



# Use of Data from Epidemiologic Studies of Pain

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## Introduction

Epidemiologic studies are an important method for understanding the burden of pain. All epidemiologic studies should strive for internal and external validity. Internal validity exists if the estimates drawn from the study population are free of confounding and bias. External validity exists if the results can be appropriately applied to a separate population. Pain is commonly experienced but difficult to measure well. Direct measures of pain rely on the subjective report of the patients. Indirect measures of pain often rely on medication consumption or other easily confounded variables. This chapter will briefly discuss the difficulties in using data from epidemiologic studies of pain, and some features of high-quality research.

## Language and Culture

Use of data from epidemiologic studies of chronic pain is complicated by subjectivity, differences in the experience of pain between subject groups, and historical changes in the detection and classification of chronic pain. No objective, direct means of measuring pain exists, and studies fre-

quently depend on the subjective report of patients. Investigators and clinicians must carefully examine any study using subjective or patient-reported outcomes that they wish to reference, since the validity of these studies is more vulnerable than studies measuring objective physiologic endpoints [1]. Differences in culture experience and the language used to describe pain also threaten the validity of subjectively measured outcomes, even those based on previously validated surveys or questionnaires [2]. A modest body of work exists in the chronic pain literature dedicated solely to culture and linguistic cross-validation of pain assessments.

## Data Sources and Coding

Retrospective and administrative studies of pain are a valuable source of information for the investigator, but they are limited by historical problems with the recognition and reporting of chronic pain. Significant progress has been made in the last few years towards creating uniform standards for the assessment of pain and the diagnosis of chronic pain conditions. Older data relating to chronic pain patients often suffers from non-uniformity and non-specificity, particularly

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when compared to current definitions [3]. The Ninth Revision of the International Classification of Diseases (ICD-9) has been widely used for administrative studies, but contains few codes relating to specific pain diagnoses, compared to a far wider and more specific selection available since the adoption of ICD-10 in the United States in 2015. In addition, more widespread clinical awareness of pain syndromes has improved detection and diagnosis rates, implying historical underestimation in the prevalence and incidence of pain [4].

## Underlying Biology

Differences in subjective experience reflect physiological as well as cultural variation and measurement error. For example, there are clear gender differences in the prevalence and reported threshold and intensity of pain [4]. Some studies make use of opioid or other pain medication consumption in order to provide objective data for analysis, however, these methods are also subject to issues with validity because of their indirect nature, metabolic variation, and documented inconsistencies in the calculation of opioid equianalgesic doses [5]. When comparing and utilizing studies of pain, it is important to consider whether the data is biologically applicable.

### High Yield Points

- The subjective nature of most pain data can make utilization difficult.
- High-quality pain assessments exist, but it is important to consider whether they apply to the population of interest.
- Older retrospective and administrative pain studies may underestimate or misclassify pain.
- Subjective differences sometimes reflect biology, such as in gender differences in pain.
- Indirect measures of pain such as opioid consumption should be scrutinized carefully.

## Questions

1. A physician compares two studies drawn from the same population reporting the prevalence of pain. One study is from 2004 and is based on chart review, and the other is from 2016 and is based on ICD-10 codes. The investigator notes a modest increase in the prevalence of several pain syndromes in the newer study. This is most likely attributable to:
  - A. Increased sensitivity of ICD-10 codes for certain pain diagnoses
  - B. True increases in chronic pain in the population of interest
  - C. Increased physician diagnosis of pain syndromes
  - D. All of the above
 Answer: D
2. Which of the following is LEAST likely attributable to error or bias in epidemiologic studies of pain?
  - A. Gender differences in reported pain thresholds
  - B. Differences in pain scores when the same pain questionnaire is applied to subjects from two different countries
  - C. Changes in prevalence of pain syndromes over time based on administrative data
  - D. Differences between studies using non-validated questionnaires
 Answer: A
3. A study was performed to evaluate a new method for identifying chronic pain patients in a primary care setting. (3) The electronic medical records of 38,520 primary care patients were screened for reported pain scores. The authors examined whether a pain scores, opioid prescriptions, or ICD-9 codes were most sensitive for diagnosing chronic pain syndromes. The presence of which of the following combinations is likely MOST sensitive for detecting chronic pain?
  - A. ICD-9 codes for chronic pain syndromes
  - B. 90 days or more of an opioid analgesic medication during the measurement year
  - C. A or B
  - D. A and B
 Answer: C

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