Veterans Health Administration
Forecasting MCCF Collections

HERC Monthly Economics Seminar

Veterans Health Administration (VHA)
Chief Business Office (CBO)

August 18, 2010

Ernesto Castro, MS, PMP
Director, Business Information Office

George Miller, PhD
Altarum Institute

Medical Care Collections Fund (MCCF) Background

- The Department of Veterans Affairs Veterans Health Administration is authorized to seek reimbursement from Third Party health insurers for the cost of medical care furnished to insured Veterans and bill copayments for nonservice-connected care
- Funds collected from First and Third Party bills are retained by the VA health care facility that provided the care for Veteran healthcare
- VA has demonstrated significant improvements in revenue processes through a total collections increase from $1.7B in FY 2004 to $2.7B in FY 2009

Expected Results Background

- Chief Business Office establishes VAMC station-level collection goals (Expected Results) each fiscal year
- General expectation is to sustain and improve prior year's collection performance
- CBO uses statistically driven models to develop Medical Care Collections Fund (MCCF) Expected Results and support President's Budget formulation process

Vision of More Robust CBO Collections Model

- Integrate independent models (e.g., Enrollee Health Care Projection Model)
- Automate modeling activities that require human intervention to develop some of the information and to pass data from one application to another
- Produce consistent, reasonable, and achievable modeled outputs
- Include a wide range of variables at the Station level, such as Priority Group status, age, demographics, economic market conditions, insurance coverage, historical performance, and policy impacts (i.e., $1 copayment increase, P8 expansion)
- Generate more timely responses to VHA CFO and OMB
- Accommodate for regionalized billings and collections efforts of Consolidated Patient Account Centers (CPAC)

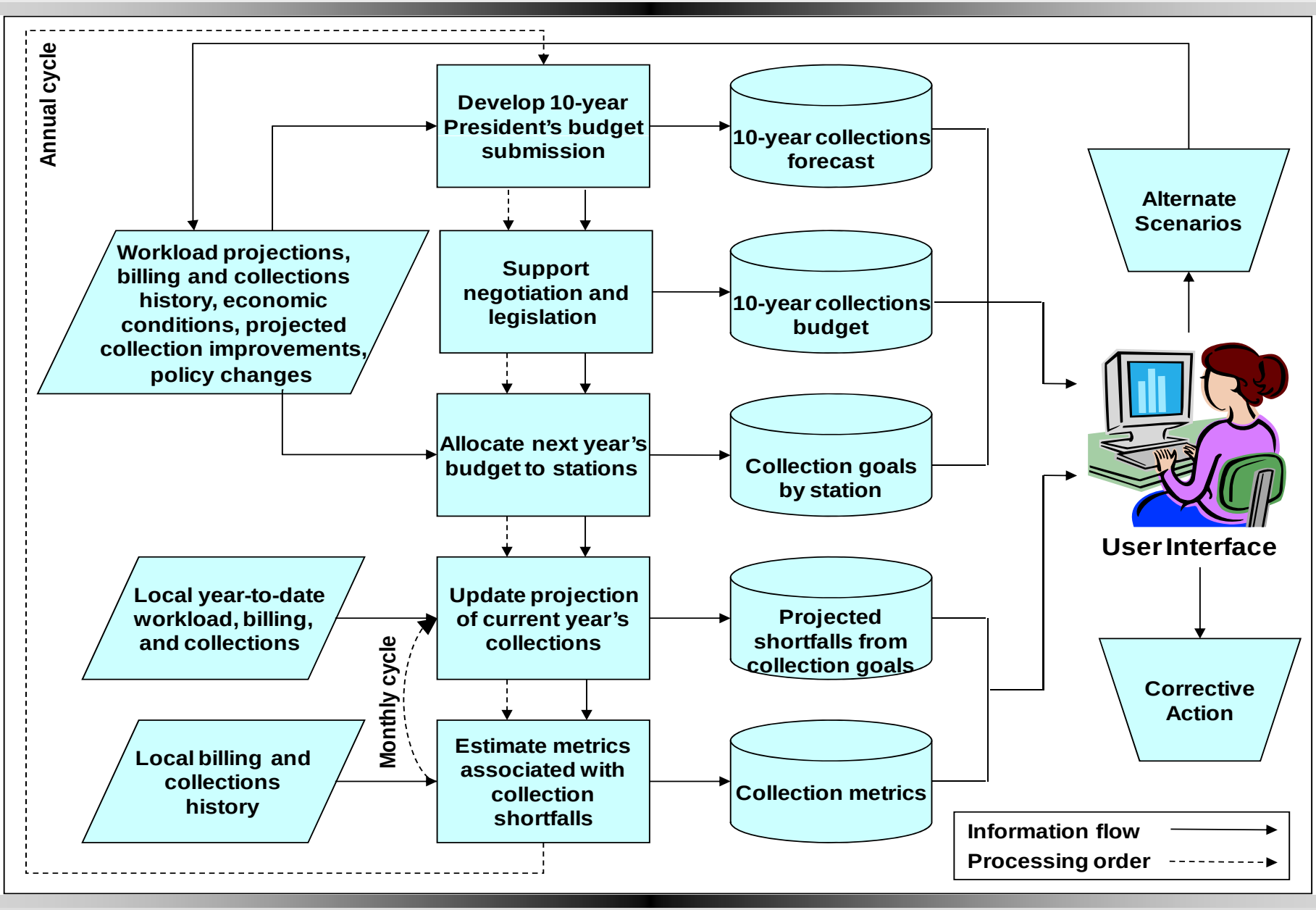
ICFM Purpose

- ICFM was developed to forecast annual VHA collections for each of three components of the MCCF:
  - First Party inpatient and outpatient copayments
  - First Party pharmacy copayments
  - Third Party collections
- Annual station-level forecasts are
  - Rolled up to national level by year to produce ten-year forecasts of future collections as input to President's Budget determination
  - Used to establish station-level Expected Results for the next year
  - Compared with current year to date collections to identify potential problems in meeting Expected Results targets

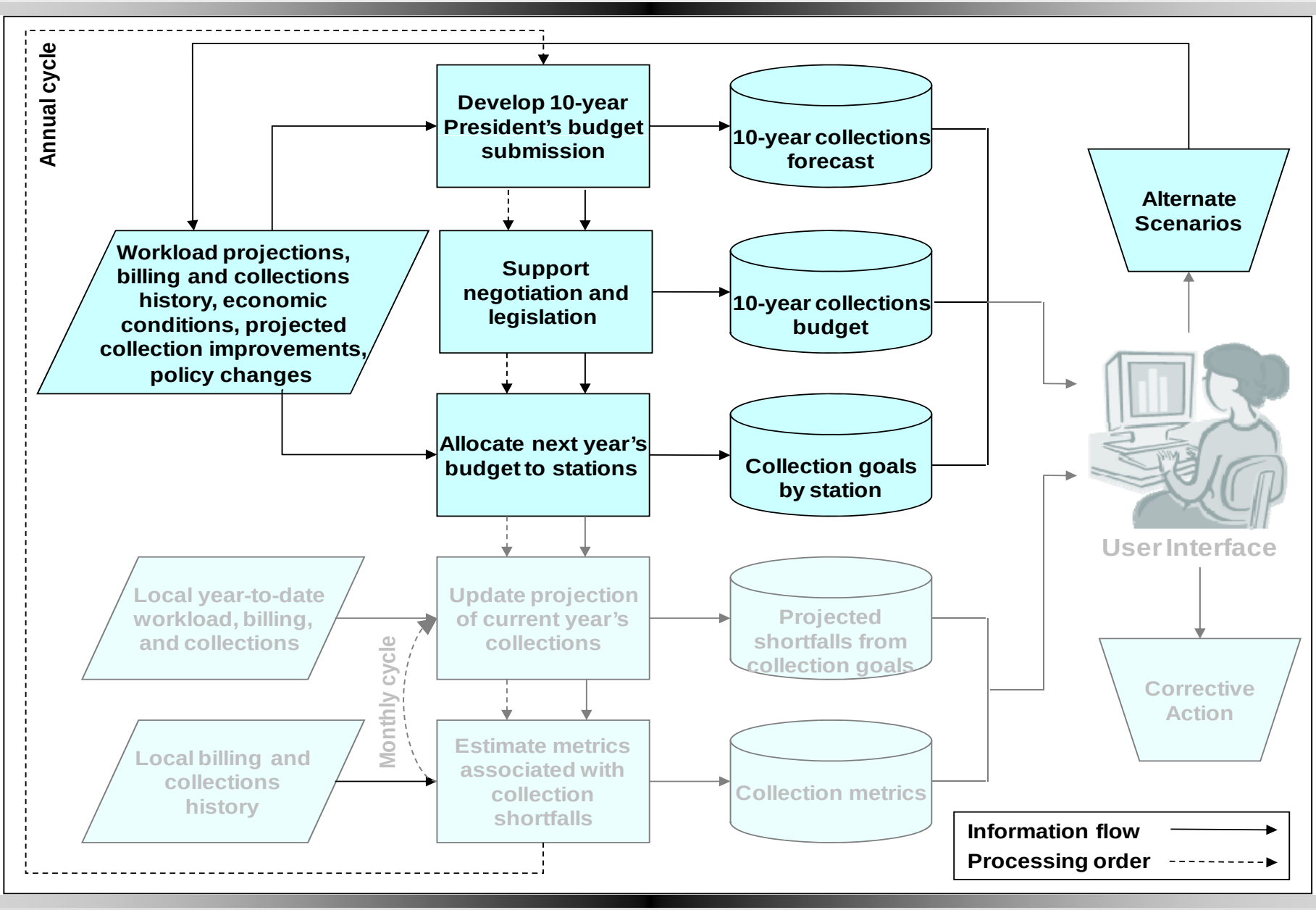
Benefits of ICFM

- Produces station-specific forecasts by fund; bottom-up approach
- Provides a single, transparent modeling system
- Incorporates impacts of policy changes (i.e., Priority 8 enrollment impact, change in Pharmacy copayment)
- Includes local economic market conditions at station level
- Provides flexibility to modify and adapt to changes in VA policy, performance, etc.
- Enables alternative scenario development for legislation outside of VA that will impact Veterans, such as Health Care Policy Reform
- Ties in all data components to arrive at a scientifically-derived collections estimate to aid the budget process

ICFM Analytic Architecture
Objective System



ICFM Analytic Architecture
Current Capabilities



ICFM Forecasting Strategy

- Conduct bottom-up forecasting starting with 2009 station-level collections by MCCF component
- Adjust future collections by year for
  - Changes in workload magnitude
  - Changes in collectability (e.g., due to change in patient demographics)
  - Systemic changes (e.g., policies, co-pays)
  - Improvements in collections performance
- Use sum of station-level forecasts by year (for ten years) for President's Budget submission
- Use next year's (2011) station-level forecasts to establish Expected Results

ICFM Forecasting Process

For each MCCF component, station, and future year:

- Estimate impacts of workload magnitude and collectability
- Estimate opportunity for improvements in collections performance
- Estimate effects of future systemic changes
- Estimate improvements in collections performance
- Combine all effects to forecast future collections

ICFM Forecasting Process

For each MCCF component, station, and future year:

- Estimate impacts of workload magnitude and collectability
- Estimate opportunity for improvements in collections performance
- Estimate effects of future systemic changes
- Estimate improvements in collections performance
- Combine all effects to forecast future collections

Estimating Impacts of Workload & Collectability
Basic Equation

For a given fiscal year, station, and MCCF component, let

C = projected collections under average historical performance

= W·B·R

where

W = projected annual workload

B = projected dollars billed per unit of utilization given average historical performance

R = projected fraction of dollars billed that would be collected for the year given average historical performance

Estimating Impacts of Workload & Collectability
Components of Basic Equation

$$C = W \cdot B \cdot R$$

EHCPM station-level workload data by:
- priority group (1, 2,…., 7-8)
- age group (<45, 45-64, 65+)
- service type (inpatient, outpatient, pharmacy)

Non-linear station-level regression as a function of:
- priority group
- age group
- service type

Non-linear station-level regression as a function of:
- priority group
- age group
- service type
- % of veterans with private, non-HMO insurance
- local unemployment rate

Estimating Impacts of Workload & Collectability
Projecting Annual Workload (W)

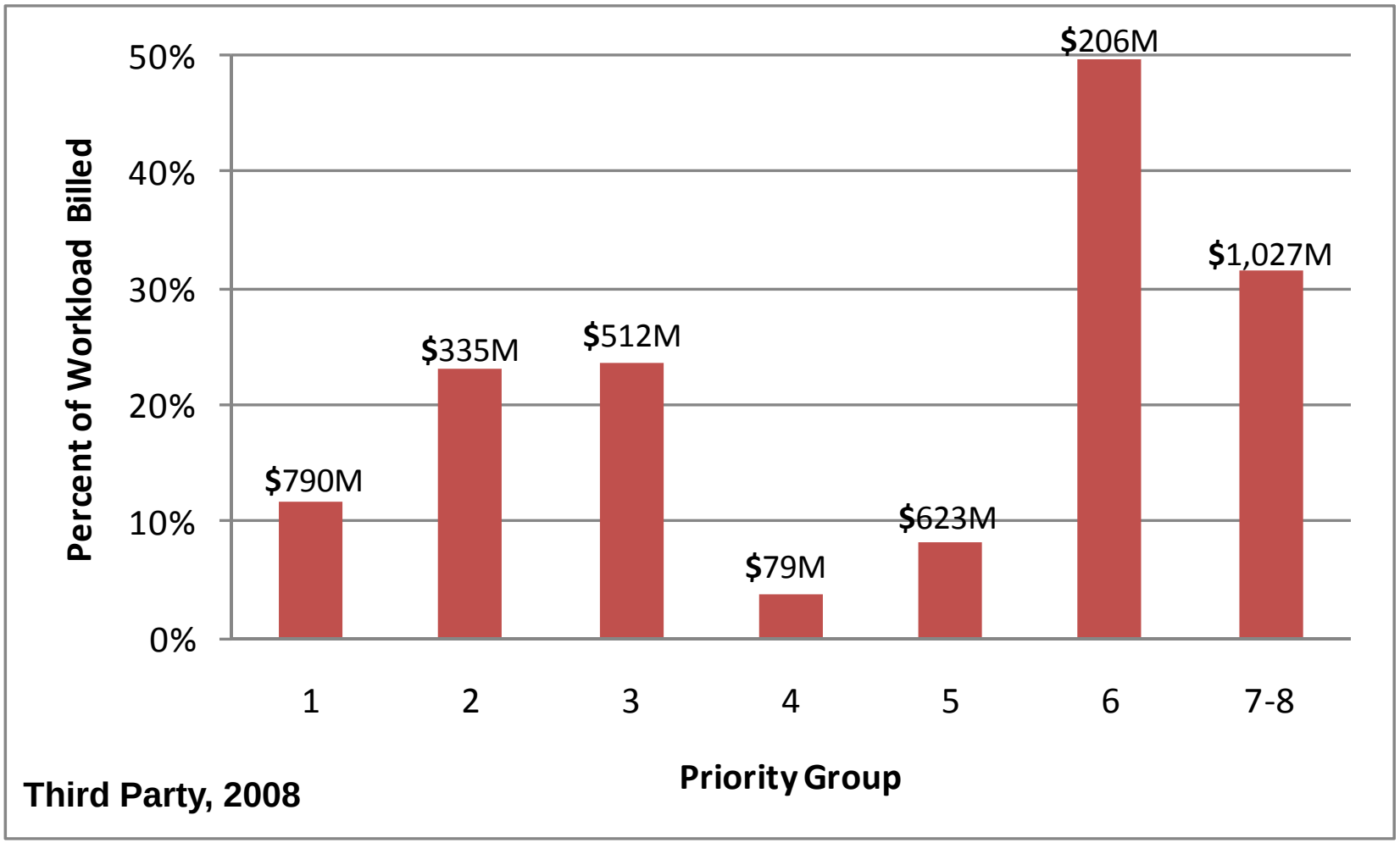
- Begin with baseline and projected workload for year i from Enrollee Health Care Projection Model (EHCPM) by Health Service Category (HSC) and sector, expressed as:
  - Medicare allowable charges for inpatient and outpatient workload
  - 30-day scripts for pharmacy (Rx) workload
- Aggregate to inpatient, outpatient, and Rx totals (w_i) and distribute to 3-digit station level using historical treatment patterns from Allocation Resource Center (ARC) data
- Estimate station-level workload associated with collections in year i as

$$f \cdot w_{i-1} + (1-f) w_i$$

where f is an estimate of fraction of workload from year i-1 that is associated with collections in year i

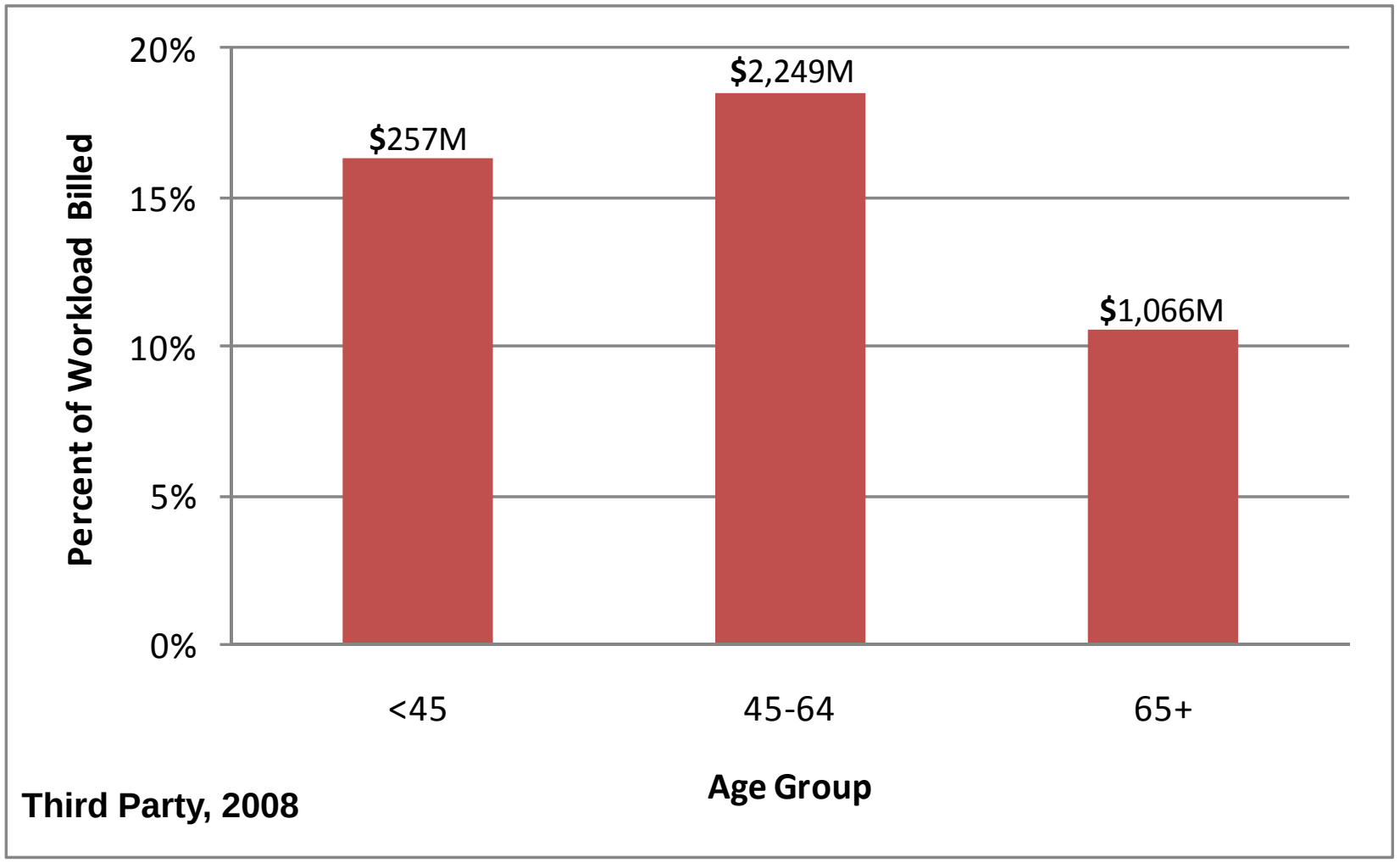
Estimating Impacts of Workload & Collectability

Billings/Workload (B) – Priority Group Impact



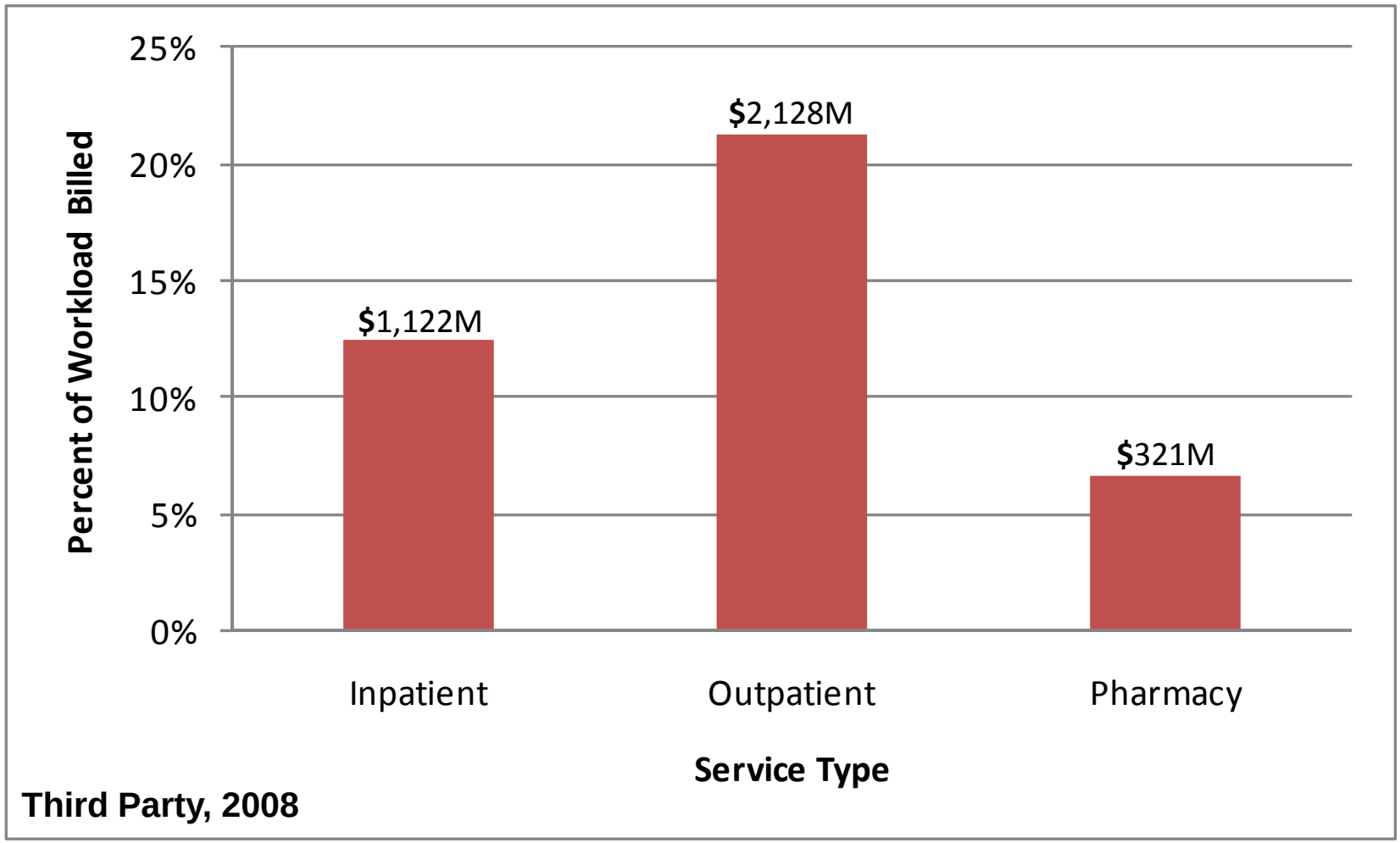
Estimating Impacts of Workload & Collectability

Billings/Workload (B) – Age Group Impact



Estimating Impacts of Workload & Collectability

Billings/Workload (B) – Service Type Impact



Estimating Impacts of Workload & Collectability
Projecting Annual Billings/Workload (B)

CBO
Chief Business Office
Veterans Health Administration

- Regression modeling establishes a billings/workload baseline for each station using VistA Direct Extract (VDE) historical billings to workload ratios
- Projections of billings/workload ratios are a function of
  - Priority group (1,2,…,7-8)
  - Age group (<45, 45-64, 65+)
  - Service type (inpatient, outpatient, Rx)
  - Forecasts of station-level unemployment rates from Economy.com (for First Party Rx billings)
  - Fraction of users with private, non-HMO insurance (for Third Party billings)
- Fraction of users with private, non-HMO insurance is estimated from
  - Regressions based on results from *2008 Survey of Veteran Enrollees' Health and Reliance upon VA* to estimate VISN-level fraction of users with private, non-HMO insurance
  - Economy.com forecasts of station-level unemployment
  - Relation between change in unemployment and change in insurance coverage to project future insurance coverage rates by station

Estimating Impacts of Workload & Collectability
Projecting Annual Billings/Workload (B) – Example

- For First Party Inpatient and Outpatient billings:

$$B_{ij} = p_i(1+a_j)$$

where

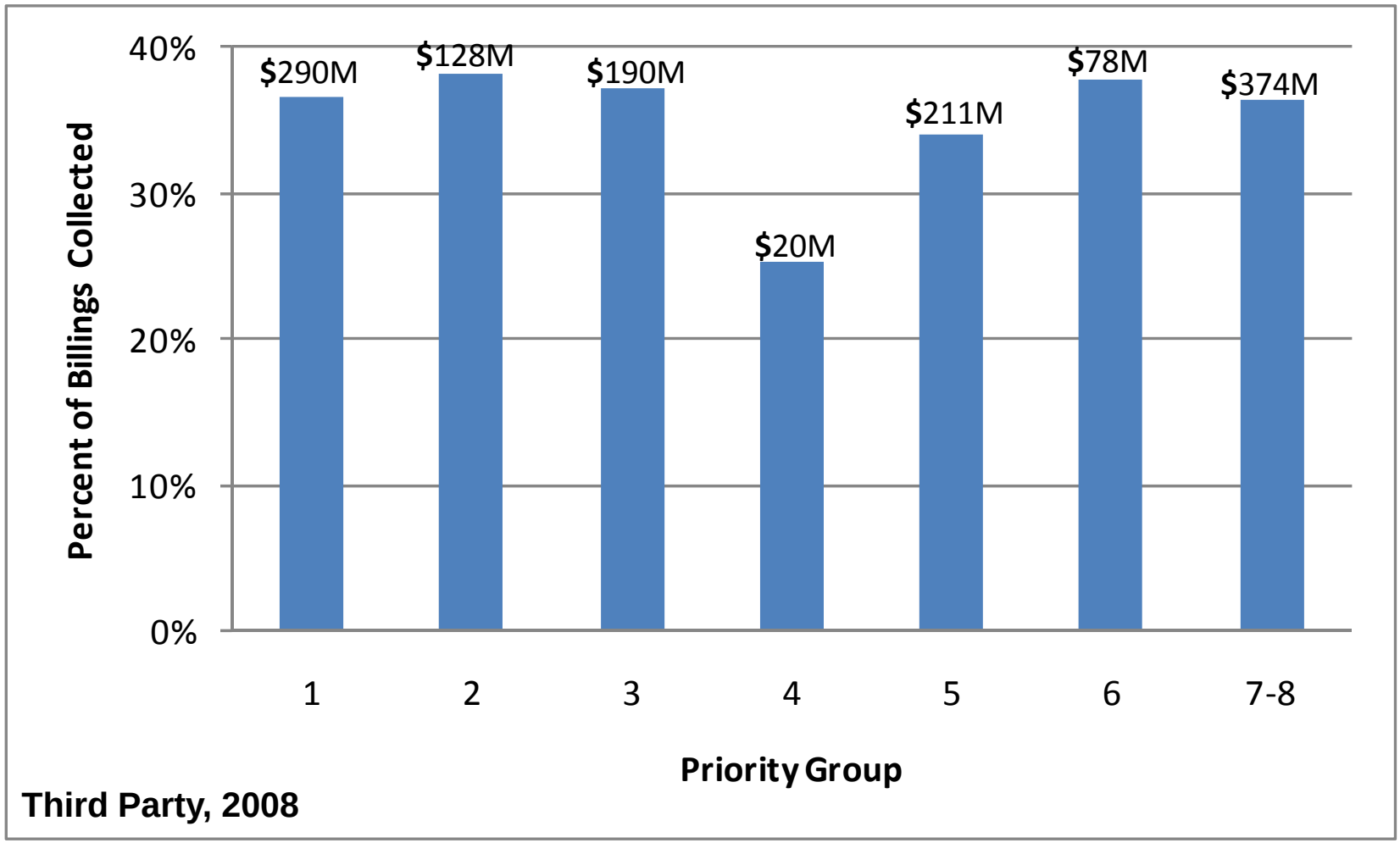
B_{ij} = fraction of station's workload that is billed as First Party copayments for priority group i and age group j

p_i = unadjusted average billing rate for priority group i (regression coefficient)

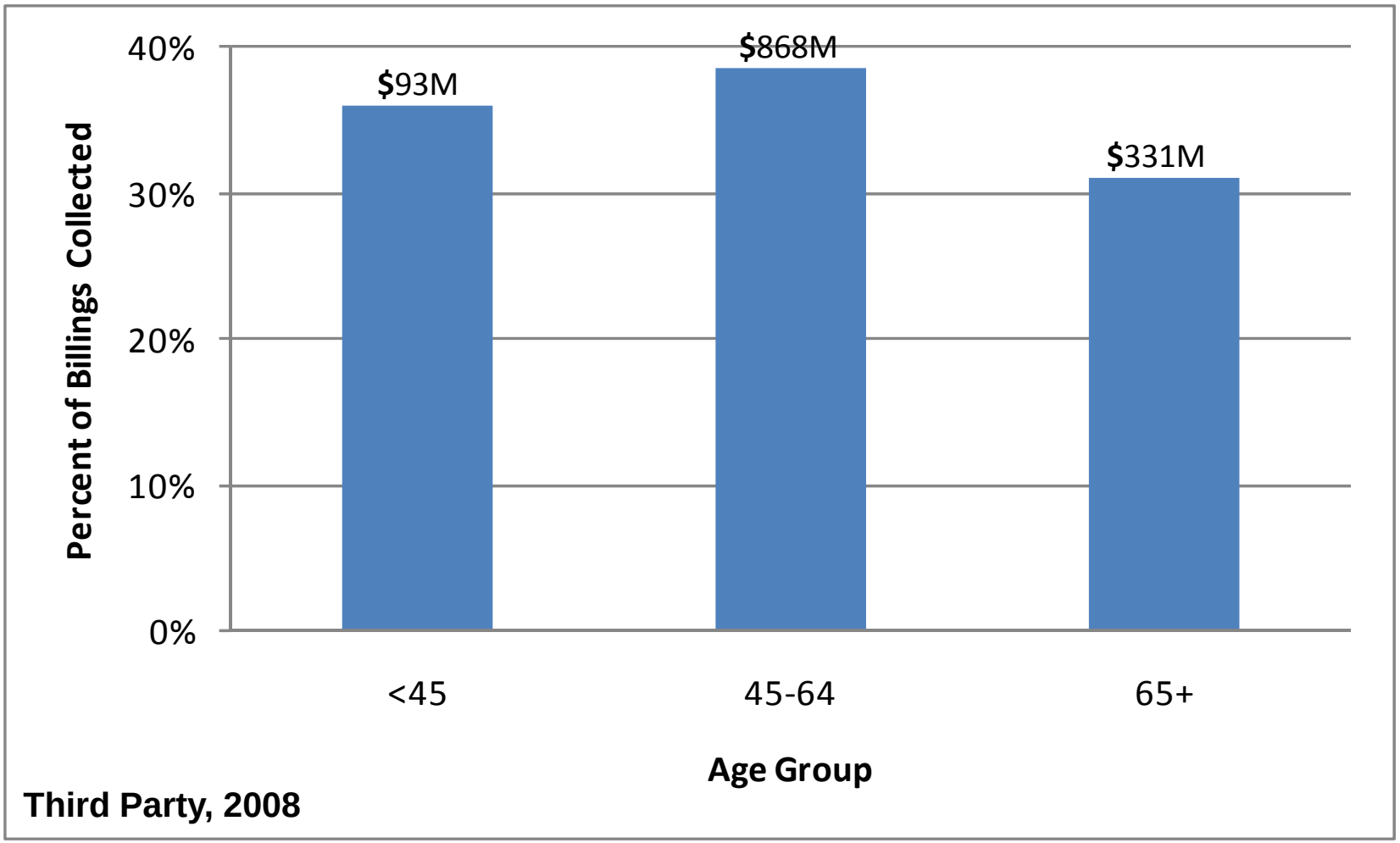
a_j = age group adjustment (regression coefficient)

- Forms for Third Party billings and First Party Rx billings are more complicated, and include effects of
  - Projected fraction of users with private, non-HMO insurance for Third Party billings
  - Projected local unemployment rates for First Party Rx billings

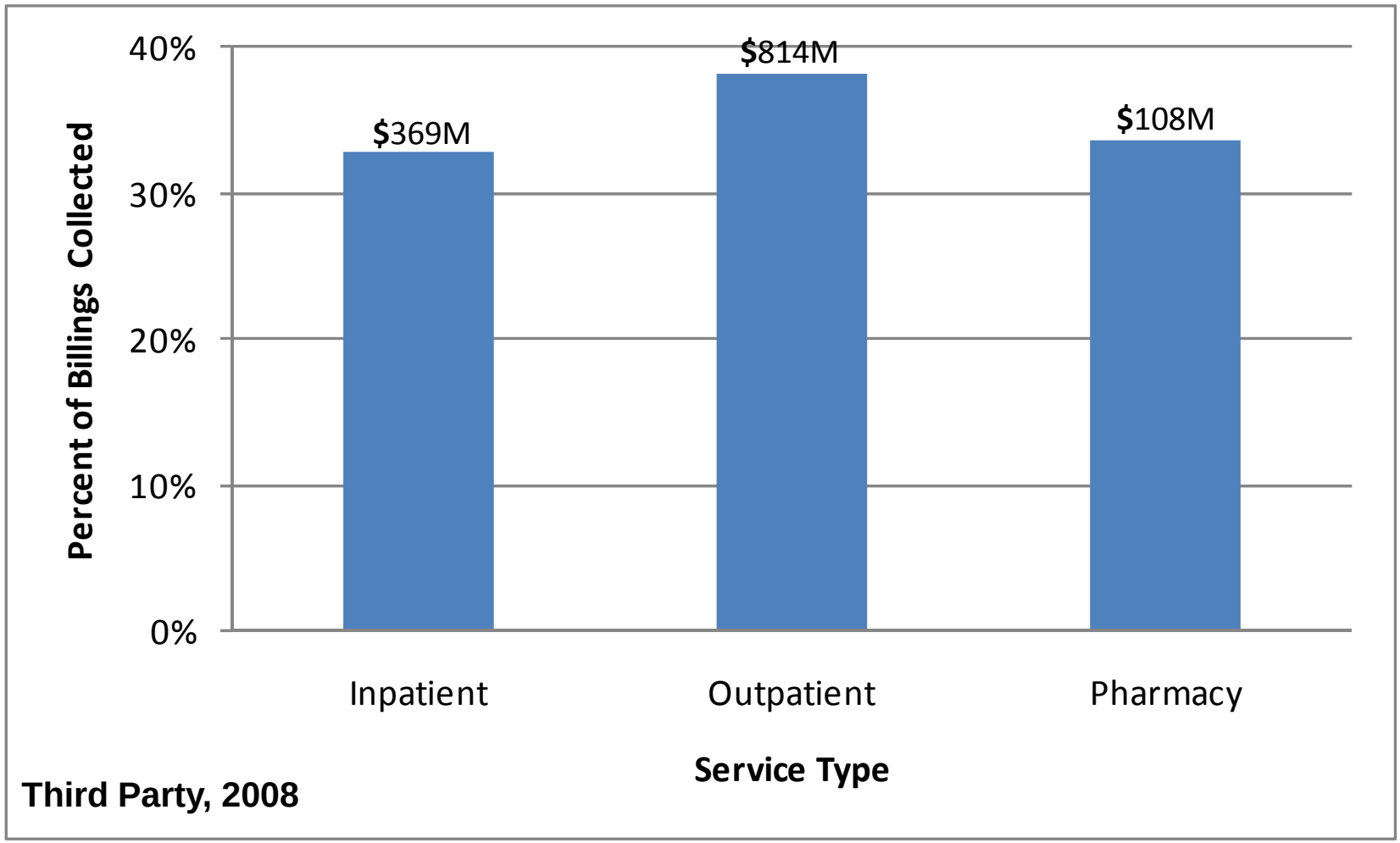
Estimating Impacts of Workload & Collectability
Collections/Billings (R) – Priority Group Impacts



Estimating Impacts of Workload & Collectability
Collections/Billings (R) – Age Group Impacts



Estimating Impacts of Workload & Collectability
Collections/Billings (R) – Service Type Impacts



Estimating Impacts of Workload & Collectability
Projecting Annual Collections/Billings (R)

- Regression modeling establishes a collections/billings baseline for each station using VDE historical collections to billings ratios for First Party and Third Party
- Projections of collections/billings ratios are a function of
  - Priority group (1,2,…,7-8)
  - Age group (<45, 45-64, 65+)
  - Service type (inpatient, outpatient, pharmacy)
- Functional forms are similar to those used to project billings/workload

ICFM Forecasting Process

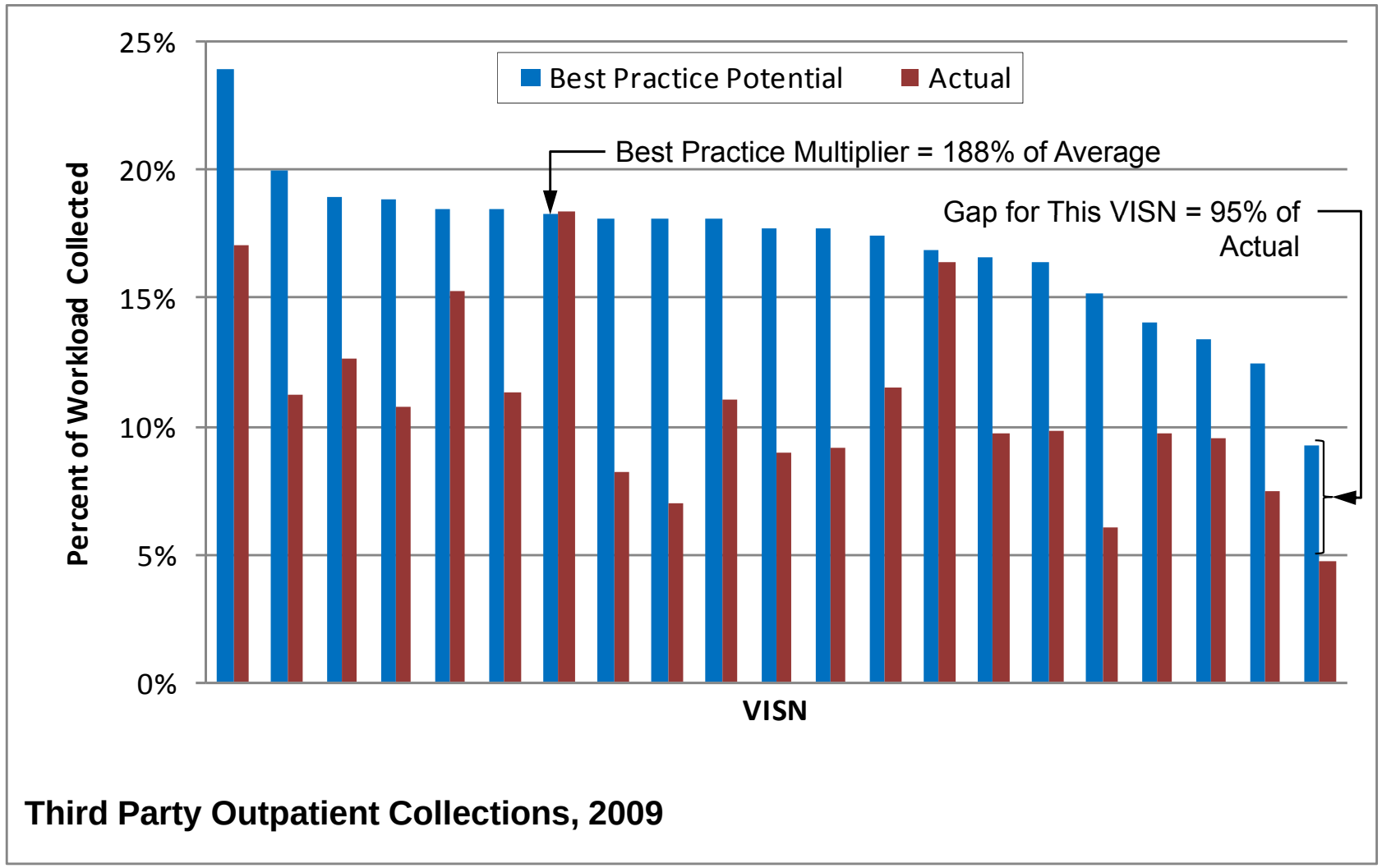
For each MCCF, station, and future year:

- Estimate impacts of workload magnitude and collectability
- Estimate opportunity for improvements in collections performance
- Estimate effects of future systemic changes
- Estimate improvements in collections performance
- Combine all effects to forecast future collections

Estimating Opportunity to Improve Collections
Approach

- Basic equation describes average collections by station, taking into account differences that affect ability to collect (such as priority group mix, age mix, service category mix, and percent with insurance).
- When summed by VISN, average collections are used to establish potential for collections for each VISN by assuming that the VISN whose actual collections exceeded its average in 2009 by the greatest factor ("best practice multiplier") represents best practice ("best practice potential").
- Best practice potential for each station equals collections that would have been realized if station performed at this same level after correcting for differences that affect ability to collect. It equals station's average collections multiplied by it's VISN's best practice potential.
- Each station's opportunity for improved performance ("gap") represents how much better station would have performed if it met its best practice potential. It equals the difference between station's best practice potential and actual collections, expressed as a percent of actual.

Estimating Opportunity to Improve Collections
Example (VISN Level)



Third Party Outpatient Collections, 2009

ICFM Forecasting Process

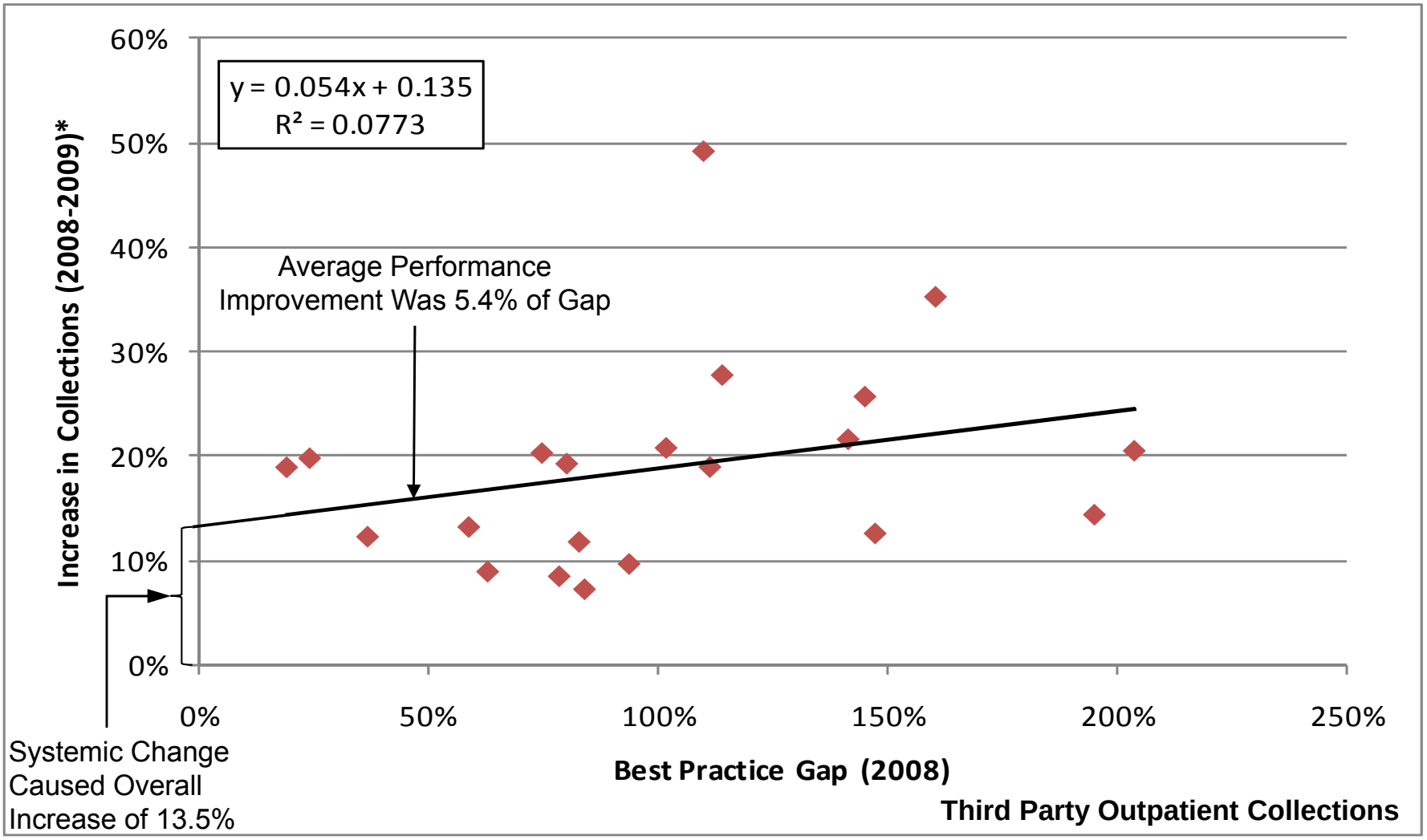
For each MCCF, station, and future year:

- Estimate impacts of workload magnitude and collectability
- Estimate opportunity for improvements in collections performance
- Estimate effects of future systemic changes
- Estimate improvements in collections performance
- Combine all effects to forecast future collections

Estimating Future Changes
Approach

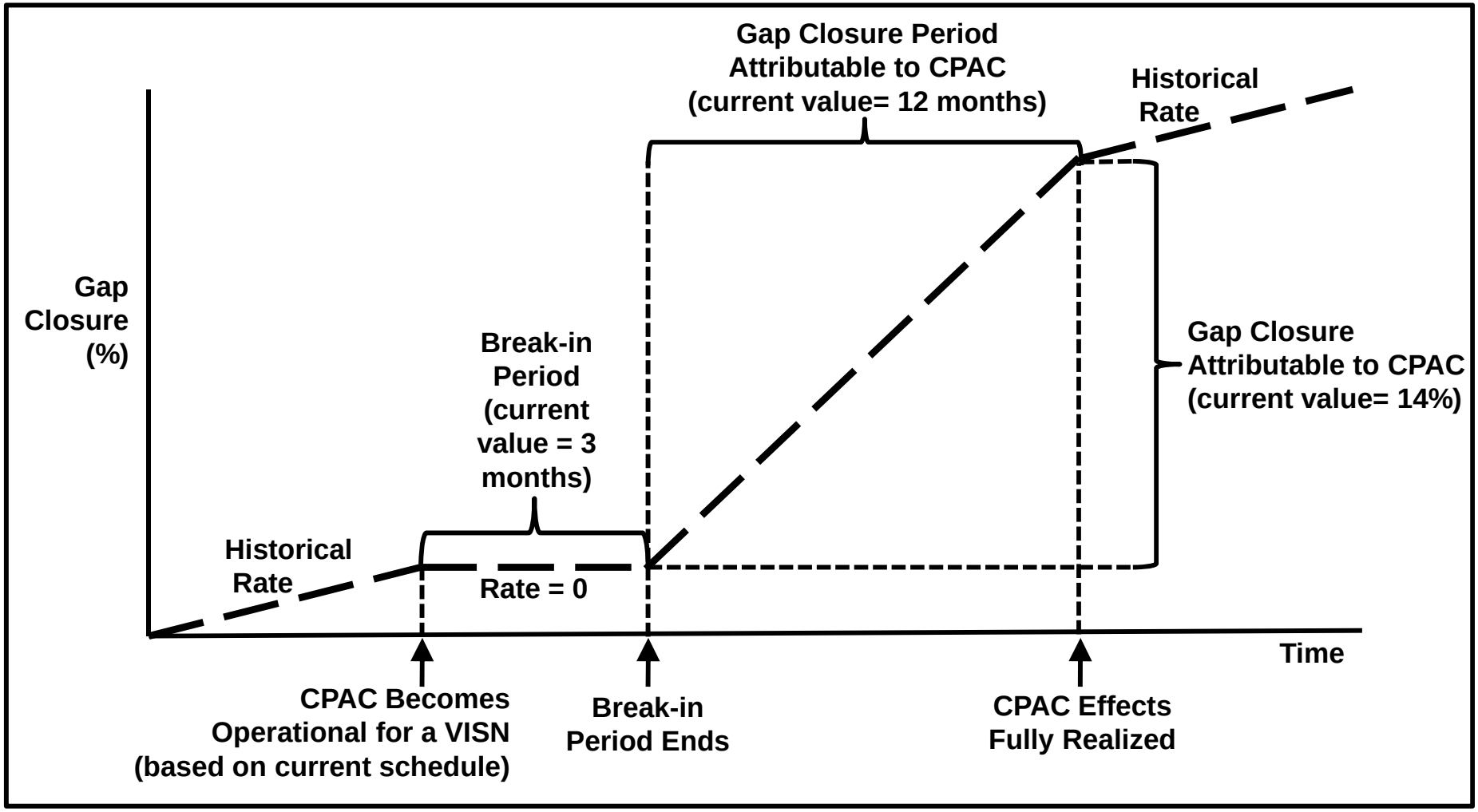
- Systemic changes are represented as shifts in best practice potential (e.g., increase in First Party Rx co-pay)
- Performance improvements are represented as reductions in the size of the gap
  - Performance improvements from 2008 to 2009 serve as starting point for estimating changes in subsequent years
  - These can be modified to reflect effects of anticipated practice changes that will improve performance (e.g., CPAC implementation at a VISN)
  - Performance improvements tend to be greater if gap is larger (stations with greater room for improvement are projected to increase collections more than those that are close to their best practice potential)

Estimating Future Changes
Example



* Adjusted for changes in workload and insurance coverage rates

Estimating Future Changes
Incorporating CPAC Effects into Gap Closure



ICFM Forecasting Process

For each MCCF, station, and future year:

- Estimate impacts of workload magnitude and collectability
- Estimate opportunity for improvements in collections performance
- Estimate effects of future systemic changes
- Estimate improvements in collections performance
- Combine all effects to forecast future collections

Forecasting Future Collections
Approach

Step 1: For each station, fund, and service type, compute best practice potential in year i as:

$P_i = C_i M_i A_i$

where

C_i = impact of workload magnitude and collectability – average collections for workload in year i using historical performance levels (computed with the basic equation)

M_i = best practice multiplier (1.88 in our example)

A_i = impact of systemic changes – adjustment for change in best practice from year to year (1.135 in our example)

Forecasting Future Collections
Approach (continued)

Step 2: For each station, fund, and service type, compute value of the gap in year i as:

$G_i = G_{i-1}(1-g_i)/(1+g_iG_{i-1})$

where

g_i = annual impact of performance improvement – gap closure rate (.054 in our example)

G_0 = observed value of the gap for the station, fund, and service type in the base year (2009) (.95 in our example)

Forecasting Future Collections
Approach (continued)

Step 3: Forecast future collections by station, fund, and service type as:

$$F_i = P_i/(1+G_i)$$

where

P_i = best practice potential in year i for that station, fund, and service type

G_i = current value of the gap in year i for the station, fund, and service type

Forecasting Future Collections
Approach (concluded)

Step 4: Make final adjustments

- For President's Budget submission, sum results over stations for each year
- For Expected Results determination:
  - Convert each station's 2011 collections forecast to station's share of each fund (S_i)
  - Adjust 2011 shares to align with 2010 end-of-year estimated collections –

    $S'_{2011} = S_{2011} + q(E_{2010} - S_{2010})$

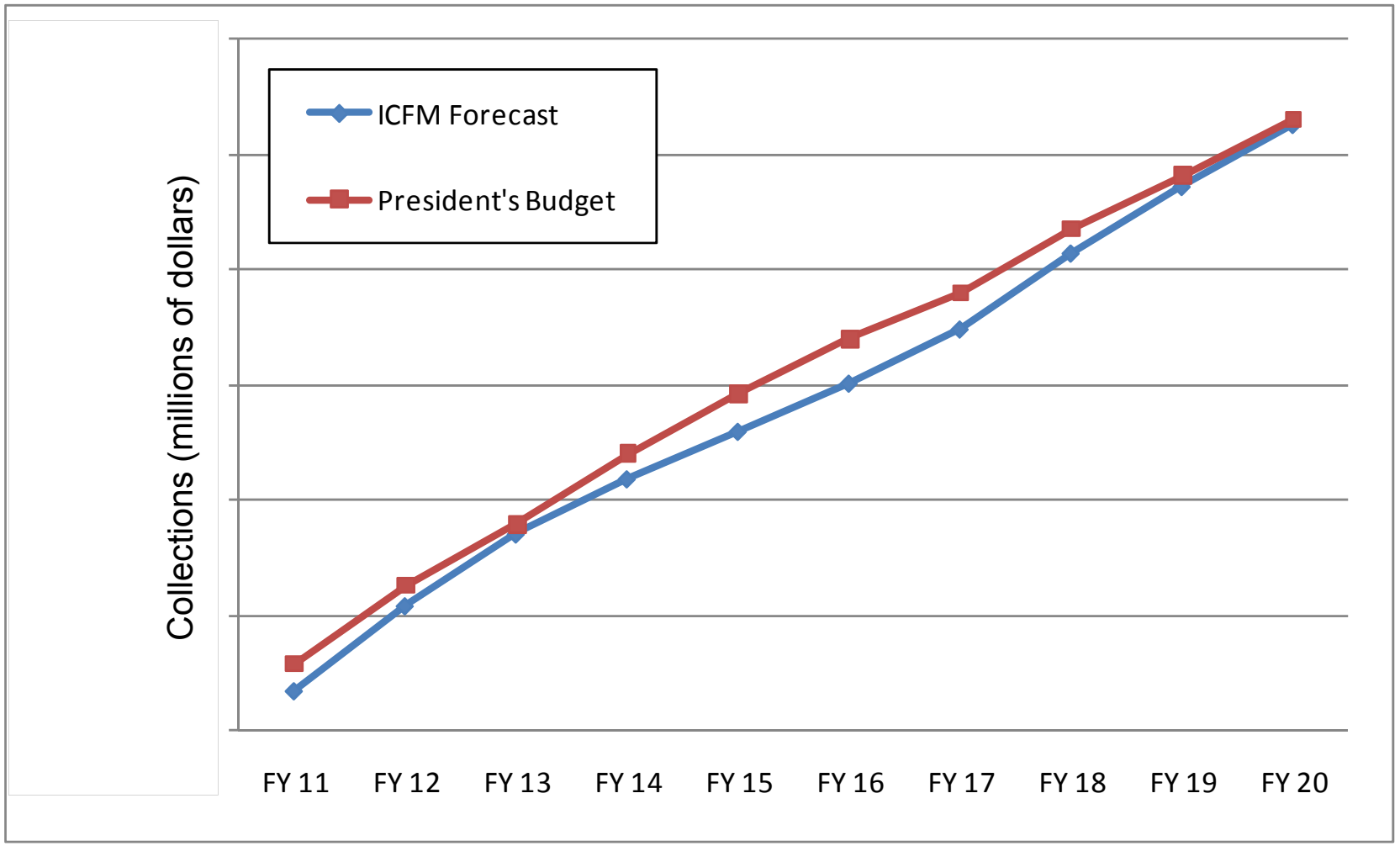
    where

    S'_i = adjusted share in year i

    q = adjustment weight ($0 \leq q \leq 1$)

    E_i = estimated actual 2010 collections share through end of year
  - Apply 2011 President's Budget to each adjusted share to establish Expected Results

Forecasting Future Collections
Summary of Results (Illustrative Only)



Summary
ICFM Capabilities

- Is a single, integrated system
- Employs available data
- Is transparent
- Produces internally consistent results
- Incorporates realistic ceilings on collections
- Appropriately incorporates historical collections performance
- Incorporates unique features of local stations (population demographics, economic conditions, etc.)
- Supports investigation of alternative scenarios

Summary
Future Enhancements

- Enhance ability to represent impacts of policy changes (e.g., health reform)
- Improve treatment of economic conditions and insurance status
- Incorporate fourth component of MCCF (long-term care) into the model
- Provide for forecast updates to end of current year
- Correlate year-to-date collections performance to key metrics (e.g., Days to Bill)
- Develop ICFM user interface