Nosocomial Respiratory Pathogens: Trends in Antibiotic Resistance 1995-2003

Results of the Antimicrobial Resistance Management (ARM) Program

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ARM Program Background

- The Antimicrobial Resistance Management Program (www.armprogram.com) is an ongoing project established in 1997 to:
  - Document trends in antimicrobial susceptibility patterns
  - Identify relationships between antibiotic use and resistance rates

ARM Program Background

- Minimum of 3 years of antibiogram/sensitivity report data is included in a national aggregate surveillance database (HIPAA-compliant non-identifying format)
- Institutions participate at no cost
- As of October 18, 2004, susceptibility data on 26.9 million isolates have been collected from 345 institutions
  - 48 frequently used antibiotics
  - 19 organisms

Purpose and Methods

- *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* are primary bacterial etiologic pathogens identified in respiratory tract infections
- Antibiograms/sensitivity reports from 1995-2003 were analyzed from the ARM surveillance database

Methods

Antibiotic-pathogen combinations reviewed for resistance:

S. pneumoniae to

- Penicillin
- Cefuroxime
- Ceftriaxone
- Levofloxacin

H. influenzae to

- Ampicillin
- Ceftriaxone

Methods

Antibiotic-pathogen combinations reviewed for resistance:

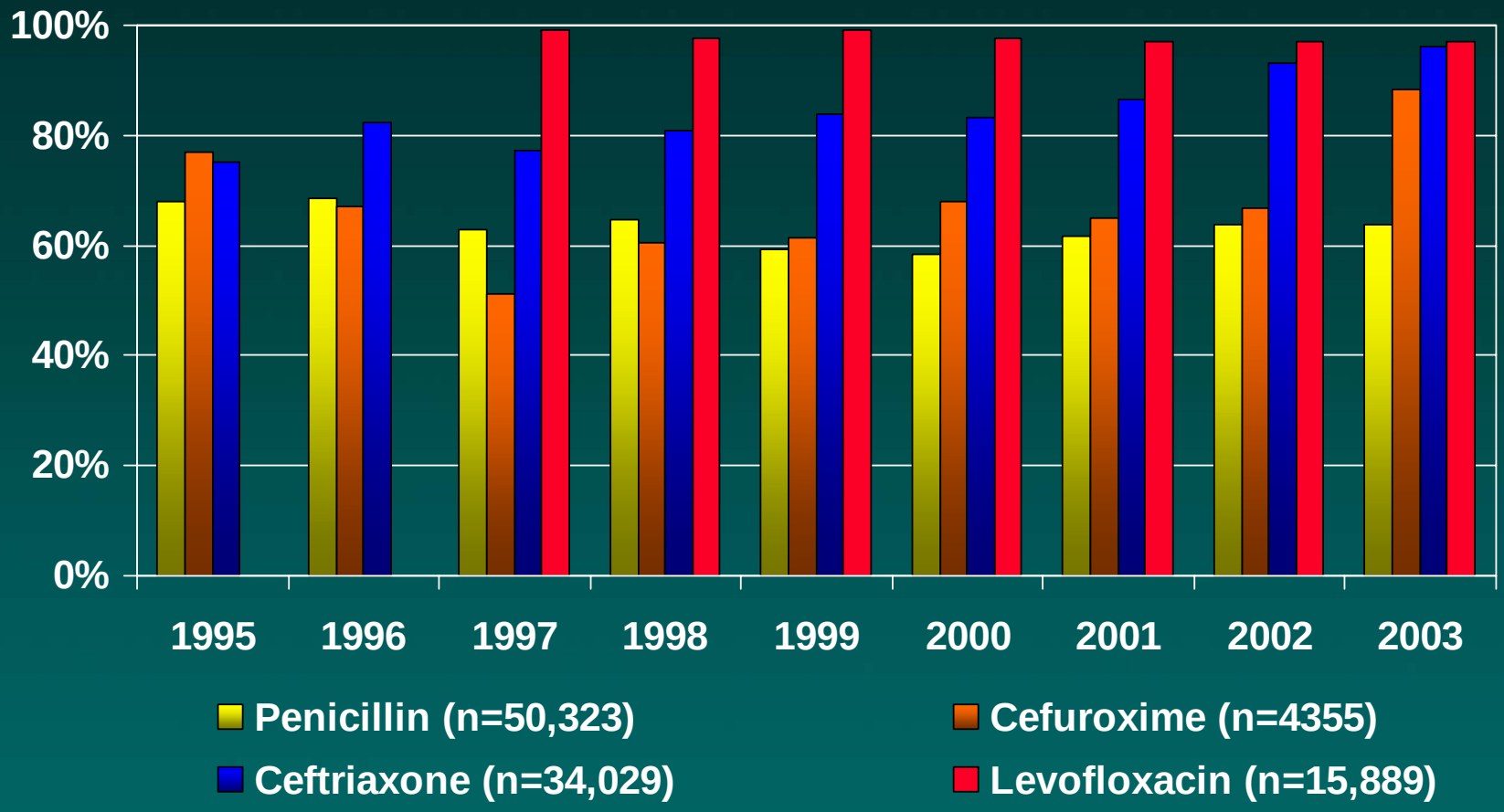
K. pneumoniae to

- Cefotaxime
- Ceftriaxone
- Cefepime
- Ciprofloxacin
- Levofloxacin

P. aeruginosa to

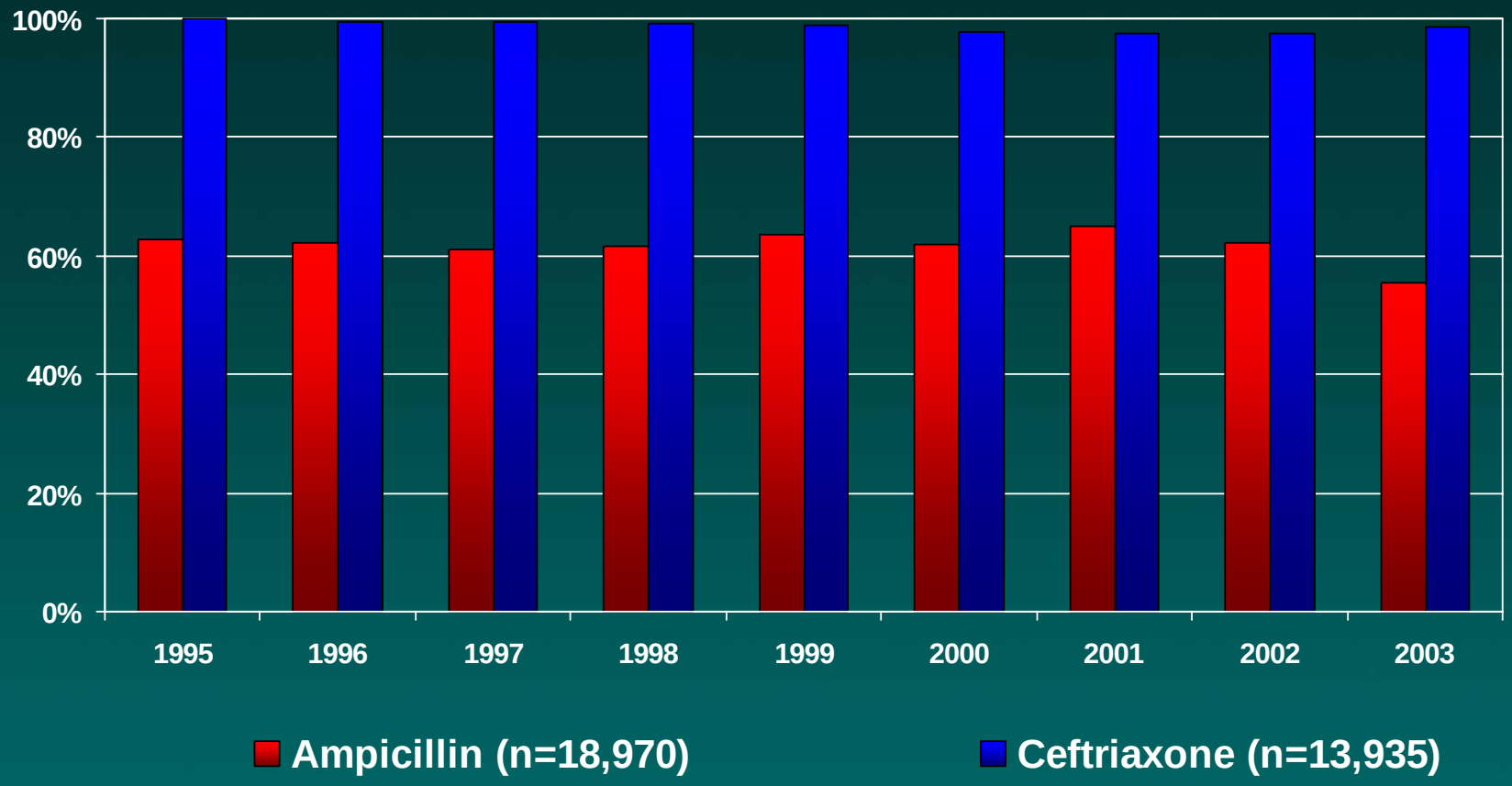
- Ceftazidime
- Cefepime
- Ciprofloxacin
- Levofloxacin
- Gentamicin
- Tobramycin
- Imipenem

Results: Decline/Increase in *S. pneumoniae* Susceptibility (1995-2003)

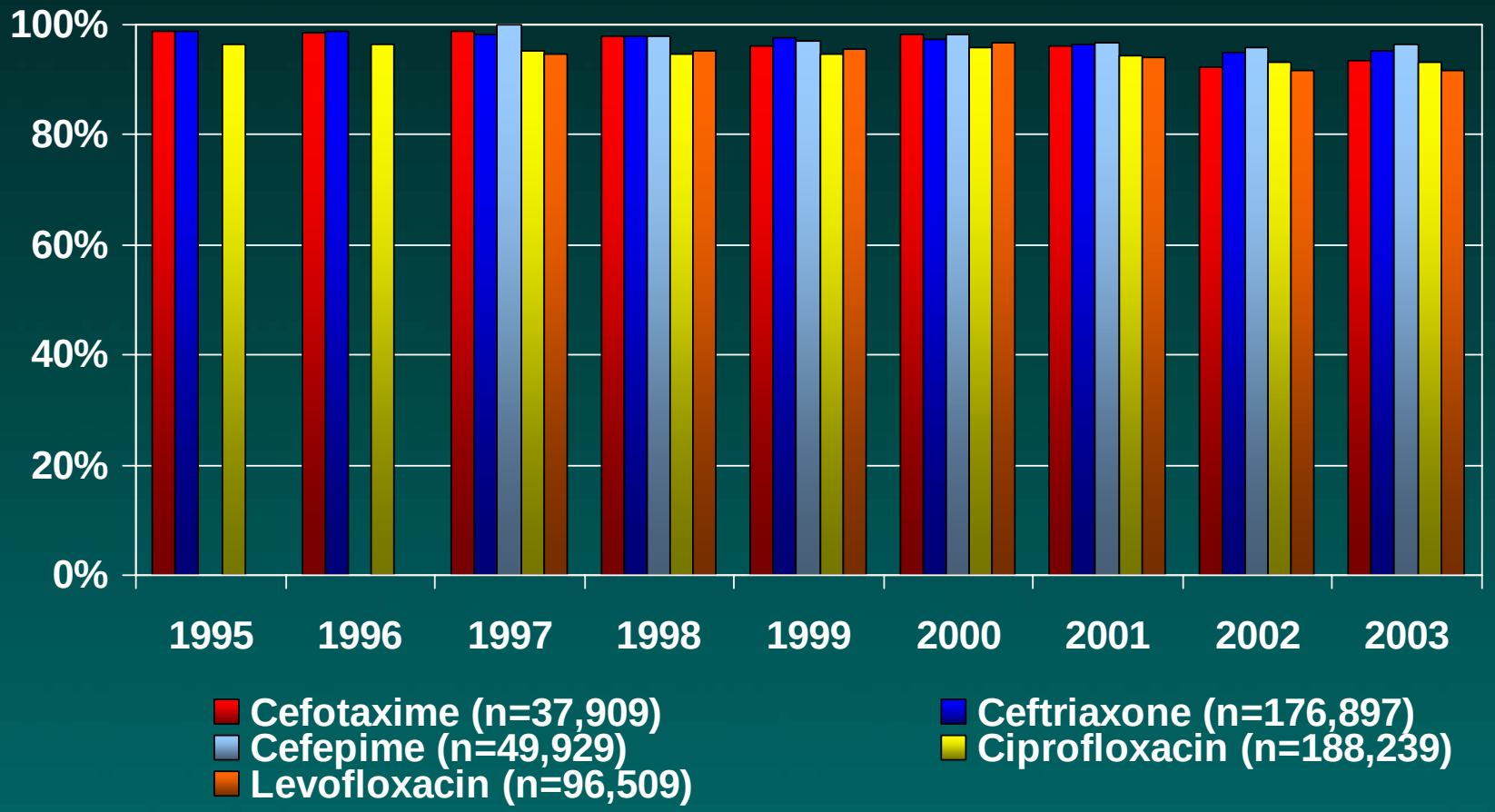


Levofloxacin not available until 1997

Results:
Decline in *H. influenzae* Susceptibility (1995-2003)

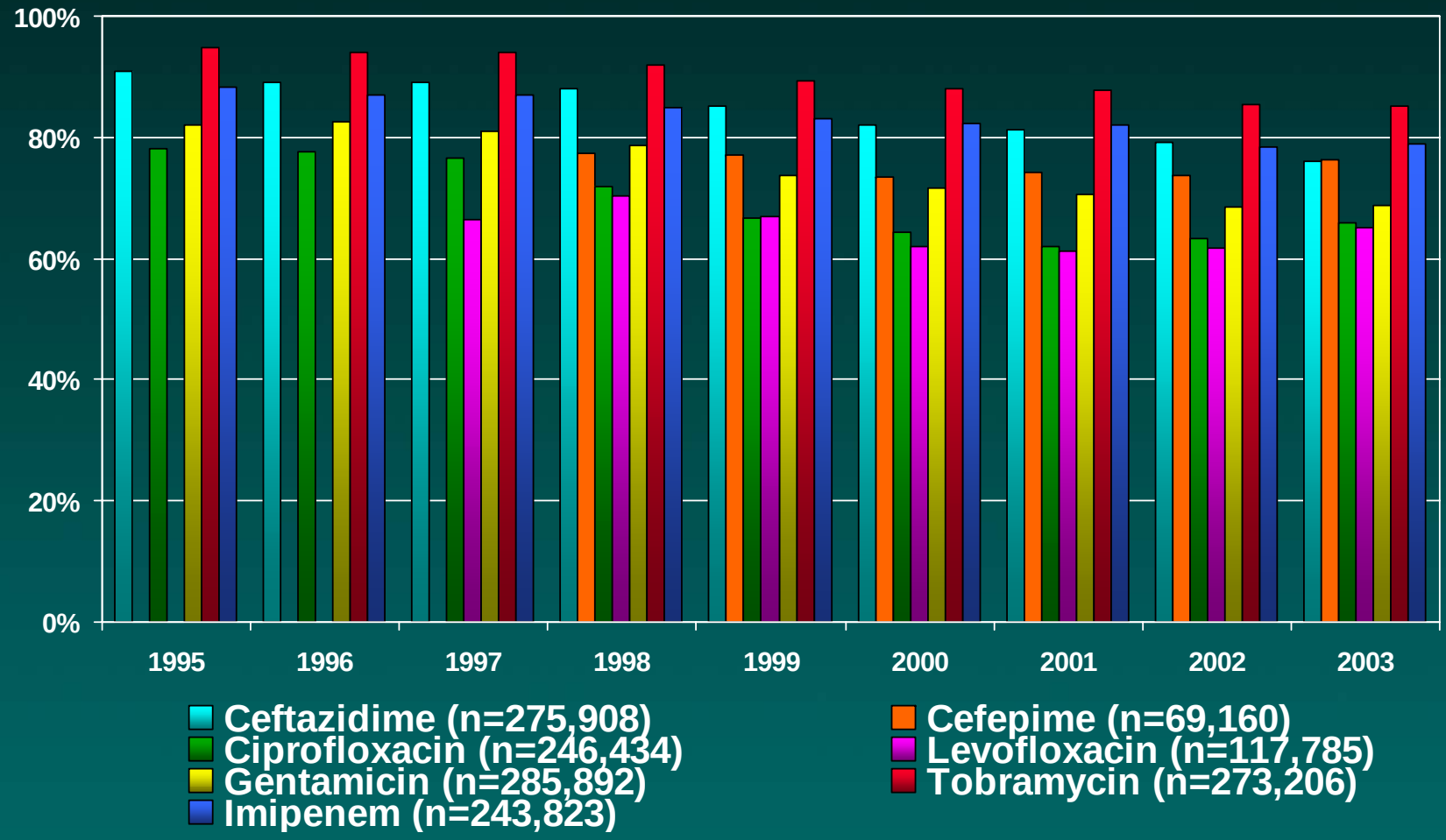


Results:
Decline in *K. pneumoniae* Susceptibility (1995-2003)



Data not available for cefepime and levofloxacin until 1997

Results:
Decline in *P. aeruginosa* Susceptibility (1995-2003)



Data not available for levofloxacin for 1995-1996 and cefepime for 1995-1997

Conclusion

- Among respiratory pathogens, resistance to commonly prescribed antibiotics increased between 1995 and 2003
- However, *S. pneumoniae* susceptibility to ceftriaxone and cefuroxime increased
- Nosocomial pathogens, *K. pneumoniae and P. aeruginosa*, exhibit considerable resistance to first line treatments

Clinical Implications

- Through benchmarking at different levels, the ARM Program works with institutions or hospital systems to delineate occurrence and extent of antibiotic resistance
- This allows institutions/systems to develop strategic interventions, with the potential to reduce the impact of antibiotic resistance on patient outcomes and cost