmental milestones had been only slightly delayed compared to her peers, and she also seemed to be somewhat inattentive, but otherwise progressed reasonably well.

In addition, the subtle expression of her delays and difficulties was missed by her parents, who were distracted after her baby brother David was born.

**More information on Developmental Milestones >**

**Checklists for Parents:**

**CDC's Developmental Milestones by specific age**


**Watch: How early recognition of developmental disabilities can assist parents and providers.**

**Learning and math disabilities and IQ**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

Amelia's parents, Darrell and Gloria, first became somewhat concerned that she might be having difficulty with school work when she was in the second grade. She seemed to be having trouble paying attention and finishing tasks like her homework.

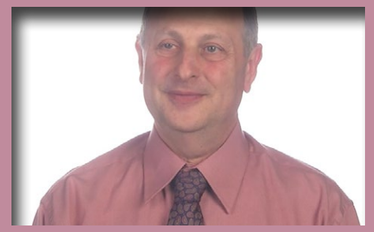
They decided, though, that she was just going through some normal adjustments at school and at home. Because they were both working long hours at their jobs, taking care of a new baby, and struggling with finances, they did not seek help for Amelia at that time as her difficulties did not seem to be very serious.

Both parents did make sure they spent time with her to help her read and comfort her when she seemed frustrated.

**The beneficial effects of an enriched social environment**

For these and other reasons, her parents put off addressing Amelia's problem until a parent-teacher meeting in the third grade, where they learned more about the difficulty Amelia was having in school. They realized they needed to take action.

**Watch: Dr. Mark Miller describes the benefits of an enriched social environment and the way it influences brain structure and function.**



**Mark Miller MD MPH, Director, Children's Environmental Health Program, Office of Environmental Health Hazard Assessment, California EPA; Director, UCSF Pediatric Environmental Health Specialty Unit**

**Watch: "Childhood Development, Resilience and the Environment"**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## EVALUATION OF LEARNING DISABILITIES

Amelia's parents met with the school psychologist, Mr. Richards, who did an evaluation to determine Amelia's education needs. He also offered to refer them to a medical setting to see if the family wanted to pursue further diagnosis. When they asked, he referred them to a center in a large city where she could be further evaluated.

### ? Evaluation – What does it mean?

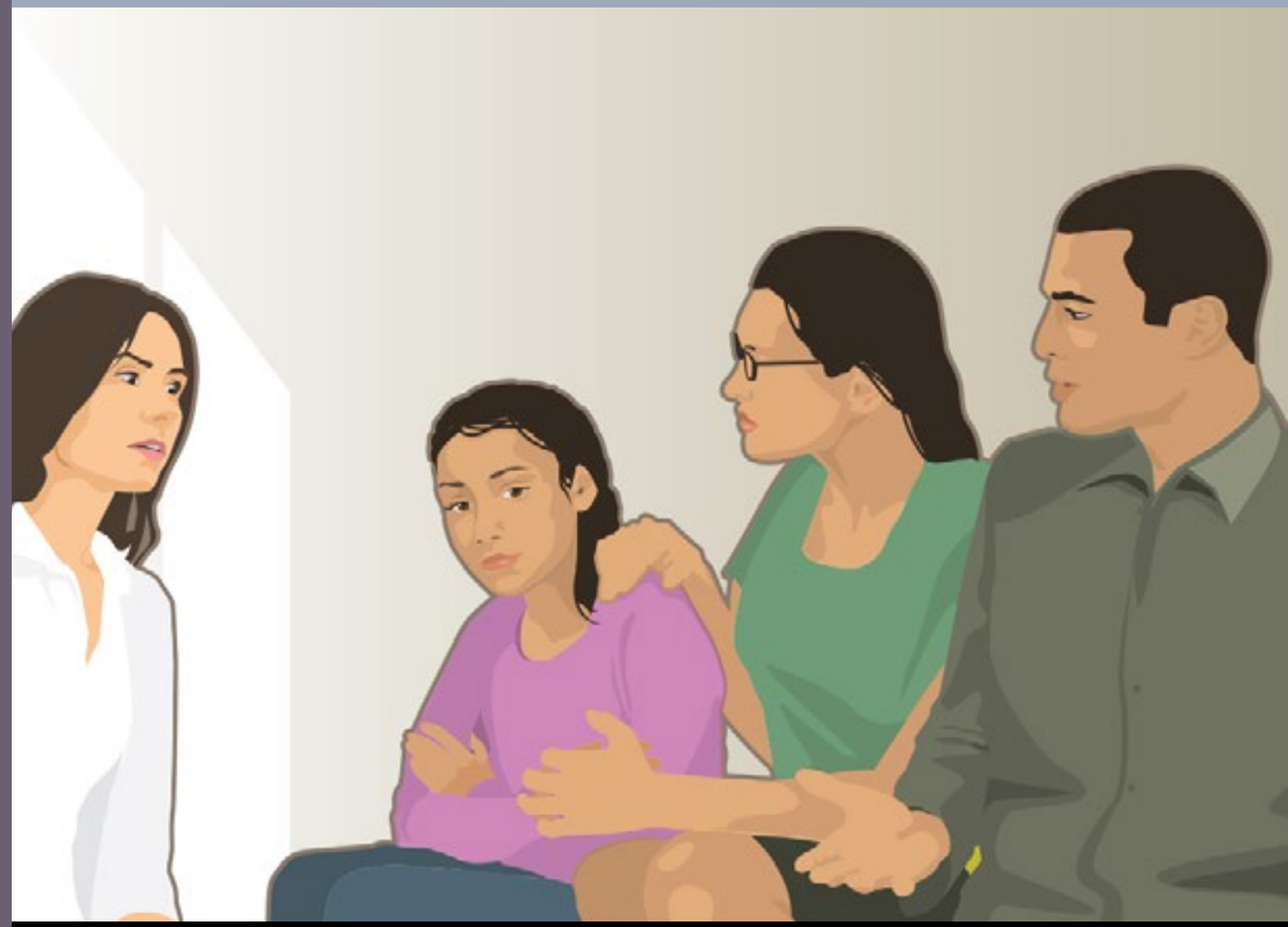
The medical setting was somewhat intimidating at first, but the people at the center made them feel at ease. They were introduced to Dr. Bradley, a developmental pediatrician, who said she would be conducting a number of screening procedures with Amelia.

After the screening, Dr. Bradley met with Amelia and her parents. She explained that Amelia's challenges were somewhat difficult to categorize as she had several that cut across syndromes they might have heard of, such as ADHD.

She explained that Amelia's reading and comprehension difficulties qualified as a learning disability. However, Amelia also exhibited inattention during the testing but not sufficiently for a diagnosis of ADHD.

**+ Find out more about Evaluations**

LDA Learning Disabilities Association of America



# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

Dr. Bradley said she thought Amelia would do well with some extra help at school along with making other healthy living choices.

**Developmental Screening Tools for Clinicians:**

Developmental Screening in Early Childhood Systems, American Academy of Pediatrics (AAP)

Developmental and Behavioral Screening Initiative, Administration for Children & Families (ACF)

## OVERLAPPING SYNDROMES

Learning and behavioral disorders often overlap with other categories. For example:

Among children with ADHD:

- 10-30% also have learning disabilities;
- 30-50% also have language disability;
- 30-80% have other behavior disorders.

ADHD is also frequently associated with autism spectrum disorder, obsessive compulsive disorder, tic disorders, and intellectual disabilities.

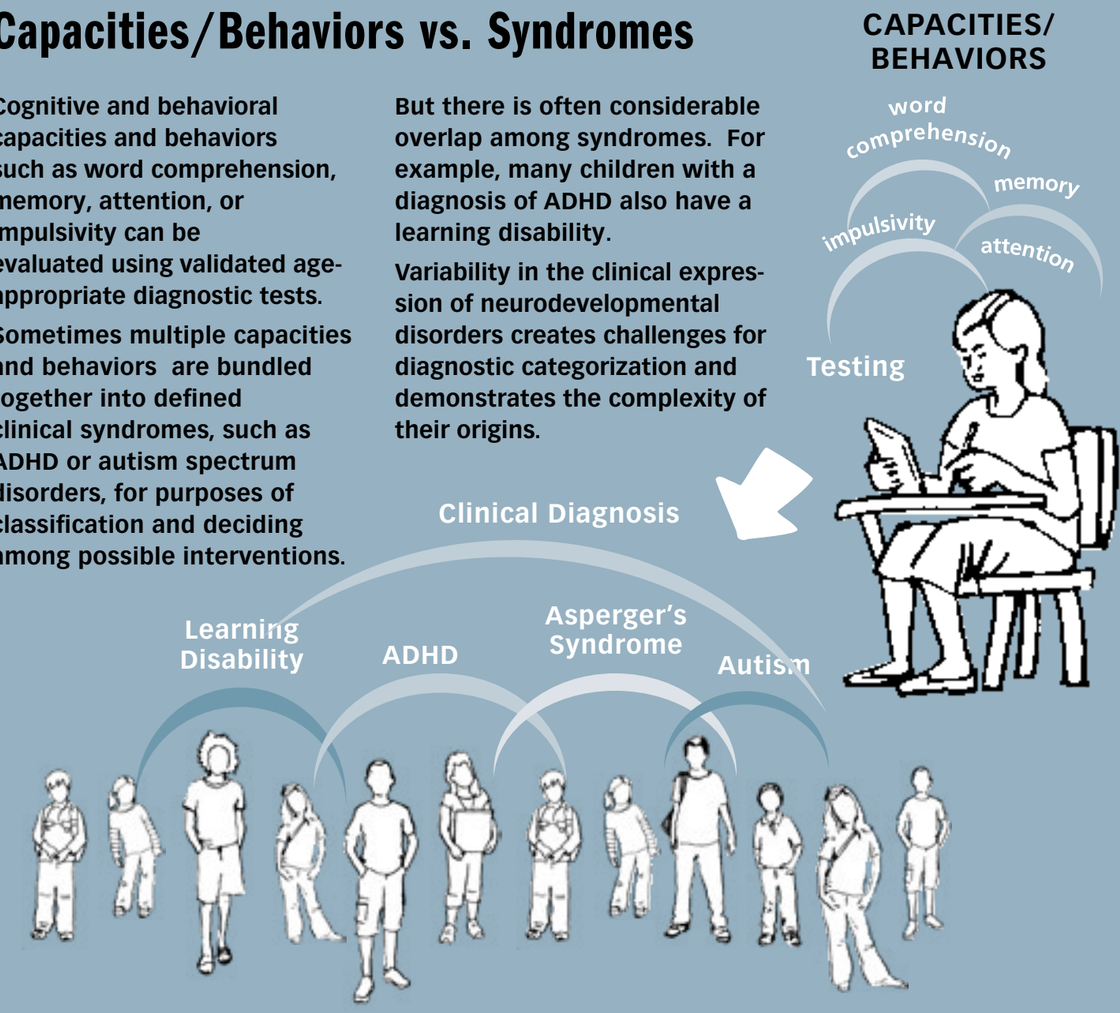
## Capacities/Behaviors vs. Syndromes

Cognitive and behavioral capacities and behaviors such as word comprehension, memory, attention, or impulsivity can be evaluated using validated age-appropriate diagnostic tests.

Sometimes multiple capacities and behaviors are bundled together into defined clinical syndromes, such as ADHD or autism spectrum disorders, for purposes of classification and deciding among possible interventions.

But there is often considerable overlap among syndromes. For example, many children with a diagnosis of ADHD also have a learning disability.

Variability in the clinical expression of neurodevelopmental disorders creates challenges for diagnostic categorization and demonstrates the complexity of their origins.




Learning Disability | ADHD | Autism spectrum disorder

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

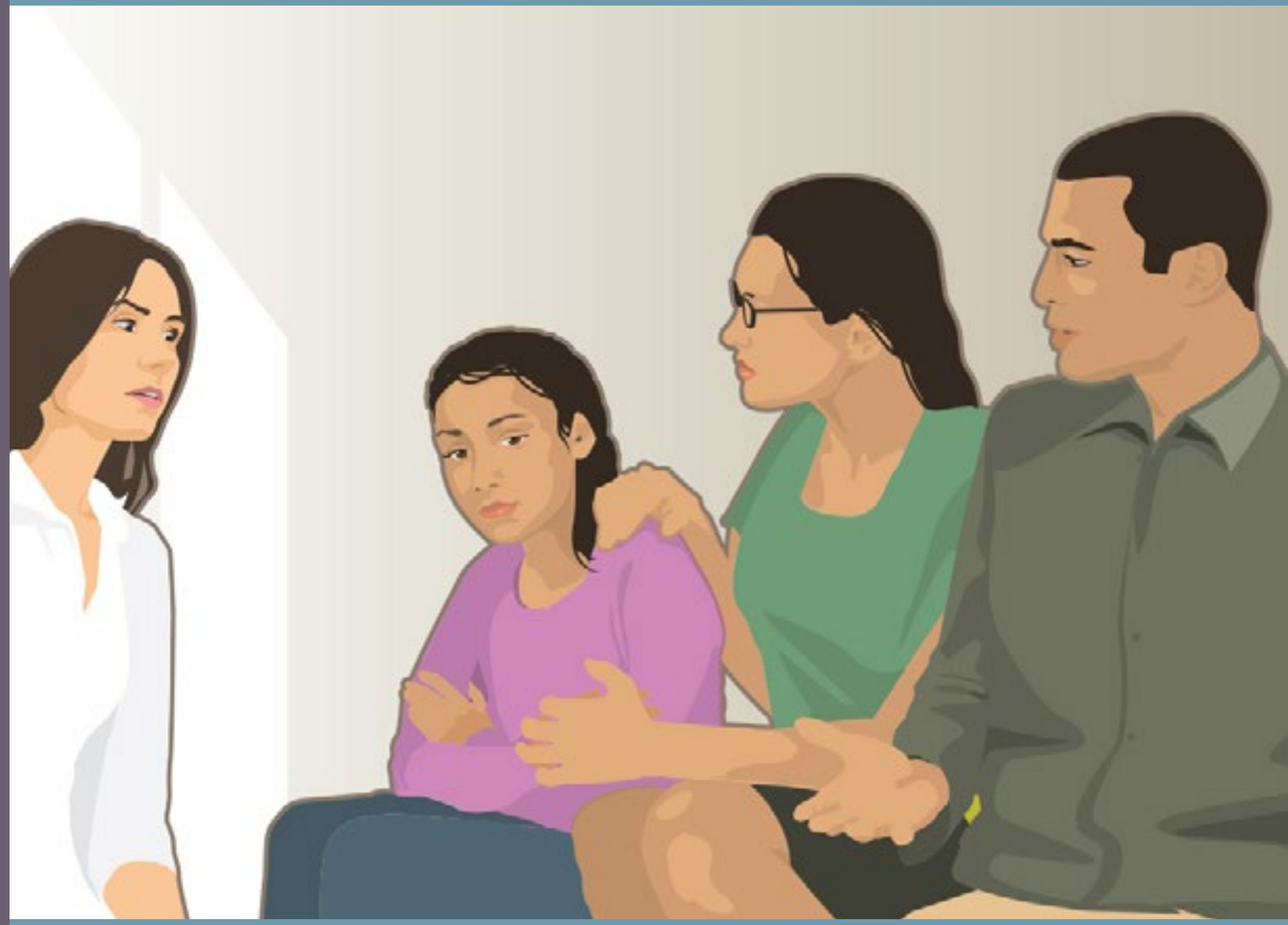
Amelia's parents, Darrell and Gloria, asked Dr. Bradley what could have caused Amelia's learning disability, and Dr. Bradley was interested in exploring that as well.

Dr. Bradley suggested that there is often a genetic predisposition and added that if Amelia had been born prematurely, or had a low birth weight, either could be a risk factor for her developmental disability.

Gloria told her that Amelia was a little underweight when she was born, but no one seemed very concerned about it at the time. Dr. Bradley also mentioned that smoking or drinking during pregnancy could increase the risk. Gloria told her that her husband had smoked during her pregnancy, although when Amelia was born he had quit with help from their local medical clinic.

Finally, Dr. Bradley told them about the risk to brain development from exposures early in life to other toxic chemicals and substances, such as lead, mercury, and diesel fumes from trucks and cars.

- **Preconception and Healthy Child Development**
  - More information: CDC's Preconception care for women and men
- **Prenatal Care and Healthy Child Development**
- **Folate supplementation recommendations for women**
- **A Rationale for Thyroid Screening**
- For Clinicians: Environmental health history form



**MORE INFORMATION:**

- CDC on pregnancy
- American Congress of Obstetrics and Gynecology (ACOG):
  - Good Health Before Pregnancy (pdf)
  - Prenatal Nutrition
  - Environmental Chemicals
- Royal College of OB/GYN:
  - Chemical Exposures During Pregnancy
- UCSF: Program on Reproductive Health and the Environment
- American Thyroid Association Guidelines

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## BRAIN DEVELOPMENT

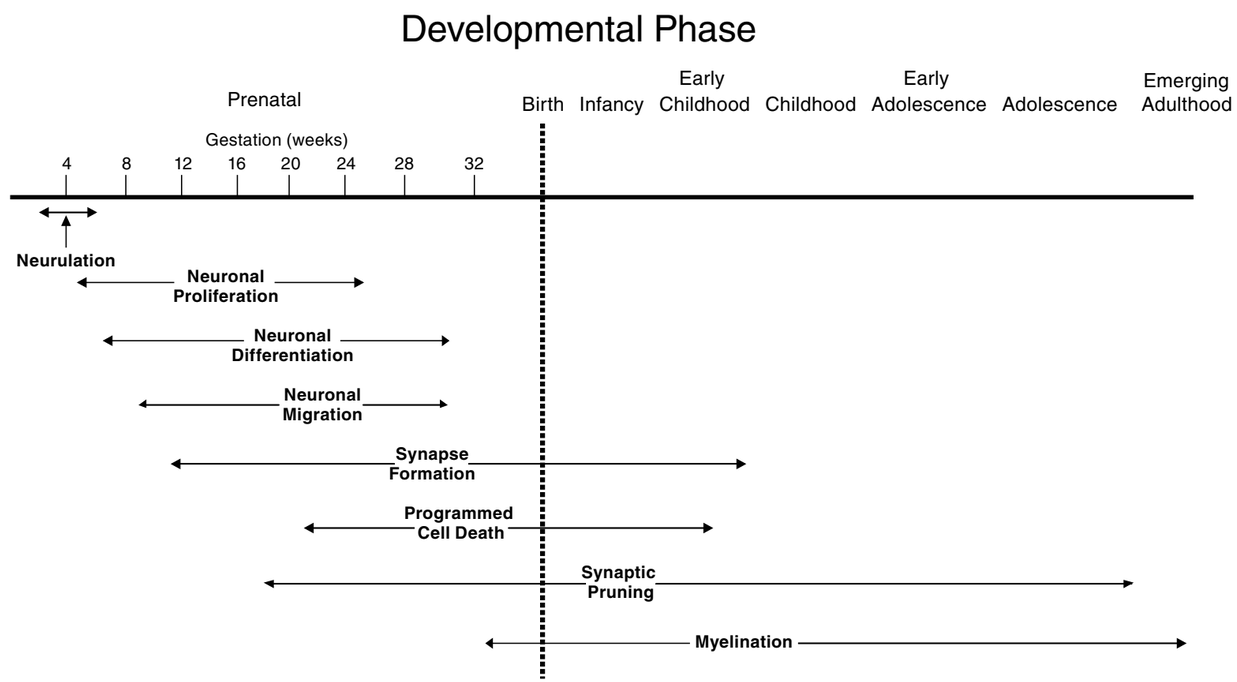
Brain development begins soon after conception and continues throughout adolescence into adulthood. It is characterized by a critical sequence of events that helps to determine brain structure and function. Each of these processes is subject to disruption by exposure to various environmental agents. Inadequate nutrition and adverse social circumstances can also impair these developmental processes.

Even brief disruptions during critical periods of early brain development can have significant downstream effects with long-lasting consequences.

The clinical manifestation of disruption from neurodevelopmental toxicants or other stressors depends on the nature of the agent as well as the size, timing, and duration of exposure.

**Find out more: Cellular events in neurodevelopment**

**Timeline of major events in brain development**




**Source:** Preventing Mental, Emotional and Behavioral Disorders Among Young People: Progress and Possibilities. **Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Eds. Natl Academies Press, Washington, DC. 2009. Graphic used with permission.**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## BRAIN DEVELOPMENT

The pattern of formation of nerve connections (synapses) in the cerebral cortex is characterized by rapid proliferation and over-production of synapses, followed by a phase of synapse elimination (pruning) that reduces the number of synapses to more adult-like levels.

This process is prominent in the first years of life, although it extends to some degree into adolescence. However, different brain regions with different functions develop on different time courses.

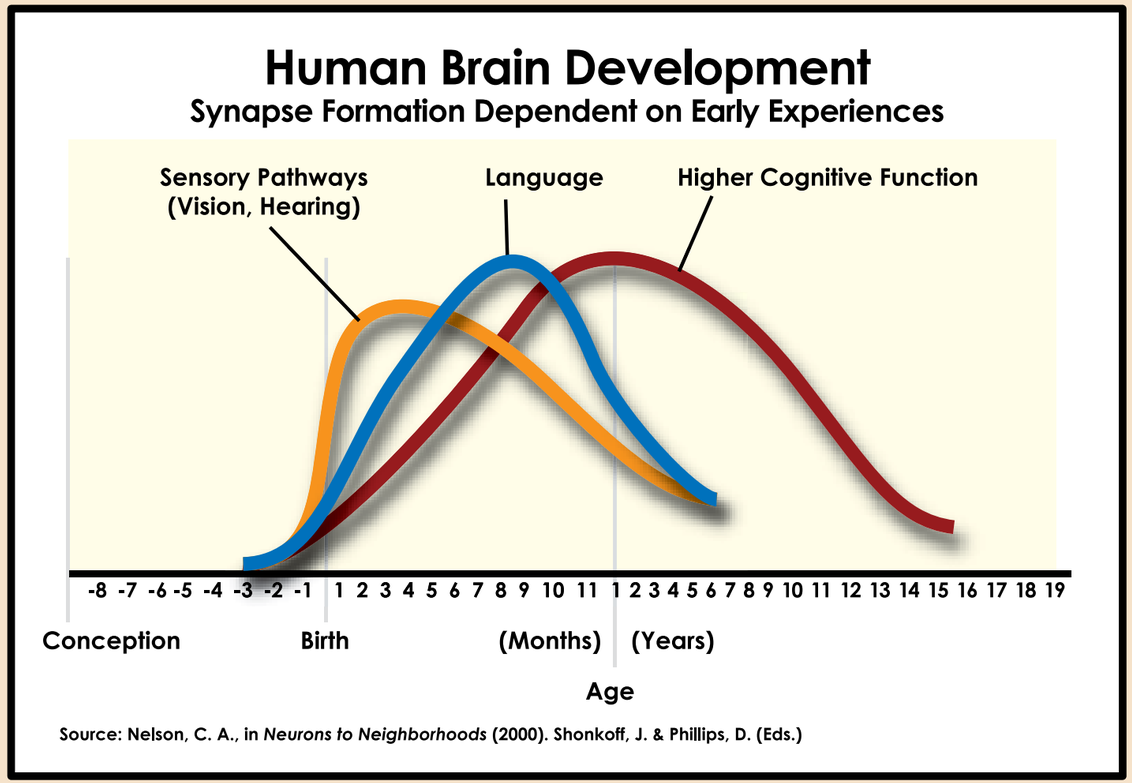
"Core Concepts in the Science of Early Childhood Development" Harvard Univ. Center for the Developing Child

**Watch: Little Things Matter: The Impact of Toxins on the Developing Brain**

**Dr. Bruce P. Lanphear, MD MPH**

**Professor, Simon Fraser University**


### Experience-dependent synapse formation




Graphic: "A Science-Based Framework for Early Childhood Policy" Center on the Developing Child, Harvard University
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# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

Dr. Bradley discussed some of the ways that Gloria and Darrell could help Amelia with her learning problems and discussed eligibility that would allow support for Amelia to attend special programs.

She encouraged them by saying that it was never too late to focus on habits to promote health for the whole family, like healthy eating, exercise, avoiding toxic chemicals, and trying to deal positively with stress.

She referred them back to Mr. Richards at the school to discuss developing a school program tailored to Amelia's needs.

She gave them some booklets and brochures. Amelia's parents thought Dr. Bradley was helpful but left feeling a little overwhelmed.

Amelia was worried because she figured there was extra school work in her future.

**+ Healthy eating habits**

**+ Effect modifiers: iron deficiency, poverty, lead exposure.**

**+ Resources to help parents:**

**Learning Disabilities Association**

**Watch: Dr. Mark Miller describes how lead and stress affect brain functioning, and the benefits of an enriched environment. (4 min.)**

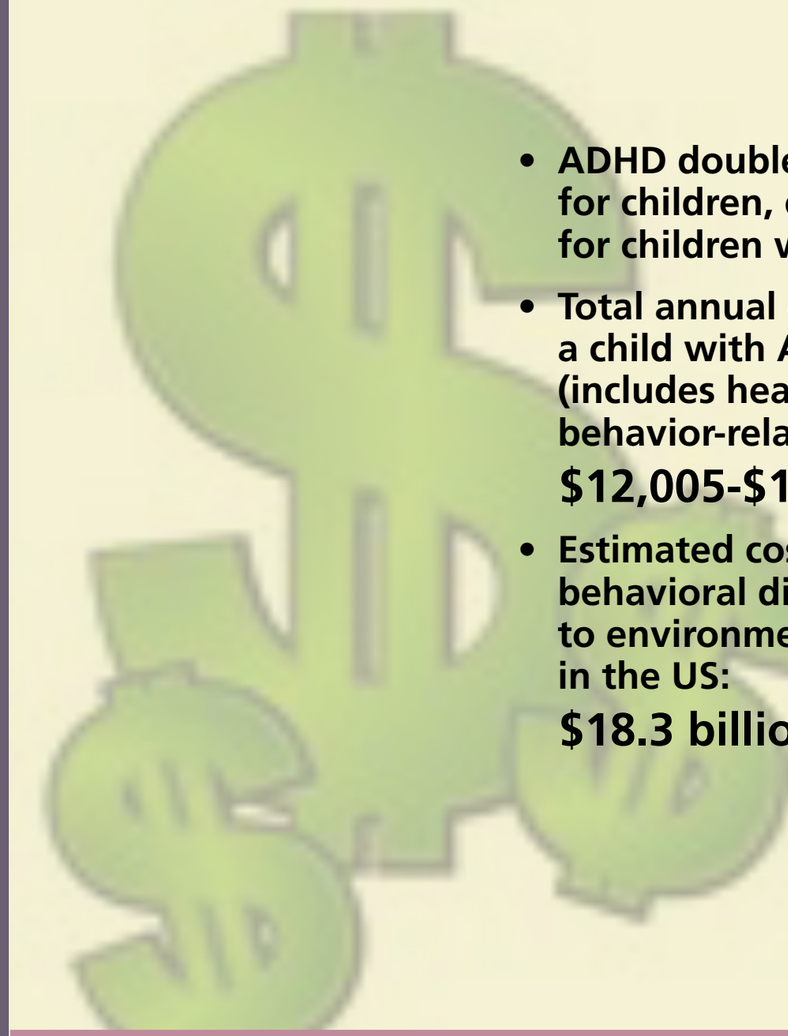
# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## ECONOMIC COSTS

**Developmental disabilities affect individuals, families, and communities and have staggering economic costs.**

Effects can include:

- academic difficulties,
- employment problems,
- financial stress,
- emotional stress,
- substance abuse,
- lawbreaking , *and even*
- suicide.



- **ADHD doubles health care costs for children, comparable to costs for children with asthma.**
- **Total annual cost-of-illness for a child with ADHD in the US (includes health-, education-, behavior-related costs):**
  **$12,005-$17,458/yr.**
- **Estimated costs of neuro-behavioral disorders attributable to environmental pollutants in the US:**
  **$18.3 billion/yr.**

**(CDC, National Center on Birth Defects and Developmental Disabilities – ADHD Data and Statistics; Trasande & Liu, 2011)**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH

Gloria decided to look online to learn more about environmental chemicals that can contribute to learning and developmental disabilities.

She began to think of the many ways that her family might have been exposed to lead, mercury, pesticides, endocrine disruptors, solvents, air pollution and other substances that she read about.

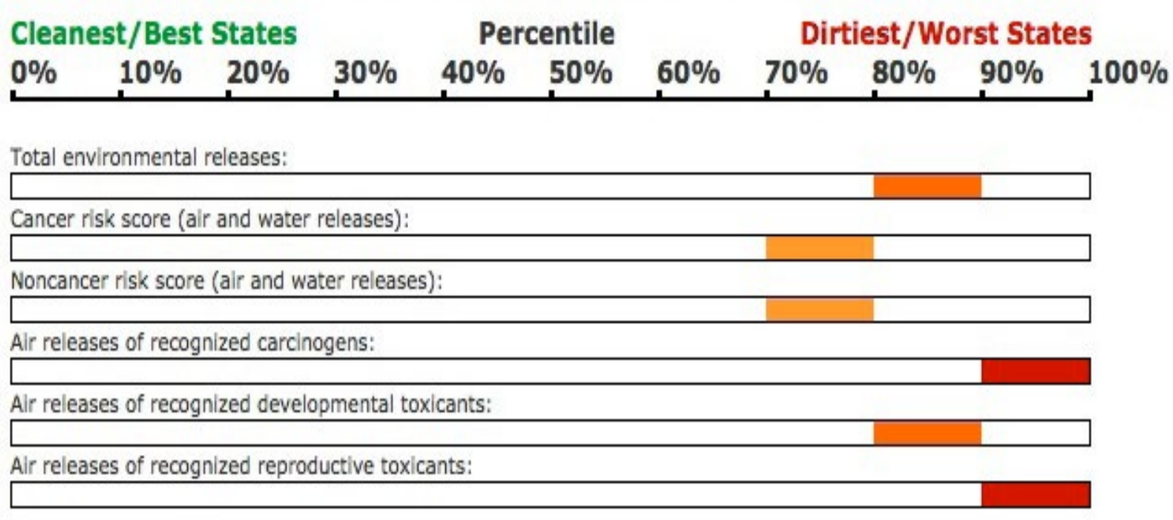
**Chemicals and neurodevelopmental health effects – an overview.**

It was not difficult. Before Amelia was born her parents lived in Baton Rouge, Louisiana where Gloria worked at a petrochemical factory. At the factory she had noticed the smell of solvents nearly every day. The smells from the factory were more bothersome when Gloria was dealing with morning sickness.

Gloria and Darrell moved to their current home just as Gloria was beginning her second trimester of pregnancy.

**Link: California Proposition 65 – chemicals known to cause cancer or reproductive toxicity**

**2002 Rankings: Major Chemical Releases or Waste Generation in LOUISIANA***




See how this state ranks on other chemical release and waste management attributes tracked by Scorecard

Graphic used with permission.

Grandjean P, Landrigan P. Neurobehavioural effects of developmental toxicity Lancet Neurol. 2014 March;(13):330-338.

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH - AIR POLLUTION

When Darrell and Gloria moved from Baton Rouge to a smaller town in Louisiana, they chose their new home because of its affordability. The house was a nice size for the growing family, but it was on a busy street, where many trucks passed on their way to factories in surrounding towns.

Soon after the family moved to their new home, Gloria and Darrell undertook some remodeling. Darrell was very busy with his new job, and Gloria (who was pregnant with Amelia) did most of the painting and had new carpet installed.

It was not until many years after moving that Gloria learned that air pollution from traffic emissions can have adverse effects on child development. She also learned that remodeling projects can involve exposures to chemicals that can harm a developing child's brain.

**Air pollution, family stress and nutrition - synergistic effects on brain development.**

**Link: TENDR (Targeting Environmental Neuro-Development Risks)**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH - PESTICIDES

Gloria recalled that they had the new house sprayed for pests after receiving promotional materials in the mail soon after Amelia was born. Although they do not use pesticides in their home or outside any longer, their neighbors regularly spray their lawns with pesticides. She later learned that pesticides, some of which are neurotoxic and can impair brain development, are widely used.

Gloria also thought about Darrell's job as a carpenter and how he works with a lot of chemicals.

She was amazed at how many exposures to toxic chemicals her family had experienced that she had never thought about before!

**Prevention Strategies: Integrated Pest Management**

**Link: Organophosphate exposures during pregnancy and child neurodevelopment: Recommendations for essential policy reforms**

**More Resources:**

Pesticides: EPA - Integrated Pest Management

Bio-Integral Resource Center (BIRC)

Pesticide Action Network (PAN)

Drawing courtesy of the Bio-Integral Resource Center, artist Diane Kuhn. Reproduced with permission.

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH - MERCURY

Amelia liked to go fishing with her father, who was an avid fisherman. For several years they had enjoyed catching and eating a variety of fish from the local lake.

Gloria remembered Darrell coming home from fishing one day and telling her about a posted fish advisory, warning fisherman not to eat the fish due to contamination from mercury.

The advisory included a state web site where Gloria was able to learn more. She read that mercury, like lead, is a heavy metal that disrupts brain development. She also read about the health benefits of eating uncontaminated fish and about nutritious fish with low contaminant levels available in local supermarkets.

Gloria searched for an alternative place where Darrell and Amelia could continue to enjoy fishing and from which the family could also eat the fish they caught. She found a nearby river where the fish were not contaminated. Amelia was happy that she and her dad could still fish together.

**Link: Pediatric Environmental Health Toolkit**


**Illustration** © Stephen Burdick Design

Photos from EPA: water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/index.cfm, used with permission.

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH - LEAD

Finally, Gloria thought about the older houses they had lived in and the lead paint problems. They had been careful to remove the paint properly, but maybe they had not removed it all.

**Lead removal from gasoline and other products – a public health success story**

Luckily, she didn't have to worry about lead in gasoline anymore. She read about how that was a public health success story and how it had reduced blood lead levels in children.

**Lead - developmental effects**

**Link: Pediatric Environmental Health Toolkit**

### Where is the Lead?

- Formerly used in house paint, gasoline, water pipes, solder in food cans;
- Currently found in imported pottery, some cosmetics, some traditional (indigenous or folk) medicine, older water pipes, older house paint, some types of industrial paint, aviation fuel, car batteries, and bullets;
- Most common sources of exposures: older paint, dust, and water pipes.

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND HEALTH

Gloria also wondered about other chemicals that she was exposed to when she was pregnant with Amelia, including second-hand tobacco smoke and solvents at the factory where she worked before they moved.

Amelia had thrived in her daycare. She seemed happy there and learned some of the basic skills she needed for kindergarten. Amelia's daycare was a good choice, but Gloria thought about hazardous chemicals Amelia might have been exposed to when she was there.

These include formaldehyde emitted from certain furnishings and building materials like cabinets, hazardous chemicals in carpeting, phthalates in flexible plastic toys and vinyl flooring, bleach and other cleaning solutions, and air pollutants from indoor natural gas combustion.

**More information:**

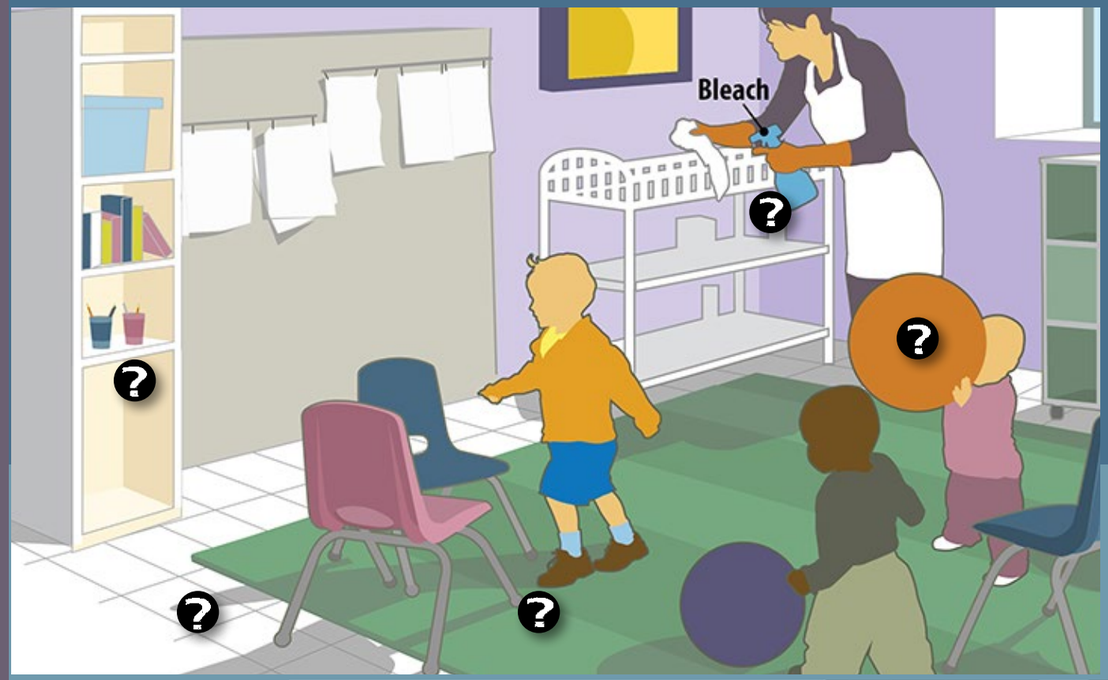
**Benefits of early childhood education and policies:**

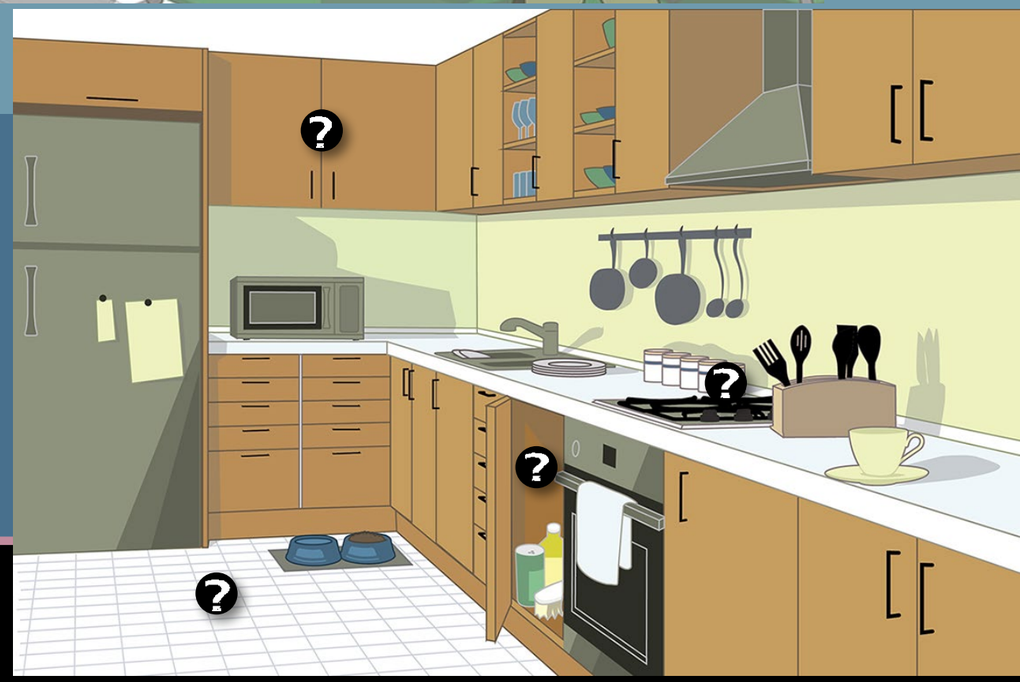
- Harvard University Center on the Developing Child: Resource Library

**Preventing/reducing toxic chemical exposures in child care settings:**

- Eco-Healthy Child Care
- Integrated pest management curriculum and Green cleaning toolkit

**Watch:** Watch Dr. Mark Miller describes the benefits of early childhood education (1.42 min.)



# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND COMMUNITY HEALTH

Gloria and Darrell became worried that there might not be much they could do about reducing the family's ongoing exposures to hazardous chemicals.

Gloria decided to call up a friend who was involved in the community to see if she knew more about community exposures to toxic chemicals.

Her friend told her there was a local group called "Clean and Green" that was working on reducing the use of chemicals in their town and other issues relating to the environment. She said they had received information from other communities facing similar issues.

Gloria heard the term "environmental justice" for the first time.

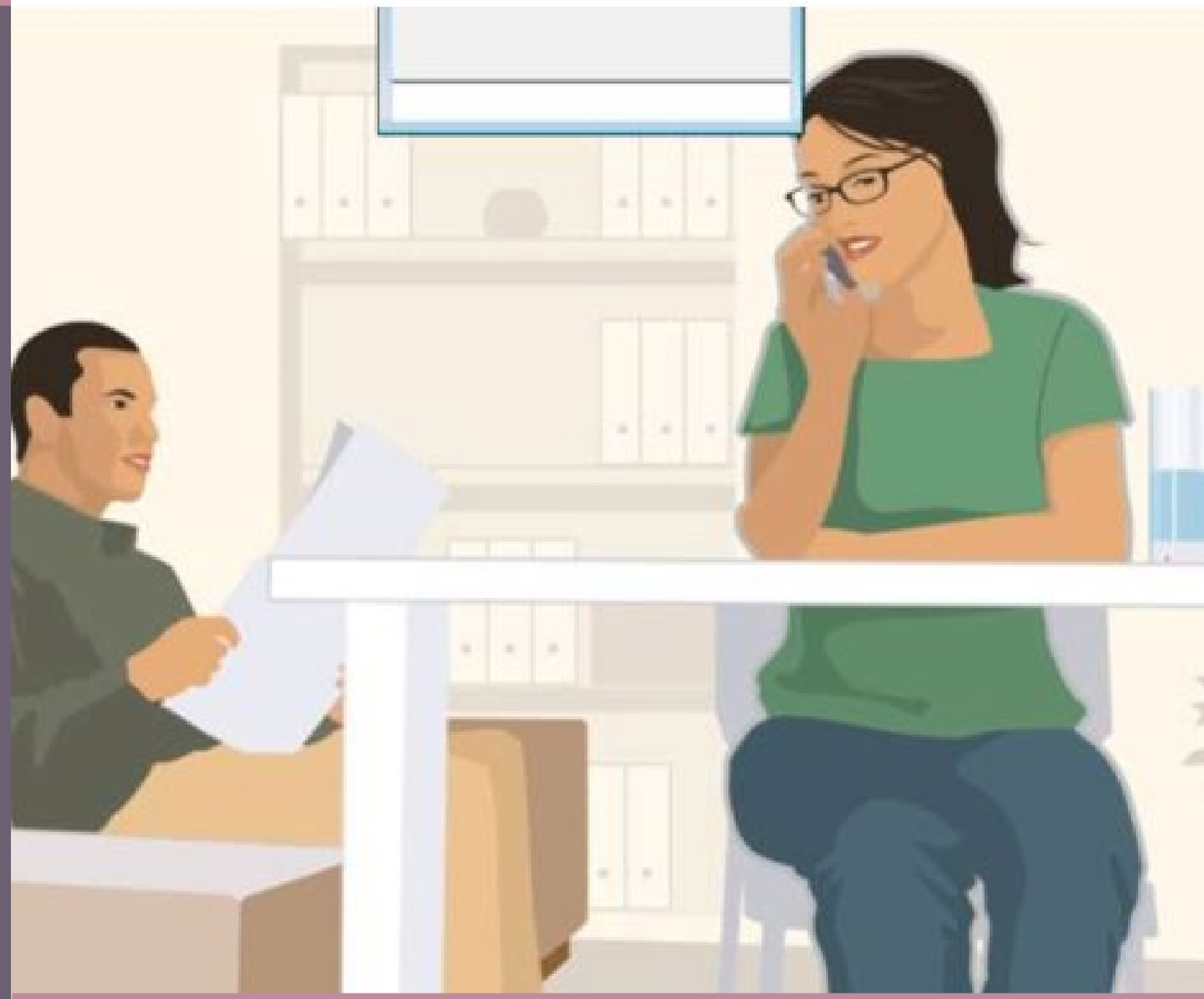
**Key Concept: Environmental Justice**

**More information:**
**CDC National Public Health Tracking Network**

**Toolkit Key Concept on environmental Justice**

**Watch presentations:**

**WSPEHSU/OEHHA symposium Environmental Justice and Children**



Find out more: Toxic Wastes and Race at Twenty: 1987-2007 (pdf)

Read the latest goals EJ 2020 Action Agenda: EPA's Environmental Justice Strategy

Browse maps: Interactive Global Atlas of Environmental Justice

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

## TOXICANTS AND COMMUNITY HEALTH

Gloria started attending meetings of Clean and Green.

She learned a lot about the many sources of pollution in the community, in the air, in the water, and on land.

The group had information about environmental contamination and community health studies. They were working with scientists from a nearby university who were considering doing a health study, as there seemed to be higher than expected levels locally of several diseases, including cancer, and concerns that there were excessive numbers of children being born with birth defects.

For more info:

Toxic-Free Future

## Community Health Studies and the Environment

**Citizens concerned about pollution in their community, or about apparent high levels of diseases like cancer, sometimes turn to scientists and health experts to ask them to study their town to see if there are connections between pollution and their health. These studies are difficult and expensive, and citizens are often disappointed in the results.**

### Find out why with these two resources.

**HEALTH STUDIES GUIDE: Boston University Superfund Research Project**

**A guide for making informed decisions, written to assist community groups and individuals who think that some form of environmental health investigation or health study may be useful or necessary in their community.**


**FROM EXPOSURE TO ILLNESS: Community Health Studies and Environmental Contamination**

**The Environmental Health Investigations Branch, California Department of Public Health**

**Created as a means to share the experience and perspective of public health staff dedicated to studying links between environmental exposure to chemicals and health effects in California communities.**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

The next time Amelia went to her new family practice for a checkup, Gloria told them about Amelia's diagnosis of a learning disability.

Her nurse practitioner, Robert, suggested some things to do that could help Amelia.

They included making sure she got enough exercise, adequate sleep, healthy and nutritious foods, and encouragement to spend time outdoors in green space or natural surroundings, such as in the park, because that could help her with her attention and focus.

**Benefits of spending time in green space or natural surroundings on cognition and general health.**

**Link: Pediatric Environmental Health Toolkit**

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

Amelia's parents both became involved in the community group. Over the years they had some major successes, including getting the truck route that used to go by their house changed to a less residential area. They knew that would promote the health of their entire family and community.

The education plan that the school, the developmental pediatrician, and Amelia's parents put together included learning strategies for reading and math that Amelia found helpful.

Amelia still struggles to some extent with particular tasks in school and can sometimes become frustrated in social situations, but she knows she has the support of her family and friends and that means a lot.

Her parents know they are doing everything they can to improve the health of their family.

# LEARNING/DEVELOPMENTAL DISABILITIES Amelia's Story

Throughout the pages of Amelia's story we've seen a wide range of interacting factors across her lifespan that may have increased her risk for developmental disabilities.

These include exposure to toxic chemicals and community stressors, diet, socioeconomics, genetics, and gene-environment interactions.

We have also seen factors that can increase resilience and enhance healthy development, such as parental love and attention, childhood enrichment activities, and early childhood education.

Although Amelia's story is fictional, children throughout our country face a similar range of issues and circumstances. Developmental disabilities are widespread. It is critical that we consider the multiple environmental influences associated with increased risks of developmental disabilities, and their long term consequences for children like Amelia, when we design prevention strategies and treatments to address them.

**Continue to Final Thoughts >**

**A wide range of interacting factors across Amelia's lifespan may increase the risk for developmental disabilities**

**Children throughout our country face a similar range of exposures and consequences.**

**It is critical that we consider the multiple environmental influences associated with increased risks of developmental disabilities, and their long term consequences for children like Amelia, when we design prevention strategies and treatments.**

# SOME FINAL THOUGHTS

## COMMON THEMES

Although the fictional narratives in *A Story of Health* describe the lives of children and adults with different conditions and diseases – infertility, asthma, developmental disabilities, childhood leukemia and cognitive decline - common themes resonate. They include:

- Important environmental influences come from the natural, chemical, food, built, and social environments.
- Although there are exceptions, most diseases as well as good health are the result of complex interactions among multiple environmental influences and genetics.
- Early-life experiences, particularly during critical windows of development, can have profound beneficial or detrimental lifelong effects, even into elder years.
- Healthy people and healthy communities are interdependent. All people do not have equal access to nutritious food, clean air and water, safe workplaces, healthy housing, green spaces, peaceful neighborhoods or quality health care.
- Preventing disease and promoting health require actions and commitments from the individual, family, community and society. Health promoting public policies are necessary to make healthy living available to all people.

### Resources

We have linked to many useful resources in each story relevant to a wide range of audiences, including clinicians. To quickly access resources on specific topics in each story, use the **Bookmarks** toolbar on the left (which you can open or close), or return to the **Help page** for more details on other eBook features.

Additional resources to help prevent disease and promote health:

**Portal to Toxicant and Disease Database**: A searchable database that summarizes links between chemical contaminants and approximately 180 human diseases or conditions.

**Pediatric Environmental Health Toolkit:** application for mobile devices


### Continuing Education

Register for Continuing Education (CE) for *A Story of Health* for a variety of health professions. Free credits are offered by the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry **at this link**.

Another free CE course on environmental health offered by the CDC/ATSDR is the **Pediatric Environmental Health Toolkit** online course.

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Asthma

Childhood Leukemia

Learning/ Developmental Disabilities

Diabetes

Infertility

Cognitive Decline

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*Note: there are many topic overlaps*

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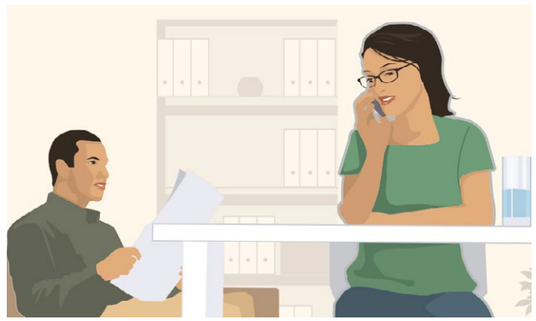

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Learning/ Developmental Disabilities

Diabetes

Infertility

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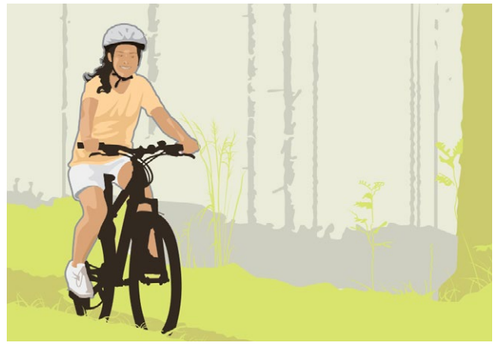


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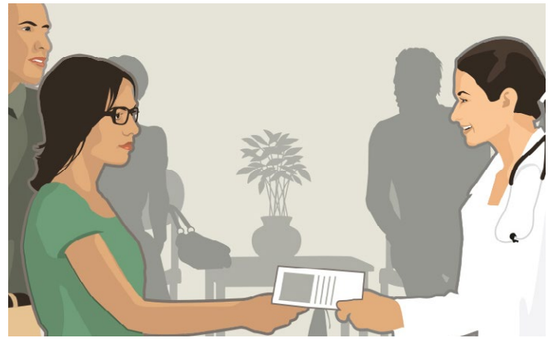

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