

Bringing Health and Environmental Data to Life

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The Tracking Network

A system of integrated health, exposure, and hazard information and data from a variety of sources, that is accessible through a public web portal for educational to policymaking purposes

The screenshot shows the homepage of the CDC National Environmental Public Health Tracking Network. At the top, the CDC logo and name are displayed, along with the tagline "CDC 24/7: Saving Lives. Protecting People™". A search bar is located in the top right corner. Below the header, a navigation menu includes "Tracking A-Z Index" and a list of letters from A to Z. The main heading is "National Environmental Public Health Tracking Network".

The central content area features a large banner for "Protect Your Family From Radon" with a photo of a house. To the right of the banner, a text block explains the Tracking Network and lists data types available: chemicals, chronic diseases, and local area information. Below this is a "Learn more about the Tracking Network" link and a "Explore Tracking Data" button.

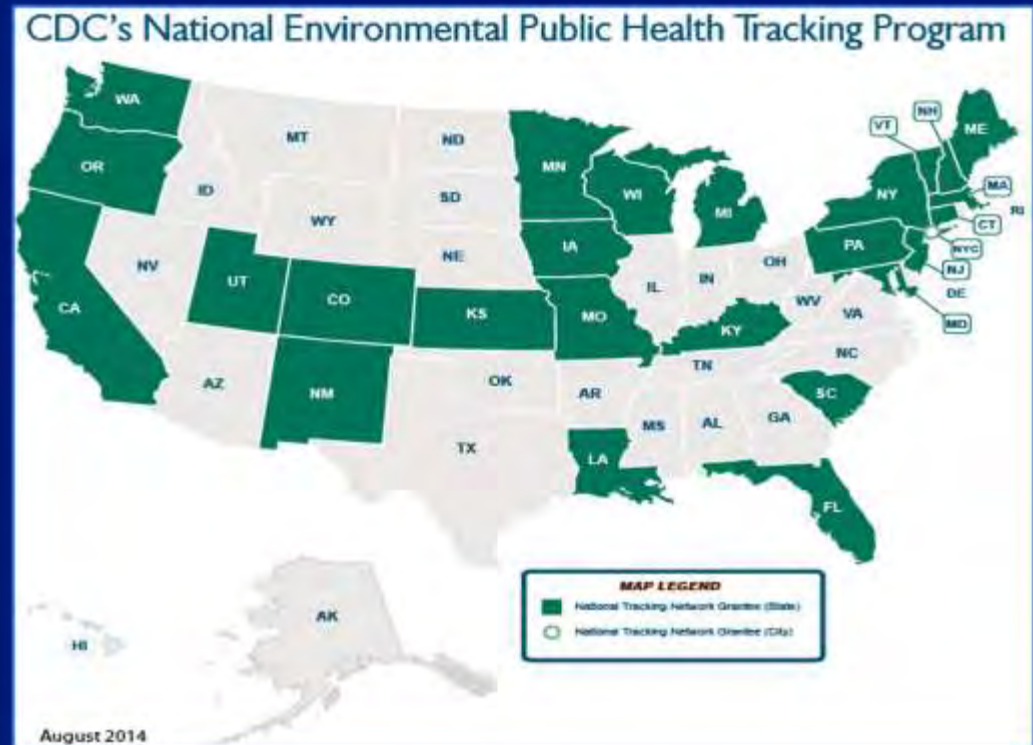
On the left side, there are three categorized lists:

- Environments:** Pesticide Exposure, Climate Change, Outdoor Air, and More.
- Health Effects:** Asthma, Cancer, Childhood Lead Poisoning, and More Health Conditions.
- Population Health:** Population Characteristics, Health Impact Assessments, Children's Environmental Health, and More.

On the right side, there is a "Quick Links" section with icons for Home, About Tracking Program, State & Local Tracking Networks, Partner Stories, Indicators & Data, Print Page, Bookmark and Share, CDC on Facebook, and CDC on Twitter. Below this is a "Celebrating Five Years" badge for the CDC's National Environmental Public Health Tracking Network. Further down is a "Tracking Hot Topics" section listing items like "Reducing Your Skin Cancer Risk", "Sun Safety", "Tracking Climate Change", "Climate Change Communication Tools", "CDC Climate and Health Program", "Extreme Heat: Heat Stress & Prevention", and "View our Tracking Success Stories to learn how Tracking is making a difference across the U.S.". At the bottom right, there is a "Resources" section with links for "Communication Tools", "Training", and "Join our Listserv".

Tracking in Action

- ❑ Currently 25 states and NYC funded
- ❑ 200+ skilled EPH practitioners in funded states/NYC
- ❑ 34 ASTHO fellowships since 2008

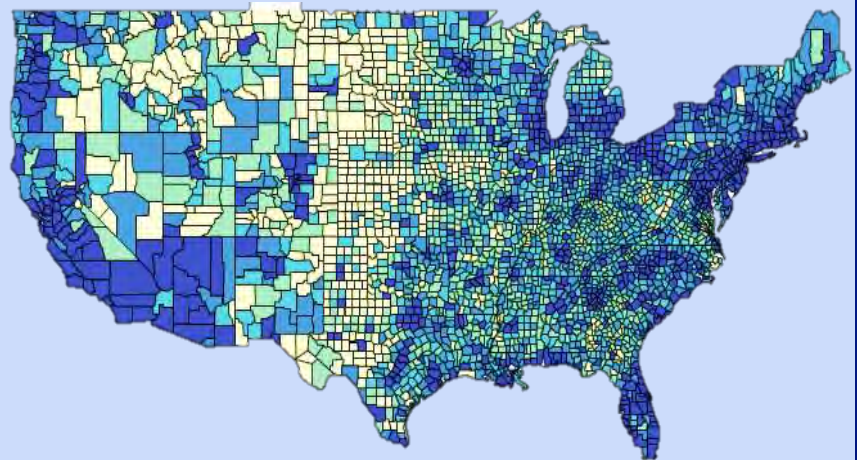


<http://www.cdc.gov/nceh/tracking/successstories.htm>

Content and Data

- ❑ Asthma
- ❑ Biomonitoring
- ❑ Birth Defects
- ❑ Cancer
- ❑ CO Poisoning
- ❑ Childhood Lead
- ❑ Climate Change
- ❑ Community Design
- ❑ Dev. Disabilities
- ❑ Heart Disease
- ❑ Homes
- ❑ Lifestyle Risk Factors
(smoking, overweight/obesity)
- ❑ Outdoor Air
- ❑ Pesticide Exposures
- ❑ Population Characteristics
- ❑ Reproductive & Birth Outcomes
- ❑ Toxic Substance Releases
- ❑ Water

**73% (281) of
measures cover
more states than
only Tracking
states and city**



Need Help?

Hide Query Panel

1 2

Step 1: Select Your Mode

Basic Advanced

All Child

Step 2: Select Your Content

Carbon Monoxide Poisoning

Carbon Monoxide Poisoning Em...

Age-adjusted rate of emergency...

Clear Content

Step 3: Choose Geography & Time

All States

Arizona

California

Colorado

Connecticut

Florida

Iowa

Kentucky

2006

2007

2008

2009

2010

2011

2012

2013

Clear Geography

Clear Time

Step 4: Advanced Options

Advanced Options (Optional)

▼ Cause

Fire


Non Fire

Unknown

Clear Options

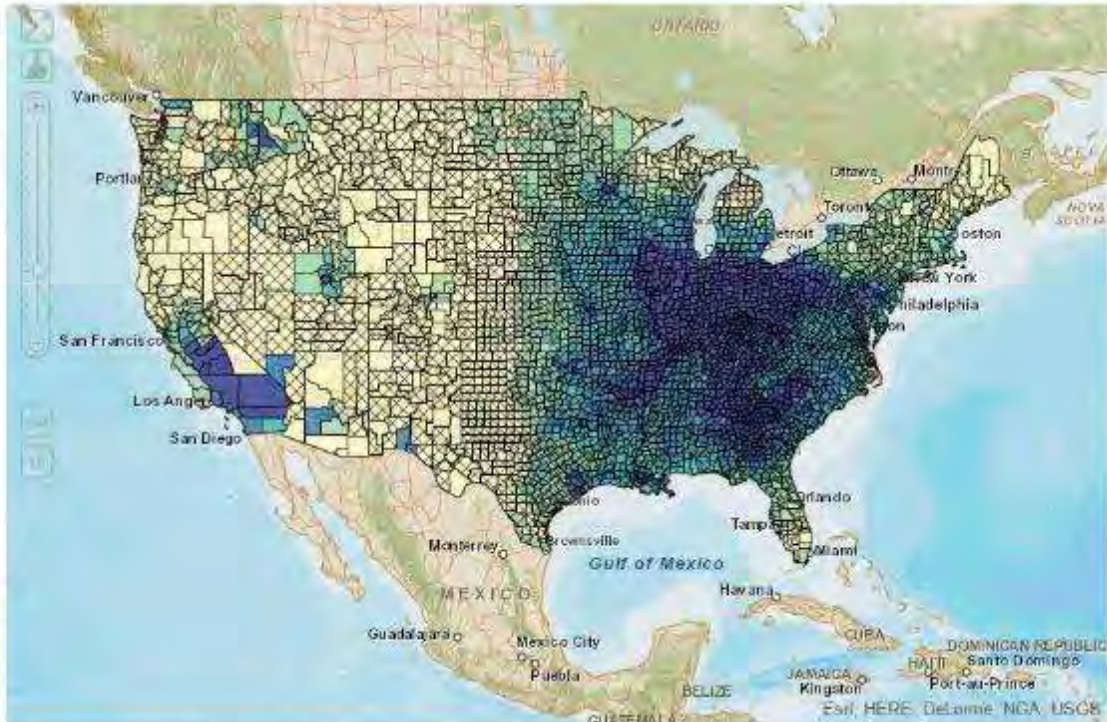
Step 5: Submit

Run Query



Environmental Public Health Tracking Program

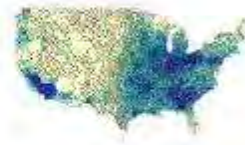
Model Annual PM 2.5 | Annual average ambient concentrations of PM 2.5 in micrograms per cubic meter (U.S.) 2010



Click and drag thumbnail map images for a magnified view

Model Annual PM 2.5

Model Annual PM 2.5

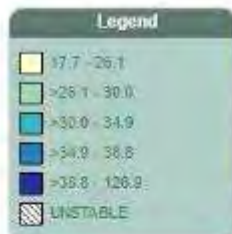


U.S. - 2010

U.S. - 2011

Heart Attack Hosp | Age-adjusted rate of hospitalization for heart attack among persons 35 and over per 10,000 population | Florida | 2011

Heart Attack Hosp | Age-adjusted rate of hospitalization for heart attack among persons 35 and over per 10,000 population | Florida | 2013



Heart Attack Hosp

Heart Attack Hosp

Heart Attack Hosp

Click and drag thumbnail map images for a magnified view



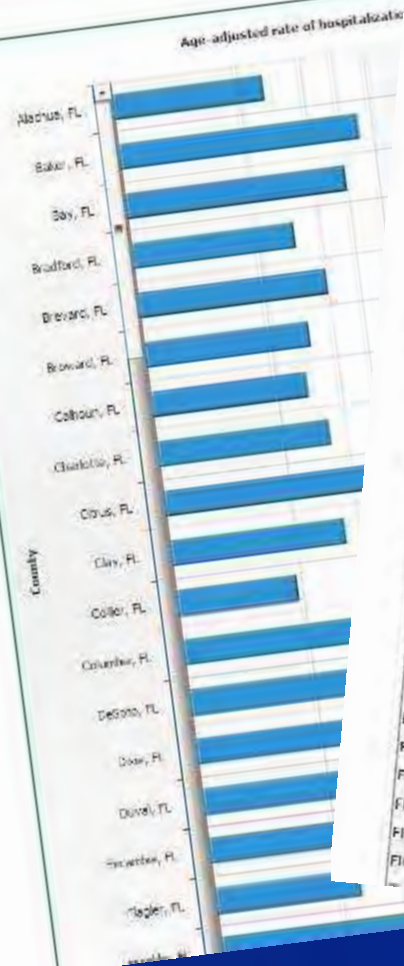
Florida - 2011



Florida - 2012



Florida - 2013



Heart Disease | Hospitalizations for Heart Attack | Age-adjusted rate of hospitalization for heart attack among persons 35 and over per 10,000 population | Florida | Multiple Times

Location		2011	2012	2013
State	County			
Florida	Wachusa			
Florida	Baker	26.2		
Florida	Bay	26.0	28.2	
Florida	Bradford	31.7	33.6	23.6
Florida	Brevard	21.5	30.4	37.7
Florida	Broward	28.4	32.0	25.0
Florida	Calhoun	26.4	32.0	25.0
Florida	Charlotte	25.7	28.6	25.0
Florida	Citrus	28.3	28.2	24.8
Florida	Clay	32.6	25.9	27.1
Florida	Collier	28.0	33.9	27.1
Florida	Columbia	28.4	35.0	41.6
Florida	DeSoto	42.8	18.9	27.8
Florida	Dade	48.7	40.8	18.9
Florida	Duval	27.8	42.6	50.9
Florida	Escambia	28.0	40.3	38.9
Florida	Flagler	28.0	31.5	27.1
Florida	Franklin	28.0	28.7	30.3
Florida	Gadsden	29.7	25.7	26.9
Florida	Glades	30.2	47.6	22.9
Florida	Grades	32.7	32.6	44.6
Florida	Gulf	23.6	24.2	32.7
Florida	Hamilton	29.9	38.3	20.2
Florida	Hardee	60.6	43.9	24.1
Florida	Hendry	38.8	34.1	33.3
Florida	Hernando	52.7	41.8	52.5
Florida	Highlands	38.8	50.4	56.2
Florida	Hillsborough	41.0	37.3	50.9
Florida	Holmes	27.3	28.2	37.8
Florida	Volusia	27.3	31.8	46.7

**CDC's
NATIONAL
ENVIRONMENTAL
PUBLIC
HEALTH
TRACKING
NETWORK**

385
ENVIRONMENTAL
HEALTH MEASURES



51 GB
OF DATA



1
BILLION
ROWS OF DATA



1.6
MILLION
UNIQUE MAPS



PROBLEM STATEMENT

How we present information affects how well our audience understands it.



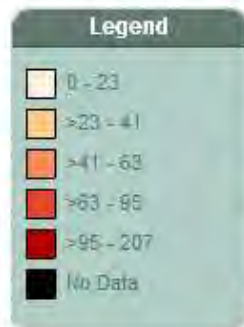
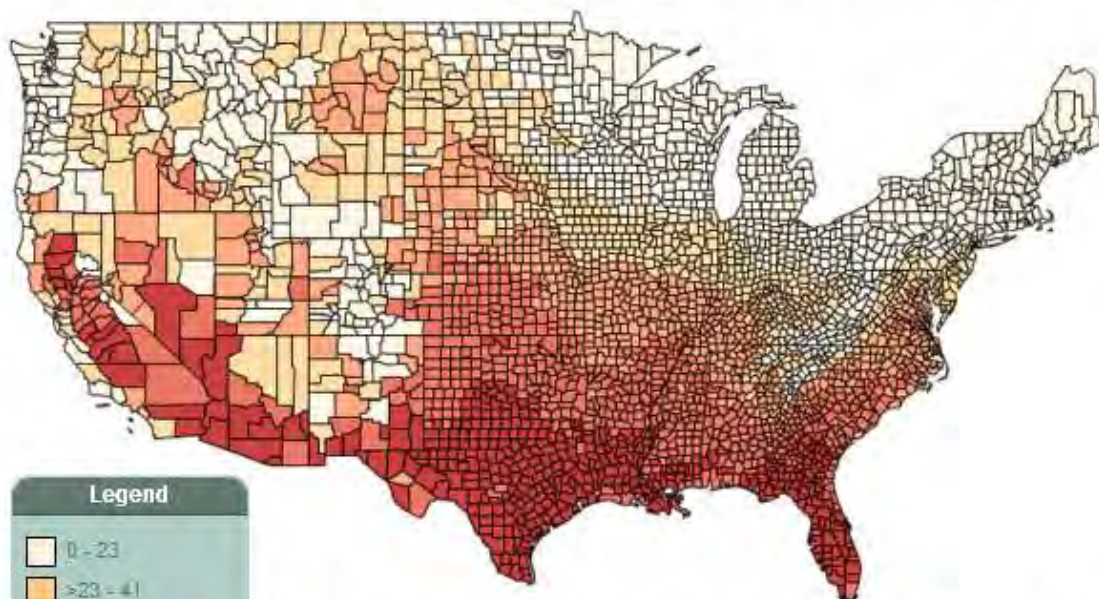
Q: WHO IS OUR AUDIENCE?

A: EVERYONE

- **Communicating data effectively to groups as different as environmental professionals, policymakers, teachers, and concerned parents is challenging.**
- **Choosing to be everything to everyone creates many bumps in the road and often fails at being perfect for anyone.**
- **We addressed this challenge by offering a wide array of resources to meet the needs of different groups.**

TRACKING SHOWCASE

Projected number of future extreme heat days



Darker areas represent higher numbers of future extreme heat days



CDC's Environmental Public Health Tracking
www.ephtracking.cdc.gov



TRACKING SHOWCASE

Fine Particulate Matter Size Comparison



Human hair (about 70 μ m wide)



Grain of sand (about 50 μ m wide)



PM₁₀ (less than 10 μ m wide)



PM_{2.5} (less than 2.5 μ m wide)

μ m = micrometer

CLIMATE CHANGE IS EXTREME HEAT

CAUSES MORE DEATHS
Heat-related deaths, hospitalizations, and deaths from dehydration, dehydration, and foodborne illness are on the rise.

WHO'S AT RISK?
Older adults, young children, people with chronic conditions, and people who live in hot climates are at greatest risk.

WHAT CAN YOU DO?

- STAY COOL**
 - Stay out of the sun during the hottest part of the day.
 - Wear lightweight, light-colored clothing.
 - Take cool showers or baths.
 - Do not use fans to cool you down.
- STAY HYDRATED**
 - Drink plenty of water.
 - Avoid alcohol and caffeine.
 - Avoid outdoor activities during the hottest part of the day.
- STAY INFORMED**
 - Check local news for extreme heat alerts and other information.
- LEARN MORE!**
 - Visit www.cdc.gov/ephtacking for more information.

Child ENVIRONMENTAL HEALTH

WHO'S AT RISK?
Children are at greater risk of environmental health problems because they spend more time outdoors and have higher breathing rates.

- WHAT YOU CAN DO:**
 - Children should spend less time outdoors during high pollution days.
 - Children should avoid playing in sandboxes that have been recently treated with pesticides.
 - Children should avoid playing in areas where there are signs of environmental health problems.
 - Children should avoid playing in areas where there are signs of environmental health problems.

LEARN MORE!
www.cdc.gov/ephtacking

CDC'S ENVIRONMENTAL PUBLIC HEALTH TRACKING CHILDHOOD LEAD POISONING

Approximately 500,000 U.S. children aged 1-5 years have blood lead levels greater than the CDC reference level.

ASTHMA & AIR POLLUTION

PARTICLES IN THE AIR LIKE DUST, DIRTY SOOT, AND SMOKE ARE CALLED PARTICULATE MATTER & CAN CAUSE:

- Increased hospital visits
- Worsened asthma symptoms
- Adverse birth outcomes
- Breathing problems
- Decreased lung growth in kids
- Long cancer
- Early death

GROUND-LEVEL OZONE

Other sources include power plants, factories, and other sources. Ground-level ozone is one of the "biggest" pollutants in the air.

WHO'S AT RISK?

People with heart or lung disease, infants, children with asthma or who spend a lot of time outdoors, older adults, and active people of all ages who exercise or work hard outdoors.

WHAT CAN YOU DO?

- Check the daily air quality forecast via newspaper, TV, radio, or online at <http://www.epa.gov> to learn when ozone levels are unhealthy.
- Reduce the amount of time outdoors when pollution is high.
- Avoid outdoor activities when ozone levels are unhealthy, usually in the morning and evening.
- Plan outdoor activities when ozone levels are lower, usually in the middle of the day.
- Exercise away from roads and highways. Particulate pollution is usually highest near these areas.
- Do easier outdoor activities, such as walking instead of running or using a hand lawn mower instead of a push mower.

LEARN MORE!
www.cdc.gov/ephtacking

CARBON MONOXIDE

Carbon monoxide, also called CO, is a colorless gas that you cannot see or smell.

CO CAN BE DANGEROUS IN YOUR HOME.
You may be exposed to unsafe levels of CO at home.

OR SYMPTOMS OF POISONING
Headaches, dizziness, weakness, nausea, vomiting, and chest pain.

WHAT CAN YOU DO?
If you suspect CO poisoning, call 911 and get outside to fresh air if you can. CO poisoning and other poisoning signs may be deadly.

LEARN MORE!
Visit www.cdc.gov/ephtacking for more information.

CDC'S ENVIRONMENTAL PUBLIC HEALTH TRACKING HEART HEALTH

HEART ATTACK:
The heart pumps oxygenated blood to the rest of the body.

WHAT HAPPENS?
The heart supply or part of the heart is interrupted. This causes an oxygen shortage to the heart muscle, causing damage and potential death to heart tissue.

ENVIRONMENTAL RISK FACTOR:
Short and long term exposure to outdoor air pollution is a risk factor for heart disease.

THREE FACTORS AFFECTING ENVIRONMENTAL RISK
Amount of air pollution, duration of exposure, and level of activity.

WHO'S AT RISK?
People with heart disease, high blood pressure, diabetes, and other conditions.

WHAT CAN YOU DO TO LIMIT ENVIRONMENTAL RISKS?
Use the Air Quality Index to know when air pollution may be bad to your area.

LEARN MORE!
www.cdc.gov/ephtacking

AUDIENCE TESTING RESULTS

- 1. Information and data need to be visually appealing**
- 2. Audiences often do not have time to analyze and interpret data on their own**
- 3. Meet your users in the communication channels they already use**

INFO BY LOCATION

- **One of our most-viewed pages, but for the wrong reason**
- **A missed opportunity**



What is your county?

DeKalb, GA

Enter your county name or zip code

SUBMIT

DeKalb County, Georgia¹



POPULATION: 691,893

INCOME

Average Household Income:

DeKalb County: \$47,068

Georgia: \$46,252

Residents who live below the poverty line:



19.4%

DeKalb County

18.0%

Georgia

QUICK FACTS:

Out of 10 people living in this county:

SEX



5 are male & 5 are female

AGE



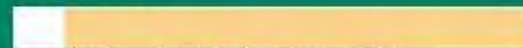
About 3 are between the ages of 0 and 19 years

About 2 are between the ages of 20 and 34 years

About 2 are between the ages of 35 and 49 years

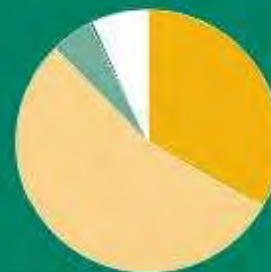
About 3 are 50 years and older

ETHNICITY



1 are Hispanic and 9 are non-Hispanic

RACE



White Black Asian Native American Other



Discover the data | Learn more about this topic

© 2015 Data from the National Governmental Data Health Trust by Permiso.



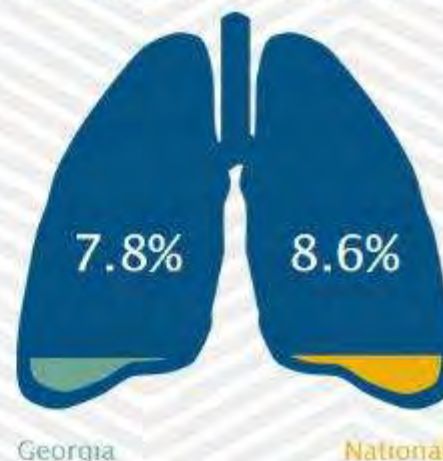
Asthma[†]

Asthma is a chronic disease that affects the airways that carry oxygen in and out of the lungs. Asthma can cause shortness of breath, wheezing, coughing, and tightness in the chest.

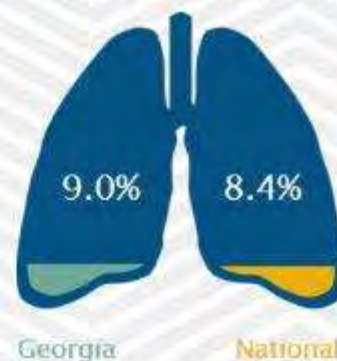
Asthma affects all races, ages, and genders. It often starts in childhood and is more common in children than in adults. The most common outdoor triggers for asthma attacks are pollen, exercise, pollution such as particulate matter and diesel fuel, and pesticides. Indoor triggers for asthma include mold, dust, secondhand smoke, and pet dander.

Asthma has no cure, but it can be controlled. The majority of problems associated with asthma can be prevented if asthma is managed properly.

Percent of **adults** who currently have asthma



Percent of **children** who currently have asthma

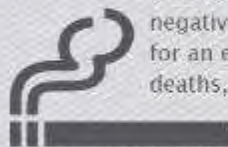


Discover the data | Learn more about this topic

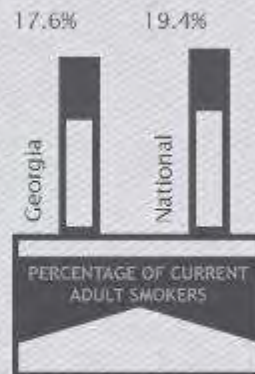
† 2010 data from the National Environmental Public Health Tracking Network



Smoking[†]



Tobacco use is the single most preventable cause of death and disease in the United States. Smoking harms nearly every organ of the body. It causes many diseases and reduces the health of smokers in general. The negative health effects from cigarette smoking account for an estimated 500,000 deaths, or nearly 1 of every 5 deaths, each year in the United States.



Discover the data | Learn more about this topic

† 2010 data from the National Environmental Public Health Tracking Network



Health Insurance[†]



Having health insurance is important because coverage helps people get timely medical care and improves their lives and health. While the environment may play a role in your overall health, having the tools needed to stay healthy are very important.

PERCENTAGE WITHOUT INSURANCE



Discover the data | Learn more about this topic

† 2010 data from the National Environmental Public Health Tracking Network



RESULTS

- We experienced a 150% increase in user traffic within the first 30 days following the launch
- User testing indicated room for improvement
- Future content areas will include extreme heat, heart mortality, access to parks, and proximity to highways

DATA VISUALIZATION PRINCIPLES

- 1. Target Your Audience**
- 2. Tell a Story**
- 3. Have a Key Message**
- 4. Have Context**
- 5. Clarity – what information needs to be where, and how prominent?**
- 6. Graphic designers can help**

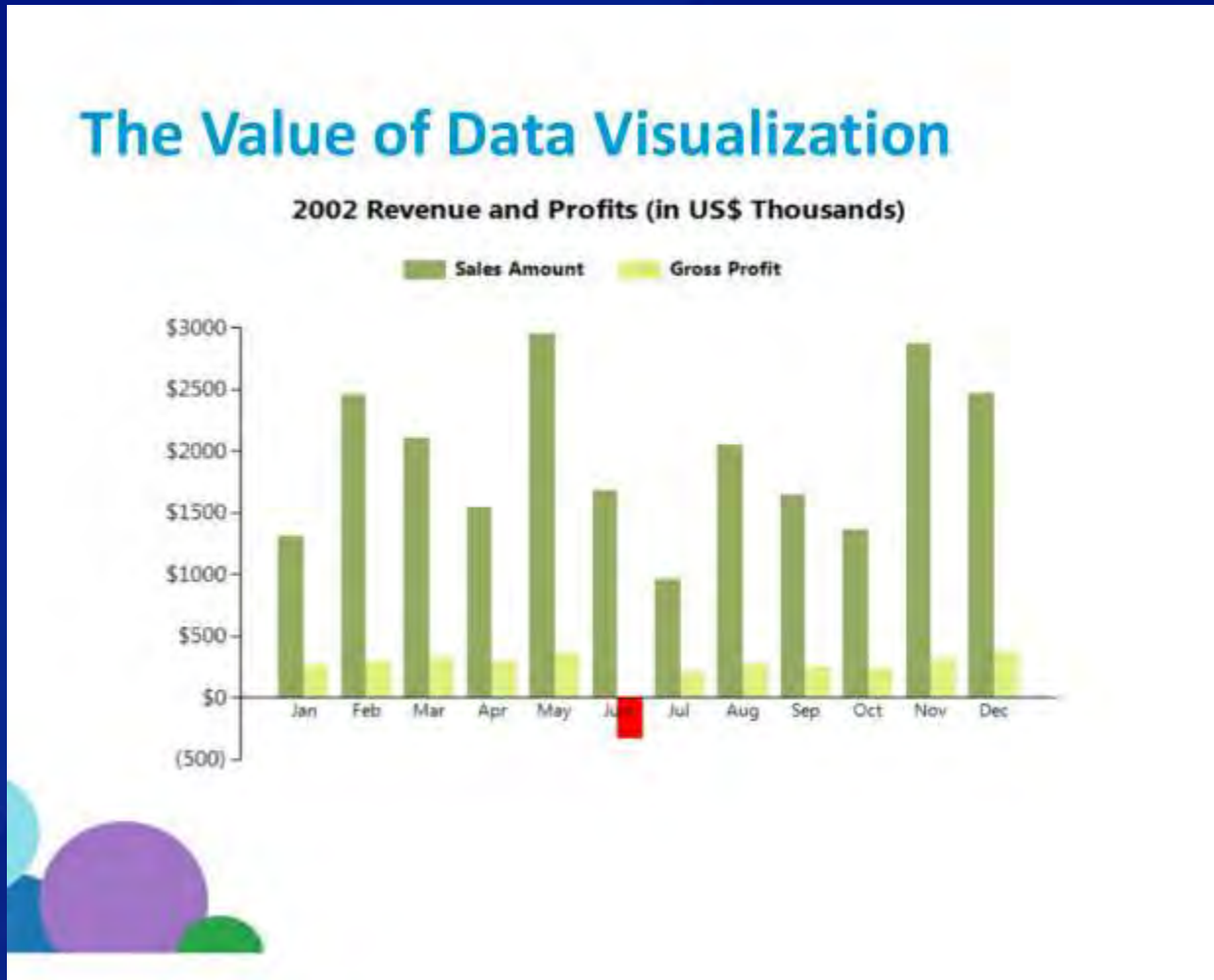
TARGET YOUR AUDIENCE

The Value of Data Visualization

Month of Year	Sales Amount	Total Product C...	Gross Profit Ma...	Gross Profit
January	1309863.2511	1046855.0401	0.20079058694...	263008.211
February	2451605.6244	2161789.71439...	0.11821473532...	289815.910000...
March	2099415.6158	1781531.84109...	0.15141536164...	317883.774700...
April	1546592.2292	1250946.0643	0.19115973772...	295646.164900...
May	2942672.90960...	2583467.20809...	0.12206783170...	359205.701500...
June	1678567.4193	2010739.61289...	-0.19789029012...	-332172.193599...
July	962716.741700...	754715.7636	0.21605625942...	208000.978100...
August	2044600.0034	1771778.75389...	0.13343502349...	272821.249500...
September	1639840.109	1393936.67389...	0.14995573882...	245903.43510001
October	1358050.4703	1124337.2647	0.17209463912...	233713.205600...
November	2868129.20330...	2561131.77409...	0.10703751729...	306997.42920002
December	2458472.4342	2085375.78659...	0.15175954076...	373096.647600...

Source: Data Visualization Best Practices 2013 – Jen Underwood, Microsoft

TARGET YOUR AUDIENCE



Source: Data Visualization Best Practices 2013 – Jen Underwood, Microsoft

COLOR IS IMPORTANT

Birth Cohort Year	Number Tested	Total 10+ $\mu\text{g/dL}$	10-14 $\mu\text{g/dL}$	15-19 $\mu\text{g/dL}$	20-24 $\mu\text{g/dL}$	25-44 $\mu\text{g/dL}$	45-69 $\mu\text{g/dL}$	70+ $\mu\text{g/dL}$
2000	28,487	454 -1.60%	256 -0.90%	92 -0.30%	44 -0.20%	55 -0.20%	5 (<0.1%)	2 (<0.1%)
2001	32,525	445 (1.4%)	251 -0.80%	97 -0.30%	31 -0.10%	59 -0.20%	5 (<0.1%)	2 (<0.1%)
2002	38,130	448 -1.20%	264 -0.70%	88 -0.20%	40 -0.10%	46 -0.10%	5 (<0.1%)	5 (<0.1%)
2003	43,982	379 -0.90%	203 -0.50%	96 -0.20%	40 -0.10%	33 -0.10%	6 (<0.1%)	1 (<0.1%)
2004	48,637	349 -0.70%	191 -0.40%	86 -0.20%	33 -0.10%	33 -0.10%	3 (<0.1%)	3 (<0.1%)
2005	51,551	301 -0.60%	177 -0.30%	57 -0.10%	38 -0.10%	23 (<0.1%)	6 (<0.1%)	0 0.00%
2006	56,035	274 -0.50%	152 -0.30%	65 -0.10%	25 (<0.1%)	25 (<0.1%)	6 (<0.1%)	1 (<0.1%)
2007	57,687	233 (0.4%)	119 (0.2%)	58 (0.1%)	21 (<0.1%)	31 (0.1%)	4 (<0.1%)	0 (0.0%)
2008	57,635	216 (0.4%)	114 (0.2%)	45 (0.1%)	28 (<0.1%)	26 (<0.1%)	3 (<0.1%)	0 (0.0%)
2009	57,383	186 (0.3%)	94 (0.2%)	49 (0.1%)	16 (<0.1%)	21 (<1%)	5 (<0.1%)	1 (<0.1%)

' $\mu\text{g/dL}$ ' means micrograms of lead per deciliter of blood.

COLOR IS IMPORTANT



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'µg/dL' means micrograms of lead per deciliter of blood.



RESOURCES

1. <http://colorbrewer2.org/>
2. <http://reddit.com/r/dataisbeautiful>
3. <http://www.slideshare.net/idigdata/data-visualization-best-practices-2013>
4. <http://www.edwardtufte.com/tufte/>
5. <http://www.fastcompany.com/section/infographic-of-the-day>
6. The Best American Infographics 2013/2014 (Edited by Gareth Cook)
7. Data Visualization Checklist:
<http://stephanieevergreen.com/dataviz-checklist/>

CONCLUSIONS

- 1. Simple data and information visualization tools can increase access to important surveillance data and health messages.**
- 2. Audience-centered resources are important for making complex data easier to understand and use**

Thank You!

Questions?

Preston Burt
pburt@cdc.gov

<http://www.cdc.gov/ephtracking>



For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Environmental Health

Division of Environmental Hazards and Health Effects

