

Introduction to US Poison Control Centers and Arizona Poisoning Data



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Outline

- History of the American Association of Poison Control Centers
- Outline Cost and Savings of US Poison Centers
- Introduction to National Poison Data System and Fatality Data
- Overview of Arizona Poison Control Centers and Poisoning Data

History of US Poison Centers

- 1940s - Large increase types of medications
- First specialized 'Toxicology Ward' - Budapest
- First drug information center - Netherlands
- 1953 - First US poison center opens - Chicago, IL
- 1978 - 661 US poison centers (no regulation)
- 2015 - 55 US Poison Control Centers (PCCs)

American Association of Poison Control Centers (AAPCC)



- 1958 - AAPCC established to help regulate centers
- 1962 - President Kennedy established a National Poison Prevention Week (3rd week of March)
- 2002 - US Federal Government did two things:
 - ~ \$28 million/year Federal funding
 - Established a toll-free number: 1-800-222-1222

Health Resources and Services Administration (HRSA)

- Poison Control Program funds the national
- Poison Help toll-free number - 1-800-222-1222
- Provides PCC Grants:
 - Treatment recommendations for poisonings
 - Certification requirements
 - Conduct evaluations of poison prevention strategies and activities

History - AAPCC

- American Association of Poison Control Centers
- Includes 55 certified US poison centers that cover the entire United States and:
 - Puerto Rico
 - Guam
 - US Virgin Islands
 - American Samoa
 - Federated States of Micronesia

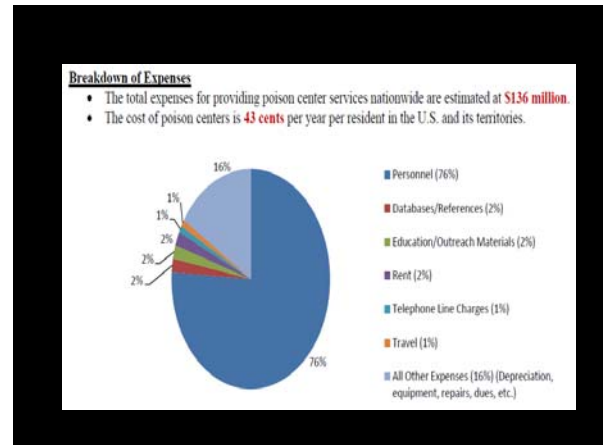


US PCC Funding (2012 data)

Funding Source	Total Poison Center Funding (in millions) in 2011	Estimated Medical Care Savings and Reduced Productivity Loss (in millions)/year	Medical Care Savings and Reduced Productivity Loss per Dollar of Funding per year
Federal Government	\$17.1	\$662.8	\$38.74
State and Local Government	\$83.8	\$284.2	\$3.39
Private	\$35.1	\$873.4	\$24.86
Total	\$136.0	\$1,820.5	\$13.39

Final Report on the Value of the Poison Center System, The Lewin Group Inc., Sept. 2012

- ### US PCC Cost Savings
- Federal government report concluded that US PCCs save \$1.82 billion / year:
 - \$752.9 million/year in health care utilization
 - \$441.1 million/year in reduced hospital stay
 - This results in \$13.39 saving per \$1 invested
- The Lewin Group, Inc: 9/26/2012



Value of Poison Centers

Poison Centers Save Money!

Dollars Spent: **\$1** Dollars Saved: **\$13.39**

Every dollar invested in the poison center system saves \$13.39 in health care costs and lost productivity.

Funding Sources (in millions)	Savings per Funding Source (in millions)
Federal: \$17.1	\$662.8
State and Local: \$83.8	\$284.2
Private: \$35.1	\$873.4
Total: \$136.0	\$1,820.5

Funding Cuts

Approximately 17 local poison centers suffered a budget reduction of 20 percent in 2011. Funding cuts will result in a 20 percent reduction in services for the American people.

Is Poisoning an Issue?

More than 400,000 people die every year from unintentional poisonings.

Poison centers receive about a million calls every year. About 2.6 million are made about poison exposures.

Personnel: 425,000 hospitalizations

100,000 emergency room visits

1.4 million physician visits

- ### AAPCC Support of US PCCs
- Providing accreditation and education
 - Partnering with federal and state agencies (EPA, HRSA, CDC) and private industries
 - Maintaining National Poison Data System
 - Providing custom toxico-surveillance reports

AAPCC Criteria for Certification (revised 7/05)

A Certified Poison Center “provides the following services to a [designated] region:

- poison information, telephone advise and consultation
- hazard surveillance to achieve hazard elimination
- professional and public education
- meet AAPCC criteria for certification

AAPCC Criteria: PCC Services

Provide information 24 hours/day - 365 days/year to the public and health professionals

- At all times, must have:
 - at least one staff member in the center
 - Physician (Medical Toxicology) real-time backup

Must be accessible by telephone from all areas

- “Use / promote” 800-222-1222 Free for lay public
- Sufficient infrastructure Disaster plan
- Access for hearing-impaired / non-English speakers

AAPCC Criteria: PCC Staffing

- Specialists in Poison Information (SPI):
 - Nurse
 - Pharmacist
 - Physician
- Must complete a PCC training program
- Must take a national certification examination every 7 years (is then a Certified-SPI)

AAPCC Criteria: PCC Staffing

- Specialists in Poison Information (SPI)
- Annual average of 16 hrs/week in PCC (8 hrs/week for CSPIs)
- 100% dedicated to poison center activities
- 50% of SPI FTEs must be C-SPIs
- At least 2000 human exposures / SPI FTE

AAPCC Criteria: PCC Staffing

- Poison Information Provider (PIP) - “must be qualified to understand and interpret ... poison information resources and transmit information to both health care professionals and the public.”

Must have:

- “appropriate health-oriented background”
- On-site medical backup (CSPI, MD, Tox MD)

Poisindex[®]

- Software database used by PCCs to code calls
- Contains >400,000 chemical and products
- Each product has a unique product code
- Further sorted into a system of generic codes

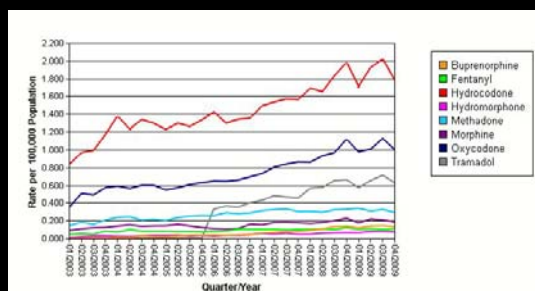
US RADARS® System?

- The Researched Abuse, Diversion and Addiction-Related Surveillance (RADARS®)
- Collects prescription drug abuse data
- 2002: developed due to increasing rates of prescription opioid abuse
- 2006: PCCs became involved

Prescription Drug Classes

- Opioids
 - Oxycodone
 - Fentanyl
 - Hydrocodone
 - Hydromorphone
 - Morphine
 - Methadone
 - Buprenorphine
 - Tramadol
- Stimulants
 - Methylphenidate
 - Amphetamines

RADARS Opioid Intentional Exposure Rates per 100,000 Population 2003 - 2009



National Poisoning Data System (NPDS)

- AAPCC and CDC joint venture
- All 55 certified PCCs upload case data to NPDS
- Automatic electronic upload every ~ 8 minutes
- Data Collected:
 - Call volume
 - Clinical effects
 - Exposure info

Nation Poisoning Data System

NPDS Goals:

- Identify injury patterns
- Monitor product safety
- Conduct post market surveillance
- Detect chemical exposure events and participate in effective responses
- **Improve public health surveillance**

National Poison Data System

- Analytical Data that can be studied:
 - Individual Case Listing Deliverables
 - Surveillance Definition
 - Custom Tables
 - Case Narrative
 - Fatality Abstracts

National Poisoning Data System

- Publishes an annual report of summarized calls, trends and selected death abstracts submitted to AAPCC poison centers:
 - *Clinical Toxicology*
 - (2013 data published ~ 12/14)

US Poisoning Data: NPDS Report

Clinical Toxicology (2014), 52, 1032-1283
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DOI: 10.3109/15563650.2014.907397

informa
healthcare

NPDS REPORT 2013

2013 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 31st Annual Report

JAMES B. MOWRY, DANIEL A. SPYKER, LOUIS R. CANTILENA JR., NAYA MCMILLAN, MARSHA FORD

US NPDS Data: Call Types

- Human exposure: confirmed case involving a human exposure to a drug/chemical/toxin
- Animal exposures: call concerning an animal
- Information: information only

2013 NPDS Data

- 3.06 million calls to US PCCs
 - 2.188 million human exposures
 - 59,000 animal exposures
 - 806,000 information only calls
 - ~ 1 call every 10 seconds

2012 US Poisoning Numbers

- 1.4 primary care physician (clinic) visits
- 749,061 Emergency Department visits
- 438,244 hospital admissions

Origin of calls to US PCCs

Site	Site of caller		Site of exposure	
	N	%	N	%
Residence				
Own	1,539,136	70.34	1,994,810	91.17
Other	32,014	1.46	50,310	2.30
Workplace	24,320	1.11	35,563	1.63
Health care facility	443,318	20.26	6,083	0.28
School	9,691	0.44	27,961	1.28
Restaurant/food service	436	0.02	4,766	0.22
Public area	6,707	0.31	20,482	0.94
Other	125,752	5.75	24,827	1.13
Unknown	6,639	0.30	23,211	1.06

Age and Gender Distribution of PCC Calls

Age (y)	Male		Female	
	N	% of age group total	N	% of age group total
Children (<20)				
<1	58,132	51.83	53,698	47.88
1	172,707	52.03	158,747	47.82
2	174,346	52.40	157,886	47.45
3	81,745	54.55	67,776	45.23
4	42,045	55.87	33,019	43.88
5	25,725	56.58	19,585	43.07
Unknown ≤5	953	46.24	809	39.25
Child 6-12	78,140	57.82	55,802	41.29
Teen 13-19	1,685	41.05	1,385	33.74
Unknown Child Subtotal	699,245	52.11	637,234	47.49
Adults (≥20)				
20-29	87,238	46.45	100,402	53.46
30-39	63,400	43.11	83,524	56.80
40-49	52,726	41.51	74,213	58.42
50-59	47,450	40.19	70,556	59.76
60-69	30,050	37.99	49,011	61.96
70-79	17,030	35.90	30,382	64.04
80-89	9,729	34.04	18,434	65.90
≥90	1,962	31.41	4,276	68.45
Unknown adult	35,855	38.88	53,889	58.43
Subtotal	345,440	41.44	485,487	58.19
Other	885	34.83	5,656	44.93
Unknown age	1,018	47.95	1,127	51.55
Total	1,018,070	47.95	1,127,977	51.55

Route of Exposure

Route	Human exposures			Fatal exposures ^a		
	N	% of All Routes	% of All Cases	N	% of All Routes	% of All Cases
Ingestion	1,824,913	79.40	83.41	985	75.08	80.87
Dermal	152,028	6.61	6.95	11	0.84	0.90
Inhalation/nasal	134,143	5.84	6.13	124	9.45	10.18
Other	95,073	4.08	4.28	1	0.08	0.08
Bite/sting	56,376	2.45	2.58	4	0.30	0.33
Parenteral	18,973	0.83	0.87	62	4.73	5.09
Unknown	11,022	0.48	0.50	108	8.23	8.87
Other	2,611	0.11	0.12	4	0.30	0.33
Otic	1,901	0.08	0.09	0	0.0	0
Aspiration (with ingestion)	1,175	0.05	0.05	13	0.99	1.07
Vaginal	915	0.04	0.04	0	0.0	0
Rectal	736	0.03	0.03	0	0.0	0
Total Number of Routes^b	2,298,466	100.00	105.05	1,312	100.00	107.72

Reasons for Exposures by Age*

Reason	≤5 y		6-12 y		13-19 y		≥20 y	
	N	Row %	N	Row %	N	Row %	N	Row %
Unintentional	1,042,537	62.32	18,754	7.10	60,129	3.59	444,092	26.55
Intentional	1,303	0.38	11,081	3.23	85,380	24.88	242,112	70.55
Adverse reaction	3,675	7.70	2,873	6.02	3,995	8.37	36,314	76.12
Unknown	741	5.17	864	6.02	1,848	12.88	10,093	70.37
Other	1,219	8.97	1,573	11.57	1,785	13.13	8,722	64.15
Total	1,049,475	50.17	135,145	6.46	153,137	7.32	741,333	35.44

* excludes cases with unknown age

Substances Most Commonly involved in Human Exposures

Substance (Major Generic Category)	All substances		Single substance exposures	
	N	% ^a	N	% ^b
Analgesics	298,633	11.50	193,037	9.90
Cosmetics/personal care products	199,838	7.70	192,940	9.89
Cleaning substances (household)	196,183	7.55	175,594	9.00
Sedative/hypnotics/antipsychotics	153,398	5.91	57,901	2.97
Antidepressants	109,110	4.20	45,123	2.31
Foreign bodies/boys/miscellaneous	103,737	3.99	100,632	5.16
Cardiovascular drugs	101,544	3.91	46,406	2.38
Antihistamines	99,470	3.82	70,882	3.52
Topical preparations	89,287	3.44	87,278	4.47
Pesticides	85,033	3.27	79,405	4.07
Alcohols	70,258	2.71	24,176	1.24
Vitamins	66,206	2.55	56,914	2.92
Cold and cough preparations	65,053	2.51	46,581	2.39
Bites and envenomations	61,857	2.38	61,143	3.13
Stimulants and street drugs	58,514	2.25	33,278	1.71
Antimicrobials	58,514	2.25	48,259	2.47
Hormones and hormone antagonists	56,957	2.19	38,556	1.98
Anticonvulsants	53,102	2.04	21,957	1.13
Gastrointestinal preparations	47,698	1.84	36,180	1.85
Plants	46,376	1.79	43,947	2.25
Dietary supplements/herbals/homeopathic	38,955	1.50	31,254	1.60
Chemicals	38,873	1.50	32,959	1.69
Fumes/gases/vapors	33,973	1.31	31,244	1.60
Hydrocarbons	33,081	1.27	31,031	1.59
Electrolytes and minerals	30,498	1.17	25,089	1.29

Common Pediatric (<6 yr) Exposures

Substance (major generic category)	All substances	% ^b
Cosmetics/personal care products	151,154	13.82
Cleaning substances (household)	113,872	10.41
Analgesics	106,639	9.75
Foreign bodies/boys/miscellaneous	99,470	9.08
Topical preparations	66,893	6.12
Vitamins	47,816	4.37
Antihistamines	45,250	4.14
Pesticides	35,254	3.22
Plants	29,346	2.68
Gastrointestinal preparations	28,481	2.60
Antimicrobials	27,928	2.55
Cold and cough preparations	25,708	2.35
Dietary supplements/herbals/homeopathic	24,638	2.25
Cardiovascular drugs	23,124	2.11
Arts/crafts/office supplies	20,736	1.90
Hormones and hormone antagonists	20,522	1.88
Electrolytes and minerals	20,071	1.84
Deodorizers	17,555	1.61
Other/unknown nondrug substances	13,261	1.21
Sedative/hypnotics/antipsychotics	12,676	1.16
Antidepressants	11,526	1.05
Alcohols	11,026	1.01
Information Calls	9,984	0.91
Hydrocarbons	9,947	0.91
Asthma therapies	9,923	0.91

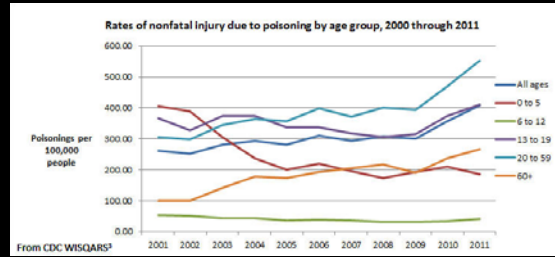
Common Adult (>19 yr) Exposures

Substance (major generic category)	All substances	% ^b	Single substance exposures	% ^c
Analgesics	138,440	12.18	63,555	9.55
Sedative/hypnotics/antipsychotics	119,784	10.54	38,138	5.73
Antidepressants	74,818	6.58	25,534	3.84
Foreign bodies/boys/miscellaneous	67,645	5.98	25,020	3.80
Cleaning substances (household)	66,408	5.84	52,395	7.87
Alcohols	52,430	4.61	10,422	1.57
Pesticides	42,055	3.70	38,022	5.71
Bites and envenomations	41,400	3.64	40,966	6.15
Anticonvulsants	38,709	3.41	13,666	2.04
Antihistamines	33,625	2.96	16,578	2.49
Cosmetics/personal care products	32,010	2.82	29,374	4.41
Hormones and hormone antagonists	31,223	2.75	19,038	2.86
Stimulants and street drugs	30,978	2.72	14,375	2.16
Fumes/gases/vapors	24,349	2.14	22,270	3.35
Chemicals	23,430	2.06	19,023	2.86
Antimicrobials	22,409	1.97	16,034	2.41
Cold and cough preparations	20,828	1.83	11,232	1.69
Muscle relaxants	20,351	1.79	7,117	1.07
Hydrocarbons	18,735	1.65	17,266	2.59
Topical preparations	17,288	1.52	16,645	2.50
Gastrointestinal preparations	15,005	1.32	7,599	1.14
Foreign Bodies/boys/miscellaneous	13,582	1.19	12,632	1.90
Miscellaneous drugs	12,173	1.07	6,095	0.92
Information calls	11,844	1.04	10,466	1.57
Other/unknown nondrug substances	11,514	1.01	10,092	1.52

Management Site of Human Exposures

Site of management	N	%
Managed on site, non-health care facility	1,502,483	68.7
Managed in health care facility		
Treated/evaluated and released	286,690	13.1
Admitted to critical care unit	99,117	4.5
Patient lost to follow-up/left AMA	86,725	4.0
Admitted to noncritical care unit	67,114	3.1
Admitted to psychiatric facility	61,996	2.8
Subtotal (managed in HCF)	601,642	27.5
Other	27,929	1.3
Refused referral	33,305	1.5
Unknown	22,654	1.0
Total	2,188,013	100.0

Rates of US Poisoning Injuries

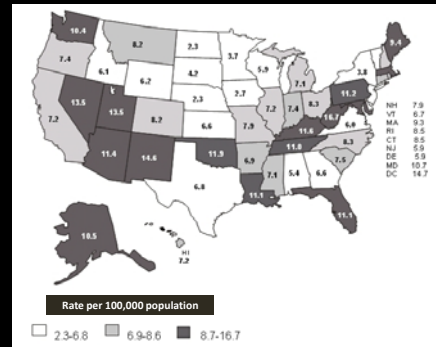


US Motor Vehicle and Poison Deaths by Age



2005 - 2006 (all poisoning deaths)

US Deaths* from Drug Poisoning



US Poisoning Deaths: 2008

- Poisoning deaths caused by medications increased from 60% to 90%
- 40% of medication deaths are caused by an opiate
 - 76% accidental
 - 16% suicide
 - 8% unknown

US Poisoning Deaths: 2013

- 2,477 deaths reported to US PCC
- Estimated total US deaths related to poisoning ~ 45,000 per year
- Death rate has tripled over 30 years

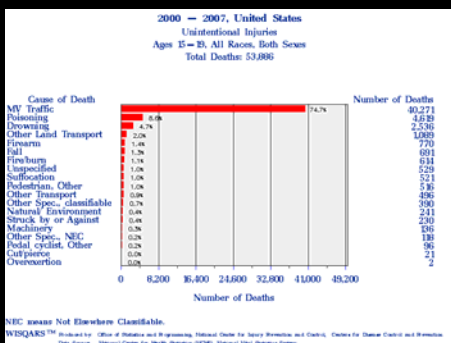
Drugs Most Commonly Associated with Deaths

Substance (minor generic category)	All substances	% ^b	Single substance exposures	% ^c
Miscellaneous sedative/hypnotics/antipsychotics	363	12.86	19	3.53
Miscellaneous cardiovascular drugs	301	10.67	58	10.78
Opioids	243	8.61	34	6.32
Miscellaneous stimulants and street drugs	210	7.44	44	8.18
Miscellaneous alcohols	174	6.17	12	2.23
Acetaminophen combinations	153	5.42	44	8.18
Acetaminophen alone	145	5.14	58	10.78
Selective serotonin reuptake inhibitors (SSRI)	92	3.26	4	0.74
Miscellaneous fumes/gases/vapors	89	3.15	53	9.85
Miscellaneous antidepressants	77	2.73	6	1.12
Miscellaneous antihistamines	70	2.48	5	0.93
Tricyclic antidepressants (TCA)	64	2.27	12	2.23
Acetylsalicylic acid alone	62	2.20	22	4.09
Miscellaneous muscle relaxants	60	2.13	6	1.12

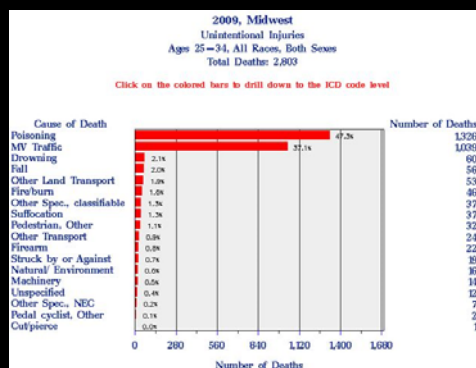
Age and Gender Distribution of Deaths

Age (y)	Male	Female	Unknown	Total (%)	Cumulative total (%)
<1 year	4	0	0	4 (0.3%)	4 (0.3%)
1 year	7	5	0	12 (1.0%)	16 (1.3%)
2 years	2	1	0	3 (0.3%)	19 (1.6%)
3 years	3	2	0	5 (0.4%)	24 (2.0%)
4 years	2	1	0	3 (0.3%)	27 (2.2%)
5 years	1	1	0	2 (0.2%)	29 (2.4%)
Child 6-12 years	3	3	0	6 (0.5%)	35 (2.9%)
13-19 years	37	36	1	74 (6.3%)	99 (8.1%)
20-29 years	103	88	0	191 (15.7%)	290 (23.8%)
30-39 years	93	101	0	194 (15.9%)	484 (39.7%)
40-49 years	98	109	0	207 (17.0%)	691 (56.7%)
50-59 years	111	115	0	226 (18.6%)	917 (75.3%)
60-69 years	72	66	0	138 (11.3%)	1,055 (86.6%)
70-79 years	55	41	0	96 (7.8%)	1,151 (92.9%)
80-89 years	23	45	0	68 (5.6%)	1,199 (98.4%)
> = 90 years	5	5	0	10 (0.8%)	1,209 (99.3%)
Unknown adult	2	3	0	5 (0.4%)	1,214 (99.7%)
Unknown age	0	2	2	4 (0.3%)	1,218 (100.0%)
Total	601	614	3	1,218 (100.0%)	1,218 (100.0%)

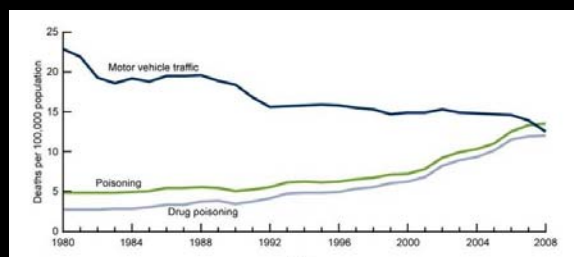
US Deaths Ages 15-19: 2000 - 2007



Causes of US Deaths: 2009



Causes of US Deaths: 1980-2008



CDC: 2008

Arizona DHS: 2011 Poisoning Data

- Poisoning was the leading cause of injury related mortality among Az residents
- 12,516 non-fatal ED visits
- 6,930 non-fatal inpatient hospitalizations
- Associated hospital charges > \$127 million

Arizona Department of Health Services: Poisonings among Arizona Residents, 2011
<http://www.azdhs.gov/dhs/cwch/pdf/injuryvention/poisonings-among-az-residents2011.pdf>

Intermission

- History of the AAPCC
- PCC Cost and Savings
- Fatality Data

- Overview of Arizona Poison Control Centers and Poisoning Data

Who we are - LOGOS

Service Area

Who we are

- Phones staffed by pharmacists and nurses
 - Additional training in toxicology (CSPI)
 - Many HAZMAT trained
- Board certified medical toxicologists
 - Medical Toxicologists
 - Emergency Medicine, Peds, EMS...
- Pregnancy Riskline
 - Certified Genetic Counselor
- Public Educators
 - Certified Health Educators

Services

- **Public Service**
 - Free service
 - 24/7
 - Confidential
- **Healthcare Provider**
 - Home management
 - Hospital management
 - Toxicology consult service
 - Toxicology inpatient service
- **Research**
 - Rattlesnake and Scorpion
 - Antivenoms
 - Exposure Trends
 - Case Reports/ Case Series
- **Education**
 - Medical
 - Pharmacy
 - Nursing
 - Medical Toxicol

Toxicology History

- Paracelsus

- “Poison is in everything, and no thing is without poison. The dosage makes it either a poison or a remedy.”

Why call a poison center

- If the dose makes the poison and everything is a poison, the poison center gets called about **EVERYTHING!**
- Legos, Button Batteries
- Adverse Drug Reactions
- Medication Management
- Suicide attempts
- Envenomations
- Radiation exposures
- Tiger Bites



Poison and Drug Information Centers

<ul style="list-style-type: none"> • Banner Poison Control • 17 onsite stations • 16 remote stations 	<ul style="list-style-type: none"> • Arizona Poison Control • 12 onsite stations • 1 remote stations
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Interpreting service
 >150 languages available 24/7
Mobile computers for evacuation and onsite HAZMAT

Arizona Poison Control

<p>Maricopa County Partnership</p> <ul style="list-style-type: none"> • Disease Reporting Line • Ebola Information Line • Flu on Call <p>Host Facility Partnership</p> <ul style="list-style-type: none"> • Post Exposure Prophylaxis (PEP) • Banner Employee Ebola surveillance line • Hospital Discharge Calls • Education 	<p>Community Partnership</p> <ul style="list-style-type: none"> • Adverse Medication Reporting for scorpion antivenom • After hours call support for Medication Management Center <p>Host Facility Partnership</p> <ul style="list-style-type: none"> • Bedside Toxicology Consult Service • Education
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2014 Total Calls >300,000

<ul style="list-style-type: none"> • Banner Poison Control • 25 SPIs • 8 PIPs • Managing Director • Medical Director • Toxicologists • 24/7 call 	<ul style="list-style-type: none"> • Arizona Poison Control • 12 SPIs • 5 PIPs • Managing Director • Medical Director • Toxicologists • 24/7 call
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2014 Total Calls >300,000

<ul style="list-style-type: none"> • Banner Poison Control • Total calls: 68,941 <ul style="list-style-type: none"> • Exposures: 44,158 • Information: 23,717 • Other: 1,066 • Follow Up calls >102,000 • Hospital discharge calls >30,300 • Total calls managed >200,000 	<ul style="list-style-type: none"> • Arizona Poison Control • Total calls: 36,930 <ul style="list-style-type: none"> • Exposures: 21,630 • Information: 15,188 • Other: 112 • Follow Up calls >63,000 • Total calls managed >100,000
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Questions ?



References

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