DIVERTICULITIS IN THE UNITED STATES

A DECADE ANALYSIS OF CHANGING TRENDS

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Acknowledgements

- No financial disclosures.

- No conflicts of interest.

- No funding was received for this work.

Introduction

- Diverticulitis is a common and complex health care problem in the United States.

- Diverticulitis accounts for almost one-third of all colorectal resections.
  - At least 300,000 inpatient admissions.
  - 1.5 million days of inpatient care.
  - $2.6 billion US dollars per year.

- Considerable shift towards a higher threshold for surgical intervention and increasing use of minimally invasive percutaneous and surgical techniques in treatment.

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Objectives

1. To assess the decade-long national trends in admissions and procedural treatment of diverticulitis.

2. To compare the outcomes and trends of procedure-based treatment of diverticulitis between:
   – Young (<45 years).
   – Middle-aged (46-65 years).
   – Elderly (≥66 years) populations.

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Methods - Study Design

- Healthcare Cost and Utilization Project Nationwide Inpatient Sample (NIS) database

- Inclusion criteria
  - All patients with diverticulitis that were admitted and treated in the United States
  - January 1st 2002 to December 31st 2012

- Exclusion criteria:
  - Younger than 18 years old.
  - Length of stay of zero days.
  - Diagnosis of colon or rectal cancer.
  - Missing or incomplete data.
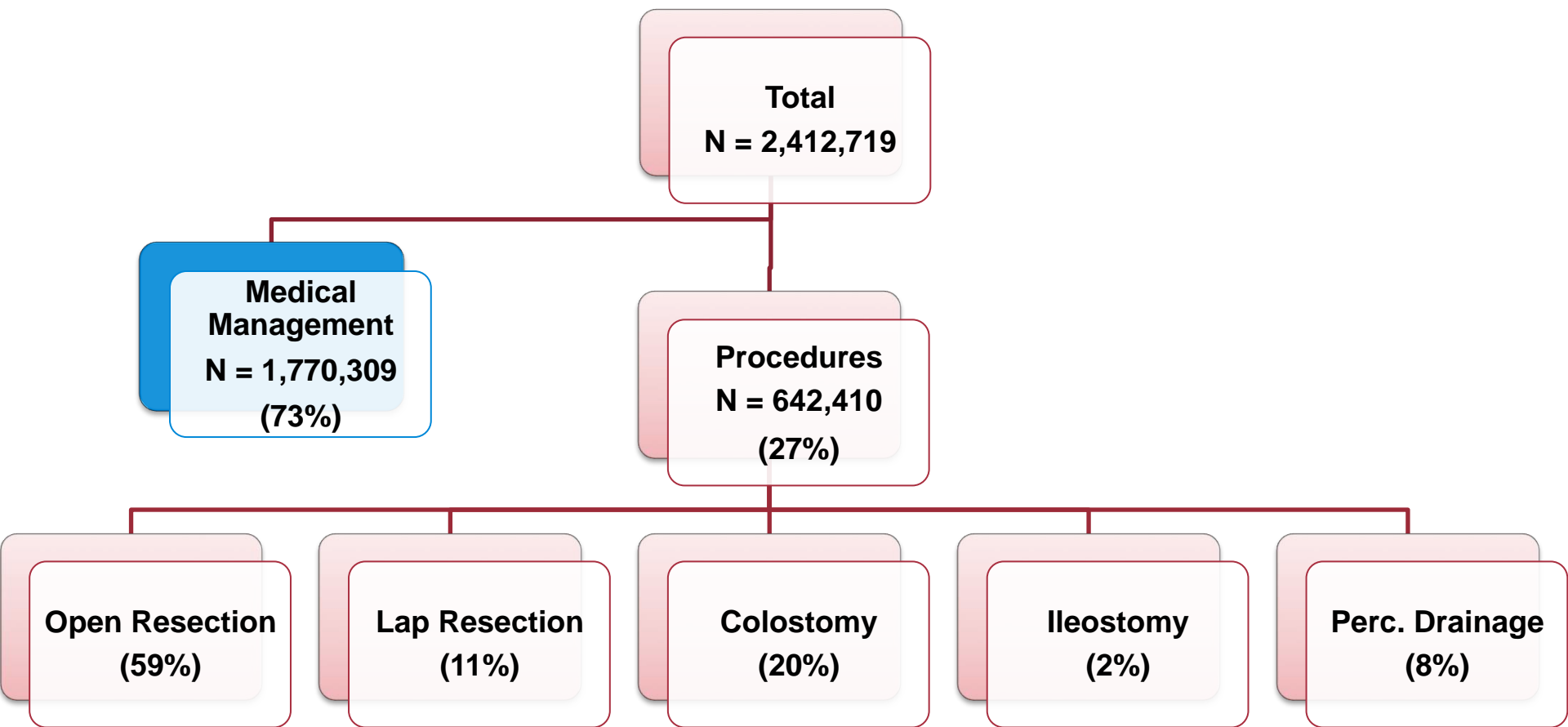
Methods - Endpoints

- Primary Endpoints:
  - Inpatient Mortality.
  - Length of stay.
  - Hospital Charges.

- Secondary Endpoints:
  - Type of intervention.

- To consolidate the impact of age on type of intervention and outcomes we stratified our analyses into 3 groups:
  - Young.
  - Middle-aged.
  - Elderly populations.

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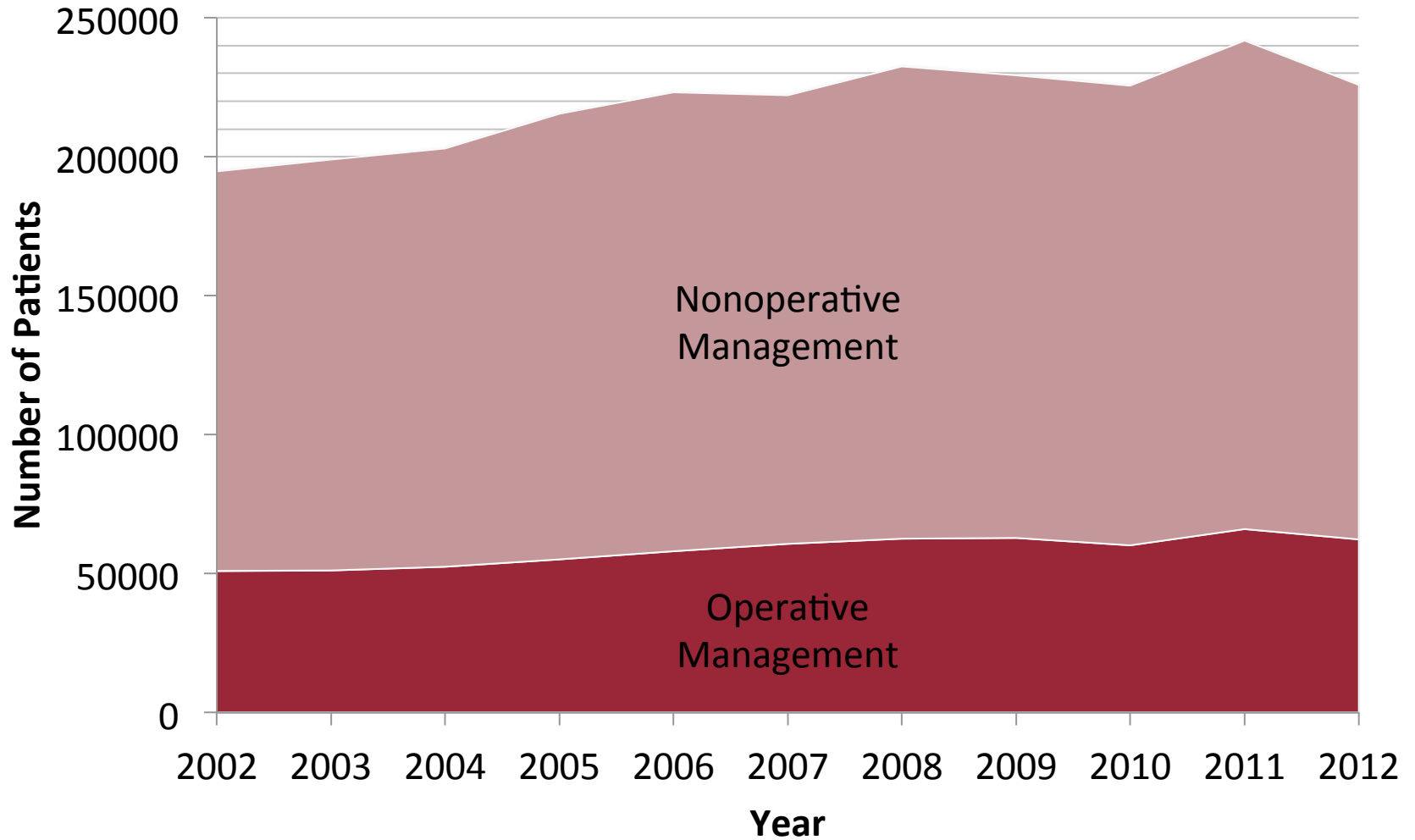School of Medicine

Methods – Statistical Analysis

- Statistical Analysis:
  - SAS and R statistical programs.
  - Statistical significance when $P<0.05$.

- Multivariate Analysis:
  - Age.
  - Gender.
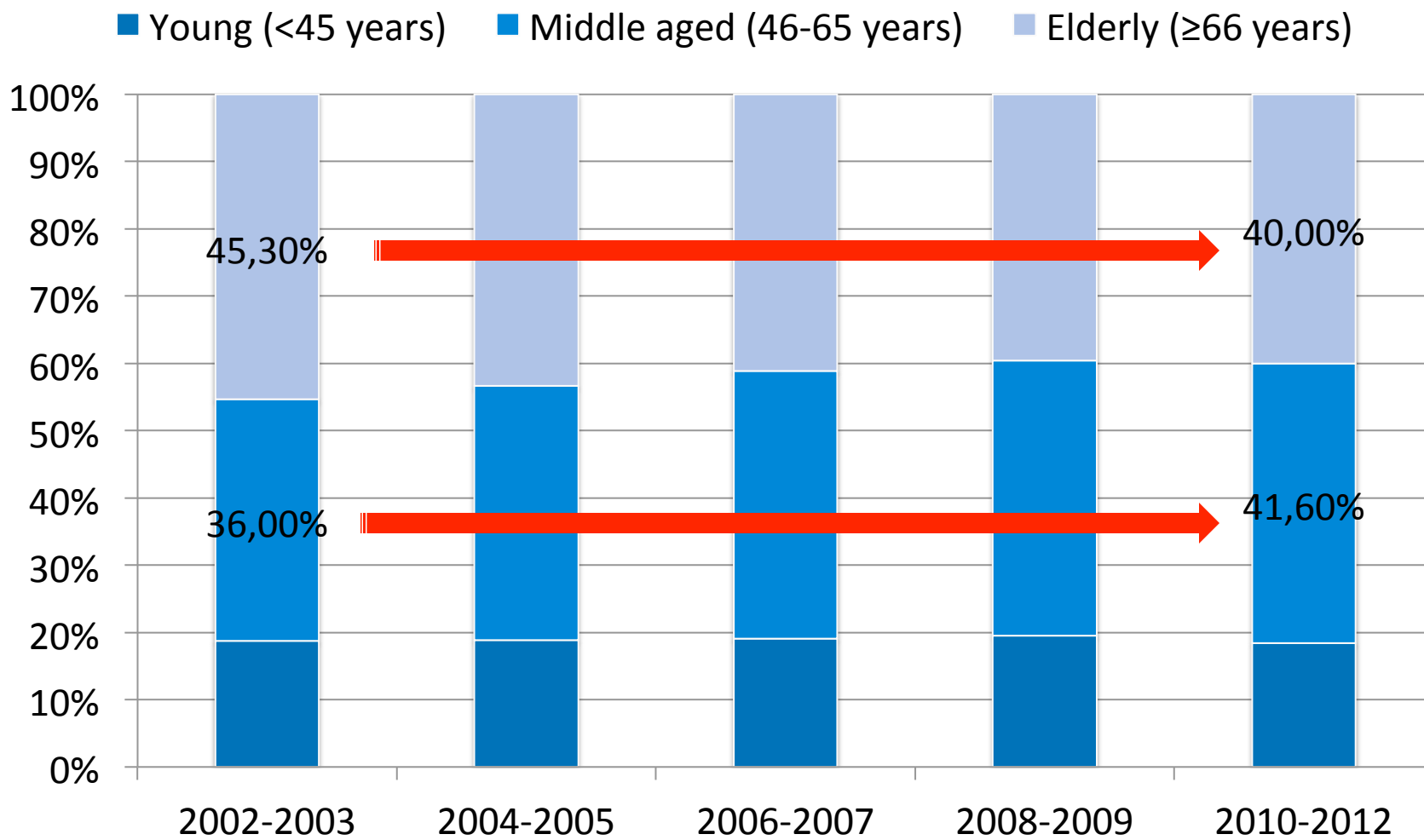 - Type of procedure.
  - Type of admission.
  - Comorbidities.

Results – Management of Diverticulitis

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                          ┌─────────────────────┐
                          │       Total         │
                          │  N = 2,412,719      │
                          └─────────────────────┘
                                    │
        ┌───────────────────────────┴─────────┐
┌─────────────────────┐          ┌─────────────────────┐
│ Medical             │          │     Procedures      │
│ Management          │          │   N = 642,410       │
│ N = 1,770,309       │          │      (27%)          │
│      (73%)          │          └─────────────────────┘
└─────────────────────┘                    │
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Open Resection (59%)	Lap Resection (11%)	Colostomy (20%)	Ileostomy (2%)	Perc. Drainage (8%)

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Results – Management of Diverticulitis

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Results – Trends in Age of Patients Admitted for Diverticulitis

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Results – Trends in Intervention for Diverticulitis

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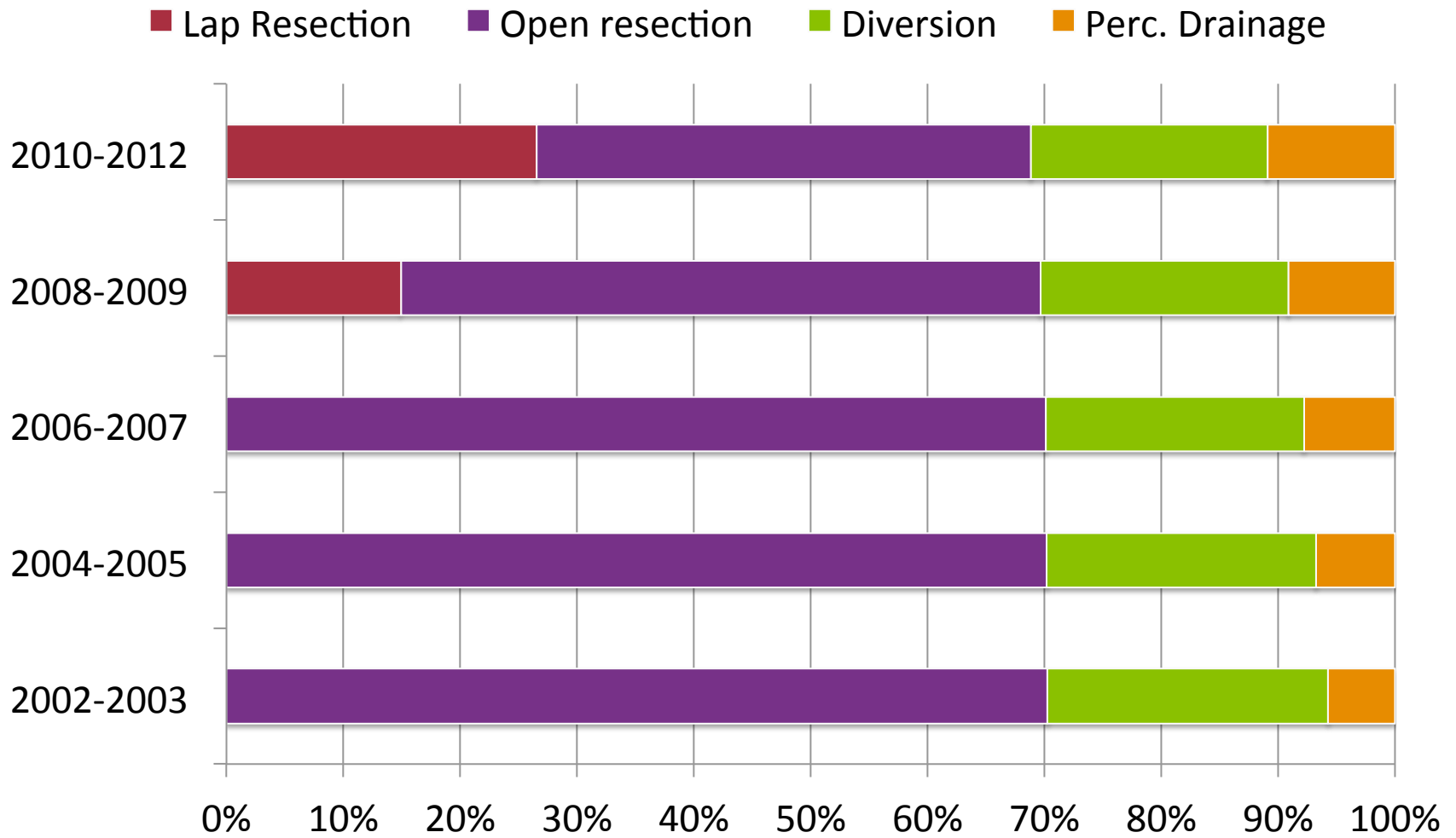
Results – Outcomes: Middle-aged vs. Young

Variable	Adjusted Mean Difference / AOR	P-value
Elective admission	1.339	<0.01
Intervention		
Laparoscopic Resection	0.86	<0.01
Open resection	1.13	<0.01
Colostomy	1.23	<0.01
Ileostomy	1.22	<0.01
Percutaneous abscess drainage	0.89	<0.01
Hospital Care		
Length of Stay	1 day	<0.01
Charges ($)	$1,742.72	<0.01
Inpatient Mortality	2.44	<0.01

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Results – Outcomes: Elderly vs. Young

Variable	Adjusted Mean Difference / AOR	P-value
Elective admission	1.191	<0.01
Intervention		
Laparoscopic Resection	0.70	<0.01
Open resection	1.29	<0.01
Colostomy	1.56	<0.01
Ileostomy	1.64	<0.01
Percutaneous abscess drainage	0.75	<0.01
Hospital Care		
Length of Stay	1 day	<0.01
Charges ($)	$11,849.21	<0.01
Inpatient Mortality	14.34	<0.01

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Limitations

- Retrospective observational study.

- Lack of detailed clinical endpoints.

- Patient selection bias.

- Coding errors.

- Lack of long term outcomes.

Conclusions

- The rate of admission for acute diverticulitis rose 20% over the past decade.
  - The need for surgical intervention has remained steady at ~25%.

- Overall inhospital mortality (1%) and length of stay (6 days) have decreased significantly.

- Middle-aged and elderly patients
  - More likely to receive an open resection or colostomy .
  - At least a two-fold increase in mortality.