Can we utilize hospital-based data to improve the performance of CRC screening?

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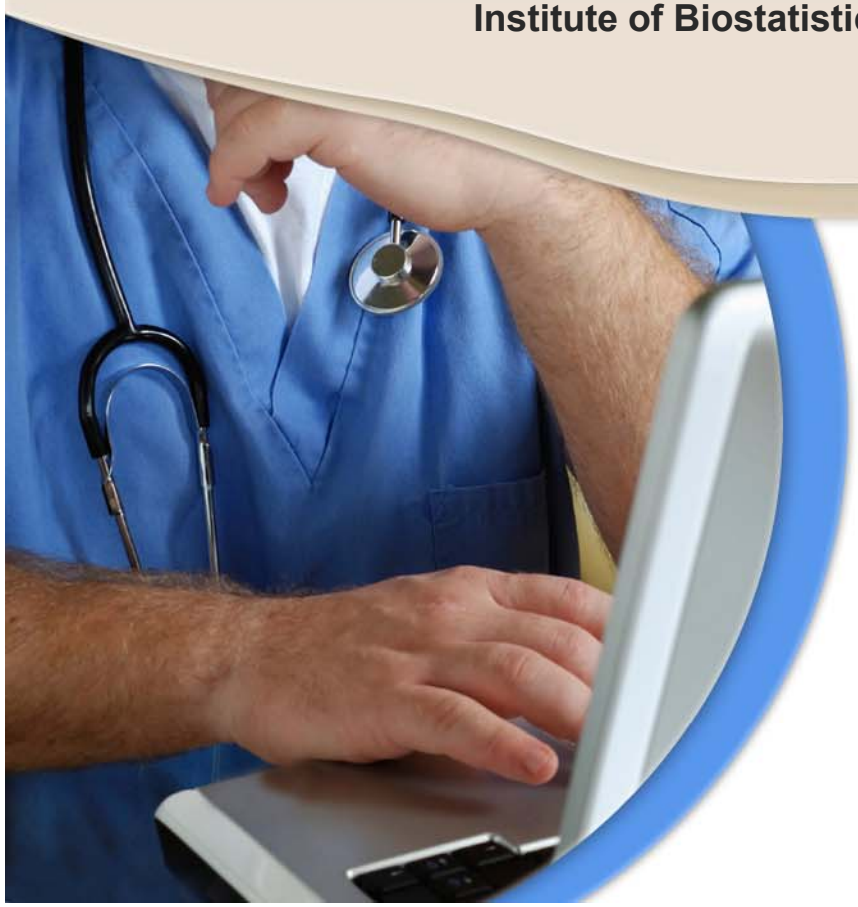

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Institute of Biostatistics and Analyses, Masaryk University, Brno

Sources of data

- Administrative data
  - billing, scheduling, ordering services, ...
- Clinical database
  - record repository
  - narrative text
- Registry
  - database for specific research purpose
  - observational research

- Advantages
  - large samples of geographically dispersed patients
  - assemble longitudinal reports
  - data are already collected (inexpensive)
- Disadvantages
  - lacks specificity or sensitivity for identifying medical conditions

Logan & Lieberman, 2010

Review of using administrative data in colonoscopy monitoring

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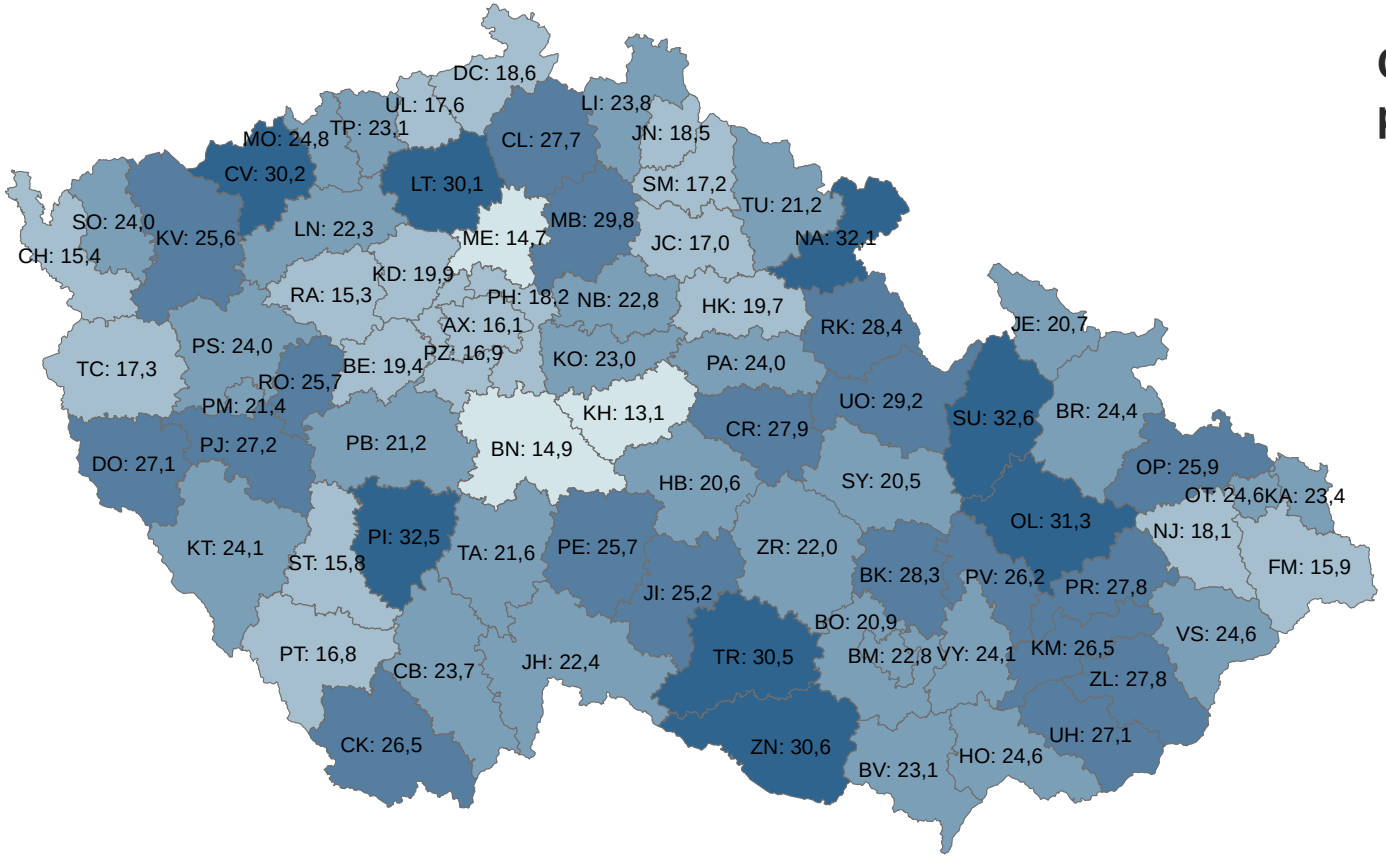
Use of colonoscopy

- **Effect of Medicare Coverage on Use of Invasive Colorectal Cancer Screening Tests** – Ko et al, 2002
  - Source: Administrative data
  - Outcome measure: percentage receiving test
- **Data Sources for Measuring Colorectal Endoscopy Use Among Medicare Enrollees –** Schenck et al, 2007
  - Source: Administrative, EMR, survey
  - Outcome measure: percentage receiving test
- **Trends in Colorectal Cancer Testing Among Medicare Subpopulations –** Fenton et al, 2008
  - Source: Administrative data
  - Outcome measure: percentage receiving test

Example: CRC screening coverage in the Czech Republic

Individuals over 50

(2009-2010, N = 862,526 FOBTs (NRC))



Total coverage (2009-2010): 22.7 % (range in districts: 13.1-32.6 %)

Quality of colonoscopy

- **Specialty Differences in Polyp Detection, Removal, and Biopsy during Colonoscopy** – Ko et al, 2002
  - Source: Administrative data
  - Outcome measure: use of diagnostic biopsy, polyp detection and removal rates
- **Utilization and Predictors of Early Repeat Colonoscopy in Medicare Beneficiaries** – Ko et al, 2010
  - Source: Administrative data
  - Outcome measure: colonoscopy within 1 year of index

Safety of colonoscopy

- **Risk of Perforation After Colonoscopy and Sigmoidoscopy: A Population-Based Study** – Gatto et al, 2003
  - Source: Administrative data
  - Outcome measure: risk of perforation within 7 days of the procedure, risk of death
- **Adverse Events After Outpatient Colonoscopy in the Medicare Population** – Warren et al, 2009
  - Source: Administrative data
  - Outcome measure: rate of serious gastrointestinal events (bleeding and perforation), other gastrointestinal events, and cardiovascular events resulting in a hospitalization or emergency department visit within 30 days after colonoscopy

Effectiveness of colonoscopy

- **Association of Colonoscopy and Death From Colorectal Cancer: A Population-Based, Case–Control Study** – Baxter et al, 2009
  - Source: Administrative data + cancer registry
  - Outcome measure: CRC mortality
- **Assessing the Impact of Screening Colonoscopy on Mortality in the Medicare Population** – Gross et al, 2011
  - Source: SEER-Medicare
  - Outcome measure: Life expectancy, CRC- and colonoscopy-attributable mortality rates

Validation of performance indicators

GASTROENTEROLOGY 2011;140:65–72

CLINICAL—ALIMENTARY TRACT

Analysis of Administrative Data Finds Endoscopist Quality Measures Associated With Postcolonoscopy Colorectal Cancer

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Merging administrative data and cancer registry

CONCLUSIONS: Endoscopist characteristics derived from administrative data (completeness, polypectomy rate) are associated with development of PCCRC and have potential use as quality indicators.

Issues with utilization of administrative data

- **Accuracy of Medicare claims for identifying findings and procedures performed during colonoscopy** – Ko et al, 2011
  - "Medicare claims have high sensitivity and specificity for polyp detection, biopsy, and polypectomy at colonoscopy, but sensitivity is low for other diagnoses such as tumor detection and for incomplete colonoscopy."
- **Determination of Colonoscopy Indication From Administrative Claims Data** – Ko et al, 2012
  - "Algorithms using Medicare claims data have moderate sensitivity and specificity for colonoscopy indication, and will be useful for studying colonoscopy quality in this population.."
- **Polypectomy rate is a valid quality measure for colonoscopy: results from a national endoscopy database** – Williams et al, 2012
  - "Endoscopists' PRs correlate well with their ADRs. Given its clinical relevance, its simplicity, and the ease with which it can be incorporated into claims-based reporting programs, the PR may become an important quality measure."

Defining basic set of patients

- **bill for endoscopy**
- **codes**: screening, diagnostic, with polypectomy
- **indication** - dg. possibly within 6 months (Ko, 2010):
  - diagnostic: abdominal pain, anemia, diarrhea, constipation, GI bleeding, intestinal obstruction, abnormal weight loss, functional intestinal disorders, other symptoms, abnormal finding
  - surveillance: polyp or cancer, Crohn, UC, high-risk code
  - CRC screening: code, low-risk
- **comorbid conditions, utilisation of comorbidity index**: diagnoses within year before
- **association with completion/polypectomy code**

Defining outcomes

- polyp detection, removal, biopsy
- adverse events
  - hospitalisation
  - serious GI, GI, CV event
- repeat colonoscopy within a year
- posctcolonoscopy colorectal cancer (PCCRC)
  - colonoscopy within 7 to 36 monts

Pilot study:
utilization of hospital data for colonoscopy monitoring

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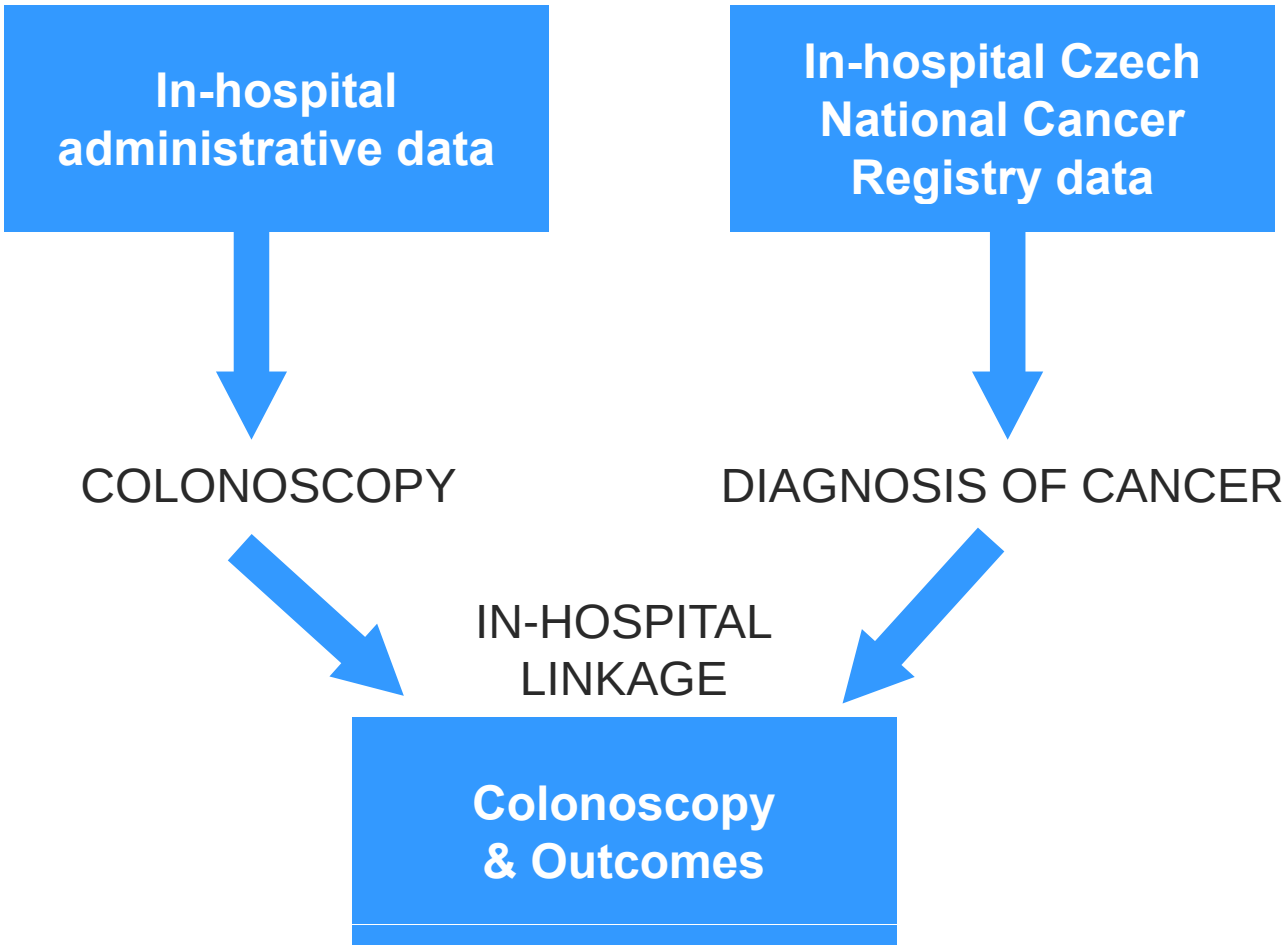
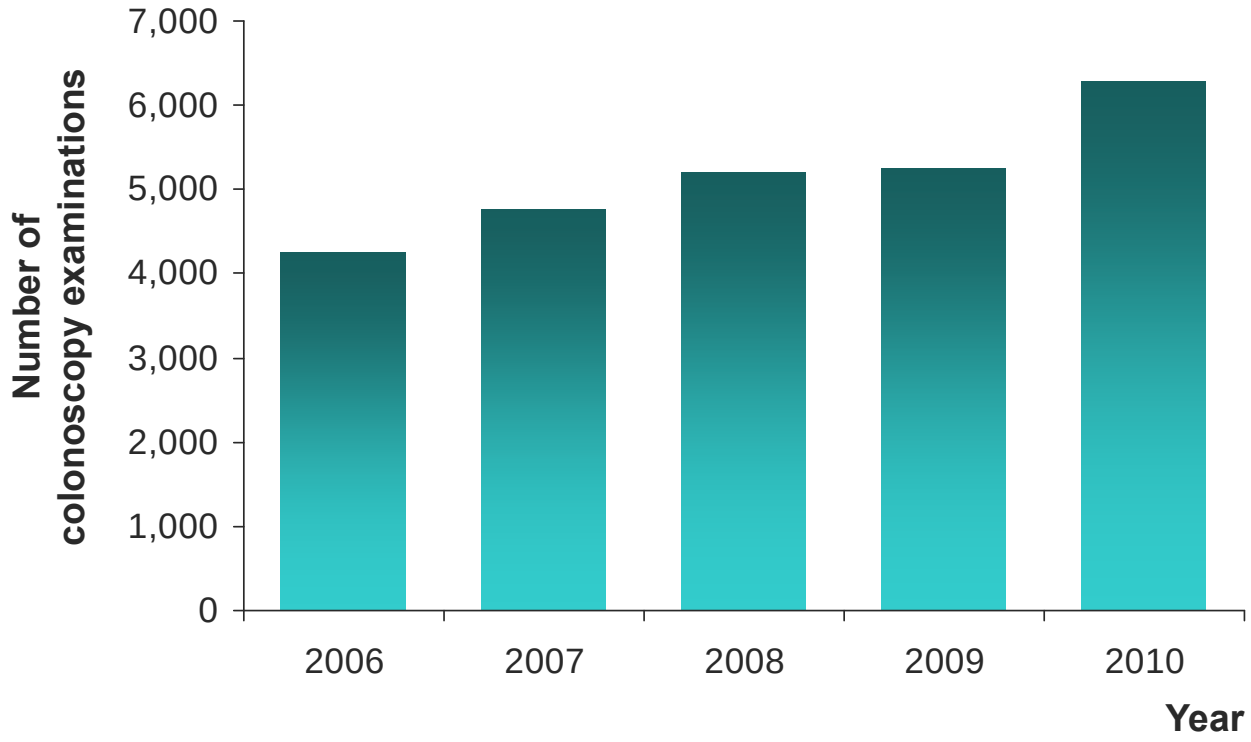
Scheme of study



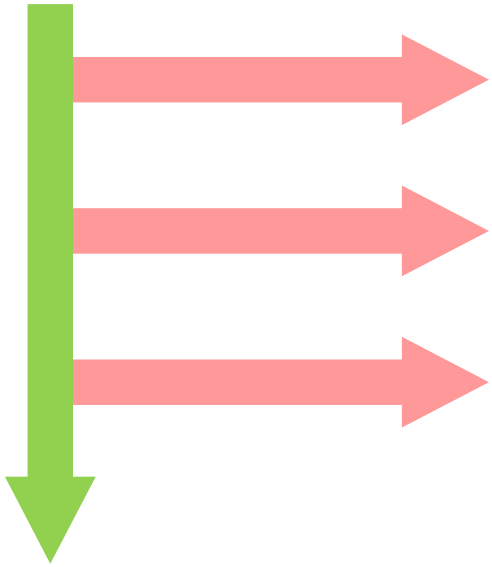
Number of identified colonoscopies

3 hospitals
n = 25,755 colonoscopies (2006-2010)



Selection of claims

3 hospitals
n = 25,755 colonoscopies (2006-2010)



inpatient colonoscopies
5,350 (20.8%)

age under 50 years
5,796 (22.5%)

second and further colonoscopy
4,202 (16.3%)

n = 10,407 subjects with first colonoscopy
outpatient, aged 50+

Indications for colonoscopy

Code/Indication	Nuber	Proportion
Previous diagnosis of CRC	1 850	17,8%
Primary screening colonoscopy[1]	59	0,6%
FOBT+ follow-up colonoscopy[1]	120	1,2%
Colonoscopy with preventive DG	259	2,5%
Diagnostic (bleeding, pain, etc.)	2 013	19,3%
Crohn, UC	290	2,8%
History of other cancer	1 219	11,7%
Other[2]	4 597	44,2%
Total	**10 407**	**100,0%**

n = 6,254 subjects

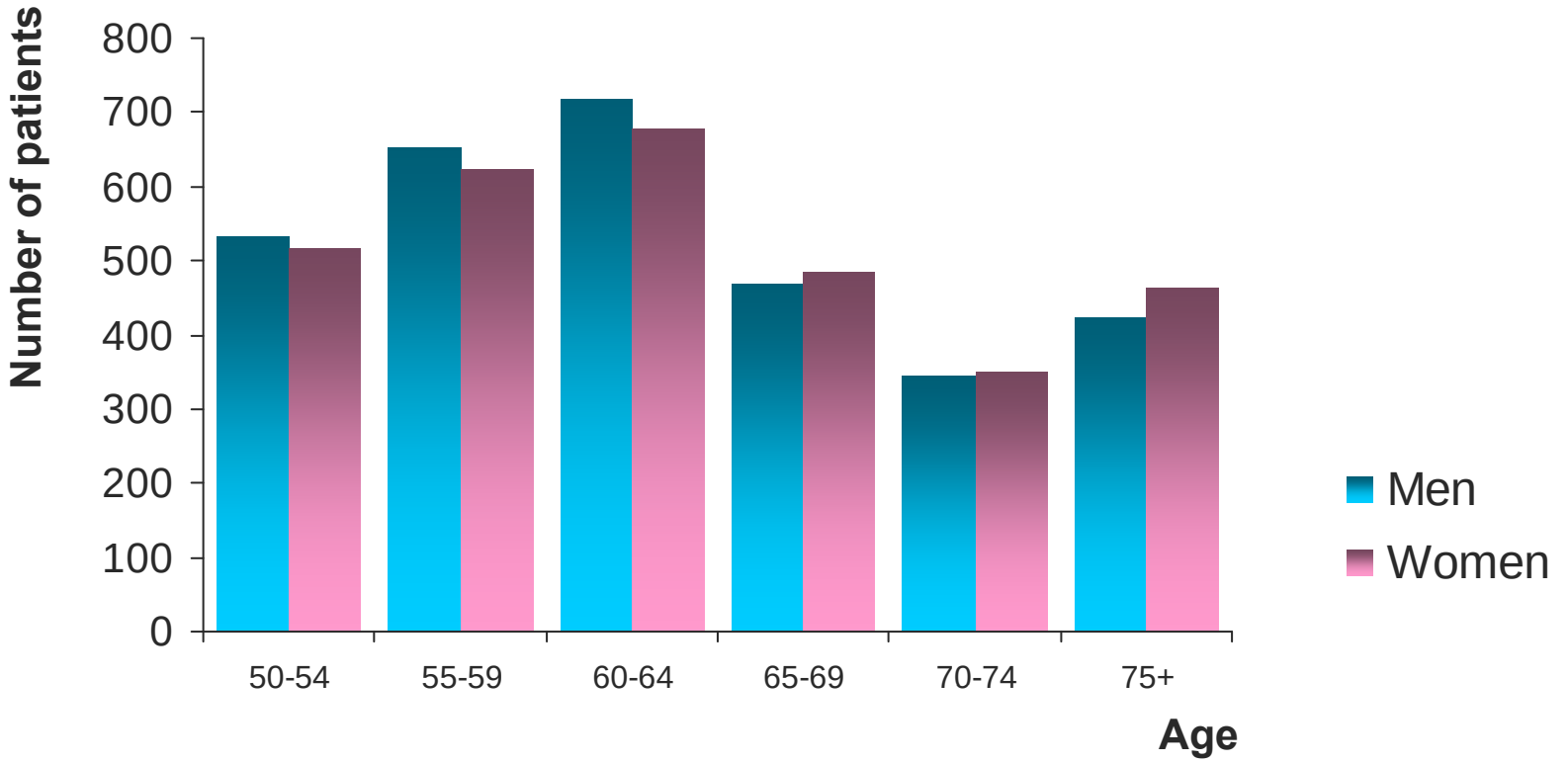
apparent non-screening indications
4,153 (39.9%)

[1] specific screening codes introduced in 2009

[2] mostly recorded claim-related diagnosis of polyp or cancer screening cannot be distinguished from referral, surveillance, etc.

Age structure of patients with colonoscopy

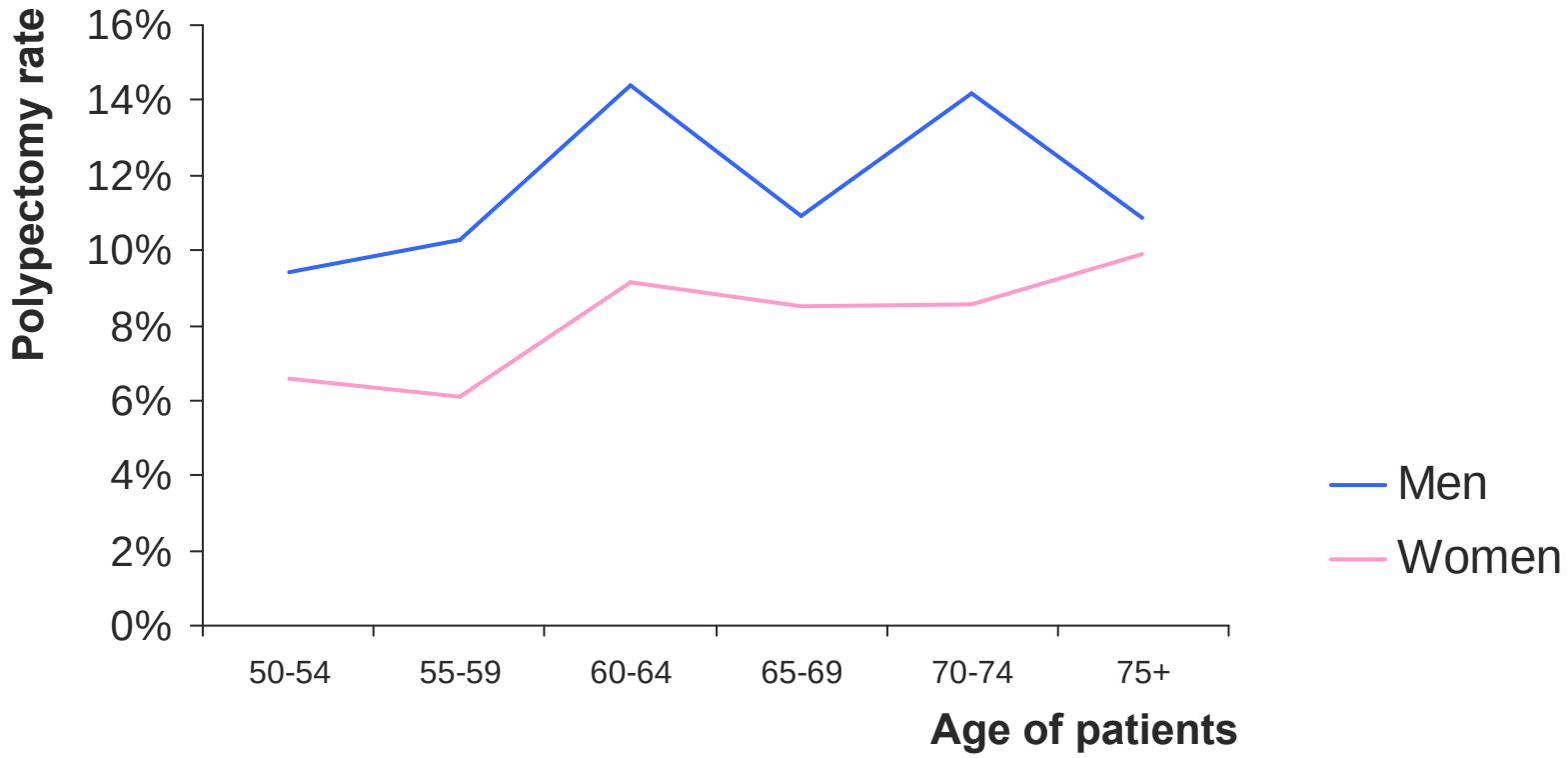
n = 6,254 subjects



Mean age: 64 years (vs. 63 in registry)

Polypectomy rate by sex and age

n = 6,254 subjects

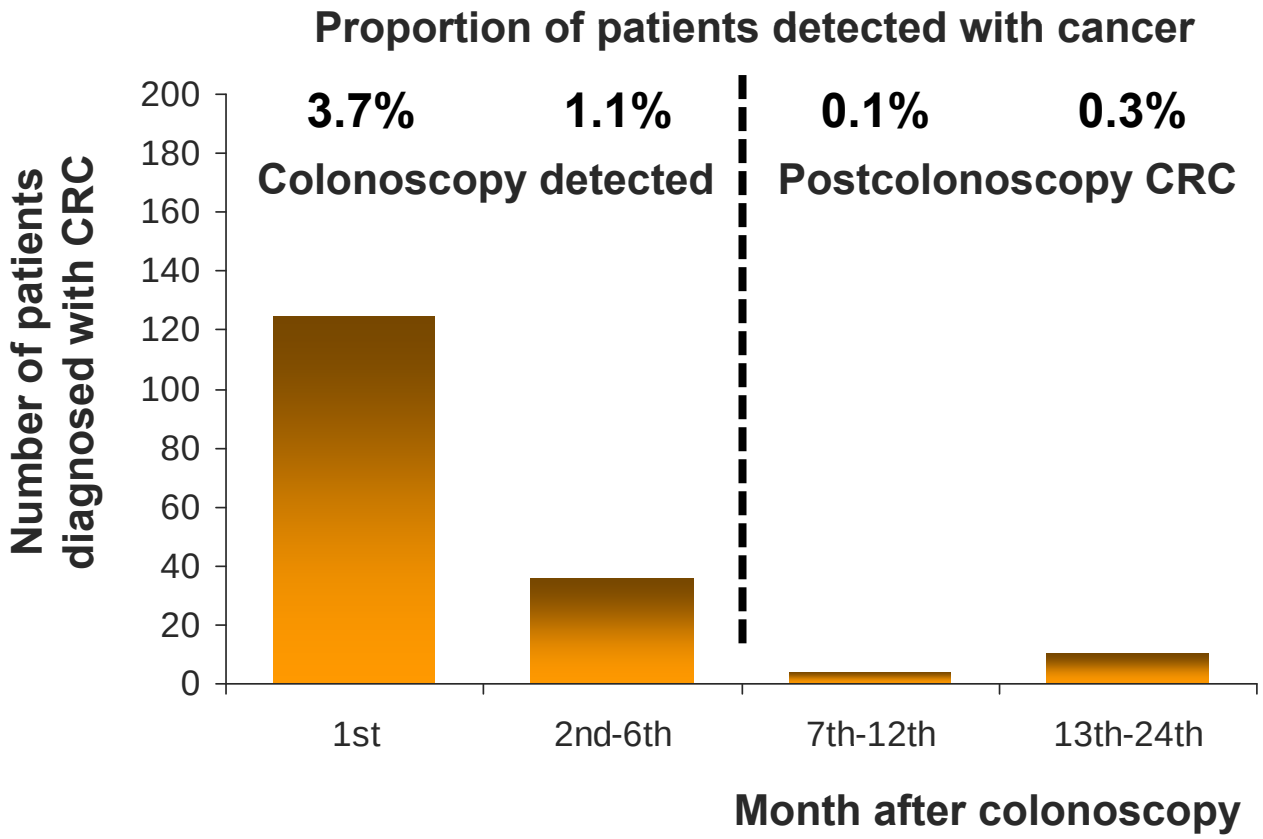


Total polypectomy rate: 9.9% **(vs. 43.3% in registry vs. 24% in NRC)**

Probable underreporting in data!!!

Colonoscopy-detected and posctcolonoscopy CRC

n = 3,421 subjects (years 2006-2008)



Total colonoscopy CRC detection rate: 4.8% (vs. 6.1% in registry)

Total postcolonoscopy CRC rate (7th-24th month): 0.4%

Summary

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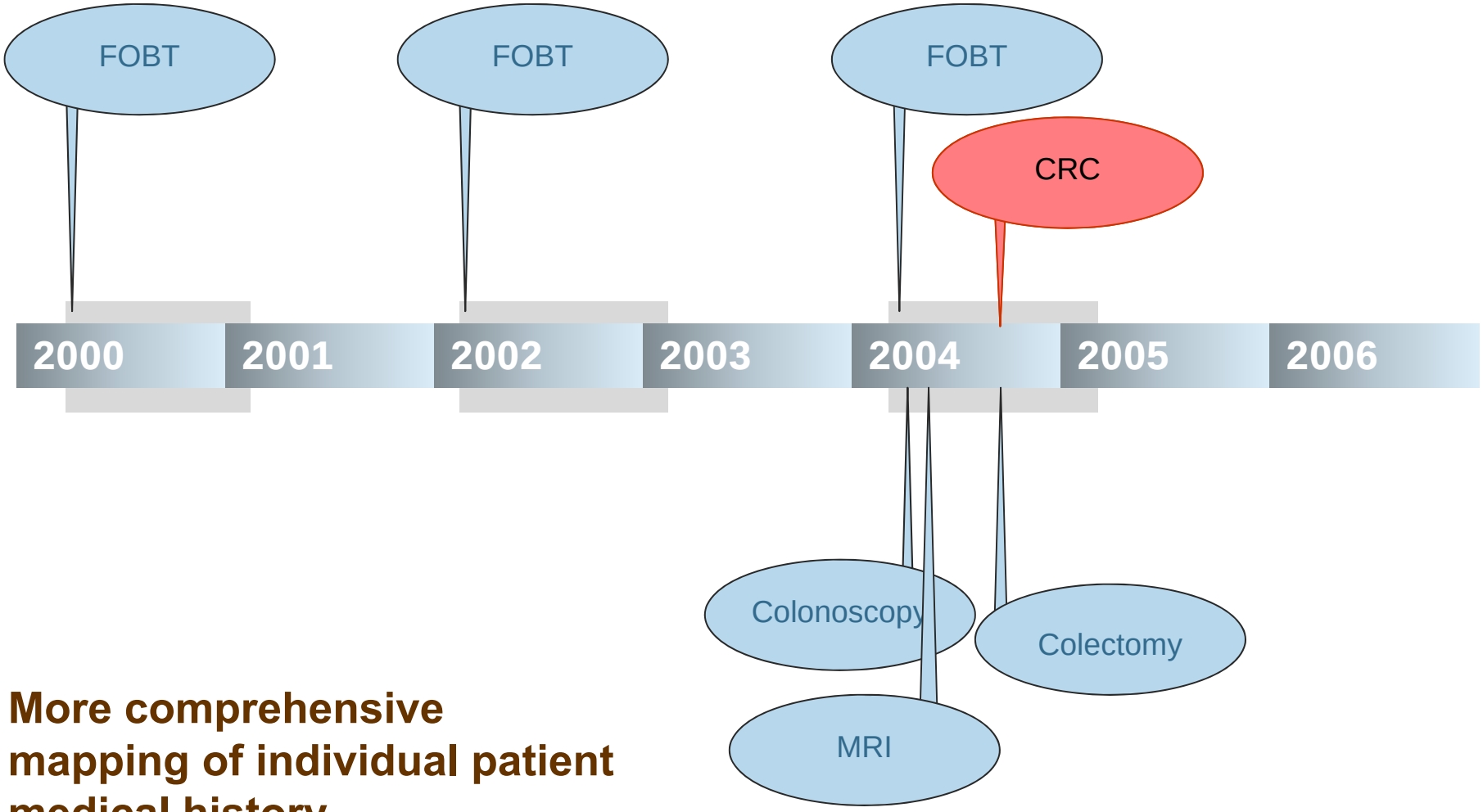
Strengths and limitations of in-hospital linkage

- it is possible to identify colonoscopy-detected and postcolonoscopy CRCs
- specific screening codes were introduced in 2009, precluding precise specification of screened cohort
- potentially useful code for polypectomy seems to be underreported
- current pilot study was limited to in-hospital setting
  - not possible to include previous medical procedures in primary care
  - not possible to take previous colonoscopy examinations in different healthcare facilities into account

Future direction:
Nationwide utilization of administrative data



More comprehensive mapping of individual patient medical history