

Using What You Have: The NJ Nurse Demand Forecasting Model

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Workforce Development Health Policy Quality Care



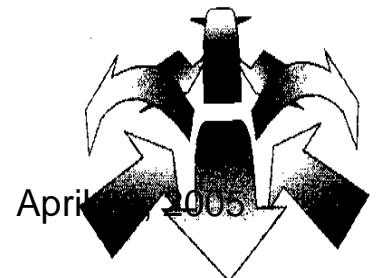
Objectives for Today

- Identify the process of the development of the NJ NDM
- Explore the original model and the four forecasts
- Describe the testing of the original model
- Examine the forecasts for 2010



The CIC Project (1996-2002)

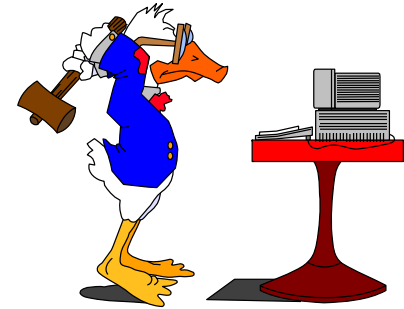
- The challenge from RWJF to measure, monitor, and forecast the demand
- The HRSA (Division of Nursing) NDM Model
- Developing our own
- Nurse Work Group, a labor economist, and databases



Forecasting



Type of Model



■ Econometric

- Used a mathematical model to measure and predict the demand for RNs/LPNs
- Demand = the number of nurses employers are willing to hire, given the availability

■ Existing Databases

- Historical - one decade of data to forecast a decade ahead
- Panel data - 1986, 1990, 1994, 1996
- Data from all 21 NJ counties



What We Wanted to Know

- How many RNs/LPNs will be needed to fill all the positions in 2006 in New Jersey?
- How many FTE positions will be available for RNs/LPNS in Acute Care in New Jersey in 2006?



The Nurse Databases

- For RN/LPN employment from the NJ DOL for 1986, 1990, 1994, 1996 (#s)
- For RN/LPN positions from the AHA for Acute Care for 1986, 1990, 1994, 1996 (FTEs)
- For all 21 NJ counties





What factors are related to the demand for RNs/LPNs in the total workforce?

What factors are related to the demand for RN/LPN FTEs in Acute Care only?



The Independent Variables (The Factors)

- Panel Data: All data are from the same years: 1986, 1990, 1994, 1996
- All data for each of the 21 NJ counties
- Data points = 84 (sample)
- Data sources: New Jersey Departments



The Independent Variable Databases for Each County

- Number of HIV/AIDS*
- The percentage of HMO enrollees*
- The ratio of county unemployed to the county population*
- The proportion of the population >65*
- Counties with more medical facilities*
- Hourly salary rates for RNs^ and LPNs*
- Mortality rates^



*Statistically significant
^Statistically not significant





The Method: Multiple Regression

- Develop assumptions, equations
- Software, e.g., SAS, SPSS
- Regression:
 - Allows us to make predictions from some know evidence to some unknown future events
 - The Model generates a number for each Independent Variable based on its relationship to the Dependent Variable
- Regression of more than one factor = multiple regression



Four Nurse Demand Forecasts

■ Forecasts

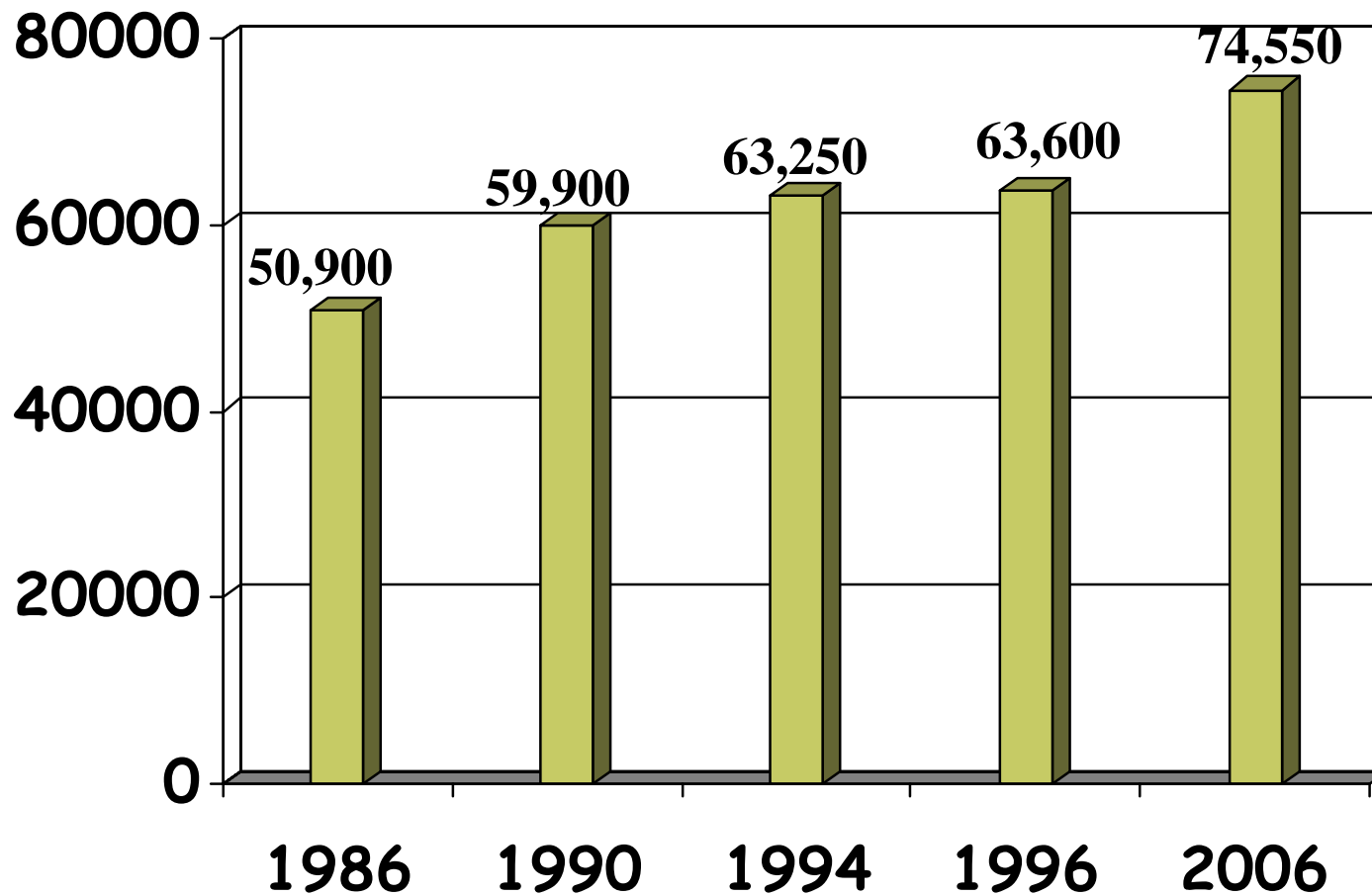
- RNs in all employment sectors
- RNs in Acute Care only
- LPNs in all employment sectors
- LPNs in Acute Care only

■ Trends can also be identified from the data



Actual Total RN Workforce: 1986-96

Short Term Forecast: 2006



Adjusted R² = 0.68

April 29, 2005



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The NJ RN NDM Forecasts for the Total Workforce

- From 1986 to 1996 the actual increase was nearly 13,000 or 25%
- The projected demand for RNs from 1996 to 2006 will increase by nearly 11,000 additional positions or 17% of the nursing workforce





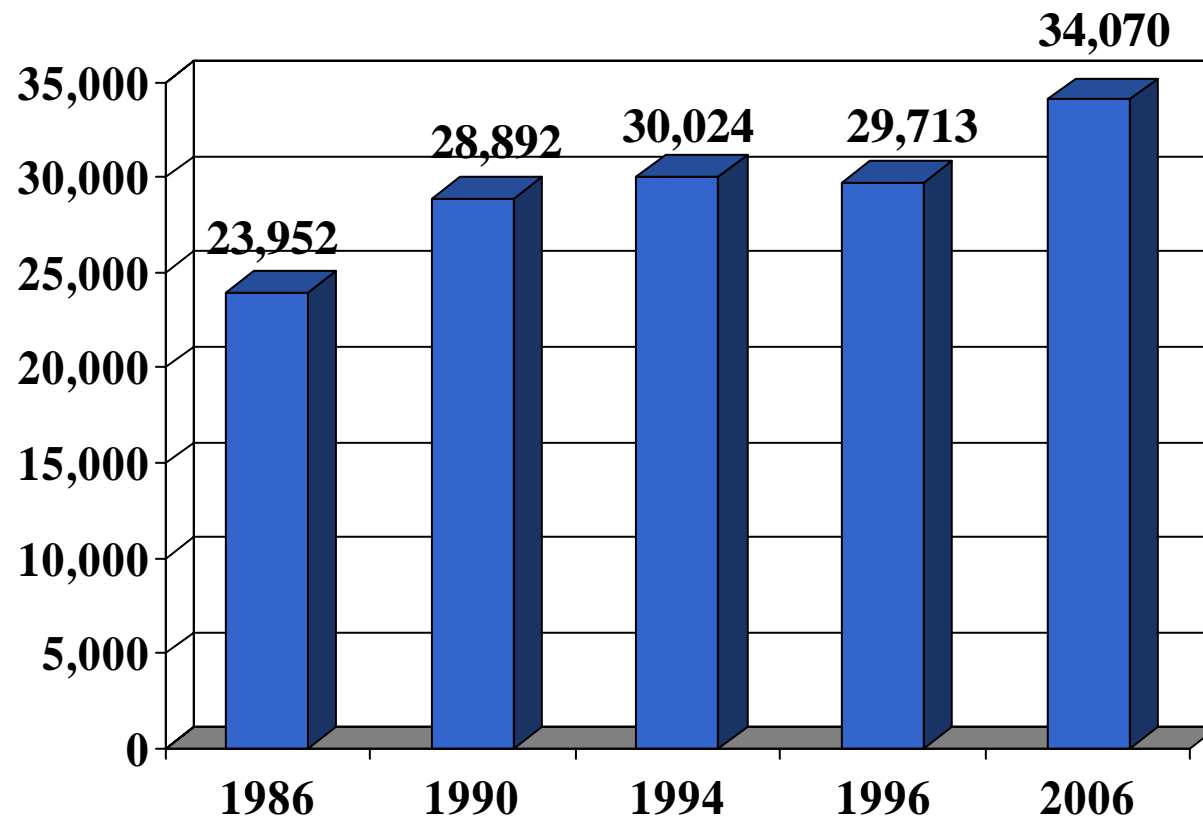
The NJ Forecasting Model for Acute-Care RNs

- Variables added to indicate level of hospital activity:
 - Birth rate - average rate of change in the number of births between 1990-96
 - Surgery rate - average rate of change in the number of surgical operations/1000 population from 1986-96
 - Inpatient day rate - average rate of change in the number of inpatient days/1000 population from 1986-96



Actual Acute Care RN FTEs: 1986 -96

Forecast Acute Care RN FTEs: 2006



Adjusted R² = 0.84





How RELIABLE was the New Jersey Nurse Demand Forecasting Model in Predicting the Number of RNs/LPNs in 2006?



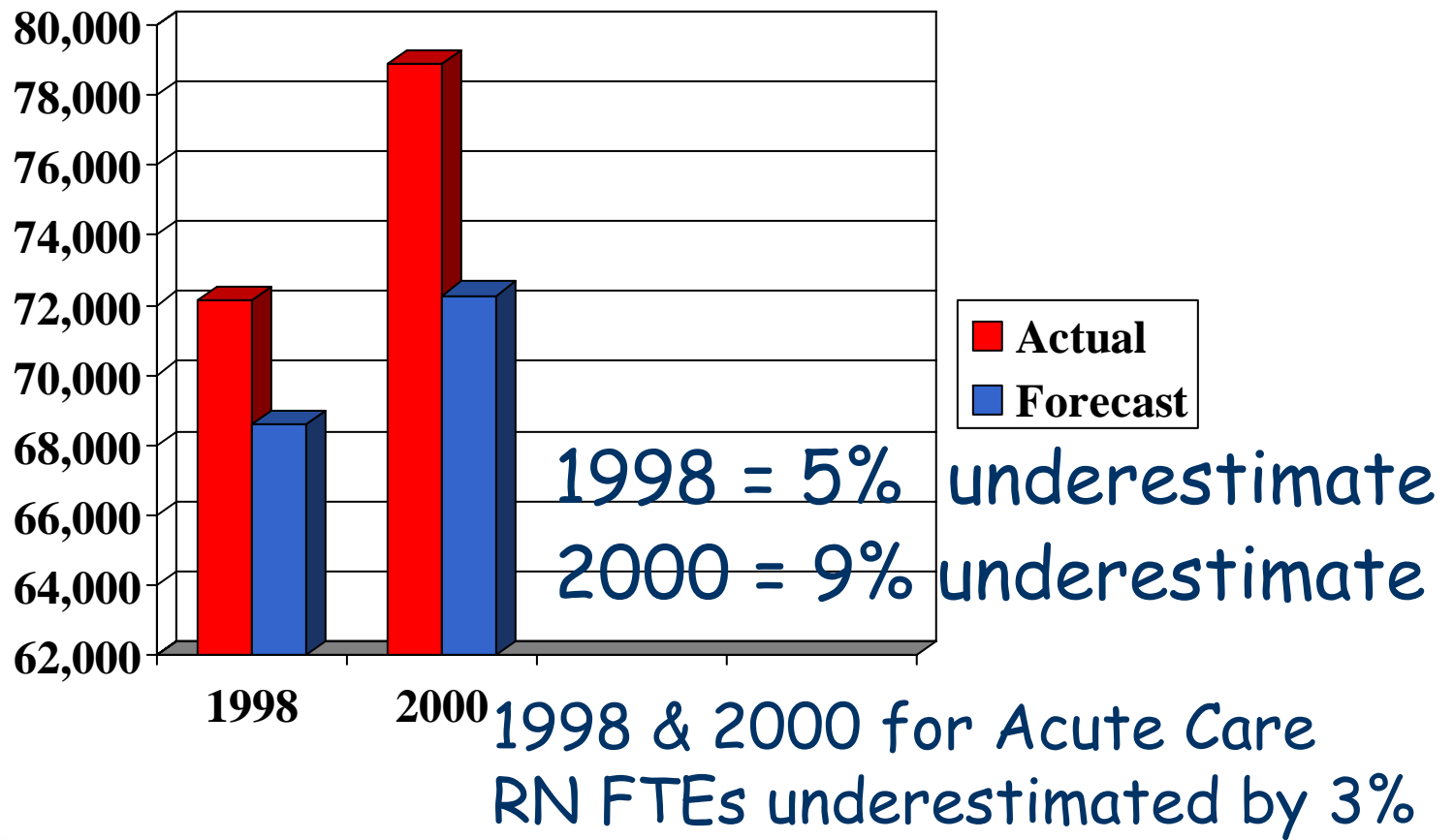


Process for Test

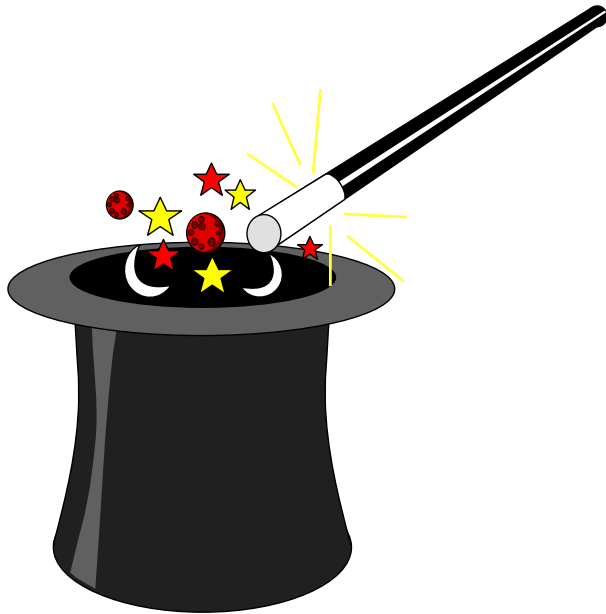
- *Ex-post facto* RN/LPN forecasts of the model were run with the original model for 1998 and 2000
- Compared the forecasts for 1998 and 2000 with the actual data for 1998 and 2000
 - Significant Independent Variables similar to original model
 - Standardized coefficients - contribution of Independent Variables - similar to original model
 - t-tests indicate similar significance



Comparisons of the Model Forecasts: Total RNs for 1998/2000



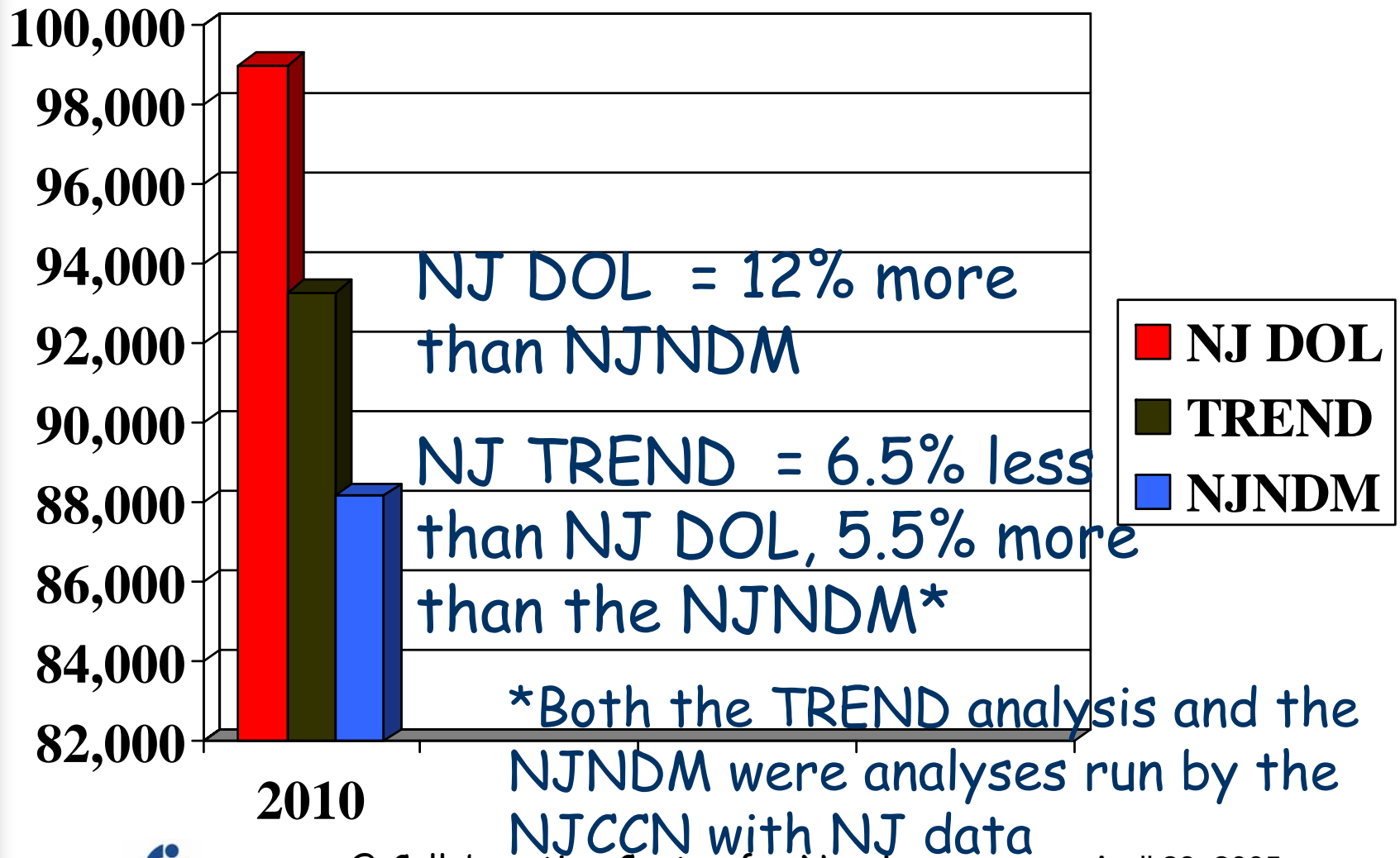
What Does the Future Hold?



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Comparisons of 3 Forecasts For 2010





Limitations

- Databases may not be available
- May be expensive
- May take time
- Will not account for out-of-the ordinary changes
- Need to collaborate with non-nurses





Advantages

- Can create different scenarios
- Legislators like numbers
- Can measure a difficult concept
- Provide evidence base for public policy
- Can be combined with supply data to determine reliable projections





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