



2012 NCHS/SAMHSA Data User Conferences

Medical Emergencies: A Strategy to Assess and Identify Potentially Inappropriate Medications (PIMs) for Older Persons

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Drug Abuse Warning Network (DAWN)

- Center for Behavioral Health Statistics and Quality (CBHSQ), Substance Abuse and Mental Health Services Administration (SAMHSA)
- Screen sample of **emergency department (ED)** visit records
- Collect data on ED visits related to drugs

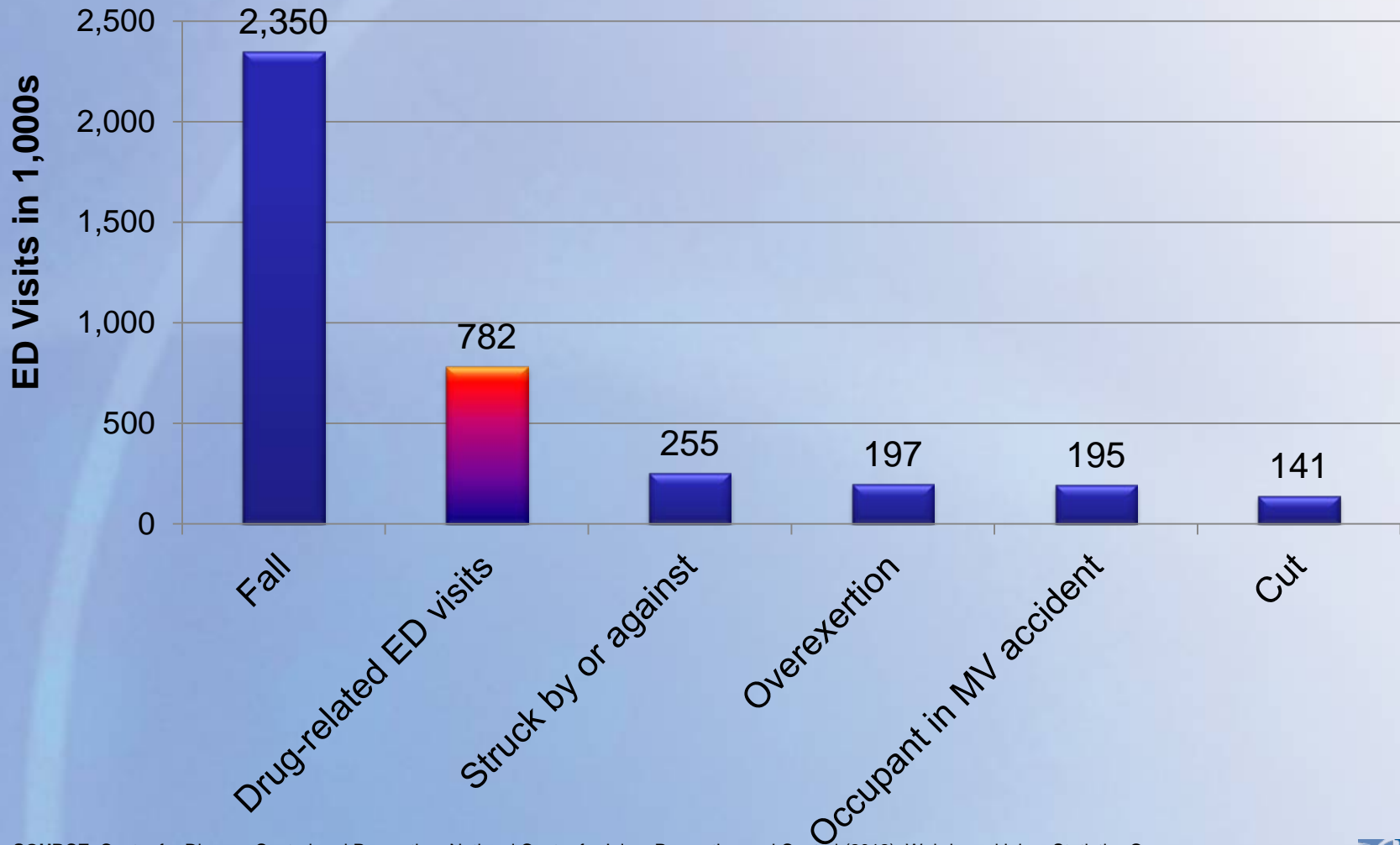
Inclusion criteria

- All ED visits: adverse reactions, overmedication, pharmaceutical misuse/abuse, accidental ingestion, suicide attempts
- About three-quarter million visits by persons aged 65 and older in 2010

Outline of Presentation

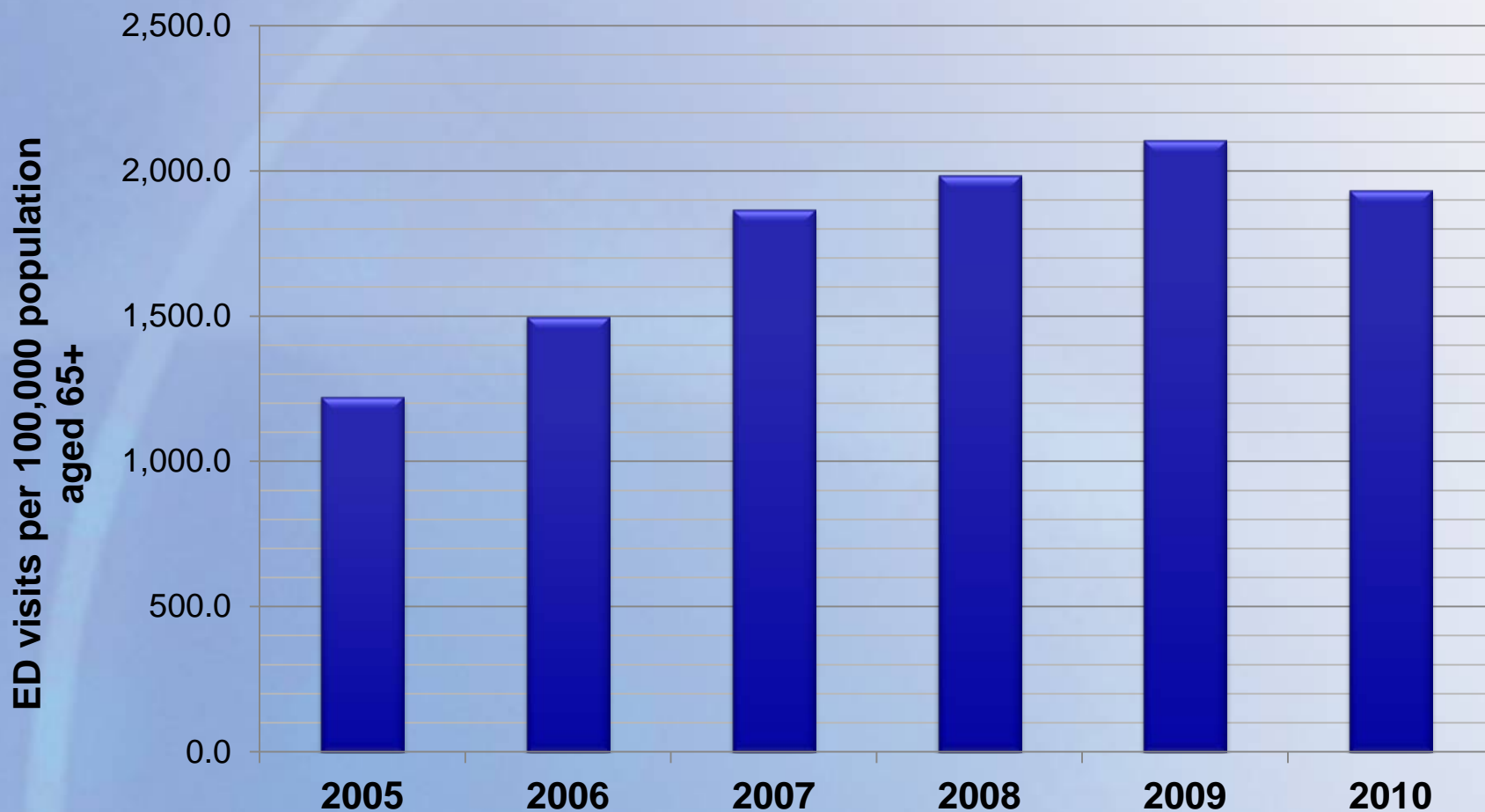
- Magnitude of the problem of adverse drug-related outcomes
- Older persons (65+) need to take special care in choosing medications - PIMs
- How DAWN data can help evaluate adverse outcomes due to drugs in older population
- What you will know at the end
 - PIMs with rising levels of adverse outcomes
 - Emerging drugs with rising levels of adverse outcomes

ED visits for unintentional injuries by older persons



SOURCE: Center for Disease Control and Prevention, National Center for Injury Prevention and Control (2012). Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved June 4, 2012 from <http://www.cdc.gov/injury/wisqars/index.html> and Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Trends in drug-related ED visits for older persons



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

PIMs for Older Population

- PIMs – Potentially inappropriate medications
 - Clinical evidence of adverse outcome
 - Known safer, alternative treatment/therapies
- Balance of risks versus benefits when prescribing
 - Acceptable risk
 - Determined on an individual basis



PIM analysis may under-represent certain drugs

- Unrecognized dangerous drugs
 - New drugs with short track records
 - Complex interactions with long-term, multi-drug, treatment plans
- Consumer behavior
 - Non-prescription drugs, e.g., nutritional products
 - Pill “hoarding” and self-medication
 - Misuse/abuse of pharmaceuticals



How DAWN data can help evaluate drug risks for older population?

- DAWN data can measure adverse outcomes for specific drugs identified as PIMs as well as under-represented drugs
- Limitation of DAWN data – doesn't account for volume of prescribing
- What value is DAWN data in identifying potentially dangerous drugs for older persons if we can not parse out volume from danger?



Identify PIMs that are no longer in use

- DAWN can measure absence =
“below level of detection”
- PIMs below level of detection =
successful efforts at finding
alternative treatment/
therapies



PIMs below level of detection – 134 drugs

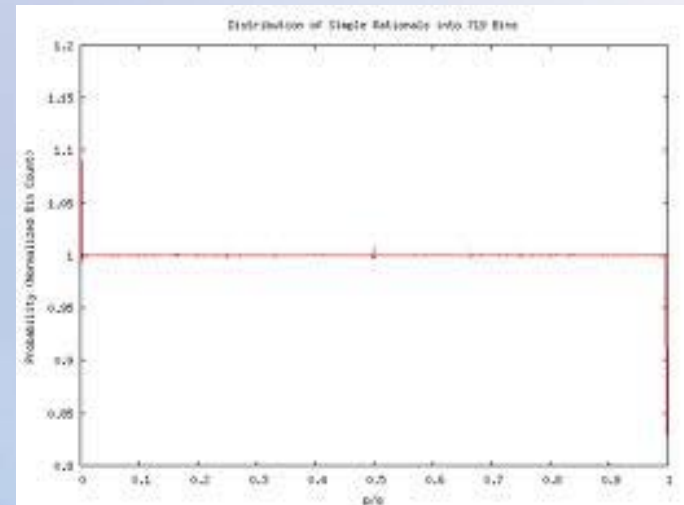
Examples	2010 Rate	2005 Rate
Barbituates		
<i>secobarbital</i>	*	*
<i>pentobarbital</i>	*	*
<i>amobarbital</i>	*	*
Antispasmodics		
<i>belladonna alkaloids</i>	*	*
<i>hyoscyamine</i>	*	*
<i>propantheline</i>	*	*



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Identify PIMs that are Stable

- DAWN can measure stability =
Compare 2005 to 2010



- PIMs with stable involvement =
“Acceptable risk” –
balance of risk/benefits
for individual patients



Stable PIMs – 24 drugs

Amitriptyline	Hydroxyzine
Aripiprazole	Ibuprofen
Carbidopa-Levodopa	Indomethacin
Carisoprodol	Naproxen Products
Clonidine	Olanzapine
Cyclobenzaprine	Pramipexole
Diazepam	Risperidone
Diclofenac	Sotalol
Diphenhydramine	Spiroonolactone
Doxazosin	Sulfonylureas
Eszopiclone	Temazepam
Haloperidol	Terazosin

PIMs with Increasing Use – 9 drugs

- DAWN can measure increasing involvement =
Statistically significant increases over time



- PIMs with increasing involvement =



Red flag these drugs - known problem drugs experiencing increases in prescribing/consumption

PIMs increasing – Benzodiazepines

Alprazolam, Clonazepam, Lorazepam

	2010 Rate	% change	% of total TG
Benzodiazepines	84.4	93%	100%
PIMs			
<i>alprazolam</i>	24.8	147%	29%
<i>clonazepam</i>	13.3	115%	16%
<i>lorazepam</i>	28.2	102%	33%
<i>diazepam</i>	6.2	NC	7%
<i>temazepam</i>	5.3	NC	6%

Brand names:



Xanax
Klonopin
Ativan

Conditions:



Anxiety
Insomnia
Agitation
Seizures
Muscle spasms

PIM increasing –Hypnotic

Zolpidem

	2010 Rate	% change	% of total TG
Other Hypnotics	43.7	103%	100%
PIMs			
<i>zolpidem</i>	24.0	113%	55%
<i>diphenhydramine</i>	7.8	NC	18%
<i>eszopiclone</i>	2.1	NC	5%
<i>hydroxyzine</i>	2.8	NC	6%
Non-PIM			
<i>buspirone</i>	1.9	NC	4%



Brand names: Ambien



Condition: Insomnia

PIM increasing – Antipsychotic

Quetiapine

	2010 Rate	% change	% of total TG
Antipsychotics	41.8	78%	100%
PIMs			
<i>quetiapine</i>	20.2	226%	48%
<i>aripiprazole</i>	1.2	NC	3%
<i>haloperidol</i>	4.9	NC	12%
<i>olanzapine</i>	5.4	NC	13%
<i>risperdone</i>	4.0	NC	10%
Non-PIM			
<i>lithium</i>	4.2	NC	10%

Brand Names:

- Seroquel,
- Seroquel XR



Conditions:

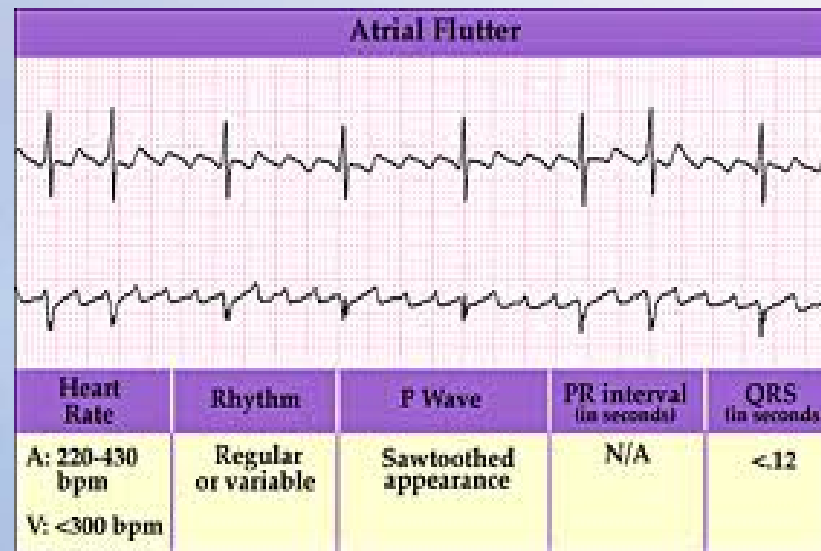
- Bipolar Disorder
- Borderline Personality Disorder
- Depression
- Generalized Anxiety Disorder
- Insomnia
- Obsessive Compulsive Disorder
- Paranoid Disorder
- Post Traumatic Stress Disorder
- Schizoaffective Disorder
- Schizophrenia
- Tourette's Syndrome



PIM increasing – Antiarrhythmic

Amiodarone

	2010 Rate	% change	% of total TG
Antiarrhythmics	16.4	170%	100%
PIMs			
<i>amiodarone</i>	10.5	308%	64%
<i>sotalol</i>	3.5	NC	21%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

PIM increasing – Antihistamine *Promethazine*

	2010 Rate	% change	% of total TG
Antihistamines	15.7	132%	100%
PIMs			
<i>promethazine</i>	6.9	139%	44%
Non-PIM			
<i>loratadine</i>	4.9	NC	31%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Reasons for Rising Involvement

- Additional research needed to determine if due to:



More prescribing

Interactions



Self medication



Misuse/abuse

Why look at non-PIMs?

- Non-PIMs with stable or declining levels = low interest or concern
- Non-PIMs with increasing levels =
emerging problem drugs due to net effect of:
 - Unrecognized dangers
 - More prescribing
 - Unexpected interactions
 - More self-medication
 - More misuse/abuse



CAUTION!!!

Therapeutic Groups - Another advantage of DAWN

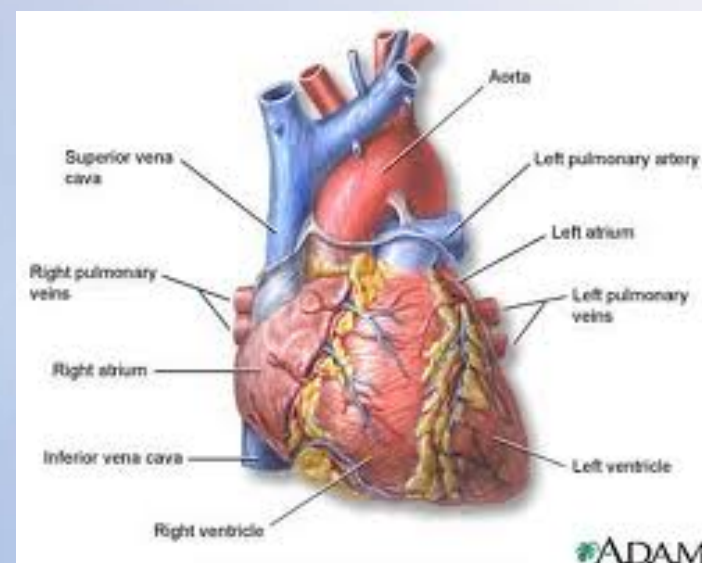
- DAWN groups drugs in therapeutic groups, e.g. Antihistamines, Benzodiazepines
- Look for therapeutic groups where PIMs are stable or declining and non-PIMs are rising
- Possibility that increased use of alternative drugs (non-PIMs) is contributing to adverse outcomes



Emerging PIM – Alpha₁ Blocker

Tamsulosin

	2010 Rate	% change	% of TG
Alpha₁ Blockers	18.2	152%	100%
PIMs			
<i>doxazosin</i>	1.9	NC	10%
<i>terazosin</i>	4.6	NC	25%
Non-PIM			
<i>tamsulosin</i>	9.8	326%	54%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Emerging PIM – Antidiabetic *Biguanides*

	2010 Rate	% change	% of TG
Antidiabetics	203	61%	100%
PIMs			
<i>insulin</i>	136.5	68%	38%
<i>sulfonylureas</i>	49.3	NC	24%
Non-PIM			
<i>biguanides</i>	25.8	111%	13%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Emerging PIMs – Non-narcotic pain relievers

Acetaminophen, Tramadol

	2010 Rate	% change
Non-narcotic pain relievers		
PIMs		
<i>aspirin</i>	64.0	62%
Non-PIM		
<i>acetaminophen products</i>	15.8	208%
<i>tramadol products</i>	24.1	138%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Other drugs we should think about avoiding for older persons –

Hydrocodone, Morphine, Oxycodone

	Rate	% Increase
Narcotic pain relievers	208.5	71%
Hydrocodone products	75.9	89%
<i>Acetaminophen-hydrocodone</i>	56.5	78%
<i>Hydrocodone</i>	18.8	134%
Morphine products	24.8	142%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Certain Cardiovascular Agents

	Rate	% Increase
Beta-adrenergic Blocking Agents		
<i>metoprolol</i>	53.7	108%
Non-cardioselective Beta Blockers		
<i>carvedilol</i>	17.4	269%
Calcium Channel Blocking Agents		
<i>amlodipine</i>	26.7	230%
Diuretics		
<i>furosemide</i>	34.9	104%
Angiotensin Converting Enzyme Inhibitors		
<i>lisinopril</i>	58.0	103%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Nutritional Products

	Rate	% Increase
Iron products	11.9	373%
Minerals and electrolytes	20.7	515%
Vitamin and mineral combinations	14.2	421%
Vitamins	23.5	156%



SOURCE: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network, 2010.

Summary - PIMS

- 134 PIMs have fallen below level of detection.
 - Kudos!



- 24 PIMS have stabilized with no change in 6 years
 - May reflect “acceptable risk”



Summary – Increasing PIMS (N=9)

- 9 PIMS have **increasing involvement**
 - Targeted messaging to medical community about
 - reducing prescribing
 - interactions
 - dependence
 - Targeted messaging to consumer community about
 - self-medication
 - dependence
 - misuse/abuse



Summary – Non-PIMS (N=5)

Messaging to medical community

- Highlight alternative drugs that appear have high risk for adverse outcomes
- Highlight need to identify different alternative treatments



Messaging to consumer community

- Risks of nutritional products, OTCs
- Awareness of dangers of self-medication, need for compliance



Further Research

- Combine data across years to investigate differences by
 - drug combinations
 - reasons for ED visit (overmedication, abuse)
- Seek out relationships across therapeutic groups
- Add information on prescribing levels



For further information

DAWN: www.samhsa.gov/data/DAWN.aspx

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