An Evaluation of the Adolescent Suicide Attempt Data System

An Issue of Definition and Nomenclature

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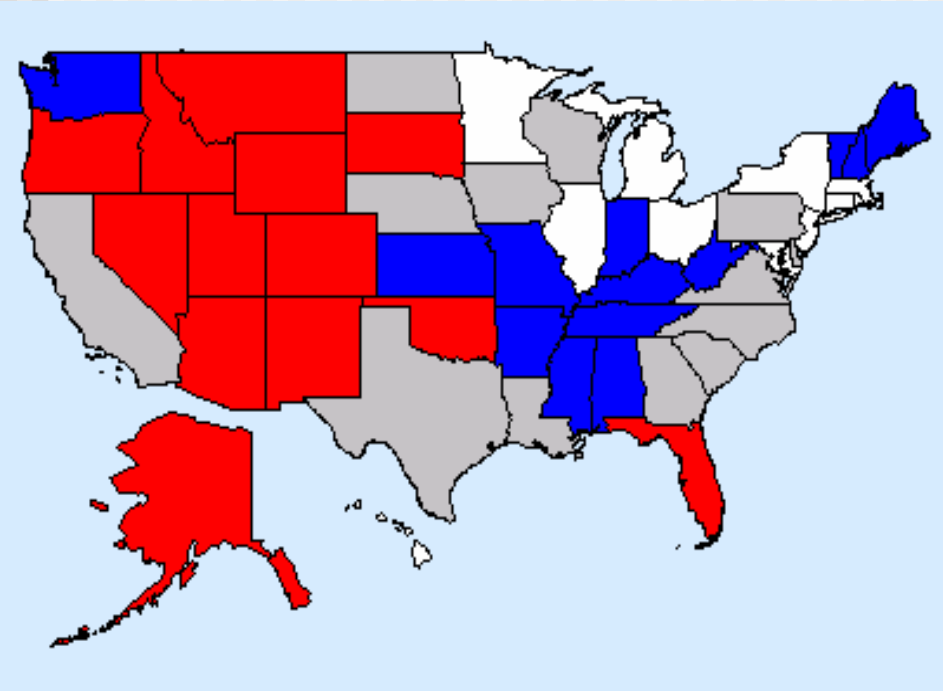
Introduction

- **Suicide is a serious public health problem**
- Approximately 30,000 Americans die each year from suicide
  - According to WISQARS, this number reached 32,439 nationally in 2004
    - 8,373 of these deaths occurred in the West
    - 555 occurred in Oregon
- For those ages 10-17, suicide was the 2nd leading cause of death in Oregon and nationwide
  - Second only to unintentional injuries
- Oregon has one of the highest rates of suicide in the country (**11th**)
  - Of the top ten states with the highest suicide rates, **9 are Western States**

Rate of suicide by state: all ages



Red = at or above the 75th National percentile

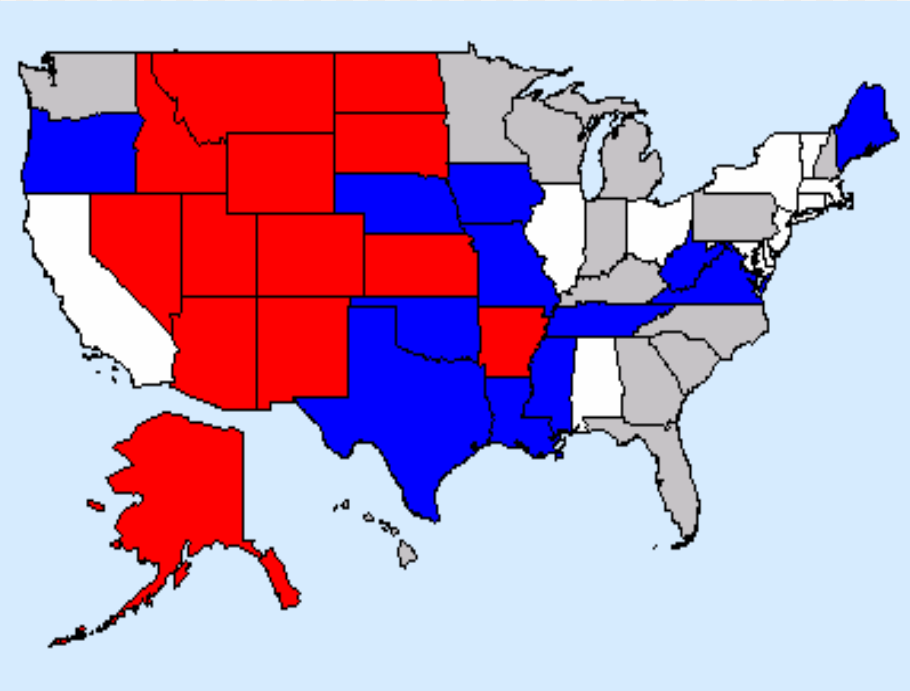
Blue = at or above the 50th but less than the 75th National percentile

Grey = at or above the 25th but less than the 50th National percentile

White = less than the 25th National percentile

*1989-1999 data from CDC

Rate of suicide by state: ages 10-19



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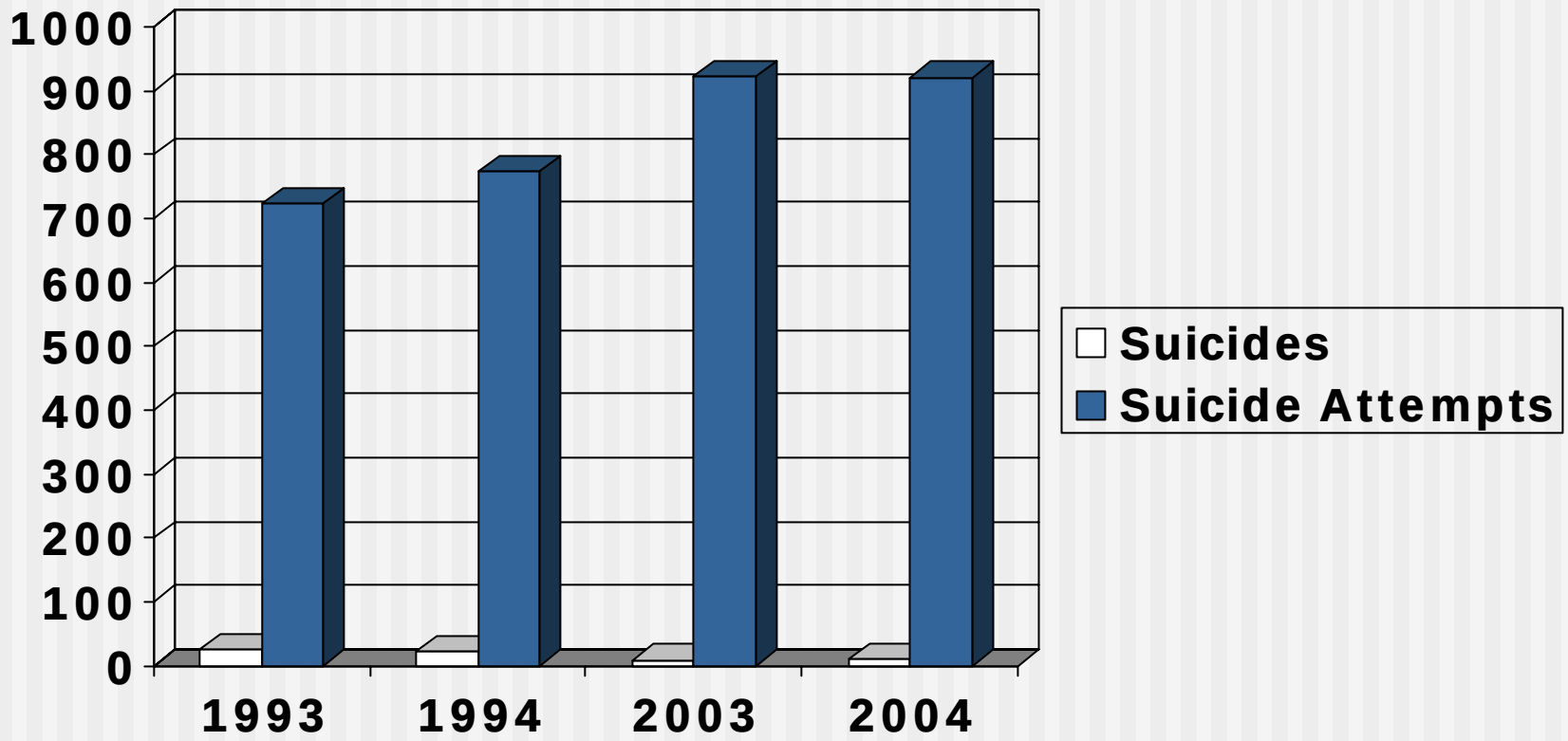
JCAHO 2007 NPSG

- The national healthcare community is starting to take notice
  - JCAHO has included new requirements in it's 2007 National Patient Safety Goals that address suicide prevention
    - Behavioral Health Care Program Goal 15A: "The organization identifies clients at risk for suicide"
      - Perform a risk assessment, provide for any immediate safety needs, and give a crisis referral

Introduction

- Suicide is ***preventable***, especially if there is an intervention effort at the first suggestion or warning sign of suicide, or after a first attempt
- Of those who die by suicide, more than 90% have depression or another ***diagnosable***, and possibly ***treatable***, mental or substance abuse disorders
- For every suicide, it is estimated that there are anywhere from 8 to 25 suicide attempts

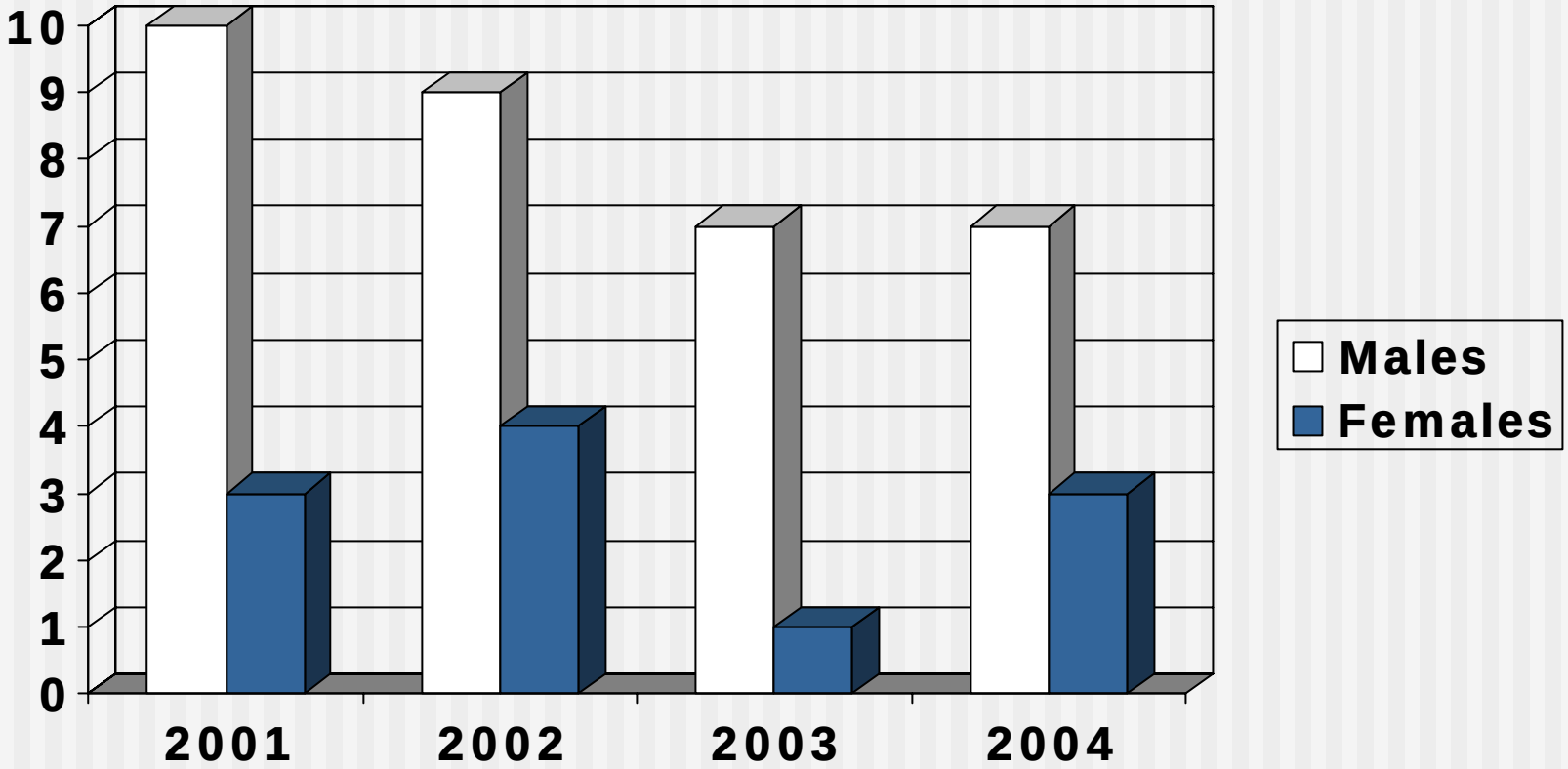
Adolescent Suicides vs. Suicide Attempts



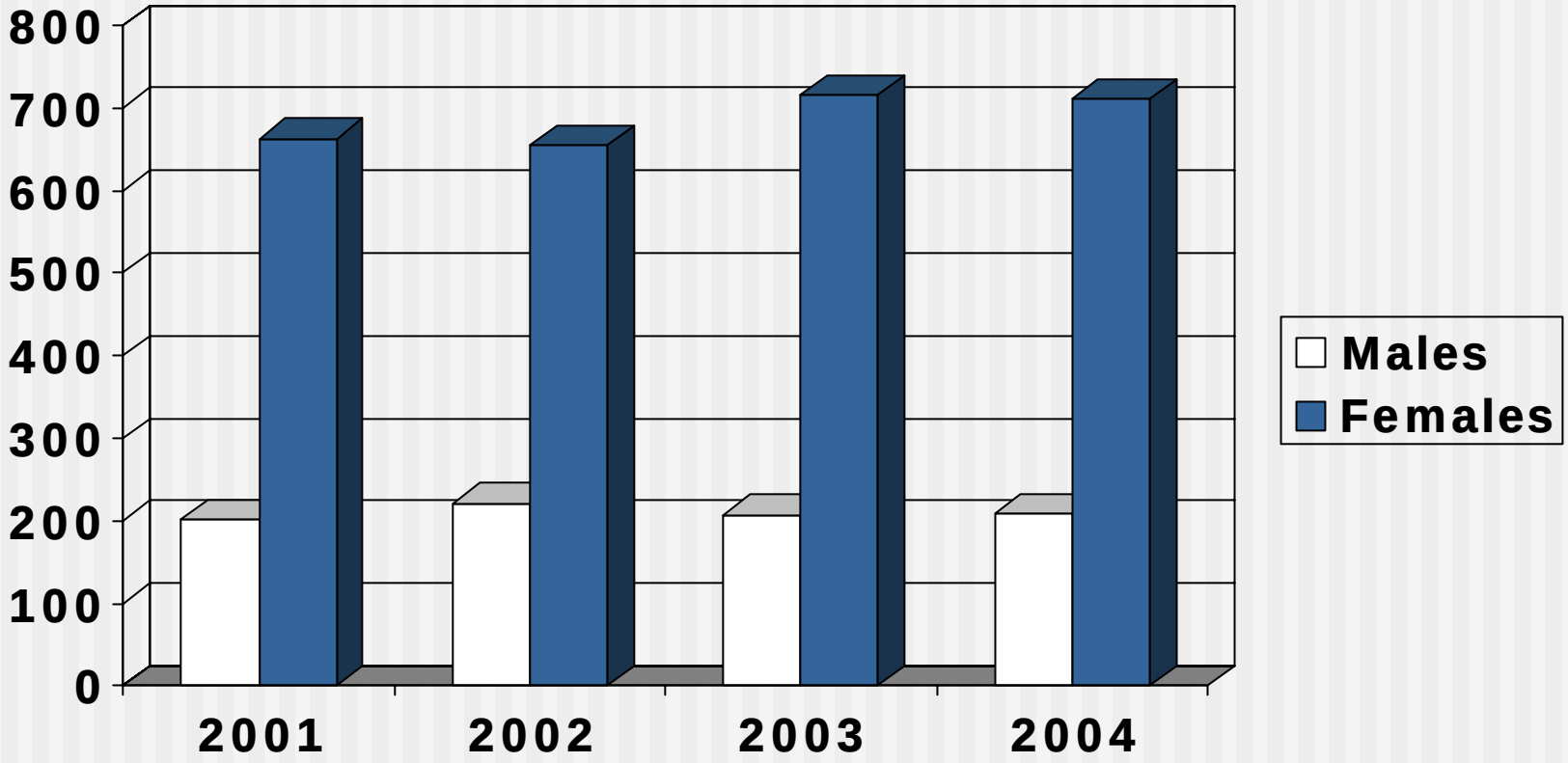
Adolescent Suicide Attempts in Oregon

- Approximately 920 Oregon youths, under the age of 17, attempted suicide in 2004 alone
  - This is the equivalent to approximately 5 attempts every two days
  - More girls attempt suicide than boys
  - More boys complete suicide than girls
- 31-50% of youth whose attempts warrant medical care will make another attempt
  - As many as 11% will eventually take their own lives

Gender and Adolescent Suicide



Gender and Suicide Attempts



Oregon Healthy Teen Data (YRBS - 2006)

- 10.7% of 8th graders and 11.9% of 11th graders surveyed reported that they seriously considered attempting suicide in the past year
- 5.4% of 8th graders and 5.2% of 11th graders reported they had attempted suicide at least once in the last year
  - 1.3% and 0.8% said they attempted suicide at least 4 or more times
- 1.3% of and 1.4% of the 8th and 11th graders who said they attempted suicide required medical care for the attempt

Oregon's Adolescent Suicide Attempt Data System

- In 1987, Oregon legislature passed a law mandating that:
  - Hospitals treating youths under the age of 18 for injuries resulting from suicide attempts must refer the patient to an appropriate community crisis intervention resource, and
  - Report the attempts to the Department of Human Services' Center for Health Statistics (CHS)
- The following year, the Oregon Adolescent Suicide Attempt Data System (ASADS) was established

Oregon's Adolescent Suicide Attempt Data System

- To prevent suicide, it is important to focus in on the population at risk and recognize the behaviors, warning signs and risk factors associated with suicide within that population
- ASADS is a unique surveillance system used to:
  - Monitor the magnitude of adolescent suicide attempts reported by Oregon hospital emergency departments
  - Gather information on possible trends and risk factors
- ASADS data are analyzed and evaluated to develop and focus suicide intervention/ prevention strategies and programs

System Description

- Non-funded legislative mandate
- Reporting takes place in a variety of locations which vary by hospital
  - Includes: medical records, billing, coding, behavioral health, social services, and in the ED itself
- Report forms are sent monthly to the ODHS Center for Health Statistics
- Not a registry; there are no patient names or personal identifiers included on the forms
  - Currently, no follow-up is possible at the state level

2007 Evaluation

- Based on the CDC's "Updated Guidelines for Evaluating Public Health Surveillance Systems"
- Based on 2004 data; 2005 database not available at time of evaluation
- Aims:
  1. Evaluate the completeness and quality of the information contained in the reports
  2. Determine the level of adolescent suicide attempt case reporting / case ascertainment
  3. Evaluate the consistency among hospitals in the reporting of cases despite the lack of a standard case definition for suicide attempts

Descriptive Analysis of 2004 ASADS Cases

- 964 unique cases reported to ASADS in 2004 (34 duplicate reports)
  - 504 were treated in ED and released
  - 460 admitted as inpatients or transferred to another facility
  - 84.6% Caucasian; 5.7% Hispanic; 2.8% African American; 1.1% Native American
  - 75% Female
  - 66% between the ages of 15 and 17; only 8 cases under the age of 10 (7 of which were male)

Descriptive Analysis

- Cases were reported from 54 of the 60 participating Oregon hospitals
- Methodology:
  - 63.4% Poisoning
  - 22% Cutting
  - 8% Suicidal Ideation only
  - 6.6% Other
- Approximately 39% had attempted suicide before; 43% reported no previous attempts
- 88% were referred for follow-up mental health care/crisis intervention services

Data Quality

- Reporting forms were 99.5% complete; 95.7% complete with informative data
  - Range 74% to 100%
  - Possible communication of suicidal plans was missing or recorded as unknown 26.2% of the time
  - 17.4% of the number of previous attempts was missing or unknown
  - Other notable variables missing informative data were:
    - place of attempt, 12.8%
    - composition of the youth's household, 7.9%
    - youth's history of mental illness, 6.4%

Representativeness

- There may be a large number of attempts that are not represented within this system – we have no information on these
  - Those that are not treated at all (i.e. less serious or interrupted attempts)
  - Those that are treated by family practitioners or other health care professionals without first presenting to an Oregon hospital
    - It is possible that youths living in small, more isolated, and/or rural areas may be somewhat underrepresented due to a lack of facilities

Sensitivity

- Difficult to measure how well ASADS is detecting all adolescent suicide attempts because there is not a standard case definition
  - Incidence of attempts in Oregon's adolescent community unknown
  - Many patients may be misdiagnosed as having attempted suicide or overlooked
- Can estimate level of ASADS case ascertainment from Oregon hospitals
  - Hook and Regal's two sample *Capture-Recapture Method* "attempts to estimate or adjust for the extent of incomplete ascertainment using information from overlapping lists of cases from distinct sources."

Capture-Recapture Analysis *Methods*

- Two source method:
  - ASADS
  - HDI (Hospital Discharge Index)
- All HDI records under the age of 18, with ICD-9 E-codes of 950-959 (suicide and self-inflicted injury) were extracted from the dataset for use in analysis
- HDI data consists of inpatient records only; analysis of ASADS cases limited to those that were admitted as inpatients or transferred to another facility
- ***Probabilistic matching*** techniques were used to match cases

Capture-Recapture Analysis *Results*

- A total of 210 matched pairs were obtained from the merged HDI/ASADS dataset

HDI Cases

ASADS Cases	Identified	Not Identified
Identified	210	246
Not Identified	84	98

Capture-Recapture Analysis *Results*

- Derived total number of *inpatient* adolescent suicide attempts presenting at Oregon hospital emergency departments was estimated at **638 cases**
  - 84 Cases were diagnosed as suicide attempts in Oregon ERs but not reported to ASADS
  - 246 cases were reported to ASADS but not officially diagnosed as suicide attempts in Oregon EDs
- Case detection rate = **71%**
  - 95% Confidence Interval (68%, 75%)

Characteristics of Reported and Unreported HDI Cases

Characteristic	Reported	Unreported
Gender (p=0.72)		
Male	69.7%	30.3%
Female	71.9%	28.1%
Age Group (p=0.85)		
0-10	66.7%	33.3%
11-14	74.0%	26.0%
15-17	70.6%	29.4%
Source of Admission (p=0.15)		
Physician Referral	70.8%	29.2%
Transfer from another facility	78.8%	21.2%
Emergency Room	69.1%	30.9%
Method of Attempt (p=0.27)		
Cut/Pierce	77.8%	22.2%
Poisoning	70.0%	30.0%
Suffocation (10 cases)	90.0%	10.0%
Firearm (1 case)	0%	100%
Other NEC (8 cases)	62%	38%

Capture-Recapture Analysis *Biases and Limitations*

- No standardized case definition or criterion for diagnosis of a suicide attempt
  - May lead hospitals to over or underreport cases to ASADS
  - Intent difficult to determine
    - i.e. 31 records in the HDI database have an E-code with an undetermined intent; 7 (22.5%) had matches in ASADS
- Some of the unreported HDI self-harm cases may not have had suicidal intent
- Probabilistic Matching - No personal identifiers to guarantee “true” matches
- Lack of E-codes in 32% of the adolescent HDI data

Positive Predictive Value

- Also impossible to measure the PPV and specificity due to the lack of universal case definition
- Issue of Intent: How is this measured? Some of the cases may be questionable in regards to intent, for example:
  - Can be difficult to determine whether youth in this dataset presenting to the ED due to a poisoning actually had a suicidal intent, or were using said drugs “recreationally”
  - Many of those that presented with wounds from cutting and piercing may not have been suicidal, but rather displaying self-mutilating cutting behavior as a means of coping with stress and emotional situations

Positive Predictive Value

Issue of Suicidal Ideation

- Third largest reported methodology category in the ASADS database
- Less than half of the hospitals (only 17 out of 54) report any cases that displayed *suicidal ideation only* to ASADS
- Two hospitals reported almost 60% (46) of the total SI cases, with another 15 hospitals responsible for the remaining 32 cases
  - These data imply a lack of consistency in what behaviors are reported by each hospital

Consistency in Reporting: ASADS Survey

- A survey was distributed to each Oregon hospital ASADS contact
  - 56 ASADS contacts (representing 59 hospitals)
    - Contact forwarded survey to person(s) who completes the forms (when necessary)
  - Consisted of 8 multiple choice questions regarding:
    - Who determines whether an act is a suicide attempt and who fills out the reporting form
    - Possible scenarios aimed at determining consistency in reporting behaviors to ASADS
    - Potential barriers to reporting to ASADS

ASADS Survey *Results*

- Who fills out the reporting form?
  - 3 (6.1%) Physicians
  - 8 (16.3%) Nurses/PAs/ER Techs
  - 3 (6.1%) Mental Health Professionals
  - 5 (10.2%) Social Workers
  - **31 (63.3%) Medical Records/Coders/Billing**
- Who determines which behaviors and/or cases are reported to ASADS?
  - 19 (38.8%) Physicians
  - 9 (18.4%) Nurses/PAs/ER Techs
  - 8 (16.3%) Mental Health Professionals
  - 8 (16.3%) Social Workers
  - **26 (53.1%) Med.Rec./Billing/Coders**

ASADS Survey *Results*

- Six different “self-harm” scenarios
  - Not complete agreement on any
  - Generally, 50-65% agreement on whether to report or not report a particular behavior
  - In all scenarios, approximately 15% of the contacts didn’t know whether or not the behavior should be reported to ASADS
    - Contacts in MR/Billing/Coding most likely to answer “don’t know”
- Lack of consistency in interpretation of suicide attempt cases creates a low level of internal validity within the surveillance system
  - Further exacerbated by the variety of people making these determinations

Acceptability

- Participation is compulsory
- Lack of personal identifiers and passive nature of the system makes it unobtrusive and participation easy
- No penalties for non-reporting, very few motivations for reporting
  - Many hospitals not involved in process, don't know what's done with the data or the value of reporting these events
- Some hesitancy to label acts as suicide attempts due to stigma attached
  - Issues with future insurance coverage, etc.
- Lack of funding for surveillance system may put strain on already limited resources

Acceptability – Barriers to Reporting

Issue	**Not a barrier**	**Mild barrier**	**Moderate barrier**	**Major barrier**
Too time consuming	31(63.3%)	12 (24.5%)	5 (10.2%)	1 (2.0%)
Not a priority	39 (79.6%)	9 (18.4%)	1 (2.0%)	0 (0%)
SA not clearly identified in chart	14 (28.6%)	**12 (24.5%)**	**17 (34.7%)**	**6 (12.2%)**
Required info not on chart	22 (44.9%)	**12 (24.5%)**	**10 (20.4%)**	**5 (10.2%)**
Confusion on what defines a SA	15 (30.6%)	**15 (30.6%)**	**14 (28.6%)**	**5 (10.2%)**
Concern about confidentiality	43 (87.8%)	2 (4.1%)	2 (4.1%)	2 (4.1%)
Unaware of legislative mandate	39 (79.6%)	4 (8.2%)	3 (6.1%)	3 (6.1%)
Other	56 (94.9%)	1 (1.7%)	2 (3.4%)	0 (0%)

Conclusions

- Suicide is preventable
  - ASADS aids in understanding the risk factors associated with suicide and suicide attempts
- Level of case ascertainment is good, but difficult to measure w/out case definition
  - Could be improved with clearer, standardized guidelines
- There is little consistency among hospitals as to what constitutes a suicide attempt
  - This confusion is the greatest barrier to reporting cases to ASADS

Recommendations

- Development of a standard reporting form and protocol to ensure consistent reporting among hospitals
  - Includes some sort of case definition or classification for suicide attempts
  - Describes the process of reporting, and who should report (encourage reporting by medical/mental health professionals only)
  - Ensure that protocol covers all adolescent hospital patients that present with suicidal issues, not just those in the ED or referred to inpatient behavioral health
- Establish some means of follow-up

Thank You!

Questions???

http://www.oregon.gov/DHS/ph/ipe/index.shtml
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Legislative Mandate

ORS 441.750 Suicide attempts by minors; referral; report; disclosure of information; limitation of liability. (1) Any hospital which treats as a patient a person under 18 years of age because the person has attempted to commit suicide:

(a) Shall cause that person to be provided with information and referral to in-patient or out-patient community resources, crisis intervention or other appropriate intervention by the patient's attending physician, hospital social work staff or other appropriate staff.

(b) Shall report statistical information to the Department of Human Services about the person described in this subsection but is not required to report the name of the person.

(2) Any disclosure authorized by this section or any unauthorized disclosure of information or communications made privileged and confidential by this section shall not in any way abridge or destroy the confidential or privileged character thereof except for the purposes for which any authorized disclosure is made. Any person making a disclosure authorized by this section shall not be liable therefore, notwithstanding any contrary provisions of law.

(3) No physician, hospital or hospital employee shall be held criminally or civilly liable for action pursuant to this section, provided the physician, hospital or hospital employee acts in good faith on probable cause and without malice. [1987 c.189 §1]

Note: 441.750 and 441.755 were enacted into law by the Legislative Assembly but were not added to or made a part of ORS chapter 441 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

441.755 Report form; contents. (1) The Department of Human Services shall prescribe a form to be used by hospitals to make the report required by ORS 441.750 (1)(b) and shall prescribe the frequency of such reports.

(2) The report form may include the name of the hospital reporting, the date of birth, race and sex of person described in subsection (1) of this section, the suicide method used by the person and known prior attempts in the past 12 months.

(3) The department shall compile the results from the reports and report the results to the public. [1987 c.189 §2]

The Situation in Oregon:

Adolescent Suicide by Year and Gender

Year	Males	Females	Total	Suicide rate per 100,000
1993	23	1	24	7.02
1994	11	10	21	6.01
1995	22	5	27	7.69
1996	18	5	23	6.42
1997	10	8	18	4.95
1998	14	4	18	4.73
1999	14	1	15	3.91
2000	12	5	17	4.35
2001	10	3	13	3.29
2002	9	4	13	3.25
2003	7	1	8	1.98
2004	7	3	10	2.44

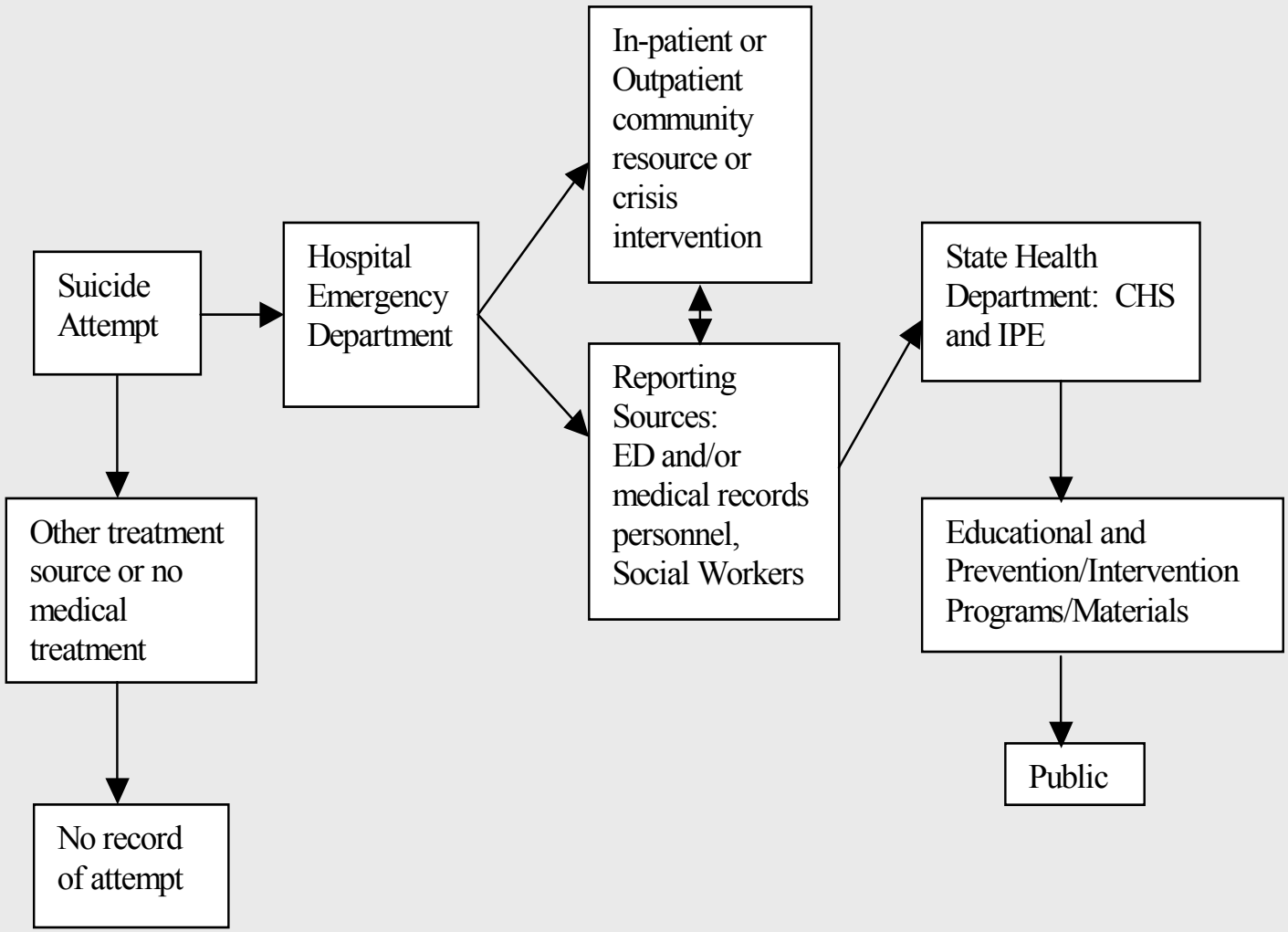
The Situation in Oregon:

Adolescent Suicide Attempts by Year and Gender

Year	Males	Females	Total	Attempt rate per 100,000
1993	*	*	723	211.6
1994	*	*	773	221.3
1995	150	603	753	214.4
1996	163	615	778	217.0
1997	151	585	736	202.4
1998	190	571	761	200.0
1999	180	558	738	192.4
2000	178	624	802	205.4
2001	202	663	865	219.2
2002	221	655	876	217.0
2003	207	715	922	226.5
2004	209	711	920	223.1

*Gender data not available

ASADS Flow Chart



Capture-Recapture Analysis *Computations*

$$\text{Total} = \frac{(N_A+1)(N_B+1)}{N_{AB}+1} - 1$$

$$\text{Total} = \frac{295 \times 457}{211} - 1 = \mathbf{638}$$

Case Detection Rate

456/638 = **0.71**

$$95\%\ CI = +/-1.96 * \sqrt{\left[\frac{246x84x(210+246+1)\ (210+84+1)}{(210+1)^2\ (210+2)}\right]}$$

95% CI = +/- 1.96 x 17.2 = **+/- 34**

The number of missing cases is: $N-(N_A+N_B-N_{AB})$

$638 - (456+294-210) = \mathbf{98}$

System Description

Information collected on form:

- Name of hospital
- County
- Date of attempt
- Place of attempt, inpatient/outpatient status
- Birthday
- Race
- Sex
- Residence
- living situation
- Method used
- Mental health history
- Number of previous attempts
- Precipitating events or risk factors
- Possible communication of suicidal plans
- Type of intervention referral – if any

ASADS Survey *Representativeness*

- 46 of the total 56 surveys were returned
  - Overall response rate of 82%
- Counties that have ASADS hospitals which are not represented in the survey:
  - Klamath
  - Malheur
  - Morrow
  - Wasco
- Counties that do not have ASADS hospitals:
  - Wheeler
  - Sherman
  - Gilliam
  - Columbia

ASADS Survey
Representativeness