

# Comparative effectiveness of granulocyte growth factors among elderly patients with non-Hodgkin's lymphoma

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# Objectives – Project 4

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- **Describe the quality of supportive cancer care among Texas residents based on adherence to ASCO and NCCN guidelines.**
- **Describe variation in guideline adherence related to patient and provider factors**
- **Compare the clinical outcomes and average cost of care of guideline adherent care to non-adherent care**

# Background – Growth factors

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- **The risk of febrile neutropenia among elderly patients receiving CHOP-based regimens for NHL approaches 50%**
- **Granulocyte growth factors are effective in reducing the risk of febrile neutropenia and infection**
- **Granulocyte growth factors are relatively expensive; limiting their use to those who may benefit is a high priority**
- **Granulocyte growth factor prophylaxis is recommended beginning in cycle 1 for all elderly patients receiving doxorubicin-based chemo by NCCN and ASCO; it is a quality indicator for ASCO**

# Data Source & Sample Selection

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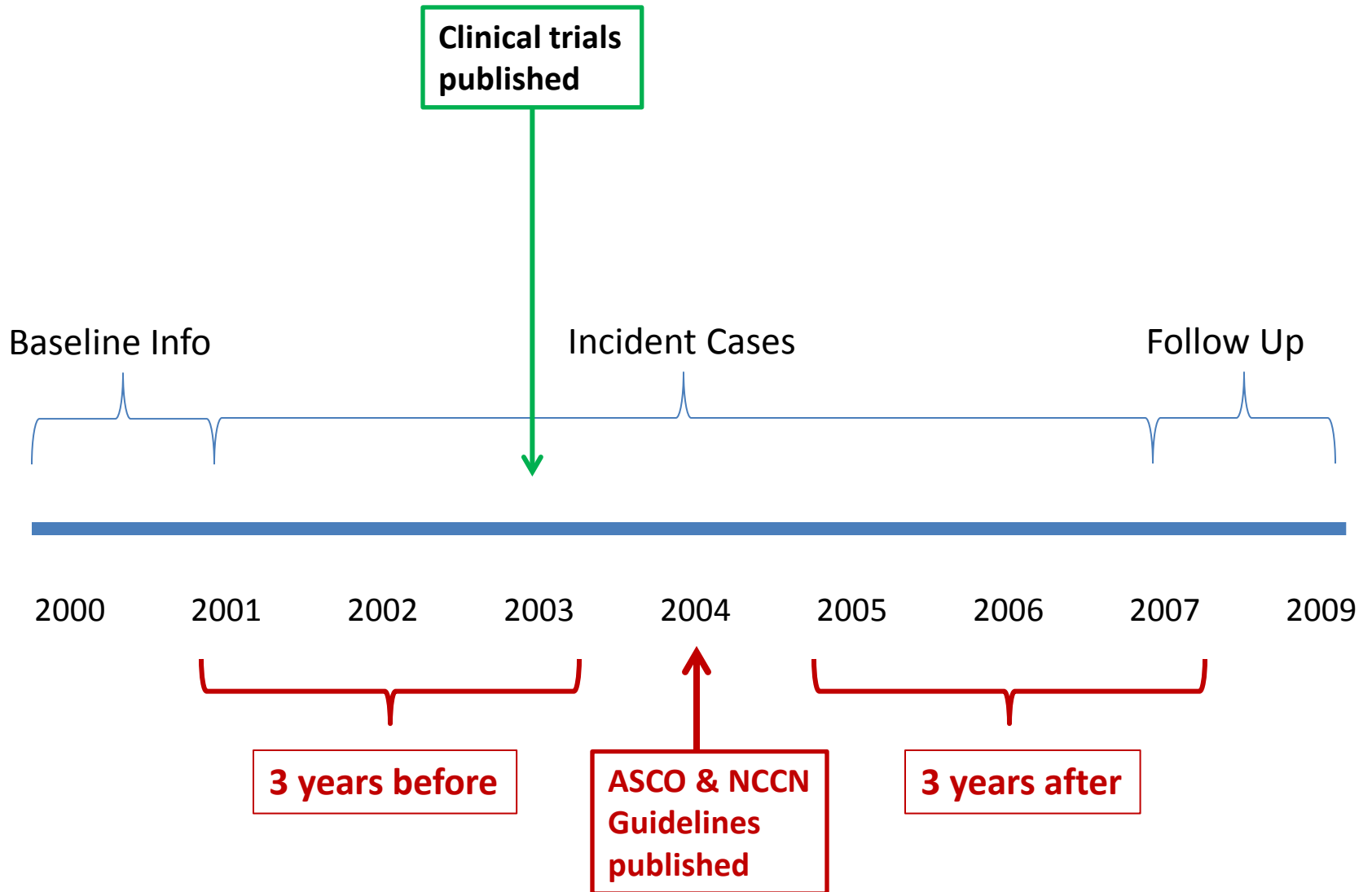
- **Linked Texas-Medicare & SEER-Medicare files**
- **Incident cases of NHL among Texas residents**
- **66 or older at diagnosis**
- **No second primary**
- **Diagnosed between 2001 and 2007**
- **Enrolled in Parts A & B for 12 months prior to diagnosis**
- **Not enrolled in HMO**
- **Received doxorubicin-base chemotherapy within 6 months of diagnosis**
- **Enrollment post doxorubicin for at least 2 months**
- **N = 728 from Texas TCR and 4891 from SEER TCR**

# Definitions

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- **Early growth factor: claim for filgrastim, pegfilgrastim, or sargramostim within 7 days of first dose of chemotherapy**
- **Guideline adherent care for NHL: at least one claim for growth factor during cycle 1**

# Study Schema

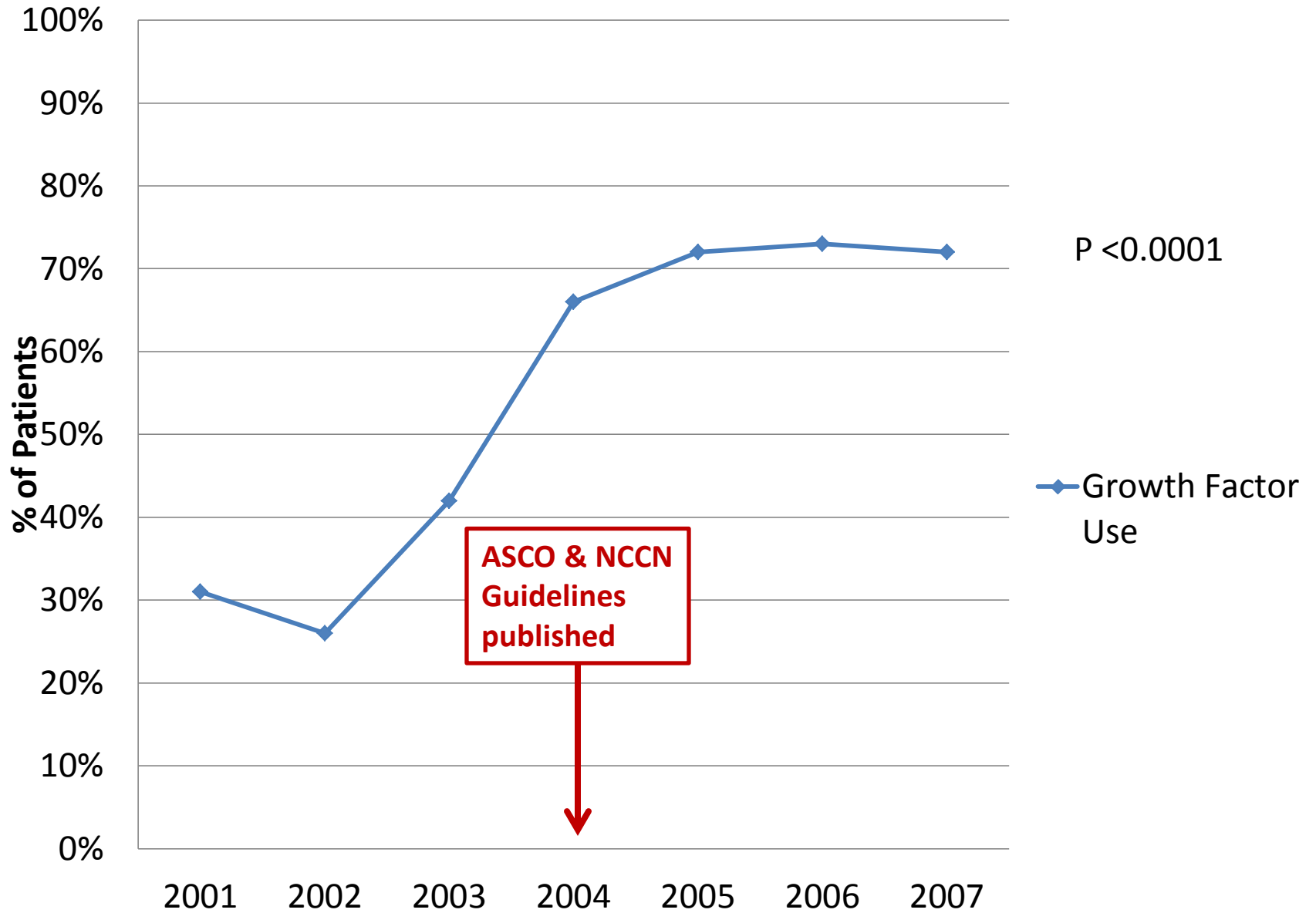


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# Growth Factor Use 56% Overall 2001-2007





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# Odds of Receiving Growth Factors

## Patient Factors Multivariate Analysis

Factor	Number of Patients	Odds Ratios (95% CI)	P Value
Age: <70 yrs	1133	Referent	
70 – 74 yrs	1598	1.11 (0.94-1.31)	0.24
75-79 yrs	1474	1.32 (1.11-1.57)	0.001
80 yrs	1414	1.59 (1.33-1.90)	<0.0001
Race: White	5154	Referent	
Black	177	0.99 (0.71-1.34)	0.95
Others	288	0.95 (0.73-1.25)	0.74
Ethnicity: Non-Hispanic	5138	Referent	
Hispanic	406	0.97 (0.76-1.22)	0.77
Unknown	75	1.05 (0.62-1.77)	0.86
Comorbidity Score: 0, 1	4919	Referent	
>1	700	1.14 (0.95-1.36)	0.16
Residence: Metropolitan	4658	Referent	
Not metropolitan	961	0.92 (0.77-1.10)	0.35
Percent of tract residents below poverty line: ≤ 4.08%	1401	Referent	
4.09% - 7.69%	1401	1.04 (0.90-1.20)	0.64
7.70%-14.22%	1389	0.84 (0.68-1.05)	0.13
≥ 14.23%	1395	0.97 (0.83-1.13)	0.66

# Odds of Receiving Growth Factors

## Provider Factors Multivariate Analysis

Factor	Number of Patients	Odds Ratios (95% CI)	P Value
Facility: Hospital based	3247	Referent	
Not hospital based	2372	1.25 (1.11-1.41)	0.0002
Board Certification:			
Medical Oncology	2632	Referent	
Hematology	1397	1.04 (0.90-1.20)	0.64
Internal Medicine	447	0.84 (0.68-1.05)	0.13
Others	1135	0.97 (0.83-1.13)	0.66
Number elderly pts treated with chemo per year			
<3	5000	Referent	
≥ 3	619	1.02 (0.84 – 1.23)	0.88
Region: Northeast	1140	Referent	
Midwest	772	0.62 (0.51-0.77)	<0.001
South	818	0.83 (0.66-1.03)	0.09
West	2161	0.70 (58 – 0.85)	0.0003
Texas	728	0.68 (0.54-0.86)	0.0001

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# Outcomes

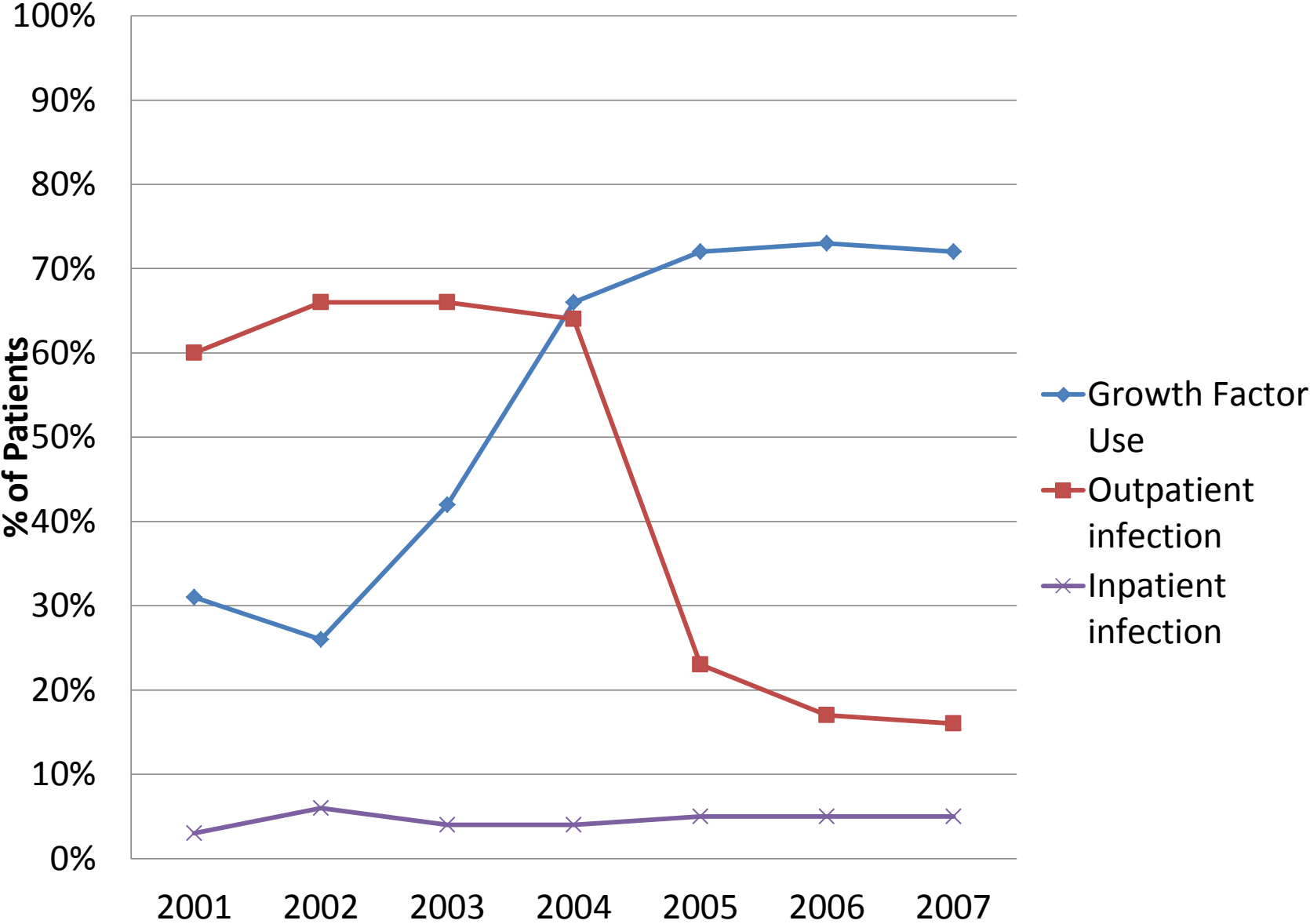
Outcome	Growth Factors	No Growth Factors	P Value
<b>% with Infection visit</b>			
Outpatient % (95% CI)	35% (33%-36%)	47% (45%-49%)	<0.0001
Inpatient % (95% CI)	5% (4% - 6%)	4% (3% - 5%)	0.047
Either % (95% CI)	37% (36% - 39%)	49% (47% - 51%)	<0.0001
<b>Days to cycle 2</b>			
Median days (min, max)	21 days (8-59)	21 days (8-57)	<0.0001
% with 22-24 days (95% CI)	11% (10%-13%)	15% (13% - 16%)	0.0003
% with 25-28 days (95% CI)	8% (7% - 9%)	12% (10%-13%)	<0.0001
% >28 days (95% CI)	7% (6% - 8%)	9% (8% - 10%)	0.006
% without cycle 2 (95% CI)	8% (7% - 9%)	7% (6% - 8%)	0.60
<b>Mean Cost of infection – All Pts</b>			
Outpatient cost Mean (SD)	\$102 (\$ 503)	\$ 72 (\$ 256)	<0.0001
Inpatient cost Mean (SD)	\$654 (\$3,472)	\$536 (\$4,481)	0.051
<b>Mean Cost of infection – Pts with infection</b>			
Outpatient cost Mean (SD)	\$ 259 (\$ 774)	\$ 144 (\$ 347)	<0.0001
Inpatient cost Mean (SD)	\$1656 (\$5,375)	\$1072 (\$6,295)	<0.0001

# Odds of Outpatient or Inpatient visit for Infection

## Multivariate Analysis

Factor	Odds Ratios (95% CI)	P Value
Growth Factor: No Yes	Referent 0.62 (0.55-0.69)	<0.0001
Age: <70 yrs 70 – 74 yrs 75-79 yrs 80 yrs	Referent 1.05 (0.90-1.23) 1.14 (0.97-1.34) 1.15 (0.97-1.35)	 0.54 0.10 0.11
Race: White Black Others	Referent 1.17 (0.86-1.59) 0.87 (0.67-1.12)	 0.33 0.27
Ethnicity: Non-Hispanic Hispanic Unknown	Referent 0.90 (0.72-1.12) 0.97 (0.60-1.57)	 0.32 0.91
Residence: Not Metropolitan Metropolitan	Referent 0.91 (0.78 - 1.06)	 0.24
Facility: Not Hospital based Hospital based	Referent 0.74 (0.67-0.83)	 <0.0001
High Care Volume: No Yes	Referent 0.77 (0.64 – 0.92)	 0.003
Region: Northeast Midwest South West Texas	Referent 0.99 (0.82-0.20) 0.95 (0.78-1.15) 0.81 (0.69 – 0.94) 0.80 (0.66-0.98)	 0.90 0.59 0.005 0.03

# Growth Factor Use and Outpatient and Inpatient Visits for Fever and Infection 2001-2007



# Conclusions

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- Growth factor use has increased dramatically since publication of clinical trials and guidelines
- Adherence to guidelines exceeds 70% in recent years
- Increased use of growth factors has been associated with a substantial reduction in the incidence of fever and infection, but not with a reduction in cost



# *Thanks*

Ying Xu, M.D., M.S.

