

# **Modeling the Health Outcomes of Capping California's ADAP Program**

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# Objective

**To Model the Differential Health Outcomes  
from Capping California's AIDS Drug  
Assistance Program (ADAP)**

# Specific Aims

- **Estimate the excess number of new AIDS diagnoses and deaths resulting from capping the ADAP program**
- **Estimate the number of deaths occurring on the waiting list**
- **Identify the model's sensitivity to key input parameters and assumptions**

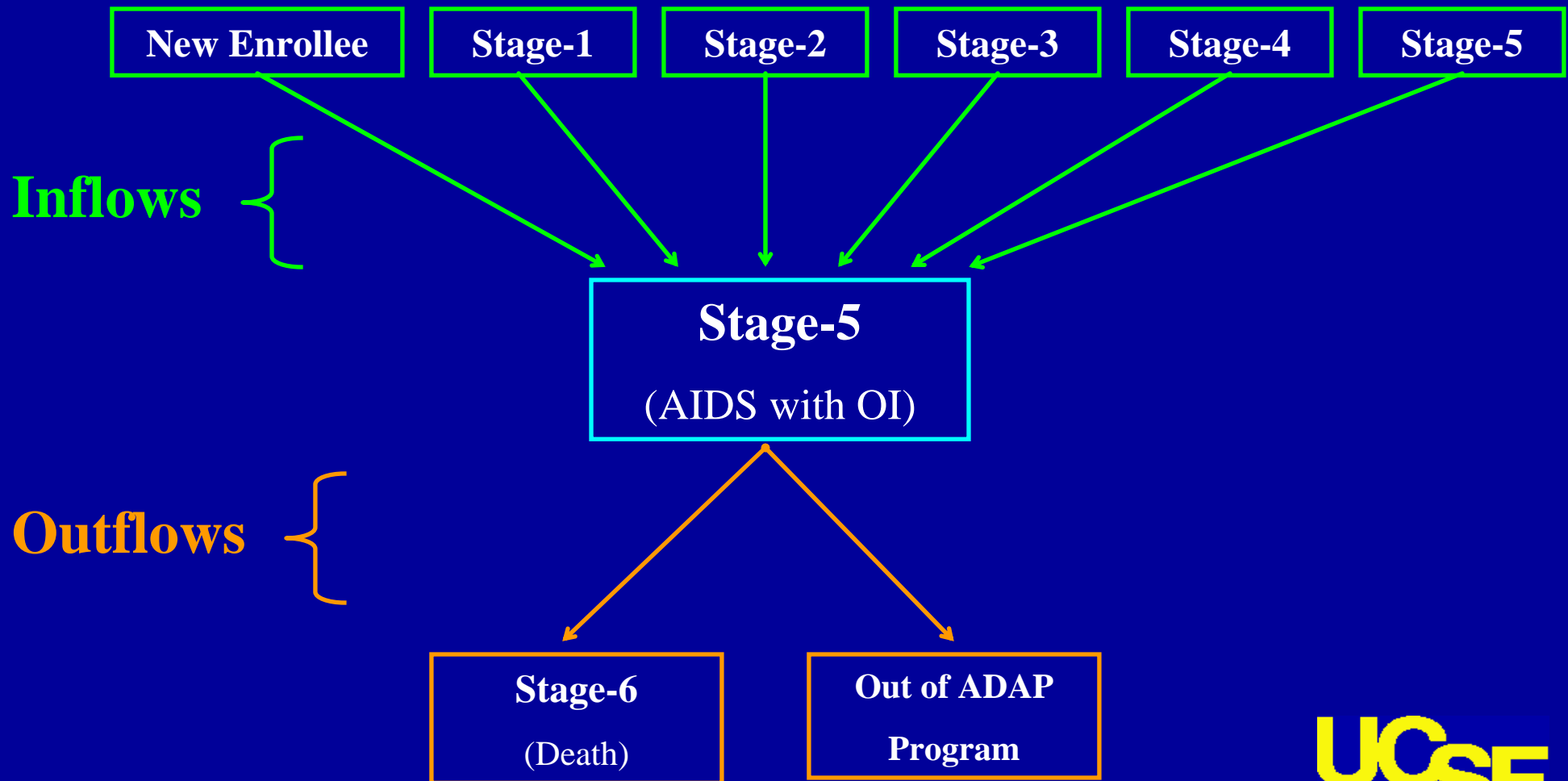
# Methods

- **Disease State Transition (Markov) Model**
- **Probabilistic simulation of individual enrollee's disease progression over time**
- **Compare results under model with cap to results under model without cap**
- **Programmed in SAS**

# Disease Stages

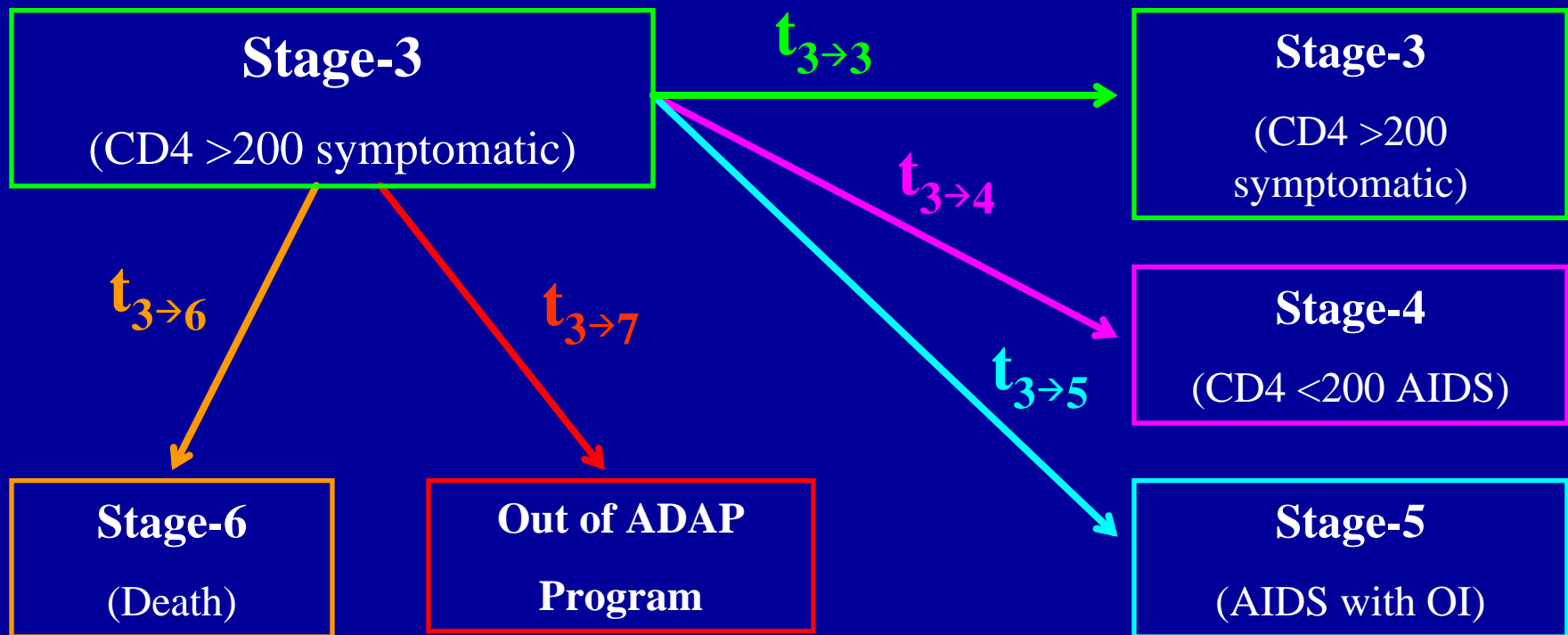
<b>Stage</b>	<b>Description</b>
1	CD4 count > 500
2	CD4 count 500 – 200, no symptoms
3	CD4 count 500 – 200, symptomatic
4	CD4 count < 200 (1993 AIDS definition)
5	AIDS defining condition (1987 definition)
6	Death

# Simplified State Schema



# Simplified Transition Schema

## Individual's Current State



$t_{3 \rightarrow 5}$  = transition probability from stage 3 to stage 5 in next quarter.

# Model Comparison

## Cap

- Active eligible persons enrolled up to cap
- Waiting list: first-on, first-off into open ADAP slot
- Active persons can receive reductions in progression probabilities from ART
- Waitlist persons do not receive ART reductions in progression probabilities
- Persons progress while on waitlist

## No Cap

- All eligible persons enrolled
- No waiting list
- All persons can receive reductions in progression probabilities from ART.

# Model Inputs

## Model Element

- Current number of ADAP enrollees
- Current disease stage distribution
- Expected new enrollees
- Expected growth in new enrollees
- Expected ADAP program growth
- Disease stage transition probabilities
- ARV reduction in disease stage transition probabilities
- Probability of remaining in ADAP
- Size of enrollee cap
- Proportion on effective ARV therapy

## Source

- 2003 ADAP data
- 2003 ADAP data
- ADAP data projection
- ADAP data projection
- ADAP data projection
- Published literature summary
- Published literature summary, Kahn 2001
- ADAP data
- Office of AIDS statement
- Estimate, published ADAP study

# ADAP Enrollment

<b>Year</b>	<b>Enrollees</b>	<b>New Enrollees</b>
<b>1999</b>	<b>19,165</b>	<b>2,469</b>
<b>2000</b>	<b>21,940</b>	<b>2,084</b>
<b>2001</b>	<b>23,723</b>	<b>2,202</b>
<b>2002</b>	<b>24,102</b>	<b>1,633</b>
<b>2003</b>	<b>25,759</b>	<b>2,232</b>
<b>annual growth</b>	<b>7.7%</b>	

# 2003 Disease Stage Distribution

<b>Stage</b>	<b>Description</b>	<b>Current Enrollees</b>	<b>New Enrollees</b>
<b>1</b>	<b>CD4 count &gt; 500</b>	<b>20%</b>	<b>20%</b>
<b>2</b>	<b>CD4 count 500 – 200, no symptoms</b>	<b>13%</b>	<b>17%</b>
<b>3</b>	<b>CD4 count 500 – 200, symptomatic</b>	<b>11%</b>	<b>10%</b>
<b>4</b>	<b>CD4 count &lt; 200 (1997 AIDS definition)</b>	<b>19%</b>	<b>19%</b>
<b>5</b>	<b>AIDS defining condition (1983 definition)</b>	<b>37%</b>	<b>34%</b>

# Quarterly HIV Disease Stage Transition Probabilities

Stage	→ 1	→ 2	→ 3	→ 4	→ 5	→ 6	→ Out
1 →	.9579	.02	.01	.002	.0005	.0018	.0078
2 →	-	.9428	.04	.005	.003	.0027	.0065
3 →	-	-	.9117	.06	.02	.003	.0053
4 →	-	-	-	.9478	.03	.012	.0102
5 →	-	-	-	-	.8789	.047	.0741
6 →	-	-	-	-	-	1	0
Out →	-	-	-	-	-	-	1

# Quarterly Disease Stage Transition: Percent Reduction by ARV

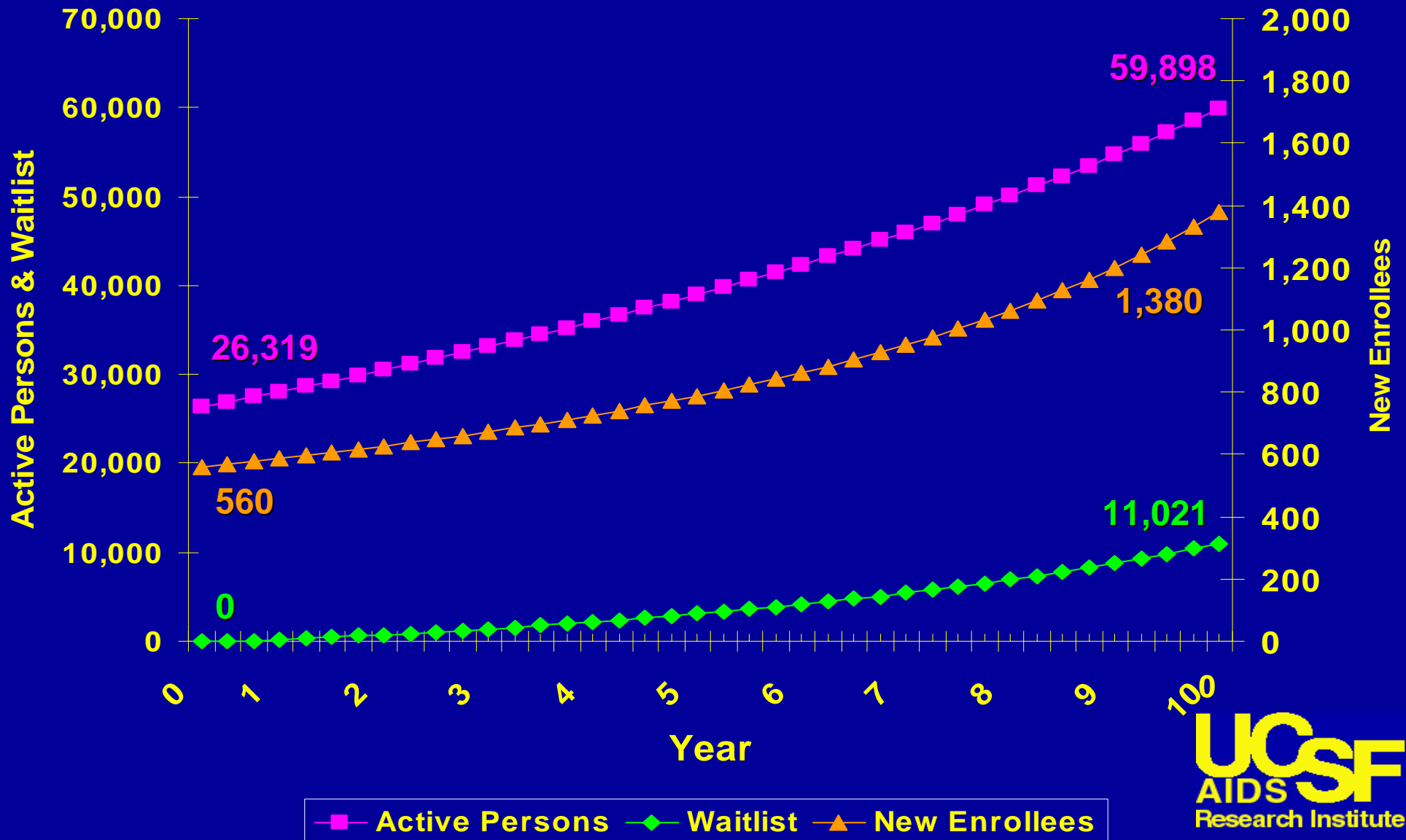
Stage	→ 1	→ 2	→ 3	→ 4	→ 5	→ 6
<b>1 →</b>	-	91%	91%	91%	91%	84%
<b>2 →</b>	-	-	90%	90%	90%	82%
<b>3 →</b>	-	-	-	87%	87%	79%
<b>4 →</b>	-	-	-	-	54%	70%
<b>5 →</b>	-	-	-	-	-	67%

Kahn et al., 2001

# 2003 ARV Use by Stage

<b>Stage</b>	<b>Description</b>	<b># on ARVs</b>	<b>% on ARVs</b>
<b>1</b>	<b>CD4 count &gt; 500</b>	<b>1321</b>	<b>26%</b>
<b>2</b>	<b>CD4 count 500 – 200, no symptoms</b>	<b>1270</b>	<b>37%</b>
<b>3</b>	<b>CD4 count 500 – 200, symptomatic</b>	<b>2677</b>	<b>97%</b>
<b>4</b>	<b>CD4 count &lt; 200 (1997 AIDS definition)</b>	<b>4695</b>	<b>95%</b>
<b>5</b>	<b>AIDS defining condition (1983 definition)</b>	<b>8997</b>	<b>93%</b>

# Projected ADAP Growth



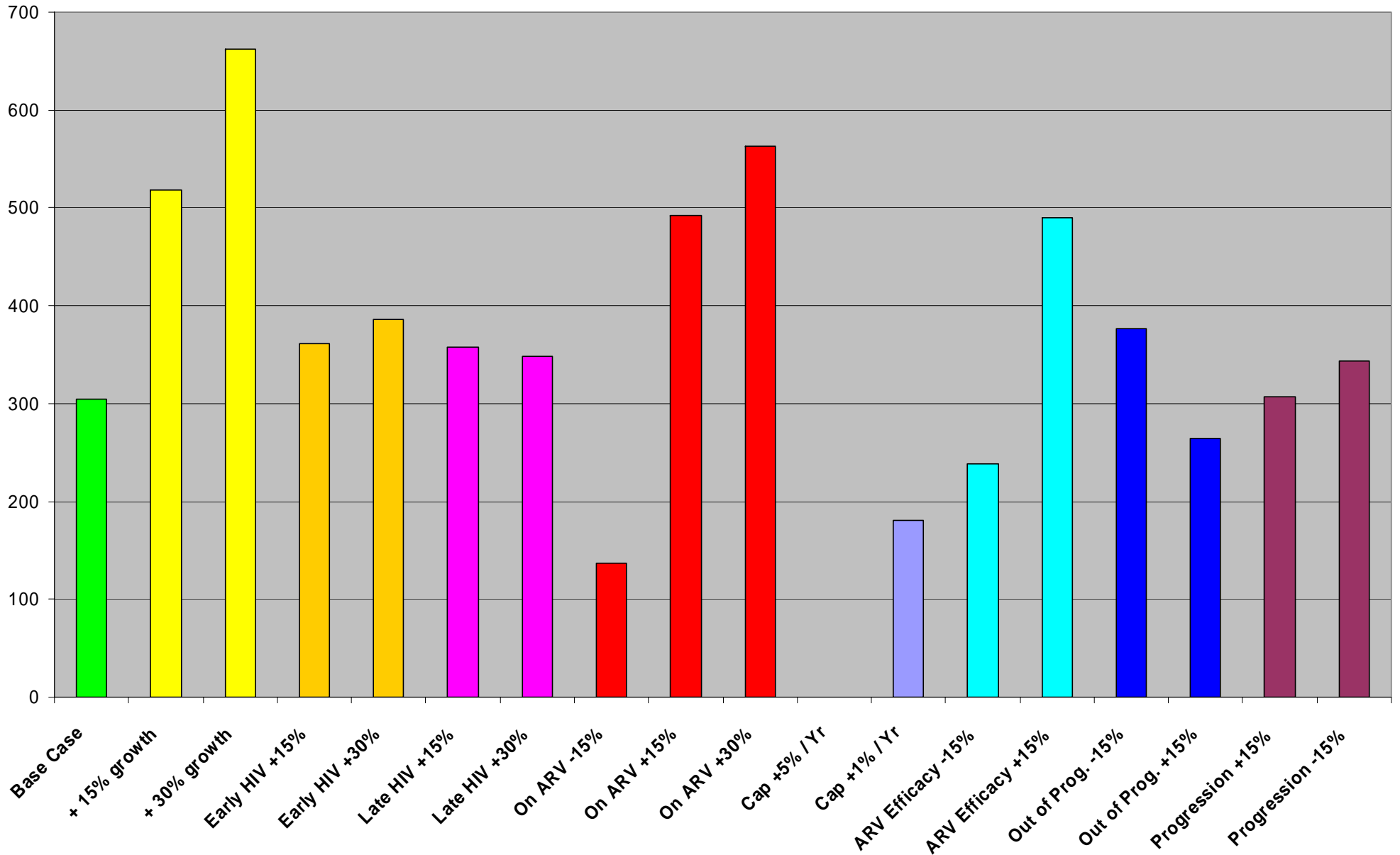
# Summary Model Results (5 & 10 Year)

5-Year	New Lab AIDS DX	New Clinical AIDS DX	Deaths	On Waitlist	Died on Waitlist
Cap	2274	2746	5759	3070	592
No Cap	2041	2638	5455	0	0
Excess	233	108	304		

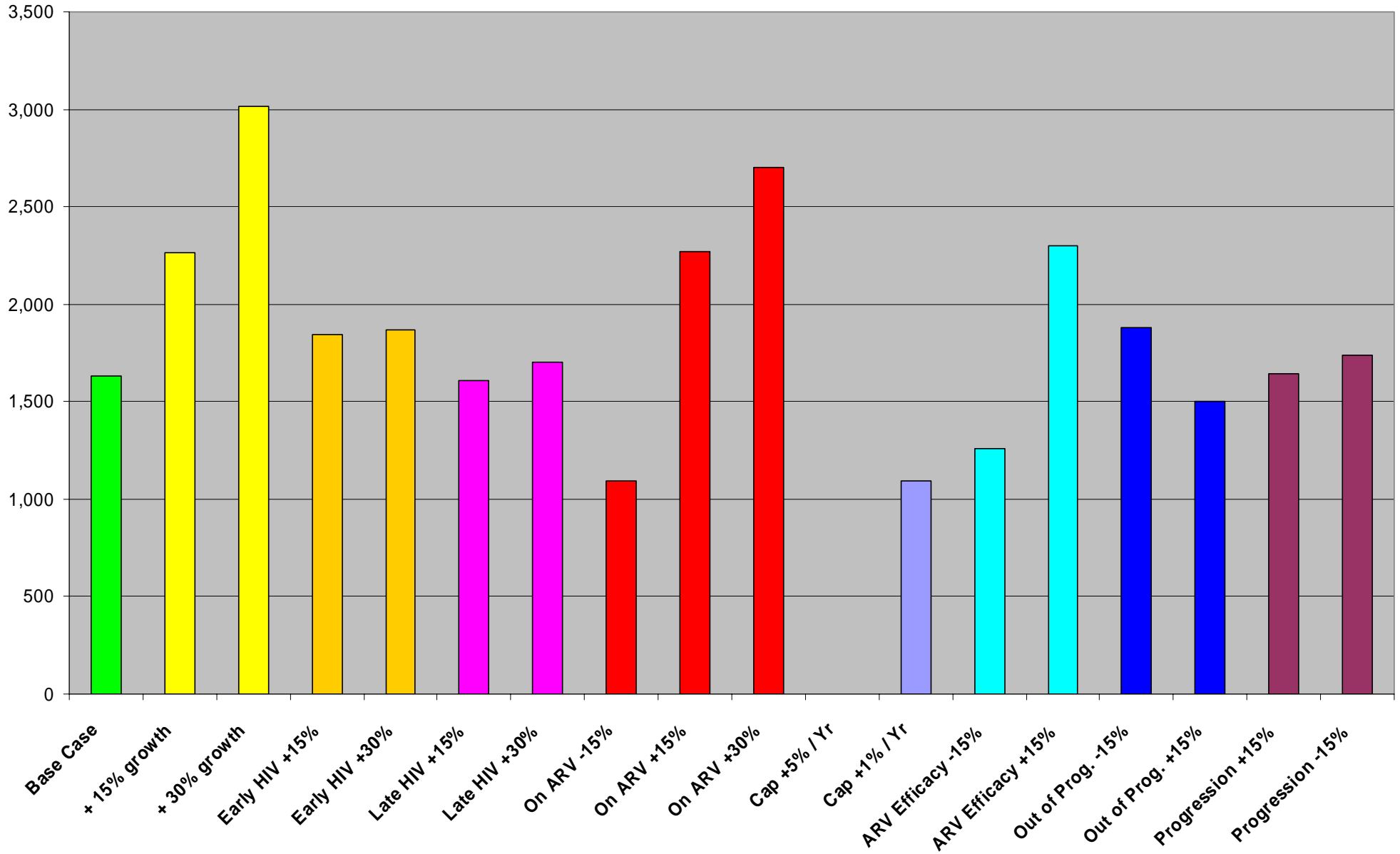
  

10-Year	New Lab AIDS DX	New Clinical AIDS DX	Deaths	On Waitlist	Died on Waitlist
Cap	5862	6834	13769	11021	3410
No Cap	4920	5981	12137	0	0
Excess	942	853	1632		

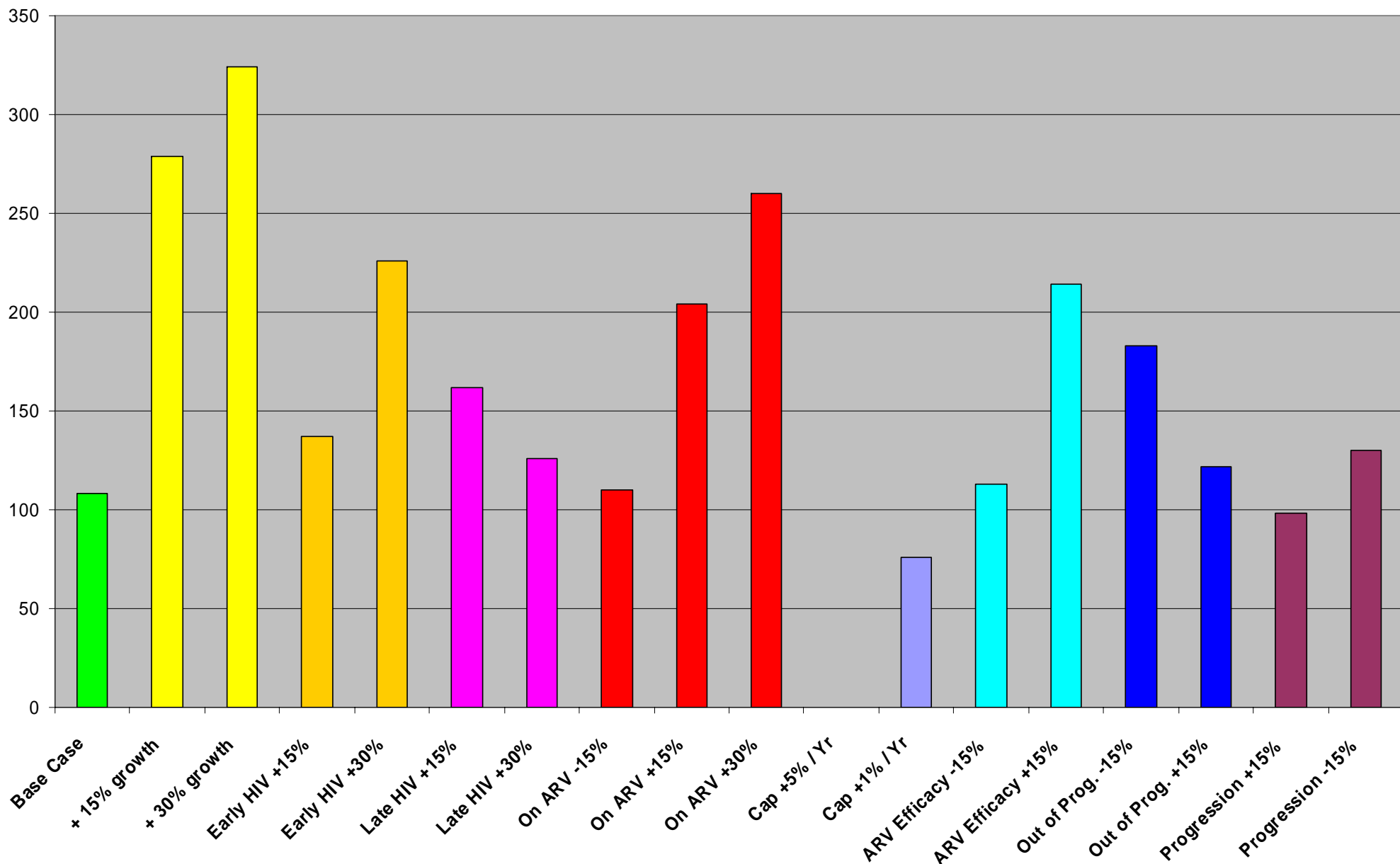
# Excess Deaths from Cap at 5 Years



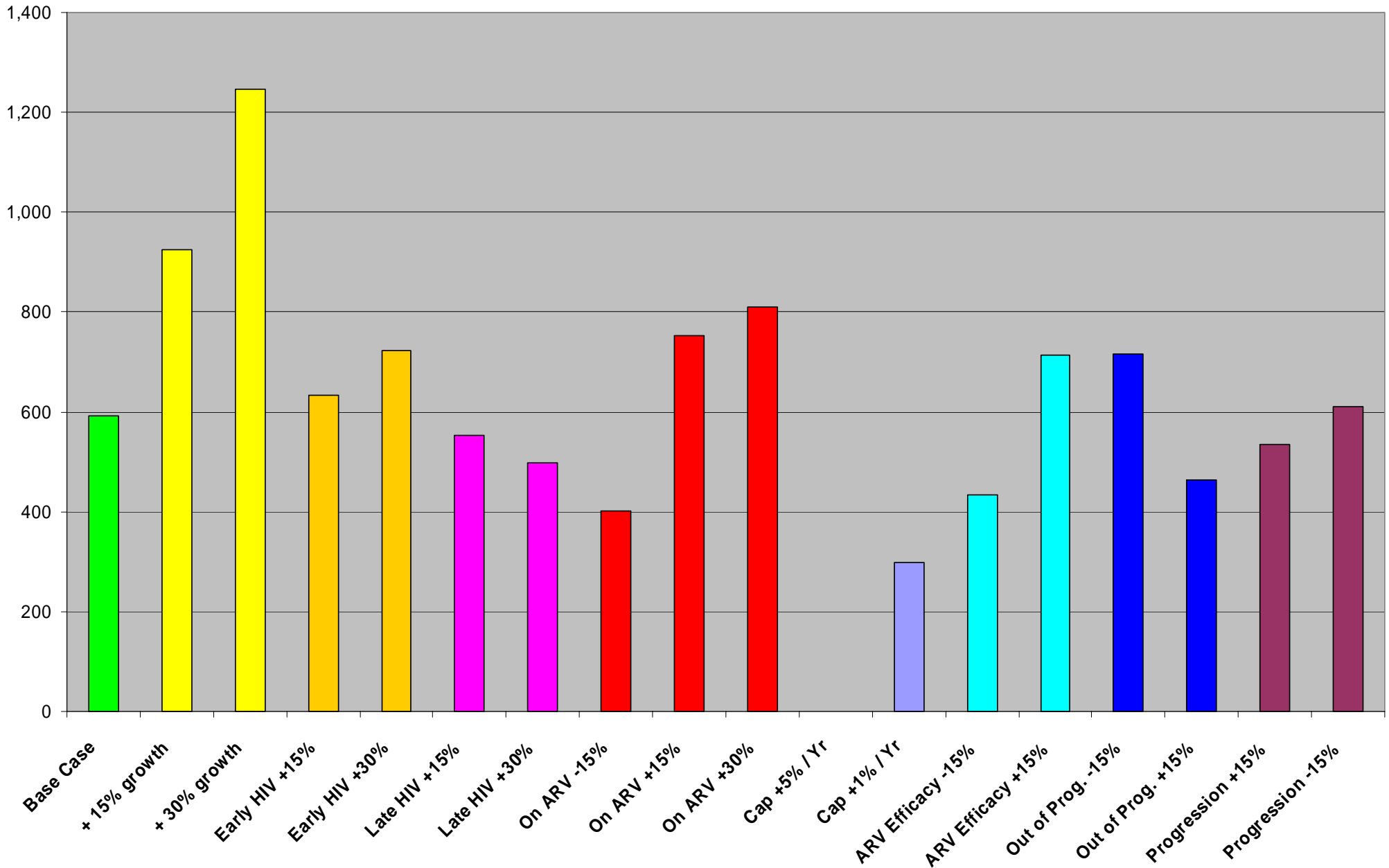
# Excess Deaths from Cap at 10 Years



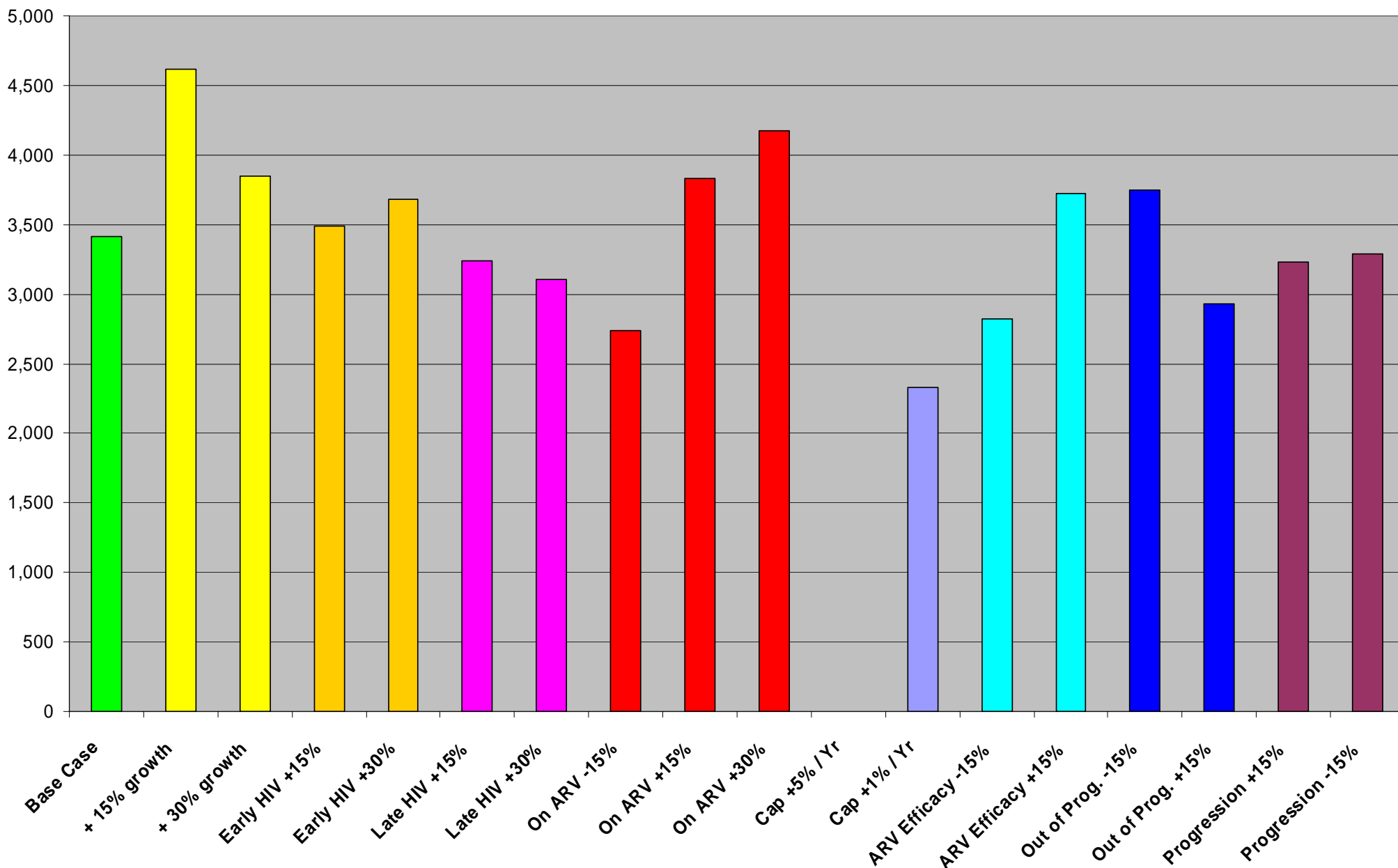
# Excess New Clinical AIDS Diagnoses from Cap at 5 Years



# Died on Waitlist at 5 Years



# Died on Waitlist at 10 Years



# Summary

- Possible to use existing data on ADAP utilization and known HIV disease progression rates to predict HIV morbidity and mortality attributable to capping California's ADAP program
- Excess new AIDS diagnoses and AIDS deaths are likely to be substantial
- Significant number of deaths likely for persons while on waiting list
- Projections are sensitive to ADAP program growth and proportion of ADAP enrollees on ARV therapy.

# Recommendations

- **Capping ADAP should be an option of last resort due to significant morbidity and mortality**
- **Modification of the cap structure (moving cap, etc) will not avoid excess death and disability over the long run.**
- **Plan for a doubling or more of the ADAP program over the next 10 years**

# Cost Analysis Inputs

- **Savings per ADAP client**
  - \$ 10,632 / year
  - \$ 886 / month
  
- **Costs per ADAP client onto disability**
  - Medi-Cal \$ 976 / month
  - SSP \$ 205 / month

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  - Total \$ 1,181 / month

# Cost Equivalencies

- **1 Death = 14 waitlisted ADAP clients**
  - Cost of AIDS hospitalization death =
  - Annual ADAP waitlist savings = \$ 10,632
- **1 New AIDS Dx = 2 waitlisted ADAP clients**
  - Annual cost for newly diagnosed AIDS = \$ 20,632
  - Annual ADAP waitlist savings = \$ 10,632

# Unaccounted Costs

- **Administration of waitlist**
- **Cost shifting to local programs from AIDS and Death**
- **Increased community HIV infections secondary to higher viral loads in untreated persons**