



# Web-based Investigation of Recreational Water Related Illness at Saltwater Beaches

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# Water-Associated Illnesses

- Abundant evidence in the EPI literature
- Human activities, microbial contamination
- Pathogenic microorganisms in sewage, runoff
- Acute illnesses and health outcomes
- Various routes of exposure
- beaches highly visited -> # illnesses

# Overview

- Underreporting of Illnesses documented in literature and by public agencies
- Ways to Investigate Waterborne Illness
  - On-site Epi Studies (e.g. Cohort studies, Controlled Trials). Advantages/Disadvantages
  - Web-based surveys
- Our approach: analyze Surfrider web-based data; suggest revisions

# Advantages of Web Surveys

- Expands potential pool of participants.
- Can potentially reach a very high number of people who use the beach.
- Accessibility to geographically disparate populations
- Data collected into readily analyzable form. No manual data entry required.
- Reduced potential for human error in data collection
- Reduced costs – Don't need to hire telephone support

# Advantages of Web Surveys

- Flexibility: Survey is iterative: can customize or modify the survey form
- Impacts on Intervention: quick turnaround time can be used to alert public health officials of a pending problem.

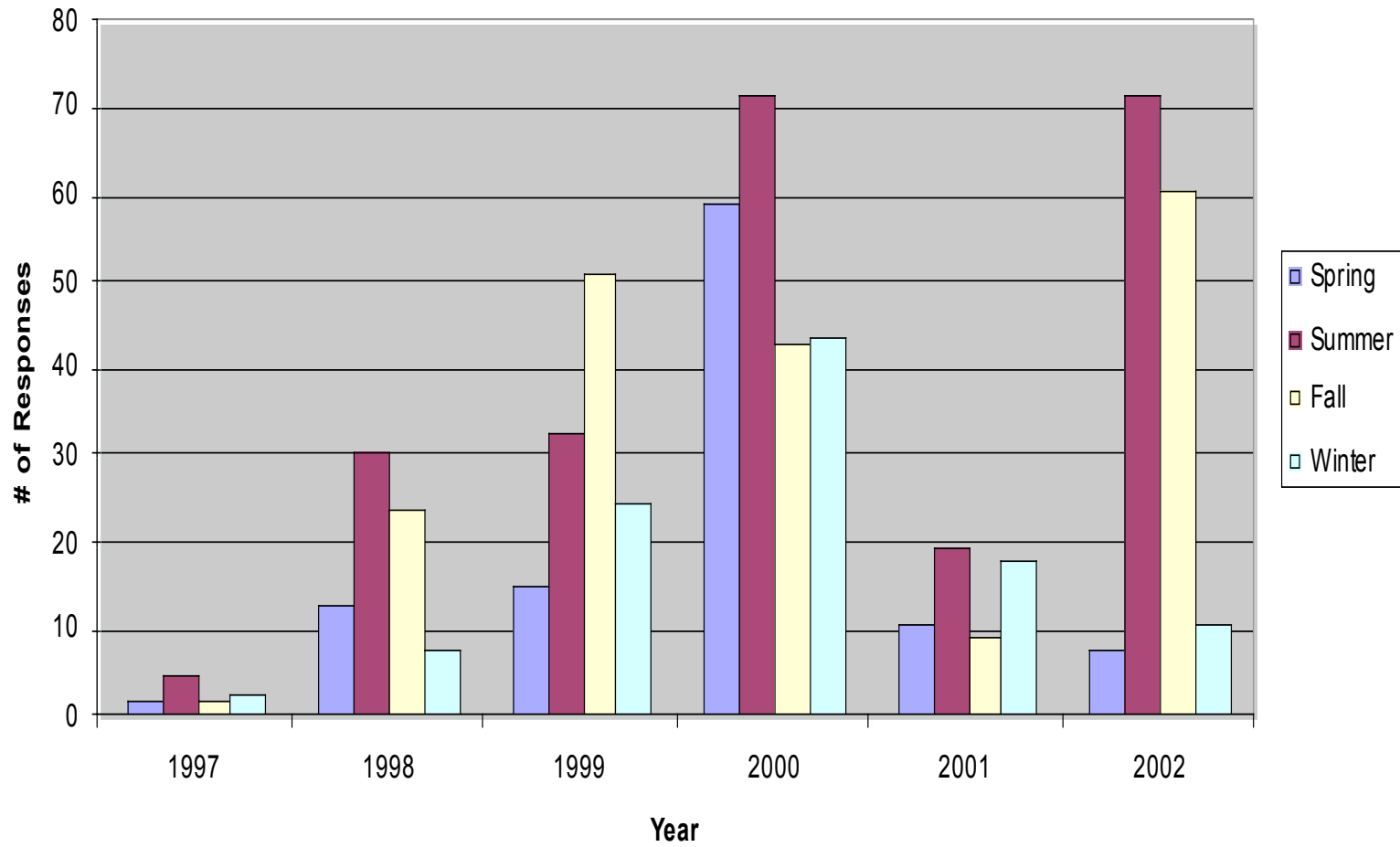
# METHODS: Surfrider Web Based Data 1997-2002

- Internet based, retrospective design
- Recruitment methods – Self-selection by website visitation
- Assess demographic characteristics (e.g. age)
- Subjects asked to describe illness symptoms experienced.
- Severity of symptoms (doctor seen yes or no)
- Other questions (onset of symptoms, duration, physician prognosis)

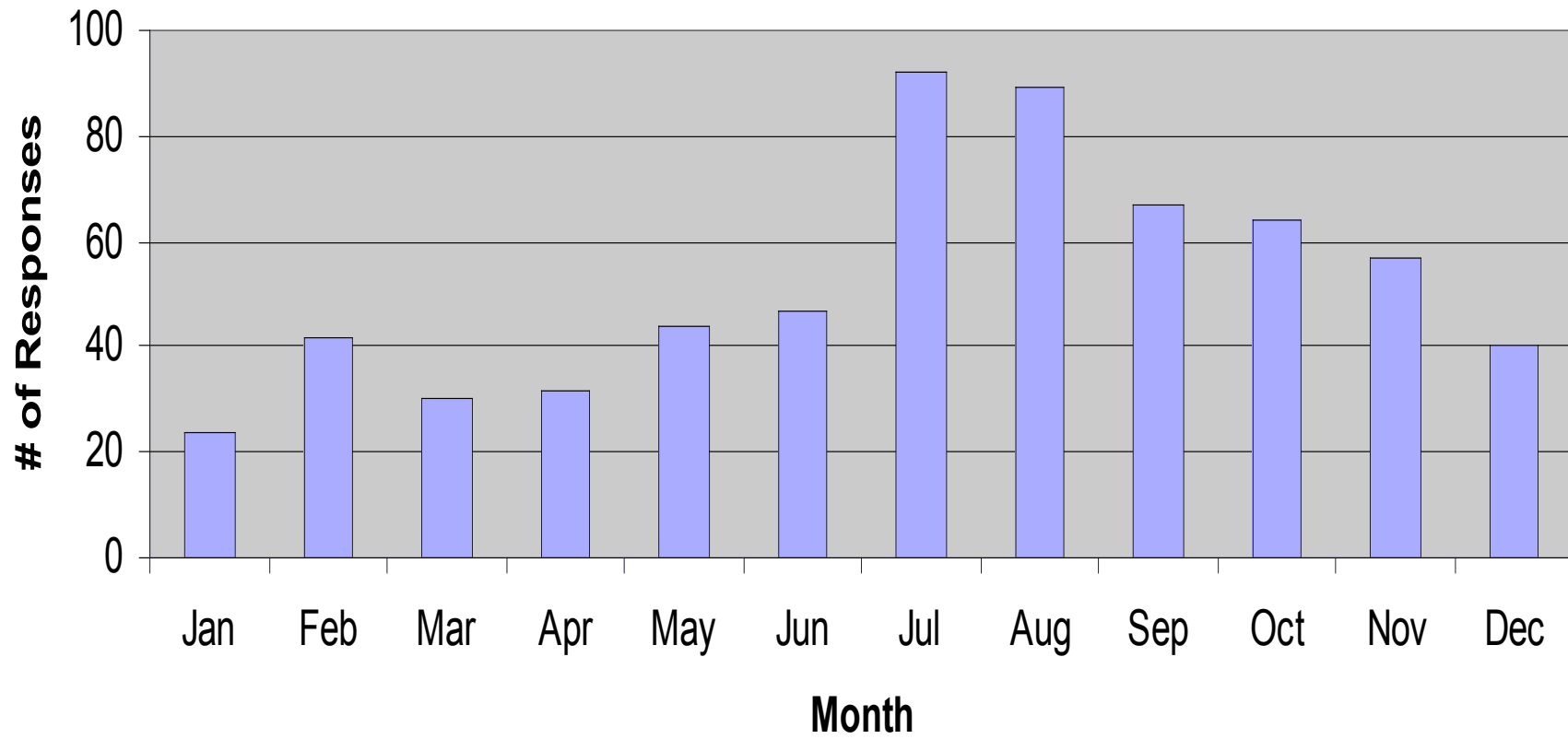
# Methods

- Analyze data (1997-2002)
- Categorize illness responses by symptoms
- Data Analysis
  - Descriptive Statistics
  - Bivariate analytical methods (t-tests)
  - Multivariate methods. Logistic Regression: determine which symptoms were significant predictors of likelihood to see a doctor

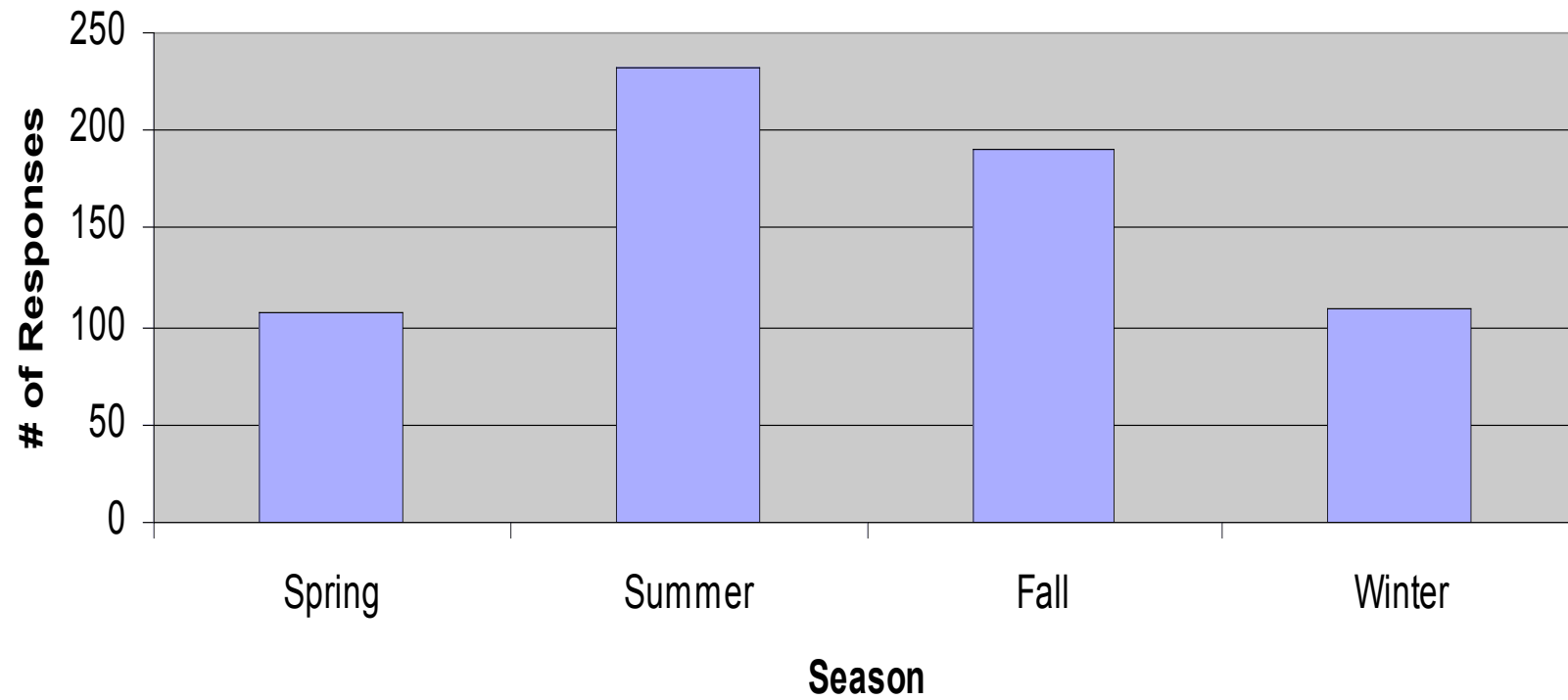
Distribution of Responses by Season (Yearly Comparison)



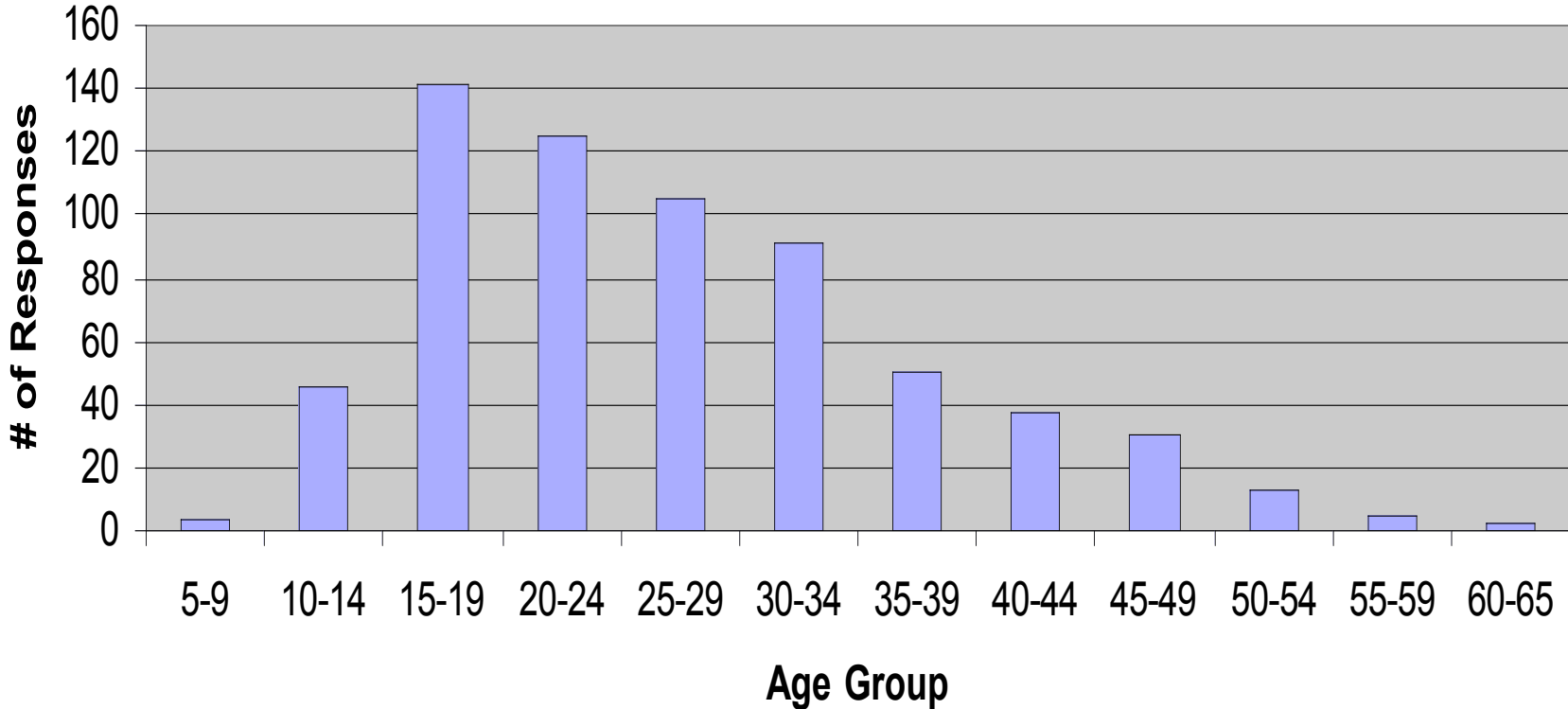
## Response Distribution by Month



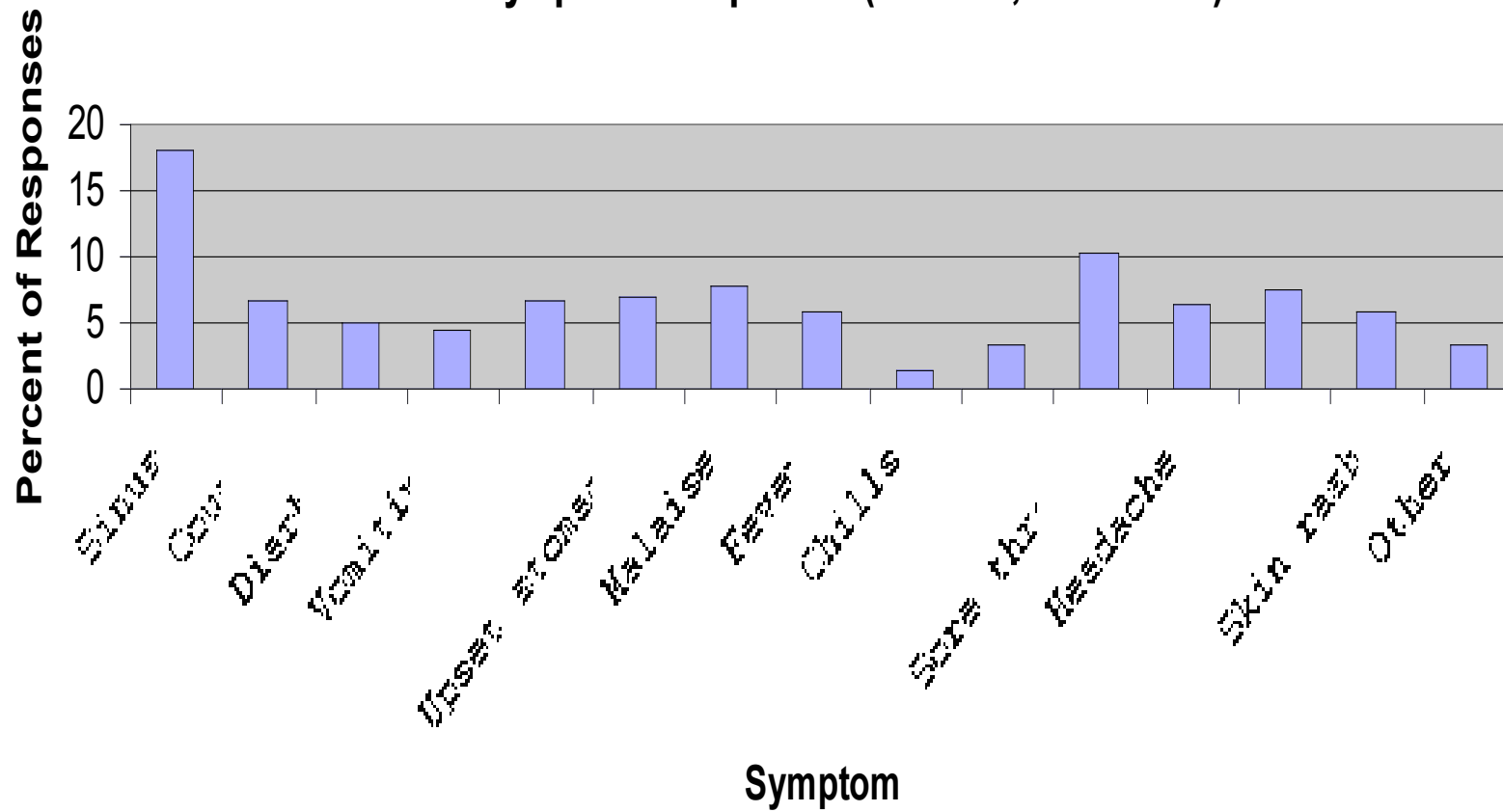
## Seasonal Distribution



### Age Distribution of Respondents (N-647)



## Percent of Symptoms Reported (N=1407, 659 cases)



# Results/Discussion

- Responses from more than 20 countries.
- ~95% of responses from U.S. Less from Australia, UK, Canada.
- At least one country from every continent represented.
- Wide range of symptoms (gastrointestinal, upper respiratory, infections of the eyes, ears, and skin; more severe symptoms)
- Mean age of Respondents ~ 26 yrs. Range: 5 by proxy-65.
- The total number of illness reports increased yearly, with the exception of 2001

# Results/Discussion

- Health Outcomes representative of range of symptoms reported in literature.
- Sinus infections, other upper respiratory symptoms most commonly reported (18%).
- Independent samples t-test: Total # of symptoms negatively assoc. w/ likelihood to see a doctor ( $p < .05$ ). Mean  $\sim 2.1$ .
- Age negatively associated w/ likelihood to see a doctor.
- Regression: Most symptoms were not significant predictors of likelihood to see a doctor. Only certain severe symptoms, such as high fevers, complaints of swollen glands, problems with the lymph nodes, and infection wounds that did not heal properly, predictive of doctor visit ( $\beta = .473$ ,  $t = .098$ ,  $p < .05$ ).
- Web Design Changed
- Open Ended Questions

# Limitations/Significance

- Limitations: Internet users may not be representative of population as a whole
- Potential for self-selection bias, recall bias
- Difficult to assess response rates
- Nevertheless, web surveys can be used to supplement epi studies, improve disease surveillance.

# Surfrider Foundation Illness Report Form

<http://www.surfrider.org/oceanillness.asp>

# Conclusions/Future Directions

- Results of Web-based surveys can help corroborate results of previous EPI studies and simulation models
- Despite limitations, methodology is useful for disease surveillance
- Future work based on Surfrider web-based data
  - Survey development
  - Direction of future collaborative research