SAFE KIDS WORLDWIDE.

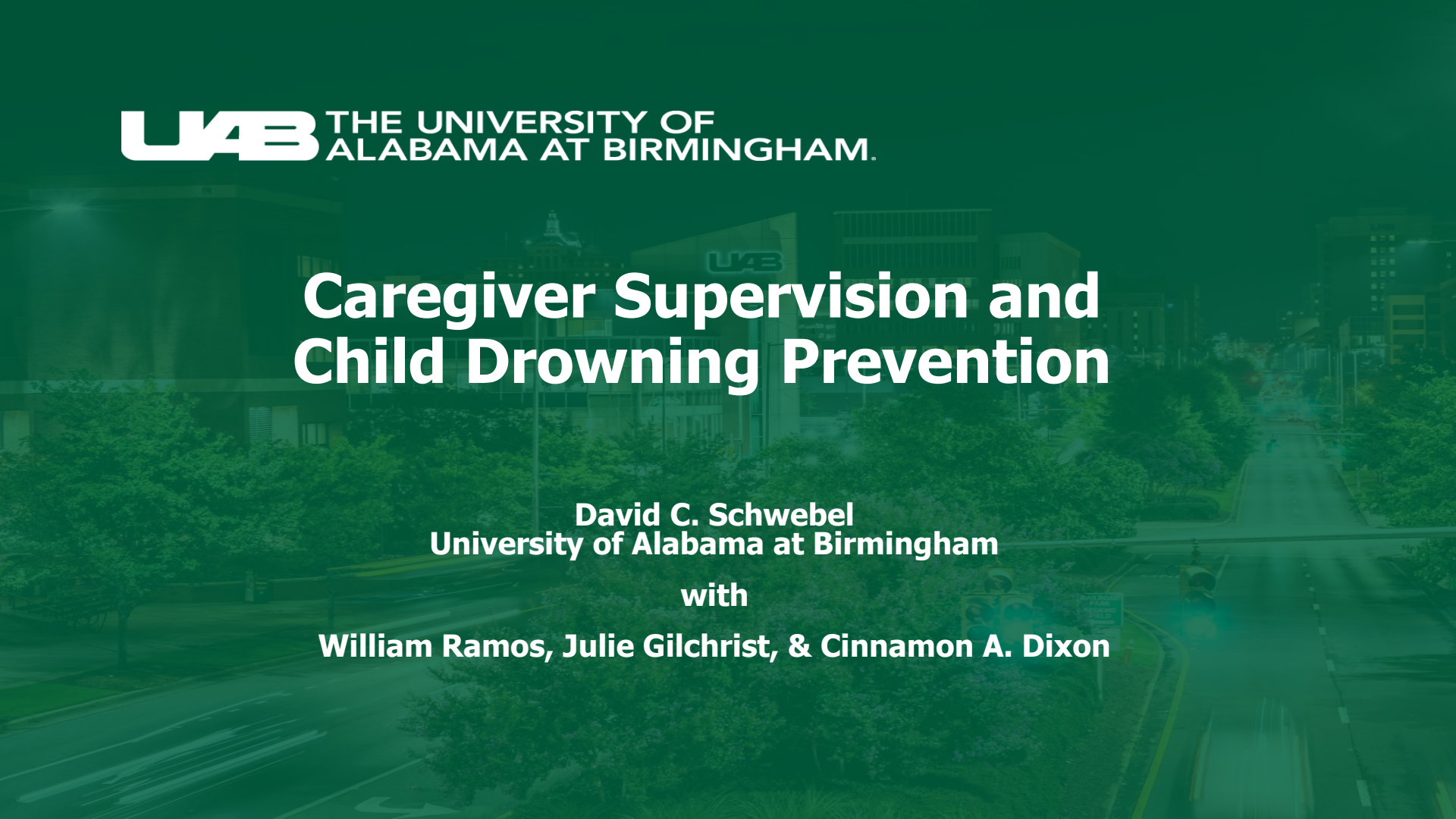
PREVCON

New Developments in Drowning Prevention

Lisa Grisham

Dr. David Schwebel

Dr. Tessa Clemens



THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Caregiver Supervision and Child Drowning Prevention

David C. Schwebel
University of Alabama at Birmingham

with

William Ramos, Julie Gilchrist, & Cinnamon A. Dixon

Background

- Drowning kills more American children ages 1-4 years than any other cause
- Second-leading cause of death for children ages 5-14 years
- On average, 11 drowning deaths and 22 non-fatal drownings daily in US
- Global rates much higher

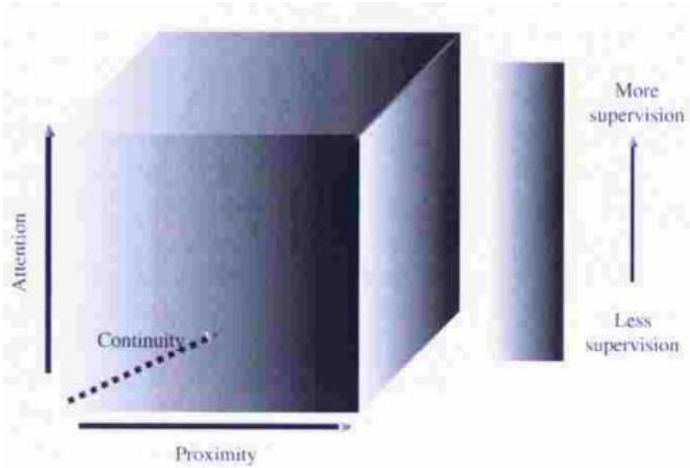
Child Drowning Prevention

- Prevention must be multifaceted and contextual
- Primary prevention:
  - Supervision
  - Restricted access – fencing and barriers
  - Swim lessons and survival skills
  - Proper use of flotation devices
- Secondary and tertiary prevention:
  - Supervisor recognition of distress
  - Supervisor safe rescue delivery
  - Quick and correct emergency care

From International Life Saving Foundation, https://www.ilsf.org/wp-content/uploads/2018/11/MPS-19-Drowning-Chain-of-Survival.pdf

Traditional Model of Caregiver Supervision and Child Injury Prevention

- Three dimensions impact supervision to prevent child injury:
  - Attention (visual and auditory focus on child's behavior)
  - Proximity (touching/interacting, within reach, beyond reach)
  - Continuity (constant, intermittent, or absent)
- Supervision is defined by the confluence of all 3 dimensions
- Quality supervision is context- and child-specific
- Model has been applied in many environments, including aquatic ones as well as homes, playgrounds, supermarkets, and pedestrian settings



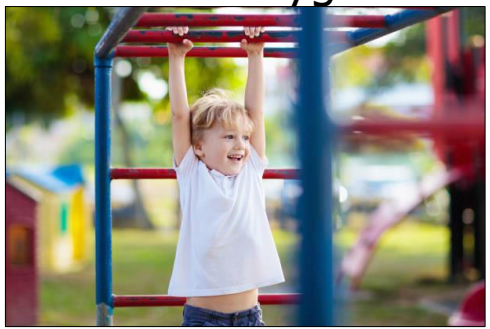
From: Saluja G, Brenner R, Morrongiello BA, Haynie D, Rivera M, Cheng TL. The role of supervision in child injury risk: Definition, conceptual and measurement issues. Inj Cont Safety Prom. 2004;11(1):17-22.

EXPANDED Model of Caregiver Supervision and Child Injury Prevention

- A fourth dimension, *competency*, is added along with attention, proximity, and continuity
- In aquatic settings, supervisors must be competent to have the skills and knowledge to carry out the Drowning Chain of Survival:
  - Recognize distress
  - Rescue distressed swimmers
  - Remove child from water
  - Provide initial care such as CPR
  - Call for emergency services
- Inadequate competency can lead to delays in precious time and even multi-victim drownings

Case Examples

On the Playground



At the Backyard Pool

Where Else Might this Concept Apply?

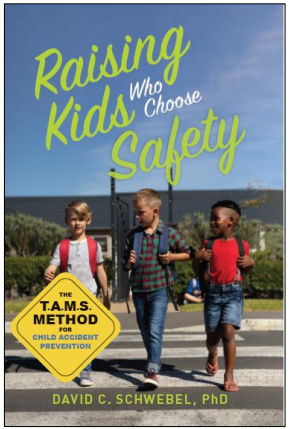
- Traffic safety – including operating a vehicle competently
- Farm and agricultural safety – animal behavior
- Knowledge about choking maneuvers to prevent suffocation

Implications

- Supervisor competency training
  - In context of swim lessons?
  - Community-based training in water safety, CPR and basic first aid
  - Incorporation of water safety into expectant parent training
- Health provider guidance
  - Can you swim? Can you provide CPR? How would you respond if your child fell into deep water?
- Social & traditional media campaigns on drowning prevention, including the 4-dimensional model of supervision near water
- Involvement of industry, including the insurance industry which has financial motivation for drowning reduction efforts

Conclusion and Contact Information

- Drowning is a leading cause of child death
- Multifaceted prevention is needed, including supervision
- In aquatic environments, supervision should incorporate the traditional domains of attention, proximity and continuity, BUT ALSO the expanded concept of competency



David C. Schwebel, PhD
schwebel@uab.edu
205-934-8745 (o)

30 YEARS CDC INJURY CENTER | PROTECTION. PREVENTION. PROGRESS.

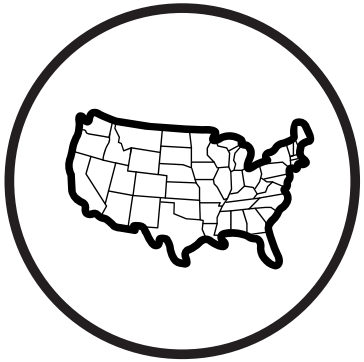
New Developments in Drowning Prevention

Tessa Clemens, PhD
National Center for Injury Prevention and Control

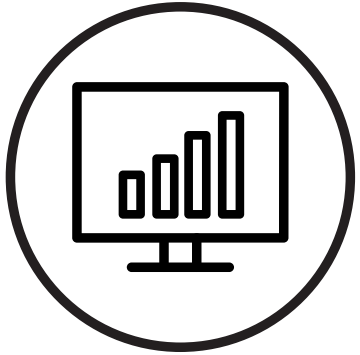
PREVCON, July 25, 2023

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

Agenda



Drowning burden in the United States



Strengthening data; Drowning data resources

Basic swimming and water safety skills training

Drowning in the United States

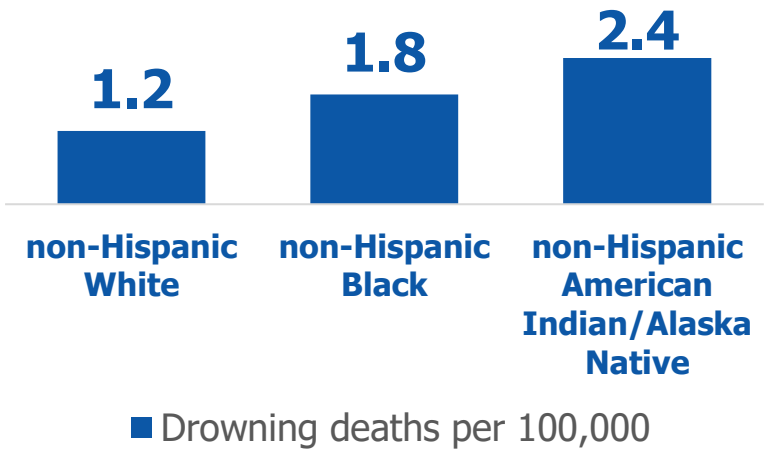
- Over **4,000** fatal drownings and over **8,000** non-fatal drownings every year
- Children <18: over **800** fatal drownings and almost **6,000** non-fatal drownings every year
- Non-fatal drowning can result in long-term health problems

Source: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS). Data years 2012-2021.

30 YEARS CDC INJURY CENTER

Drowning in the United States

#1



40x

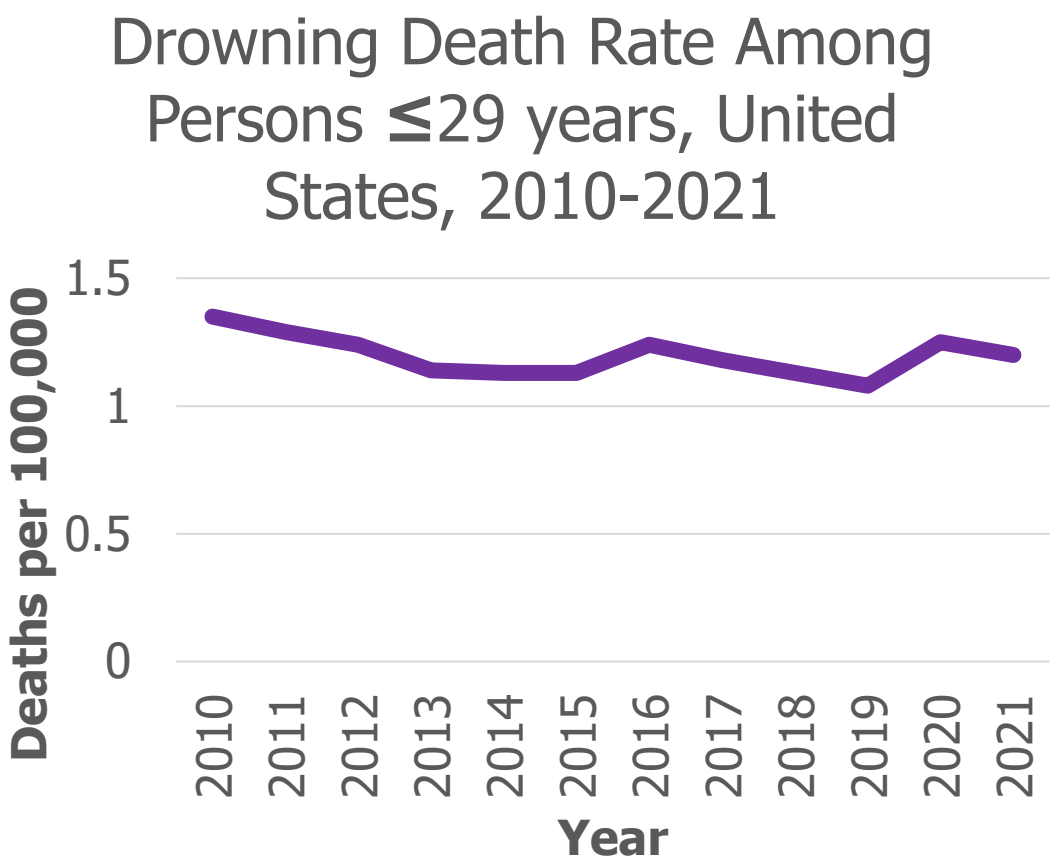
Drowning is the leading cause of death among children 1-4 years

For people <30, drowning rates among Black people are 1.5x as high and among AI/AN people are 2x as high as White people[1]

Deaths among children with Autism are nearly 40x as likely to be caused by drowning as deaths in the general population[2]

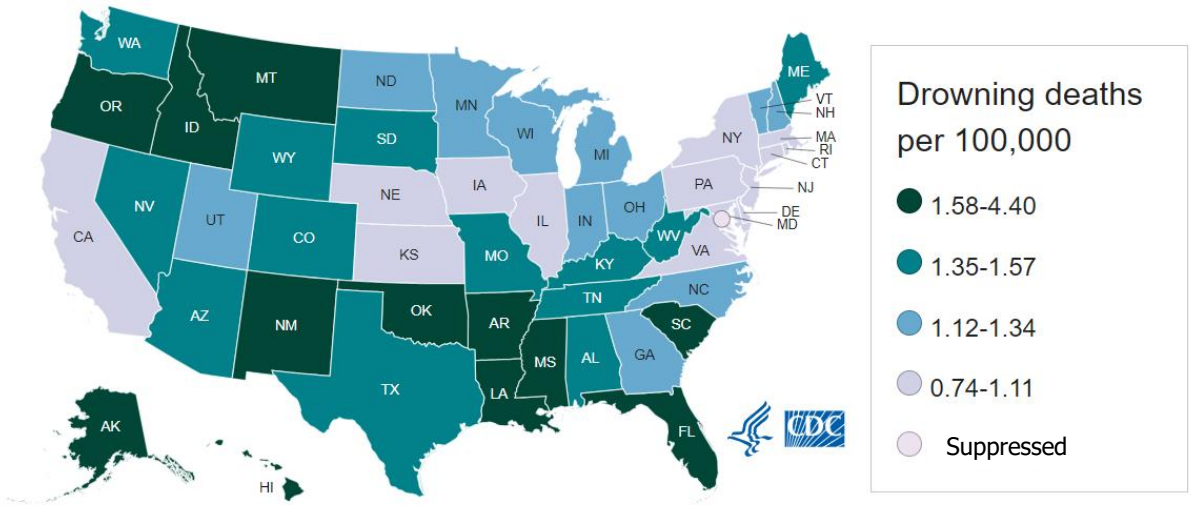
[1].Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2023). Web-based Injury Statistics Query and Reporting System (WISQARS). Data years 2001-2020.
[2].Guan, J. Li, G. (2017). Injury Mortality in Individuals With Autism | AJPH | Vol. 107 Issue 5

death rates increased 16.6% from 2019 to 2020 and remained elevated in 2021



Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2023). Web-based Injury Statistics Query and Reporting System (WISQARS).

Age adjusted drowning death rates by state 2018-2021



Overall, 1.31 drowning deaths per 100,000 population

Drowning death rates and highest risk groups vary by state

Centers for Disease Control and Prevention, National Center for Health Statistics. Wide-ranging Online Data for Epidemiologic Research (WONDER) [Online]. Available at http://wonder.cdc.gov. Accessed 31 May 2023.

CDC's drowning prevention objectives

Strengthen drowning data and surveillance

Describe risk and protective factors

Identify and evaluate effective strategies to prevent drowning

Identify how to effectively and equitably implement prevention strategies

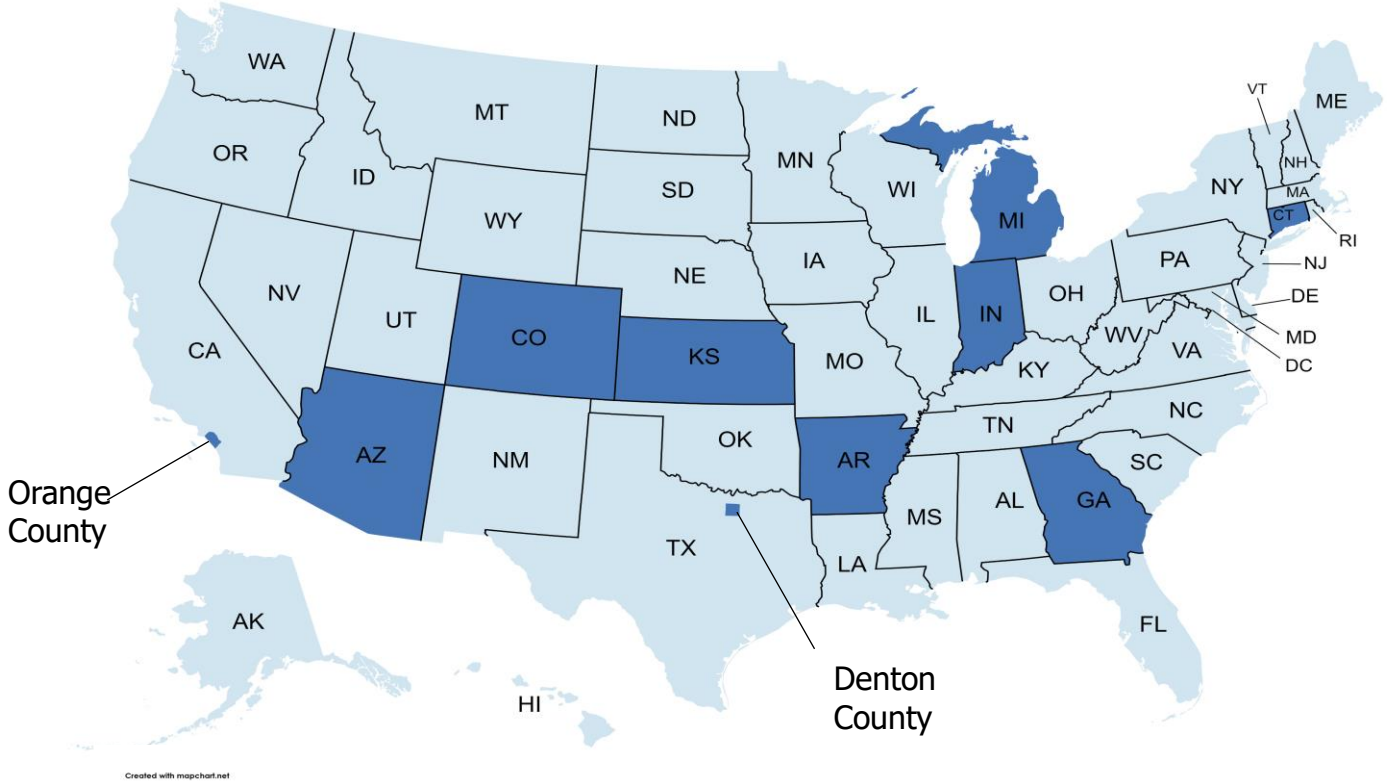
30 YEARS
CDC INJURY CENTER

Strengthen drowning data and surveillance

- Enhance child drowning data
- Link data to better understand circumstances of drowning
- Improve the availability of timely drowning data

Drowning Death Scene Investigation (DSI) and Child Death Review (CDR) project

Drowning Death Scene Investigation (DSI) and Child Death Review (CDR) project



Syndromic surveillance

- Syndromic surveillance provides near real-time data by tracking emergency department data before diagnosis is confirmed
- Syndromic data can serve as an early warning system for public health concerns
- New syndromic definition for unintentional drowning created, validated, and available for use

30 YEARS CDC INJURY CENTER

Discharge diagnosis

ICD-10-CM*	
T75.1	Drowning and nonfatal submersion
V90	Drowning and submersion due to accident to watercraft
V92	Drowning and submersion due to accident on board watercraft, without accident to watercraft
W16 with 6th character=1 (except 16.4 and 16.9 where 5th character=1)	Fall, jump, or diving into water causing drowning and submersion
W22.041	Striking against wall of swimming pool causing drowning or submersion
W65-W74	Accidental non-transport drowning and submersion

*7th Character of A or missing

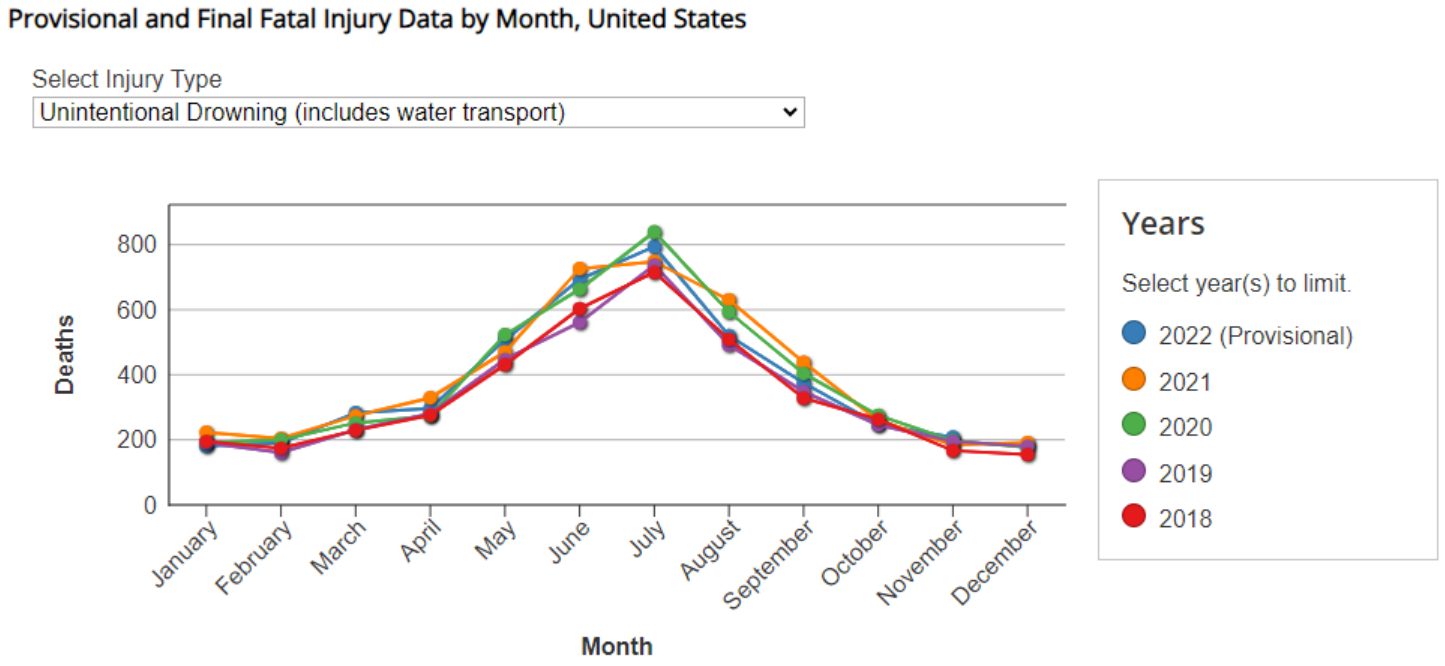
Unintentional drowning syndrome

Chief complaint

Inclusion	Exclusion
Drown	Feel like drowning, drown self, plan to drown, tried to drown Misspellings: withdrown, blood drown, indrown, syndrown
Found bottom of pool Underwater Water AND inhale, aspirate, cough, turn blue, AND lake, pool, tub, bath, swim, river, creek, pond, ocean, wave, spring	Ear, eye, bathroom, drink/ask for water, substance inhalation
Submerge	Burn, cast, splint, not/denies submerge, partially submerge, submerged object, sting ray
Fall/fell AND pool AND cough, resuscitate, wheeze	None
Swim AND unresponsive, struggle	None

Unintentional drowning syndrome

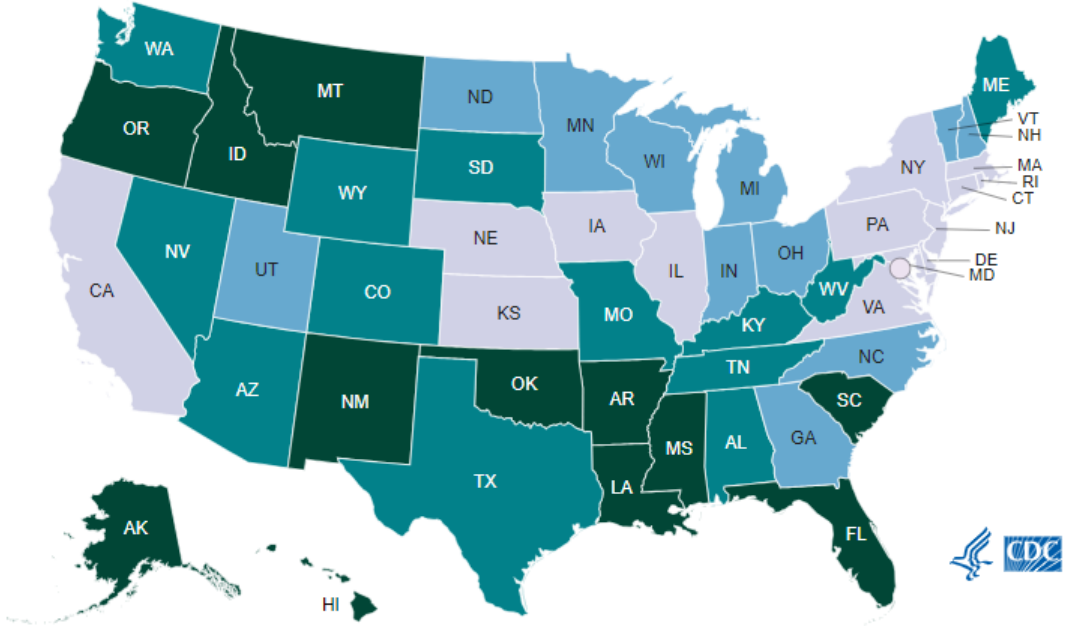
Provisional data on drowning deaths



www.cdc.gov/drowning/data

Final drowning data by state, 2018-2021

Learn more about drowning deaths in your state.



Drowning deaths per 100,000

- 1.58-4.40
- 1.35-1.57
- 1.12-1.34
- 0.74-1.11
- Unreliable

Download Data (CSV)

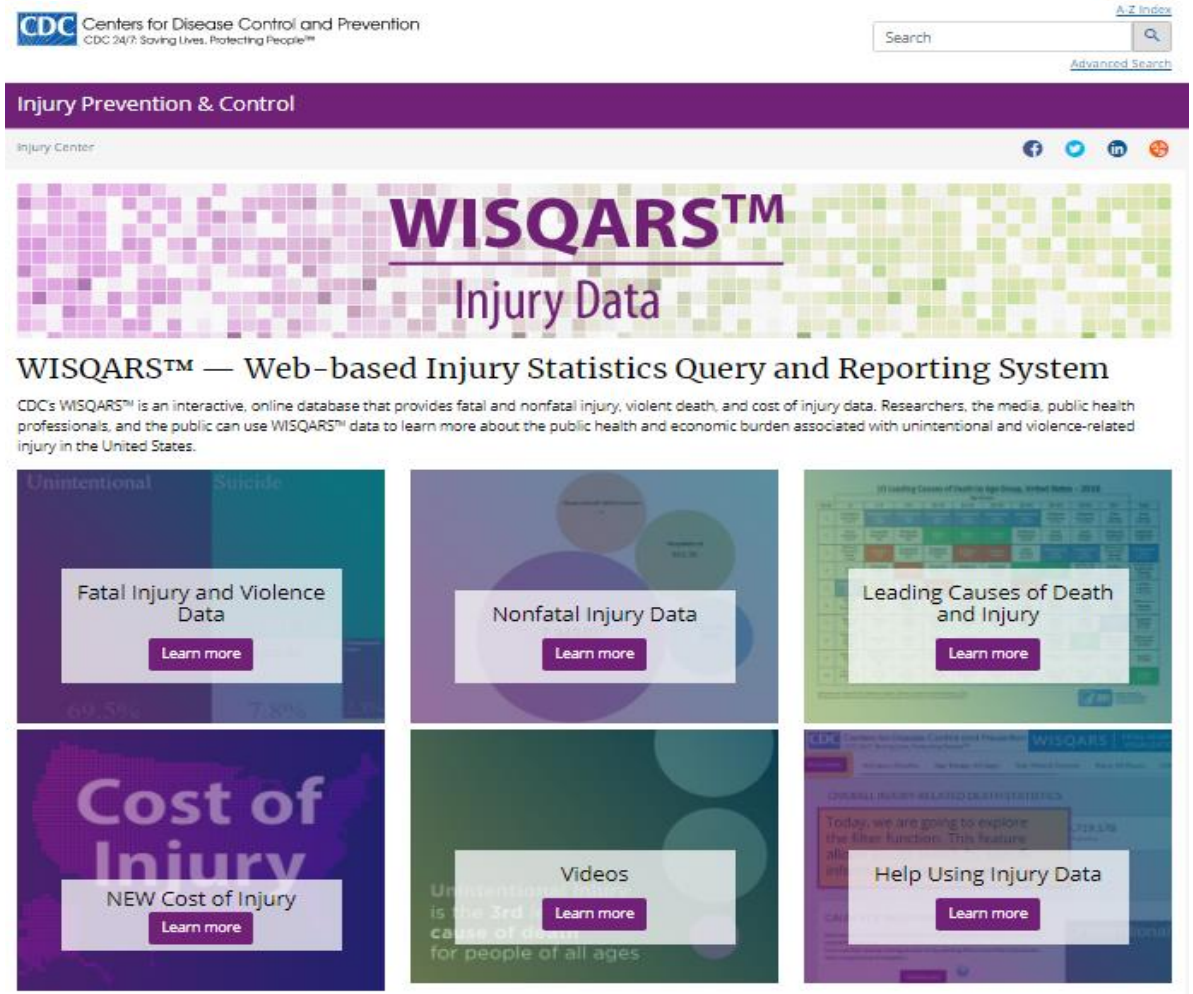
www.cdc.gov/drowning/data

WISQARS

http://www.cdc.gov/injury/wisqars

WISQARS provides statistics for:

- fatal injury data
- nonfatal injury data
- violent death data
- costs (medical and non-medical) of injury



FATAL DATA VISUALIZATION HOME | YEARS OF POTENTIAL LIFE LOST | RESET FILTER | FILTER DATA

Year Range: 2020 - 2020 | State: All States | Sex: Both Sexes | Ages: 1 - 4 | Race: All Races | Ethnicity: All Ethnicities

To view a breakdown of detailed cause and ICD code, click on any shaded square or age group. Shaded squares represent injury-related causes of death and are labeled homicide, suicide, unintentional injury. Age groups appear above each column.

Grid View Options
Click SUBMIT buttons to apply changes

View As:
Graphic

SUBMIT

Statistic to Display:
Number of Deaths

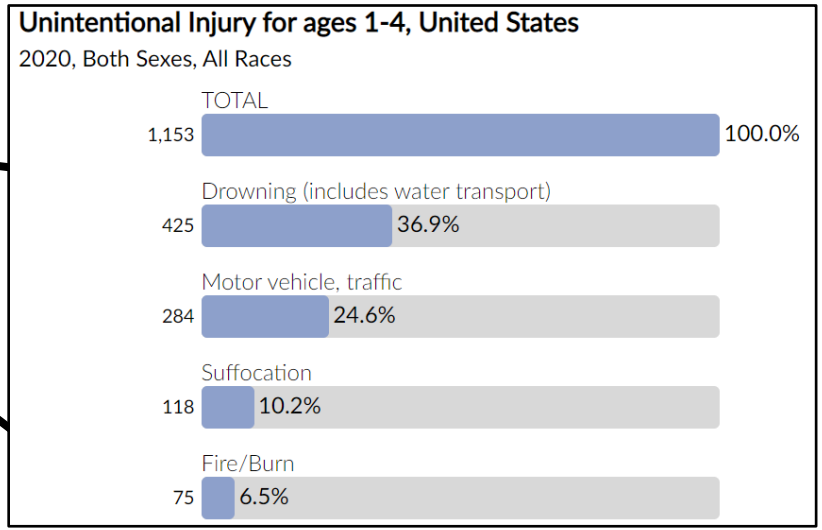
SUBMIT

Number of deaths represents the count of deaths that occurred in the selected year range for each age group. Each square in the grid lists a specific cause of death and the corresponding number of

10 Leading Causes of Death, United States

2020, Both Sexes, Ages 1 - 4, All Races

	1-4
1	Unintentional Injury 1,153
2	Congenital Anomalies 382
3	Homicide 311
4	Malignant Neoplasms 307



WISQARS Cost Of Injury

Number of Injuries and Associated Costs

Export Data

WISQARS - Data Filters

Data Year: 2020 | **Injury Outcome:** Fatal | **Intent:** Unintentional | **Mechanism:** Drowning (includes water transport) | **Geography:** United States | **Sex:** Both Sexes | **Age:** All Ages

Change Selections

Mechanism	Intent	Deaths	Medical Costs		Value of Statistical Life		Combined Costs	
			Total	Average	Total	Average	Total	Average
Drowning (includes water transport)	Unintentional	4,589	$43.60 M	$9,500	$51.49 B	$11.22 M	$51.53 B	$11.23 M

Evaluating and improving access to swim skills training

- Understand barriers and facilitators to participation
- Build evidence base for most effective ways to teach water competency skills
- Identify how to effectively scale up evidence-based programs, with an emphasis on reaching individuals and communities at increased risk of drowning

30 YEARS CDC INJURY CENTER

Understanding barriers and facilitators to participation

- Surveyed 2,785 caregivers, teens, and training providers
- Identified barriers and facilitators to participating in drowning prevention strategies
  - American Indian/Alaska Native persons:
    - affordability
    - transportation
    - nearby pool access
    - scheduling conflicts
  - Black persons:
    - scheduling conflicts
    - nearby pool access
    - safety concerns/fear of water

Evaluating water competency training program for children 1-4 years of age

- Engaged families in communities at increased risk of drowning to participate in training program
- Evaluated program's ability to teach basic swim skills:
    - Water entry, water exit, breath control, front float, back float, change in body orientation, change in body position, swimming on front, swimming on back
- Compared caregiver supported and independent lessons

Evaluating water competency training program for children 4-14 years of age

- Engaged families in communities at increased risk of drowning to participate in program
- Evaluated program to teach basic swim skills
- Developed process to collect participant swim skills data

Upcoming activities to increase impact

- Fund community-based organizations to implement basic swimming and water safety skills training programs
- Evaluate training program for children with Autism Spectrum Disorder
- Pilot training program in American Indian/Alaska Native communities

30 YEARS CDC INJURY CENTER

Summary

- Drowning is a leading cause of death among children
- Drowning rates and disparities may be increasing
- CDC is working to strengthen drowning data and has drowning data resources you can use
- Having swimming skills can reduce the risk of drowning. CDC is working to identify ways to most effectively train kids, and to increase access to training

30 YEARS CDC INJURY CENTER

Thank you!

More info:

www.cdc.gov/drowning

tclemens@cdc.gov

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

Thank you.