

# Applied Econometrics in Health Care Management

Topic „Physician practice, technology adoption and variation in health care “

**Project Seminar WS 2021/22**

*University of Duisburg-Essen, Assistant Professorship in Empirical Health Economics*

*Prof. Dr. Katharina Blankart, MBR*

*Eva Goetjes, M.Sc. M.Sc.*

## Seminar Agenda

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### Enrollment and requirements

- Please sign up via E-Mail to [sekretariat.hcm@ibes.uni-due.de](mailto:sekretariat.hcm@ibes.uni-due.de) until October 10th, 2021. Please include your matriculation number as well as a current transcript of records as attachment (pdf-format).
- The seminar spaces will be allotted under the principle “first come, first served” if requirements are met as stated below. You will be notified by October 11, 2021, whether you will participate in the seminar or not.
- It is required that you have successfully attended the lecture “Health Economics: The Demand for Health and Health Care Payments“
- Basic knowledge in econometrics, which you should have gained by attending the lectures “Mikroökonomie” and “Causality and Program Evaluation“ as well as preceding seminars or lectures, is required to attend this seminar.

### Project plan and assignments

#### 1. Kickoff and assignment of topics

- October 19th, 2021, 6:00-4:00 pm
- Weststadttürme, WST-A.01.04
- The topics listed below will be assigned.
- You have the possibility to drop out from the seminar up until two weeks after the assignment of the topics.
- As a general reading, please read: Miraldo M, Hauck K, Vernet A, Wheelock A. Variations in the Adoption of Healthcare Innovation: A Literature Review. Oxford Research Encyclopedia of Economics and Finance. 2019 Apr 26 (full text provided in Moodle)

#### 2. Formulating a hypothesis and designing the study, develop study plan

- Per each project group, prepare a draft of not more than 1,000 words describing the following
  - Formulate a research question and the hypothesis that you like to test
  - Submit 5 high quality articles from peer-reviewed journals
  - Submit additional material (for example newspaper articles, blog entries)

- Identify the data and variables that you need to test your hypothesis, including potential limitations to the data
- Submission via Moodle until, 7 November, 2021, 12:00

### 3. Run the study and collect the data, tutorial: data science & empirical strategy using R & Stata

- November 9th, 2021, 6:00 pm – 7:30pm
- Weststadttürme, WST-A.01.04
- It is expected that you have already installed the access to Stata or R-Studio on your PCs beforehand.
- Statistical coaching: Please ask any questions about implementation of your empirical model in R or Stata using the discussion forum in Moodle.

### 4. Analyzing the data: Challenging your empirical strategy

- The following points have to be prepared in advance: (1) your research question including hypotheses, (2) the variables you are going to use, as well as (3) your econometrics strategy.
- Contact: Katharina Blankart, [katharina.blankart@uni-due.de](mailto:katharina.blankart@uni-due.de)
- Please schedule a meeting on December 14th or 15th, 2021.
- All group members should be present at the arranged dates.

### 5. Reporting the Study, presentation of results (in person) and paper submission (via moodle)

- **Results presentation in person**
  - January 28th, 2022 8:00 am – 6:00 pm, schedule will be posted.
  - Weststadttürme. WST-A.01.04
- **Paper submission**
  - Submission deadline: March 15th, 2022 12pm sharp at the latest (!)
  - Please upload an electronic version of your paper, a .csv-file of your final data set as well as a .txt-file with your code into the corresponding folder in Moodle.

## General information

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This seminar's aim is to perform your own data analysis project to examine physician behavior in multiple dimensions to manage diseases and health care costs in the US health care system with the help of empirical research methods. All of the topics listed below have to be dealt with empirically, which entails the systematic evaluation of the given data. Depending on the chosen topic, a solid knowledge about statistical causal analysis (regression or variance analysis, etc.) is an essential requirement. First-hand experience with econometrics software (e.g. Stata, SPSS, SAS, R, GRETL, EViews) beforehand is strongly recommended.

As empirical research is encumbered with a multitude of challenges (data collection, choice of research design, data analysis, etc.), the topics will be assigned to groups of two to three persons each. Nevertheless, you will be graded individually. That means

that every member of a group will hand in a paper written separately by themselves, although data, methodology or results might be the product of a group work.

The term paper's format has to conform to that of an original paper to be published in the journal *Medical Decision Making*. A more detailed overview of the exact requirements is listed here: <http://mdm.uic.edu/manuscript-requirements/>. Furthermore, your paper must contain a structured *Abstract* as well. The main part of your paper should not exceed 5,000 words in length (excluding figures, tables and directories). The paper can be written in either English or German.

*Elements of each paper:*

1. Presentation of the background and the underlying theory
2. Formulation of a precise research question including formation of a hypothesis
3. Description of used data and analytical methodology
4. Empirical findings
5. Critical discussion of your findings with regards to the hypothesis and research question

In addition to the components mentioned above, (a) an overview over already existing studies as well as (b) a reason for the choice of the empirical evaluation strategy has to be always provided as well.

The following article can serve as a reference point concerning the structure of your paper and the presentation of your findings: Currie, J., MacLeod, W.B., Van Parys, J., 2016. Provider practice style and patient health outcomes: The case of heart attacks. *Journal of Health Economics* 47, 64–80.  
<https://doi.org/10.1016/j.jhealeco.2016.01.013>.

Tip: You are encouraged to use an electronic program in order to manage and cite your sources, such as Citavi, EndNote or Zotero. These programs significantly facilitate working with secondary literature.

### **Information about Econometrics**

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You are free to choose your preferred empirical research strategy while conducting your study. You are not required to take all possible analyses given in the basic literature into account for your own evaluation. It is more about a possible expansion of your research question as well as a critical discussion of your chosen empirical strategy and threats to causal interpretation of the effects. We do not expect neither one specific method nor the use of one specific software from you. Nevertheless, both of the aforementioned should be coordinated with your adviser with regards to your topic of choice.

Usually, an empirical analysis contains hypothesis testing with the help of qualitative or quantitative methods. For that purpose, you should use the data given in the topic

descriptions below. You are free to collect further data on your own, but you have to transparently indicate your source and your method of collection where appropriate.

### **Main data source: National Ambulatory Medical Care Survey (NAMCS)**

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The research questions can be answered by using the National Ambulatory Medical Care Survey (NAMCS). This service was developed in order to provide objective and reliable information about the supply and use of ambulatory medical services in the United States. Its results are based on a sample of practitioners and, from 2006 onwards, on a separate sample of municipal health centers. The NAMCS data are available for free. One particularity of the NAMCS is the fact that every practitioner will be randomly assigned to a reporting period for a week. Data about the overall visits will be collected in a systematic sample during this period. The website of the NAMCS gives you an overview about its services:

[https://www.cdc.gov/nchs/ahcd/about\\_ahcd.htm](https://www.cdc.gov/nchs/ahcd/about_ahcd.htm)

### **Information about the US health care system**

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#### **Videos**

- 7-minutes long introductory video covering the [U.S. health care system](#)
- Another video about the U.S. health care system, which also addresses important problems: [video by John Green](#)

#### **Literature**

- Rice T, Rosenau P, Unruh L, Barnes A. United States of America - Health system review. Saltman R, van Ginneken E, editors. Health Systems in Transition. 2013;15(3). [http://www.euro.who.int/\\_data/assets/pdf\\_file/0019/215155/HiT-United-States-of-America.pdf](http://www.euro.who.int/_data/assets/pdf_file/0019/215155/HiT-United-States-of-America.pdf)
- Shi, Leiyu; Singh, Douglas A. (2015): Essentials of the U.S. Health Care System. Jones & Bartlett Publishers. — ISBN: 978-1-284-10055-6
- Overview of the Patient Protection and Affordable Care Act: <http://kff.org/health-reform/fact-sheet/summary-of-the-affordable-care-act/>
- Statistics, reports, and analysis concerning the topic of access to health care are, among others, provided by
  - Commonwealth Fund: <http://www.commonwealthfund.org/>
  - Henry Kaiser Family Foundation: <http://kff.org/>

## Overview of topics

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#	Topic
<b><i>Physician treatment styles</i></b>	
1	Therapeutic disparities: Which role does race play?
2	Heterogeneity of Prescription Behavior
<b><i>Drivers of physician treatment styles</i></b>	
3	Information technology and physician prescribing
4	Treatment behavior, insurance status and managed care
5	Prescription Drug Monitoring for Opioids

## Topics in the block „Physician treatment styles“

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### Topic 1: Therapeutic disparities: Which role does race play?

Physicians are faced with a multitude of different treatment options. They ideally act as agents for their patients to identify the best available treatment option. However, frequent claims state differences and disparities in treatment depending on the patient's demographic characteristics such as gender or race. The prescription of drugs or the performance of certain services may serve as an example to what extent physicians customize treatments according to a patients' race. The aim of this project is to identify the role the physician plays in disparities in treatment driven by a patient's race.

Data: NAMCS, last 5 years

- Hall-Lipsy EA, Chisholm-Burns MA. Pharmacotherapeutic disparities: racial, ethnic, and sex variations in medication treatment. *Am J Health Syst Pharm.* 2010 Mar 15;67(6):462-8. doi: 10.2146/ajhp090161. PMID: 20208053.
- Vaccarino V, Rathore SS, Wenger NK, Frederick PD, Abramson JL, Barron HV, Manhapra A, Mallik S, Krumholz HM; National Registry of Myocardial Infarction Investigators. Sex and racial differences in the management of acute myocardial infarction, 1994 through 2002. *N Engl J Med.* 2005 Aug 18;353(7):671-82. doi: 10.1056/NEJMsa032214. PMID: 16107620; PMCID: PMC2805130.
- Strumpf EC. Racial/ethnic disparities in primary care: the role of physician-patient concordance. *Med Care.* 2011 May;49(5):496-503. doi: 10.1097/MLR.0b013e31820fbee4. PMID: 21430577.

## Topic 2: Heterogeneity of treatment behavior

Physicians are faced with a multitude of different medication options. Choosing the appropriate medicine requires such a significant effort that further search and learn costs arise. The resulting physician's prescribing behavior in turn influences costs and quality of treatment. This project will be aimed at investigating the heterogeneity in physicians' prescribing behavior for selected diseases using corresponding measures. For this purpose, appropriate measurements such as prescribing concentration have to be taken into consideration. Possible determining factors should be identified beforehand as well.

Data: NAMCS, 2007-2015

- Stern S, Trajtenberg M. Empirical Implications of Physician Authority in Pharmaceutical Decision Making. National Bureau of Economic Research; 1998 Dec. Report No.: 6851. <http://www.nber.org/papers/w6851>
- Berndt ER, Gibbons RS, Kolotilin A, Taub AL. The heterogeneity of concentrated prescribing behavior: Theory and evidence from antipsychotics. *Journal of Health Economics*. 2015;40:26–39.

## Topics in the block „ Drivers of physician treatment styles “

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### Topic 3: Information technology and physician prescribing

Electronically-based office systems offer the possibility to support appropriate, target group oriented preventive measures in ambulatory health care. This project's aim is to investigate the influence of office systems. This with a possible focus on services provided, duration of the visit or medication prescribed. Possible financial incentives to make use of information technology (insurance type of patients, reimbursement) should be considered.

Data: NAMCS, 2007-2015

- Epstein Andrew J., Ketcham Jonathan D., 2014. Information technology and agency in physicians' prescribing decisions. *The RAND Journal of Economics* 45, 422–448. <https://doi.org/10.1111/1756-2171.12057>
- Bae J, Hockenberry JM, Rask KJ, Becker ER. Evidence that electronic health records can promote physician counseling for healthy behaviors. *Health Care Management Review*. September 2017;42(3):258.
- Bae J, Ford EW, Kharrazi HHK, Huerta TR. Electronic medical record reminders and smoking cessation activities in primary care. *Addictive Behaviors*. 1. February 2018;77:203–9.

#### Topic 4: Treatment behavior, insurance status and managed care

US physicians are confronted with patients with a multitude of different insurances: Apart from state-funded insurance programs, such as Medicare and Medicaid, there are multiple private insurance plans. Each health care plan covers the costs for medicine in different proportions. Besides, there are options for managed care. Moreover, patients have to bear different shares when it comes to the reimbursement of health care services. This project will examine whether and how much physicians' treatment styles differ for patients that are insured under varying health care plans and managed care.

Data: NAMCS, 2008-2013

- Glied S, Zivin JG. How do doctors behave when some (but not all) of their patients are in managed care? *Journal of Health Economics*. 1. March 2002;21(2):337–53.
- Rice, Jennifer L. 2011. "The Influence of Managed Care on Generic Prescribing Rates: An Analysis of HMO Physicians." *Applied Economics* 43 (7): 787–96. <https://doi.org/10.1080/00036840802600061>.
- Melichar L. The effect of reimbursement on medical decision making: Do physicians alter treatment in response to a managed care incentive? *Journal of Health Economics*. 1. July 2009;28(4):902–7.

#### Topic 5: Prescription Drug Monitoring for Opioids

A rise in the prescription of opioids in the last years has ended in an increased number of opioid addictions, which eventually led to the proclamation of a national emergency. US state-wide prescription drug monitoring programs are a means to control opioid prescribing by physicians. This project will focus on the role of prescription drug monitoring programs on opioid prescribing. Socio-economic factors and physician characteristics should be considered.

Data: NAMCS, 2001-2010, Supplementary Material of Bao et. al for data on statewide prescription monitoring programs (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5336205/>)

- Bao Y, Pan Y, Taylor A, Radakrishnan S, Luo F, Pincus HA, u. a. Prescription Drug Monitoring Programs Are Associated With Sustained Reductions In Opioid Prescribing By Physicians. *Health Affairs*. 1. June 2016;35(6):1045–51.
- Buchmueller TC, Carey CM, Meille G. How well do doctors know their patients? Evidence from a mandatory access prescription drug monitoring program. *Health Economics*. 2020;29(9):957–74.