

How Nurses Affect Health Care Delivery and Patient Health

Nurses are the largest group of health professionals in the United States, with 3.4 million employed licensed nurses making up 30 percent of all health professionals. Nurses play key roles in the delivery of health care services in hospitals, primary care settings, and long-term care facilities. Yet because nurses are only one input in the provision of health care, it has long been difficult to quantify their contribution to patient health and their role in the efficient provision of health care.

Filling this gap is a new working paper by researchers Benjamin Friedrich and Martin Hackmann, **The Returns to Nursing: Evidence from a Parental Leave Program** (NBER Working Paper No. 23174).

The context for the new study is Denmark, where the introduction of a federally funded parental leave program in 1994 gave parents the opportunity to take up to a year of paid leave if they had a child under age eight. This policy was designed to lower stress on families following the birth of a child and to give unemployed people an opportunity to fill opening positions, thereby gaining valuable experience. The policy had an unintended negative effect on the market for nursing professionals, which is female-dominated and has strict licensing requirements. The researchers are able to identify the effect of nurses on patient health and care by examining what happened after this policy went into effect.

The researchers construct a dataset that combines the employment data of health care providers with individual patient records on diagnoses, procedures, and health outcomes for the full Danish population for the years 1990 through 2000. This unique dataset allows them to explore the mechanisms through which nurses affect patient health and the deliv-

ery of health care for different patient populations and in different settings.

The researchers begin by documenting the effect of the introduction of parental leave on the employment of health care professionals. There was high take-up of the program by nurses and nursing assistants—an additional 16 to 24 percent of nurses and nursing assistants with a child under age two were on leave after the program's introduction. By contrast, only an additional 2 percent of doctors with a child under age one were on leave.

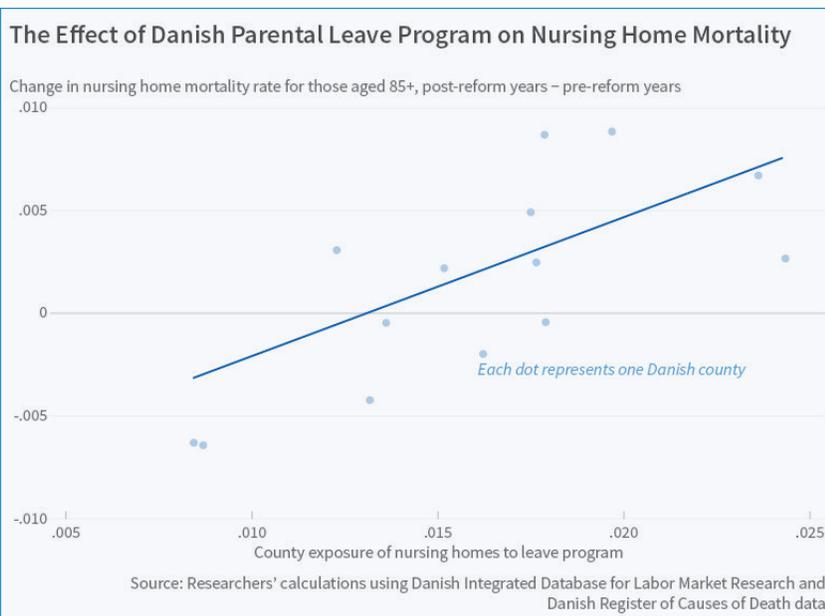
The high take-up among nurses led to a 12 percent average decrease in the stock of working nurses. This drop differed by region and facility type (hospital vs. long-term care) due to imperfect mobility, which is helpful for identifying the policy's

of negative hospital quality. However, the researchers fail to find an effect of the change in nurse staffing on the one-year mortality rate of hospital inpatients or newborns. Reconciling these findings, the presented evidence suggests that hospitals adjust their patient and staffing management in an effort to mitigate the negative effects on the sickest patients.

Patient outcomes in long-term care facilities were also affected. As seen in the figure, counties in which more nurses were eligible for parental leave experienced a larger increase in nursing home mortality after the program's implementation. Overall, the researchers estimate a 13 percent increase in nursing home mortality following the introduction of parental leave, an effect that persists for seven years (throughout the period under study).

The results suggest a larger return of nurses on the production of health care in long-term care facilities, which the researchers theorize is due to the greater responsibility of a nurse in this setting. They develop a model that predicts that lower nurse staffing levels negatively impact monitoring quality, which results in fewer hospitalizations of the neediest residents. The researchers find evidence for their prediction in the data, suggesting “a substantial fraction of nursing home deaths might have been postponed, had the needy residents had access to the hospital.”

Overall, the stronger mortality impacts of the nursing staff reductions in nursing homes indicate that there may be a misallocation of nurses between the hospital and long-term care sectors. The researchers conclude “understanding how policy instruments, including minimum nurse-to-patient ratios or wage subsidies, can increase nurse employment in nursing homes in particular is therefore of policy interest in the context of an aging population and disproportionately growing demand for long-term care services.”



effects on patient care. By contrast, there was no reduction in the aggregate employment of nursing assistants, suggesting that health care providers were able to recruit nursing assistants from other sectors or hire newly trained assistants.

Turning to health outcomes, the researchers find that there was a 21 percent increase in readmission rates for all hospital inpatients and a 45 percent increase in newborn readmissions in the three years after the introduction of the parental leave program. A higher hospital readmission rate is commonly assumed to be a signal