Quantifying Productivity Growth in Health Care Using Insurance Claims and Administrative Data

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Question: While the Bureau of Labor Statistics uses a rigorous and consistent methodology to quantify productivity growth across sectors of the economy, this methodology is not well suited to health care. Estimates of productivity growth in this sector are likely to be confounded by changes over time in the underlying health status of patients and by improvements in the health outcomes that are achieved through treatment. Romley, Goldman and Sood (2015) found substantial improvement in the productivity of hospital care for heart attack, heart failure and pneumonia over 2002-2011 when heath status and health outcomes are taken into account. This study will produce a more comprehensive perspective on productivity growth in U.S. health care. First, we will consider a wider and more representative range of acute treatments. Second, we will study a longer timeframe, specifically, 2001 through 2016. Third, for heart attacks, we will assess the contribution of improvements in specific treatments (percutaneous coronary intervention and coronary artery bypass graft surgery) to overall productivity growth in treating this condition. Most importantly, we will investigate episodes of care involving not only the initial hospital stay but also office visits, skilled nursing and other post-acute care, and subsequent admissions after a patient's initial discharge.

Methods: As in prior work, we will specify and estimate production functions in which the unit of analysis is a hospital-year. To investigate episodes of care, we will identify and link all of the insurance claims associated with a patient within 90 days (and alternative windows) of an admission. We will define output by the number of "high-quality" episodes. Our benchmark definition of a high quality episode will be that the patient is alive ninety days after the initial admission and has returned to the community as of that date. We will summarize production inputs using the total cost of providing episodes of a particular type. As in prior work, we will measure inpatient costs for each stay by applying cost-to-charge ratios to charges reported on hospital claims. In addition, we will measure other facility costs using annual cost ratios from the Healthcare Cost Report Information System. Costs for care from physicians and other professionals will be measured using the relative value units associated with the services reported on the claims. In addition to treatment costs, we will consider productivity from the perspective of the Medicare program using actual payments (with and without Part D drugs.) The underlying health of a patient is an important input into the care that is received and the outcome that is achieved. We will account for patient characteristics from Medicare enrollment files (demographics, comorbidities and dual enrollment) and also for socio-demographic factors by linking patients' 5-digit zip codes to small-area data on income, poverty and educational attainment.

Data: We will study a sample of 20% of all elderly Medicare fee-for-service beneficiaries, or nearly 5 million individuals. To do so, we will combine a set of research-identifiable databases on beneficiary enrollment and medical and pharmacy claims from the Centers for Medicare and Medicaid Services (CMS); these databases include the Master Beneficiary Summary Files, Medicare Provider Analysis and Review Files, Carrier (Physician / Supplier) Files, Part D Drug Event Files, Minimum Data Set Files, and others. Encrypted beneficiary IDs in the research-identifiable data make it possible to track the spectrum of a beneficiary's care. Because Medicare claims do not include custodial nursing home stays financed by the Medicaid program, we will follow prior work in using patient status assessments reported in the Minimum Data Set to determine a beneficiary's place of residence each day after discharge. Socio-demographic data will be obtained from the American Community Survey.