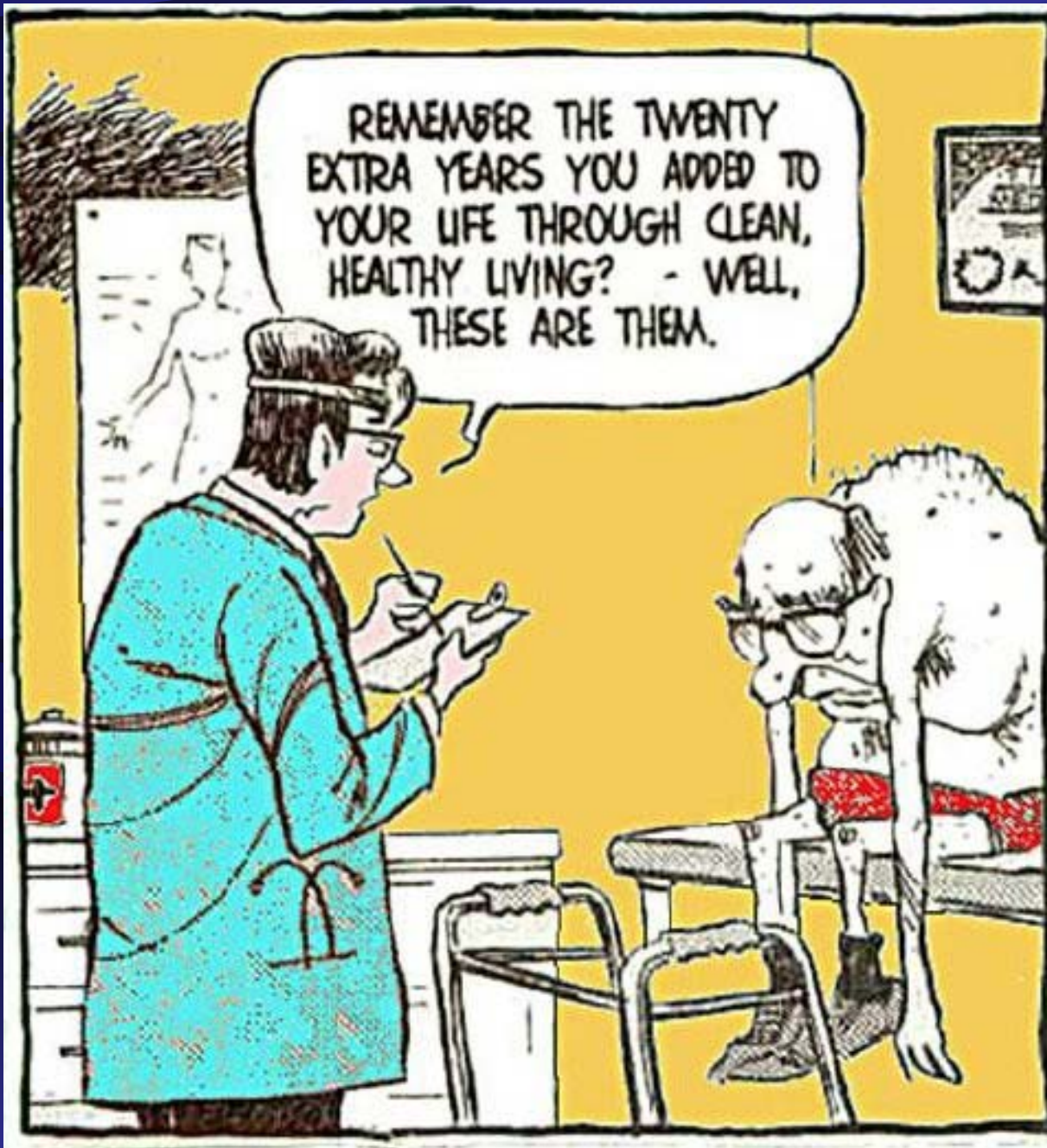


What Will it Take for DM to Demonstrate an ROI?

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The Story Line

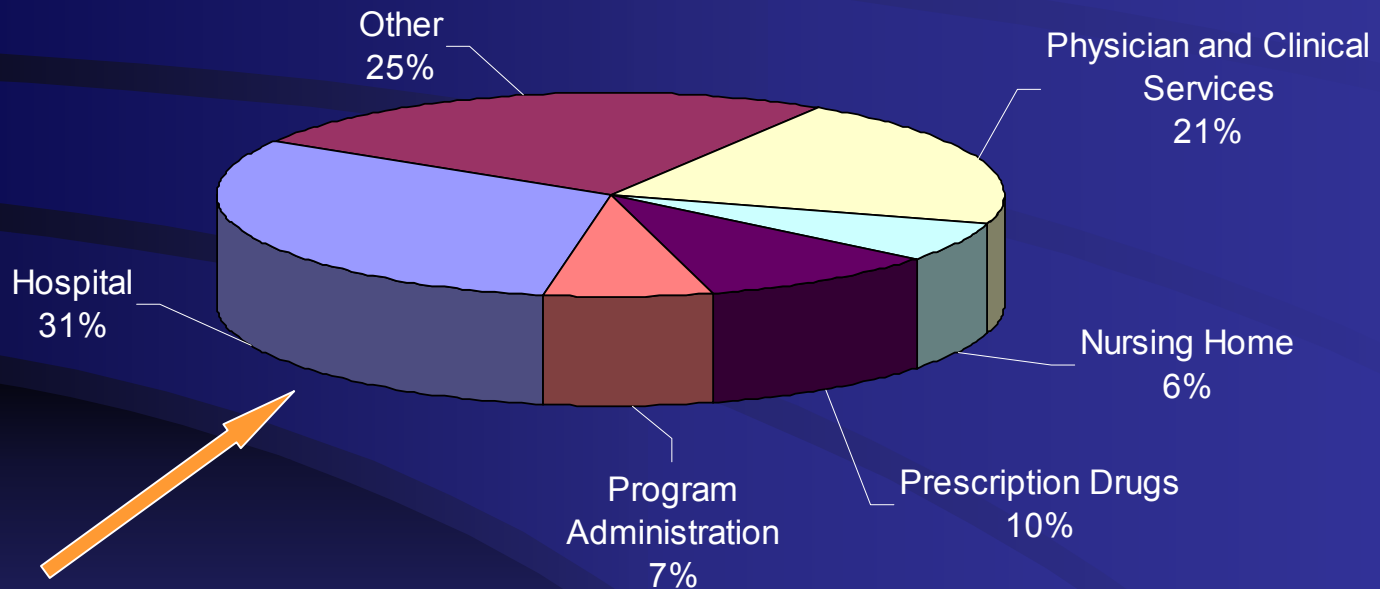
- ❖ DM is promoted as a major medical cost-savings mechanism.
- ❖ Financial outcomes are typically measured in terms of ROI (\$ spent vs. \$ saved).
- ❖ “Cost trends” are used to compare actual to predicted (diseased vs. non-diseased)
- ❖ “The jury is still out” on whether DM is economically effective

Plot

1. Demonstrate why cost is NOT a good measure of economic success.
2. Provide a more suitable alternative.
3. Demonstrate model to determine if there is sufficient opportunity to achieve economic savings – upfront!

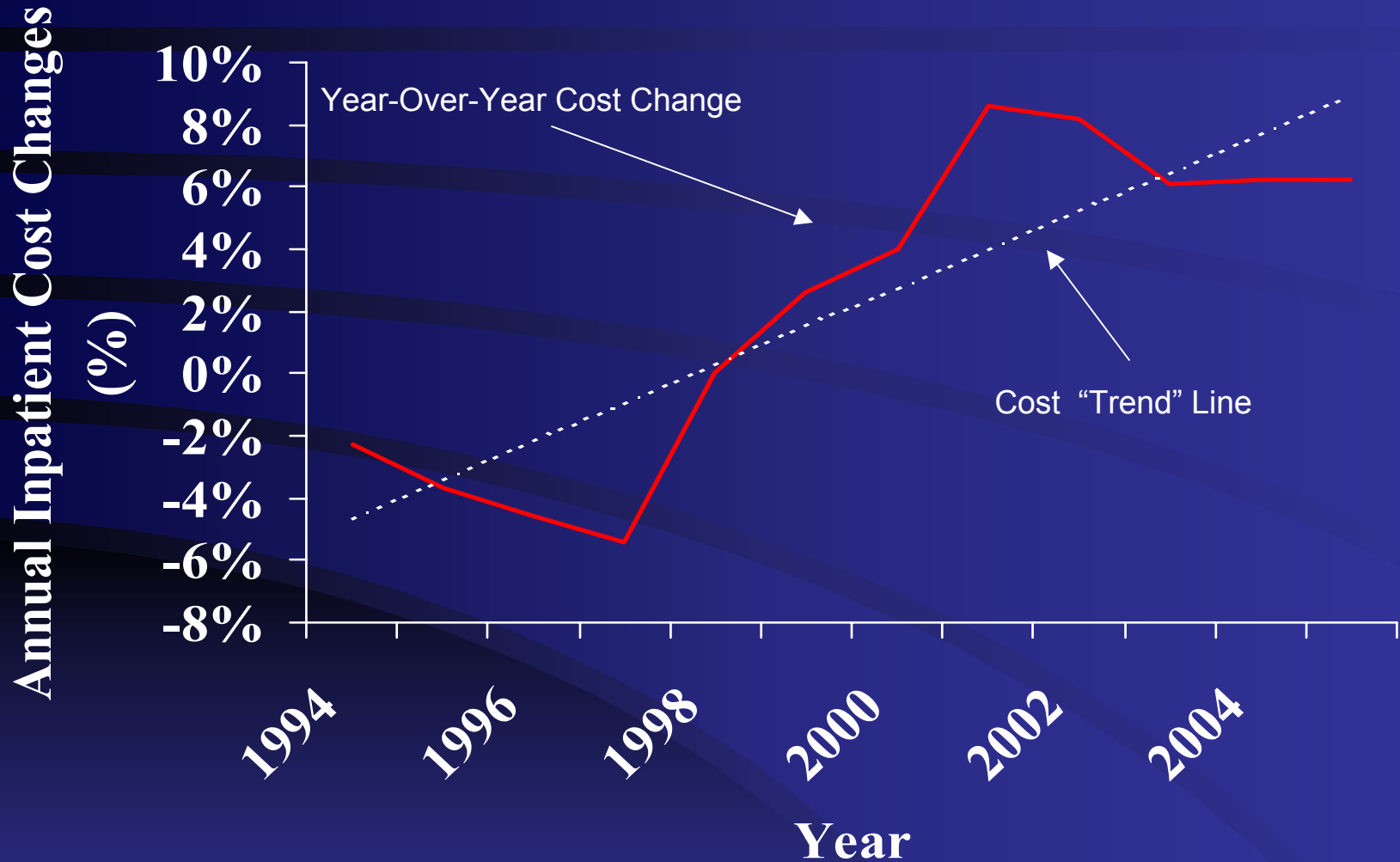
Where is the Savings Opportunity?

The Healthcare Dollar - 2004



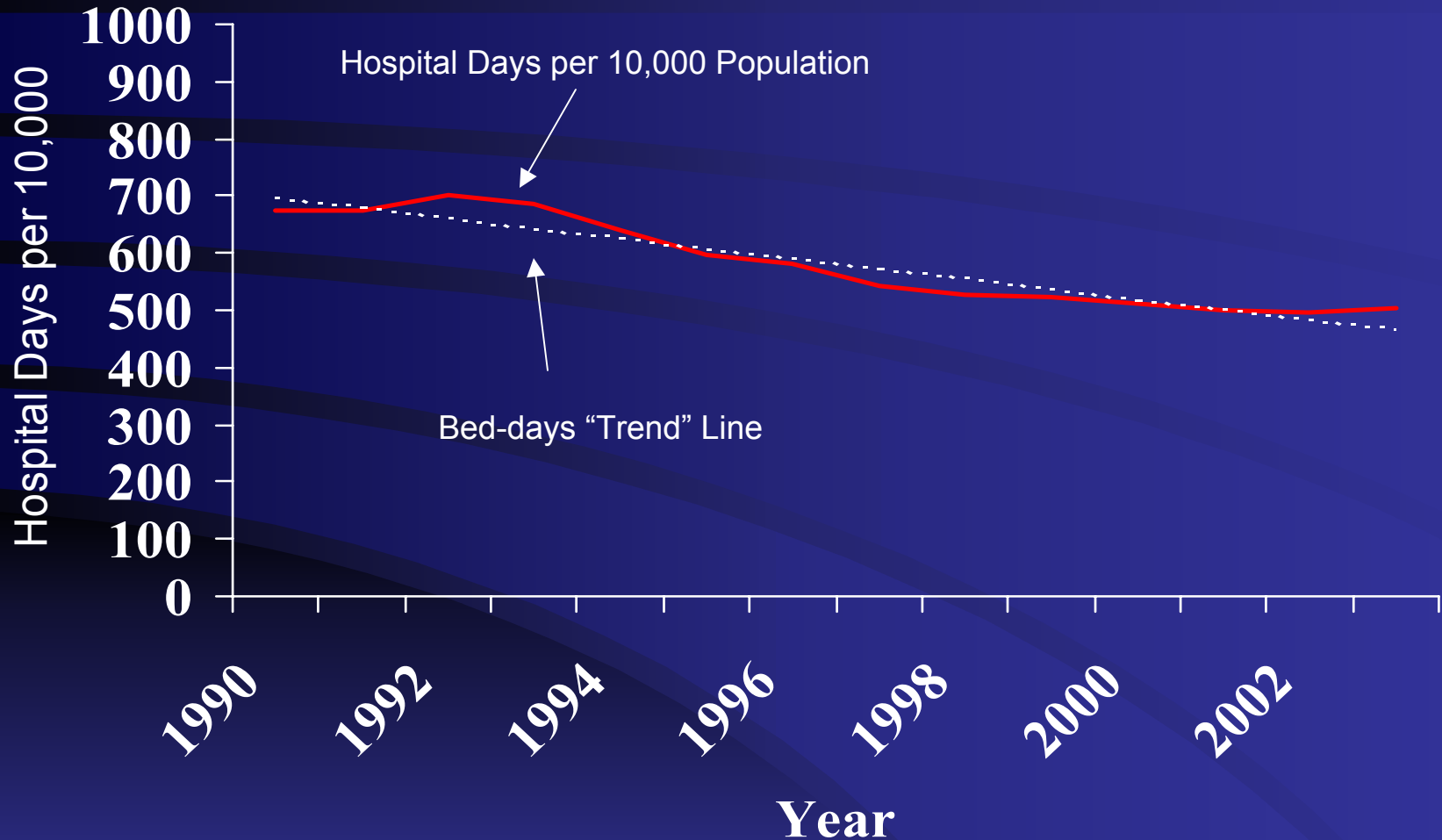
17% of admissions come from ED

Inpatient Cost Trends



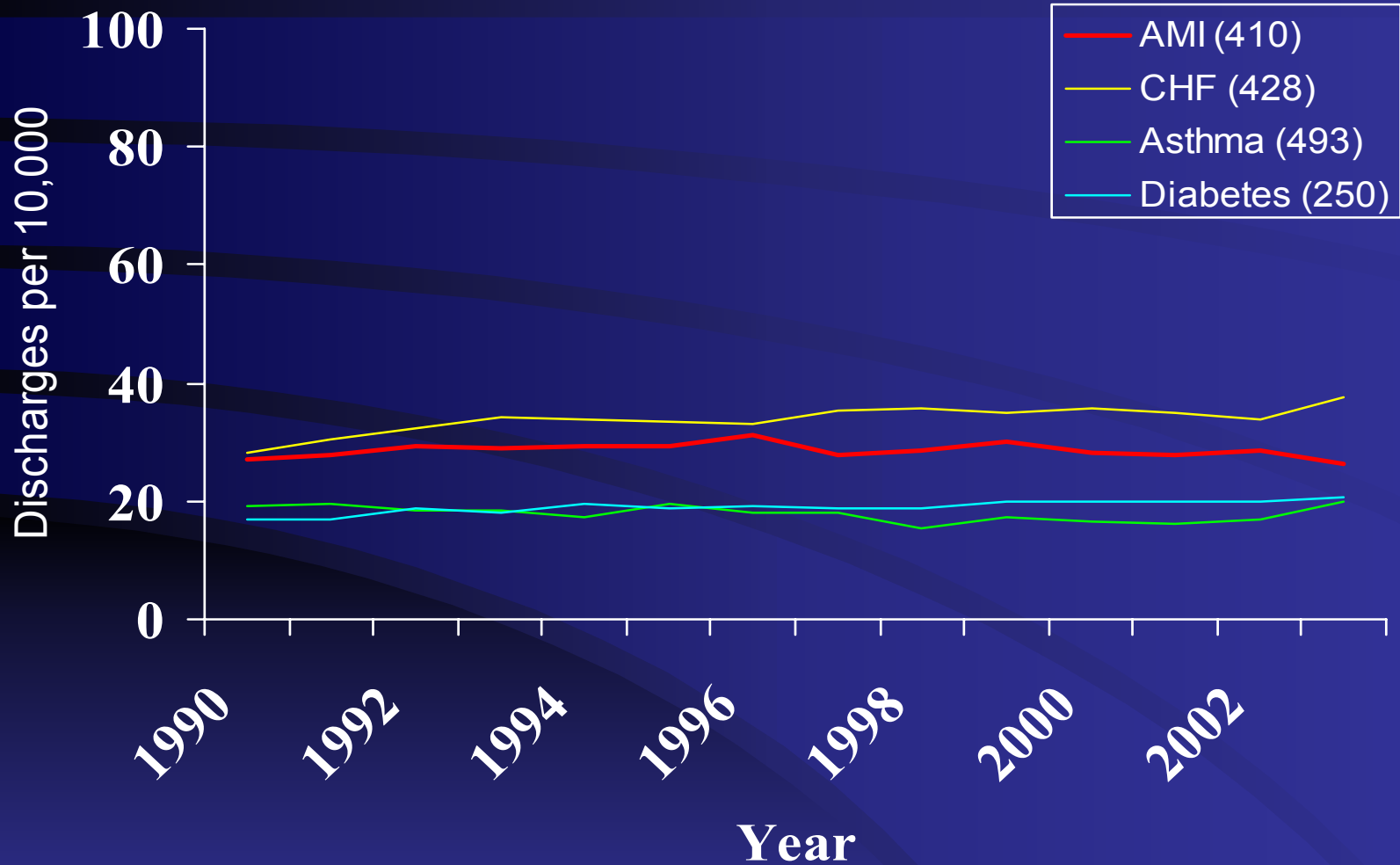
Hospital Days Trend

(AMI, CHF, Asthma, Diabetes)



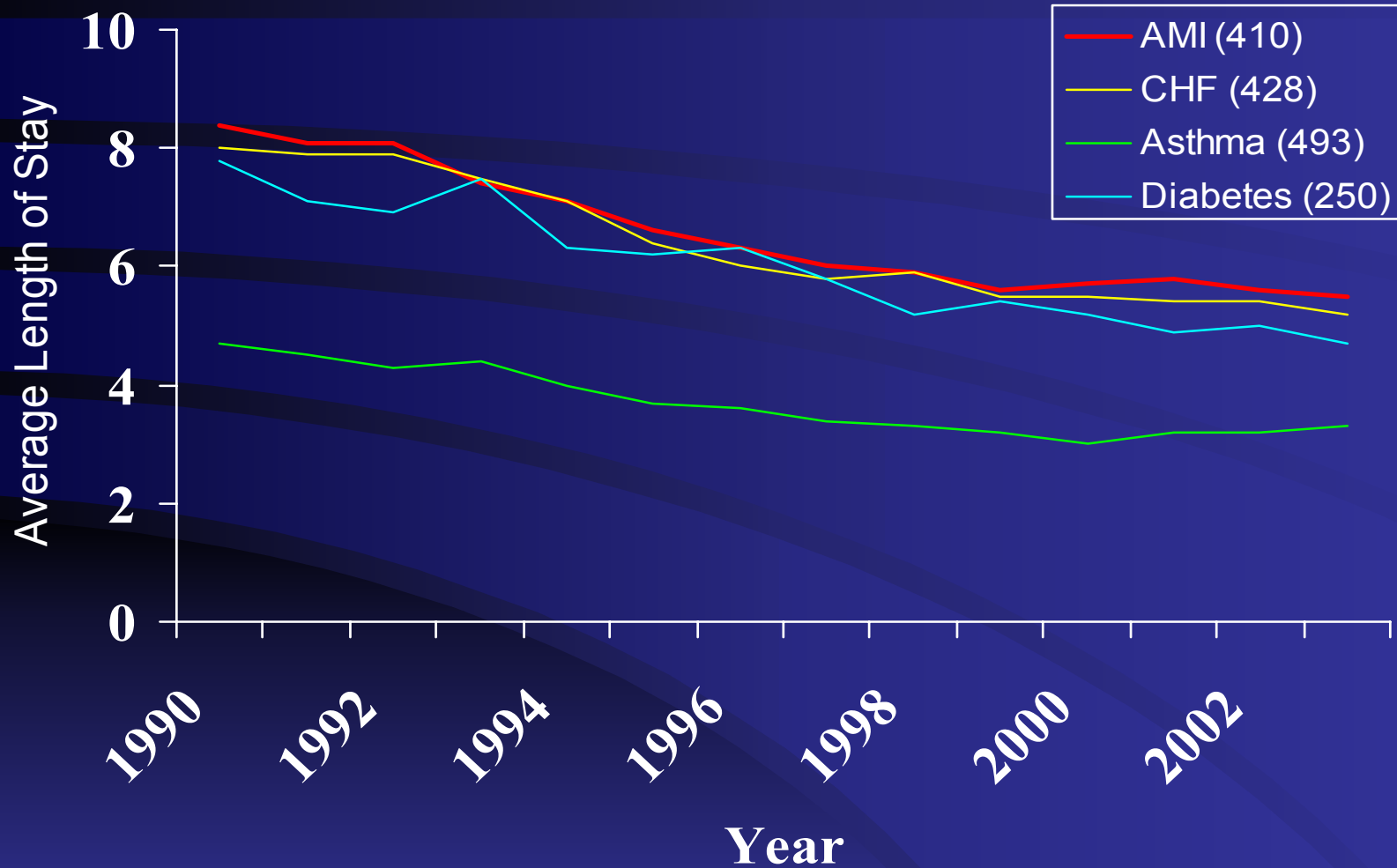
Hospital Discharge Trends

(AMI, CHF, Asthma, Diabetes)



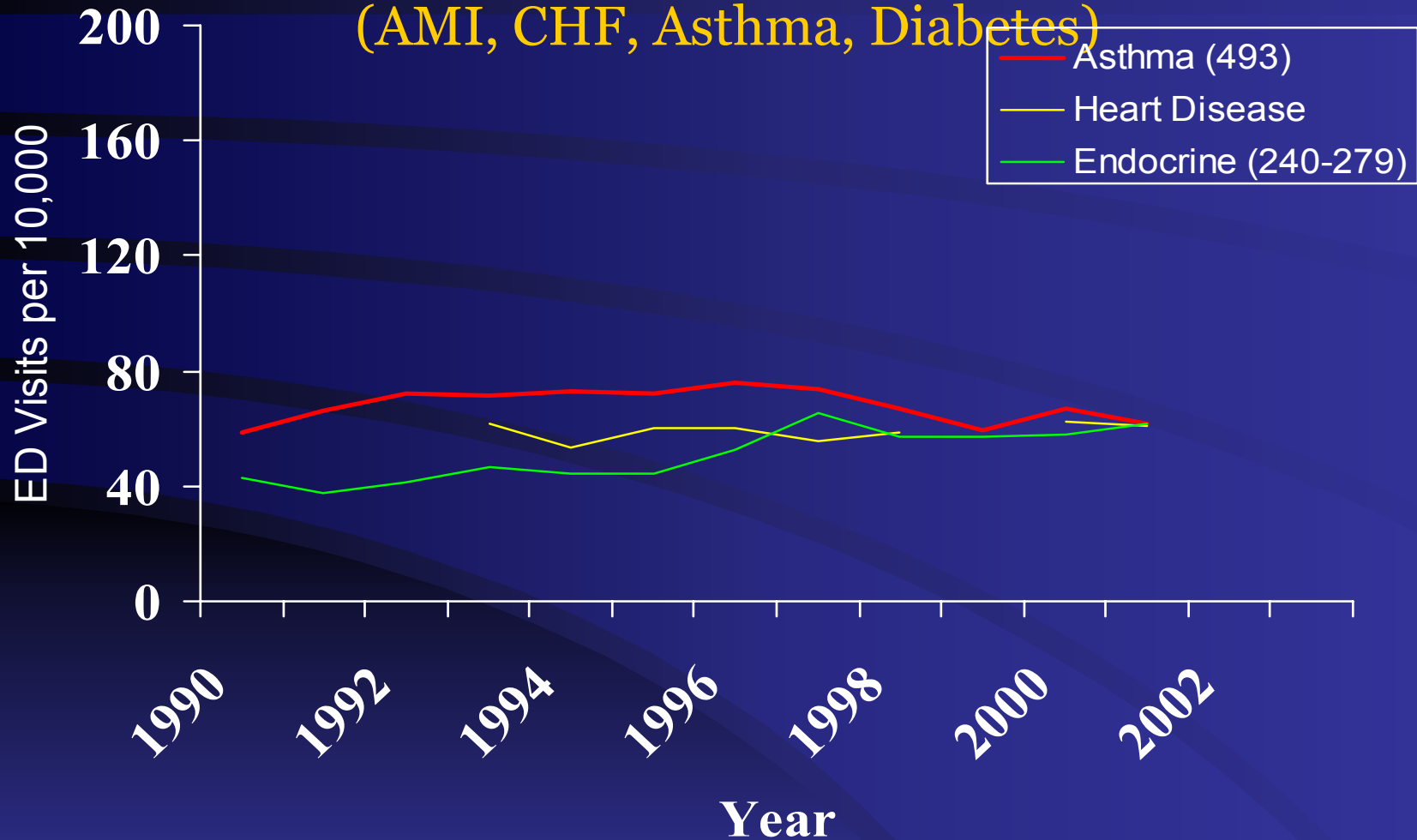
ALOS Trends

(AMI, CHF, Asthma, Diabetes)



Emergency Department Trends

(AMI, CHF, Asthma, Diabetes)



So What Have We Learned?

- ✓ Hospital costs have increased over time;
- ✓ Hospital days have decreased over time,
 - ✓ Discharges have been flat
 - ✓ ALOS has decreased

Deductive Reasoning

- ✓ Disproportionate increase in unit pricing
- ✓ DM cannot impact unit price of services
- ✓ DM can impact acute utilization

Thus:

- ✓ Programs should be evaluated on acute utilization and not costs directly.

Current Method (Scenario 1)

Baseline: 1000 admits X 5.0 ALOS X
\$1000 actual average day rate
= \$5,000,000

Year 1: 1000 admits X 5.0 ALOS X
\$1100 (estimated 10% increase in trend)
= \$5,500,000

Actual = \$5,200,000

Savings = \$300,000



Current Method (Scenario 2)

Baseline: 1000 admits X 5.0 ALOS X
\$1000 actual average day rate
= \$5,000,000

Year 1: 1000 admits X 4.8 ALOS X
\$1100 estimated 10% increase in trend
= \$5,280,000

Actual = \$5,200,000

Savings = \$80,000



Alternative Method

Measure admission and ED rates while holding unit prices constant:

Baseline: 1000 admits X \$5000 = \$5,000,000

Year 1: 900 admits X \$5000 = \$4,500,000

This controls for the confounding of unit pricing and secular decreases in ALOS (both beyond DM's purview)



Population vs. Diseased Cohort?

- ✓ DM fees are typically PMPM not PDMPM
- ✓ Unsolved issues in the identification of diseased patients, migration, disenrollment, etc.

Disease Specific vs. Non Disease?

- ✓ We would expect the intervention to decrease utilization in the targeted disease (primary outcome) and only then impact other non-specific outcomes.
- ✓ “Therapeutic Specificity”: it should not be assumed that an intervention targeting one disease will impact another.

Intervention Specificity

Example: Diabetes management and heart disease

- ✓ Clinical trials have not yet shown that aggressive management of HbA1c in diabetics leads to statistical reductions in CV events.
- ✓ Intensive BP and lipid management is more cost effective than targeting HbA1c as a means of reducing CAD.

Assessing Opportunity for DM

- ✓ Review historic acute utilization trends for admission and ED visit rates:
 - ✓ Are the rates trending up/down/flat?
 - ✓ Are the rates high enough to warrant an intervention?
- ✓ Perform a Number-Needed-to-Decrease (NND) analysis to determine ROI potential.

NND Analysis (1)

Assumptions

- Population Size = 100,000
- Discharge Rate = 1045 per 100,000
- ALOS = 4.8 days
- Hospital Day Rate = \$1000
- Cost per admit = \$4800
- Vendor fees = $\$0.90 \times 100,000 \times 12 =$
 $\$1,080,000$

NND Analysis (2)

To break-even:

$$\frac{\text{Vendor fees}}{\text{Cost/Admit}} = \frac{\$1,080,000}{\$4800} = 225$$

225 admissions (from these 4 diseases) must be reduced in order to break even on fees.

Percent decrease from baseline = $225 \div 1045 = 21.5\%$



NND Analysis (3)

Table 1. Assume \$0.90 PMPM program fees

ROI	Cost/day = \$1000		Cost/day = \$2000	
	NND	% Decrease	NND	% Decrease
1.0	225	21.5	113	10.8
1.5	338	32.3	170	16.2
2.0	450	43.0	226	21.6
2.5	563	53.8	283	27.0
3.0	675	64.5	339	32.4

NND Analysis (4)

Table 2. Assume \$1.20 PMPM program fees

ROI	Cost/day = \$1000		Cost/day = \$2000	
	NND	% Decrease	NND	% Decrease
1.0	300	28.7	150	14.4
1.5	450	43.1	225	21.5
2.0	600	57.4	300	28.7
2.5	750	71.8	375	35.9
3.0	900	86.1	450	43.1

First Set of Conclusions

- ✓ Measuring cost directly does not “tease out” the program impact vs. unit pricing
- ✓ National data has shown flat admission rates and declining ALOS which raises the question of “opportunity”
- ✓ Using the population’s data, an NND analysis should be conducted a-priori.

Criticisms

- ✓ Measuring rates at the population level does not account for differential enrollment trends
- ✓ Reviewing disease-only hospitalization data disregards changes in acute utilization for comorbidities of the primary condition
- ✓ As a result, savings are underestimated

NND in a Diabetic Population (1)

- ✓ Claims data from a medium-sized health plan were retrieved for the period between 2001 and 2004
- ✓ Diabetics in a health plan were identified retrospectively using HEDIS 2006 criteria
- ✓ Overall prevalence was 5%

NND in a Diabetic Population (2)

Table 3. Characteristics of the diabetic cohort under study

	Commercial (77.8%)	Medicare (14.2%)	Medicaid (8.0%)
Age	48.9	71.3	46.5
Female (%)	59.8	66.0	60.3
Enrollment (months)	25.0	20.0	27.0

NND in a Diabetic Population (3)

Hospitalizations were categorized into 3 groups:

- ✓ Diabetes only
- ✓ Diabetes + Comorbidities
- ✓ Diabetes + Comorbidities + “Possibles”

1150 primary codes were evaluated by an expert in field - (Tom Biuso, MD, MBA)



NND in a Diabetic Population (4)

Table 4. Break-even point for a diabetes disease management program

Assumptions	Diabetes Only	Diabetes, Comorbidities	Diabetes, Comorb, Possibles
Admits per 10,000	377	658	1018
ALOS	4.3	4.7	4.5
Cost/Admit (\$2k/day)	8,600	9,400	9,000
Program Fees (\$20/mo.)	\$2.4 M	\$2.4 M	\$2.4 M
NND (break-even)	279	255	267
% Reduction	74	39	26



Second Set of Conclusions (1)

- ✓ Using a disease specific cohort elicits even more stringent performance requirements than at the population level for DM to break-even
- ✓ Expanding the diagnoses to include nearly everything related to the disease does not make life that much easier.

Second Set of Conclusions (2)

- ✓ Fees are the only variable that can be manipulated. Thus more cost effective interventions should be considered to bring down costs.
- ✓ Alternate measures of economic effectiveness should be considered
- ✓ An NND analysis should be conducted using either the population or cohort.

Health Researcher's Oath

I (state your name), hereby acknowledge that the methods presented herein do NOT solve every source of bias in the evaluation of DM program effectiveness and should not be construed as such.



References

Linden A. What will it take for disease management to demonstrate a return on investment? New perspectives on an old theme. *Am J Manage Care* 2006;12(4):217-222.

Linden A, Biuso TJ. In search of financial savings from disease management: applying the number needed to decrease (NND) analysis to a diabetic population. Under Review



Q & A

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