

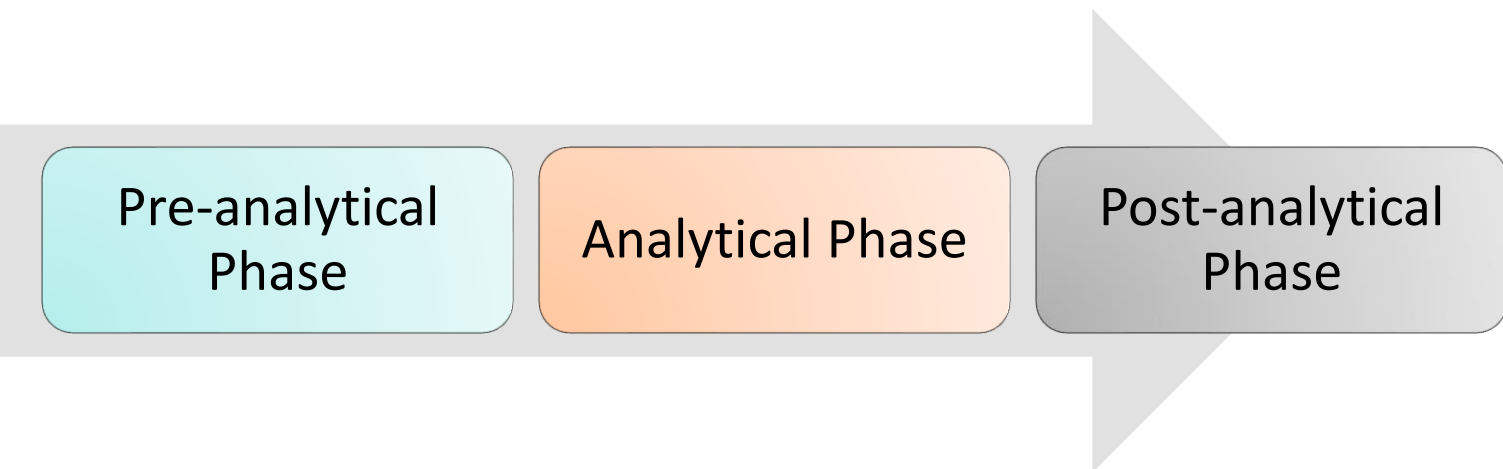
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## Abstract

- Introduction**
- Pre-analytical errors account for 70% of all laboratory testing errors.
  - Minimizing pre-analytical errors is crucial as laboratory test results influence 60-70% of clinical decisions.
- Methods**
- PubMed, MEDLINE, and Google Scholar were searched for English peer-reviewed studies (2000-2024) on pre-analytical errors' prevalence or cost.
  - A narrative review of the findings was conducted.
- Results**
- 744 abstracts/titles were screened, with 21 articles included (13 on prevalence, 8 on costs).
  - Pre-analytical errors' costs can represent up to 1.2% of hospital operating costs.
- Conclusions**
- The prevalence and costs of pre-analytical errors vary significantly across studies.
  - Pre-analytical errors impose a substantial financial burden.

## Introduction

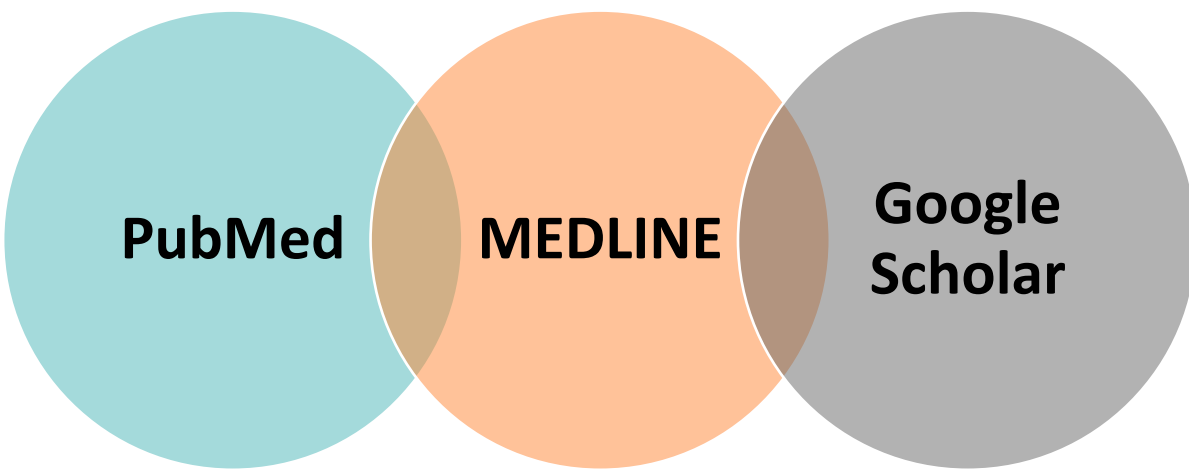
- Laboratory testing is an essential tool in clinical practice for diagnosis and treatment.
- It is estimated that **laboratory test results influence 60-70% of all clinical decisions**.
- Ensuring the accuracy of laboratory test results and minimizing errors is critically important.
- The laboratory testing process consists of three phases:



- A considerable number of **errors occur during the pre-analytical phase**.
  - Our narrative review has the following objectives:**
- Provide an overview of the frequency of pre-analytical errors in laboratory settings as documented in existing research.
  - Provide an overview of the evidence regarding the costs associated with pre-analytical errors.

## Methods

- A **structured narrative review** was conducted to synthesize the current evidence on the prevalence and economic impact of pre-analytical errors.
- A comprehensive search of three electronic databases was performed:



- The search strategy included combinations of keywords such as:
- "Pre-analytical Errors"
  - "Laboratory Testing"
  - "Specimen Rejection"
  - "Laboratory Quality"
  - "Error Cost"
  - "Economic Impact"
  - "Healthcare Costs"

- Inclusion criteria were:
- Original studies reporting data on the prevalence of pre-analytical errors.
  - Original studies quantifying the direct or indirect costs of pre-analytical errors.
  - Studies focused on hospital, outpatient, or clinical laboratory settings.

Editorials, opinion pieces, non-English articles, and studies without clear data on pre-analytical errors prevalence or associated costs were excluded.

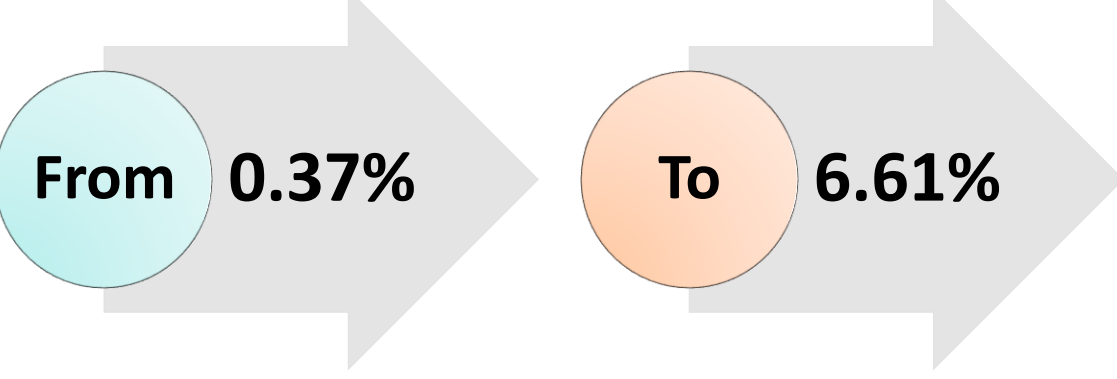
- Titles and abstracts of 744 records published between 2000 and 2024 were initially screened.
- After applying the inclusion and exclusion criteria:



## Results

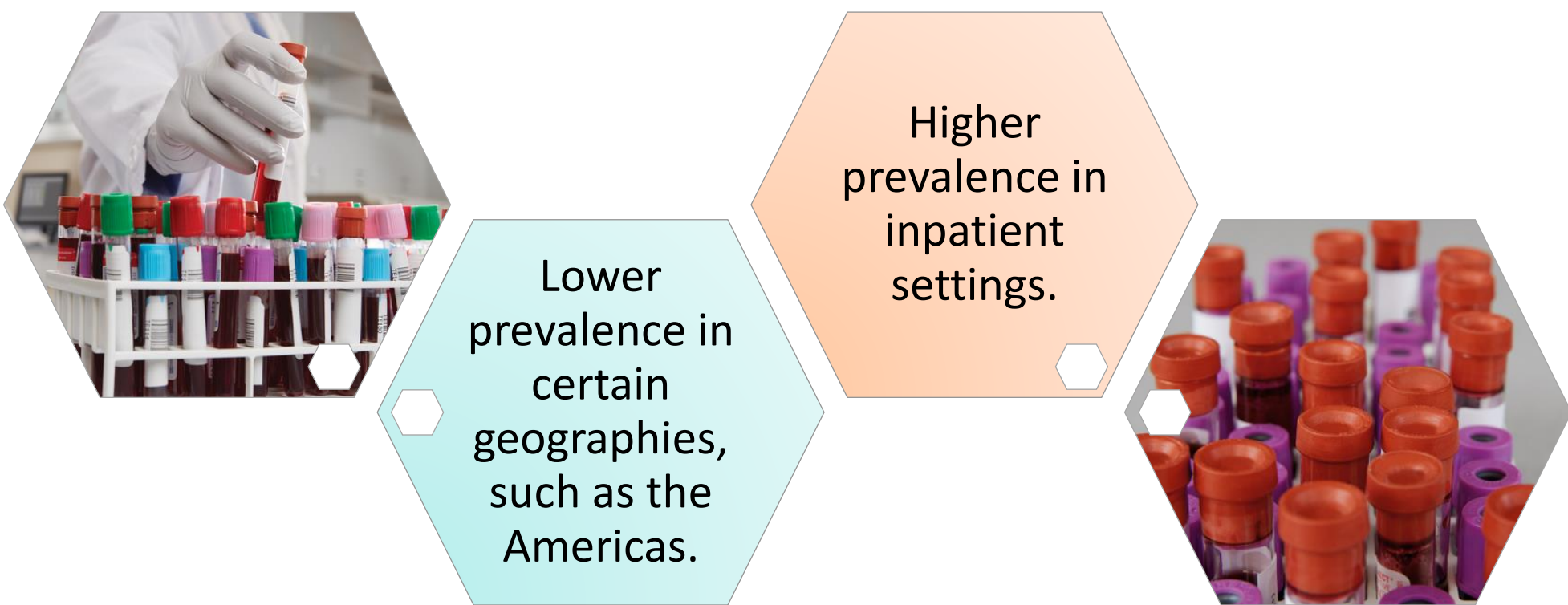
### Pre-analytical errors prevalence

- The prevalence of pre-analytical errors varies significantly across studies due to differences in study settings and measurement methods:



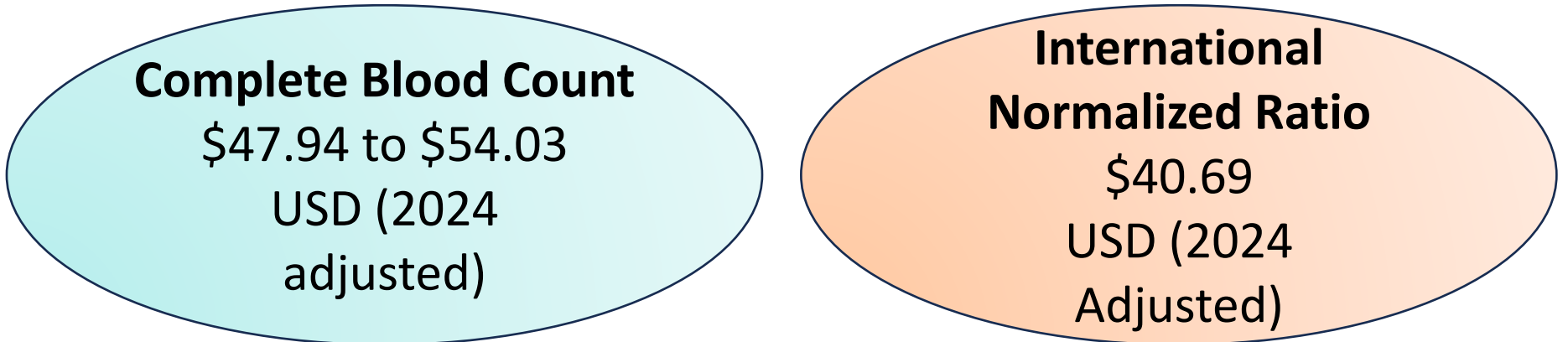
of all samples rejected due to pre-analytical errors.

- The prevalence of pre-analytical errors varies based on **sample settings** and **geographic location**.



### Pre-analytical errors direct costs

- The direct costs associated with pre-analytical errors are significant.
- The cost of a single sample impacted by pre-analytical errors can vary based on the specific test, for instance:

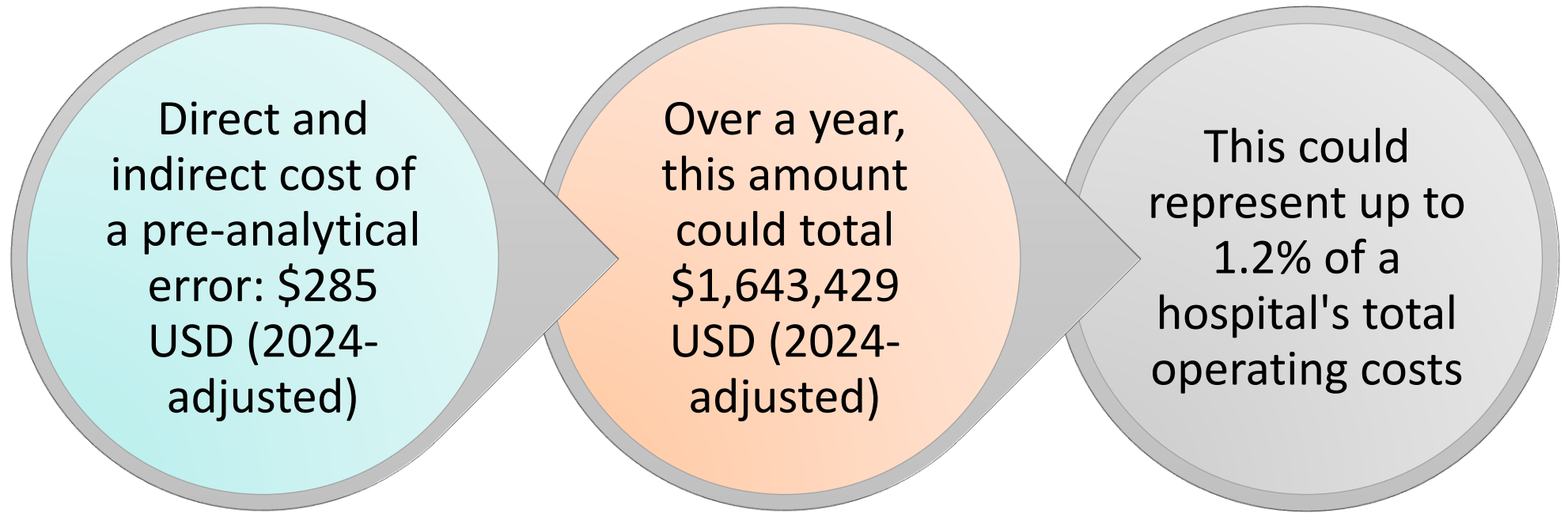


Direct costs of pre-analytical errors can lead to significant annual expenses, varying by error type, test, and sample setting, potentially amounting to:

Error Type / Test / Setting	Annual Direct Costs
Non-order-entry error / International Normalized Ratio / Inpatient adult	\$54,737 USD (2024-adjusted)
All / Complete Blood Count / Inpatient adult	\$62,286 USD (2024-adjusted)
All/ All / Inpatient adult and outpatient	\$103,427 USD (2024-adjusted)
All/ All / Inpatient pediatric	\$114,754 USD (2024-adjusted)

### Pre-analytical errors indirect costs

- Indirect costs of pre-analytical errors include delays in diagnosis or treatment, which can **prolong patient care or extend hospital stays**.



- Pre-analytical errors directly impact laboratory costs, mainly due to the time and effort required from personnel.

## Conclusions

- Pre-analytical errors constitute the majority of all laboratory errors.
- Pre-analytical errors are widely discussed, but varying prevalence reports make it hard to determine their true magnitude.
- Few studies have quantified the financial impact of pre-analytical errors.
- Awareness of the costs associated with pre-analytical errors has only recently increased.
- Systematic research on the financial implications of pre-analytical errors remains notably scarce.
- Although few studies report the costs of pre-analytical errors, it is clear that they impose a significant financial burden.
- Pre-analytical errors increase costs through personnel time and effort. Reducing them can yield significant savings, especially with rising labor shortages and wages.

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