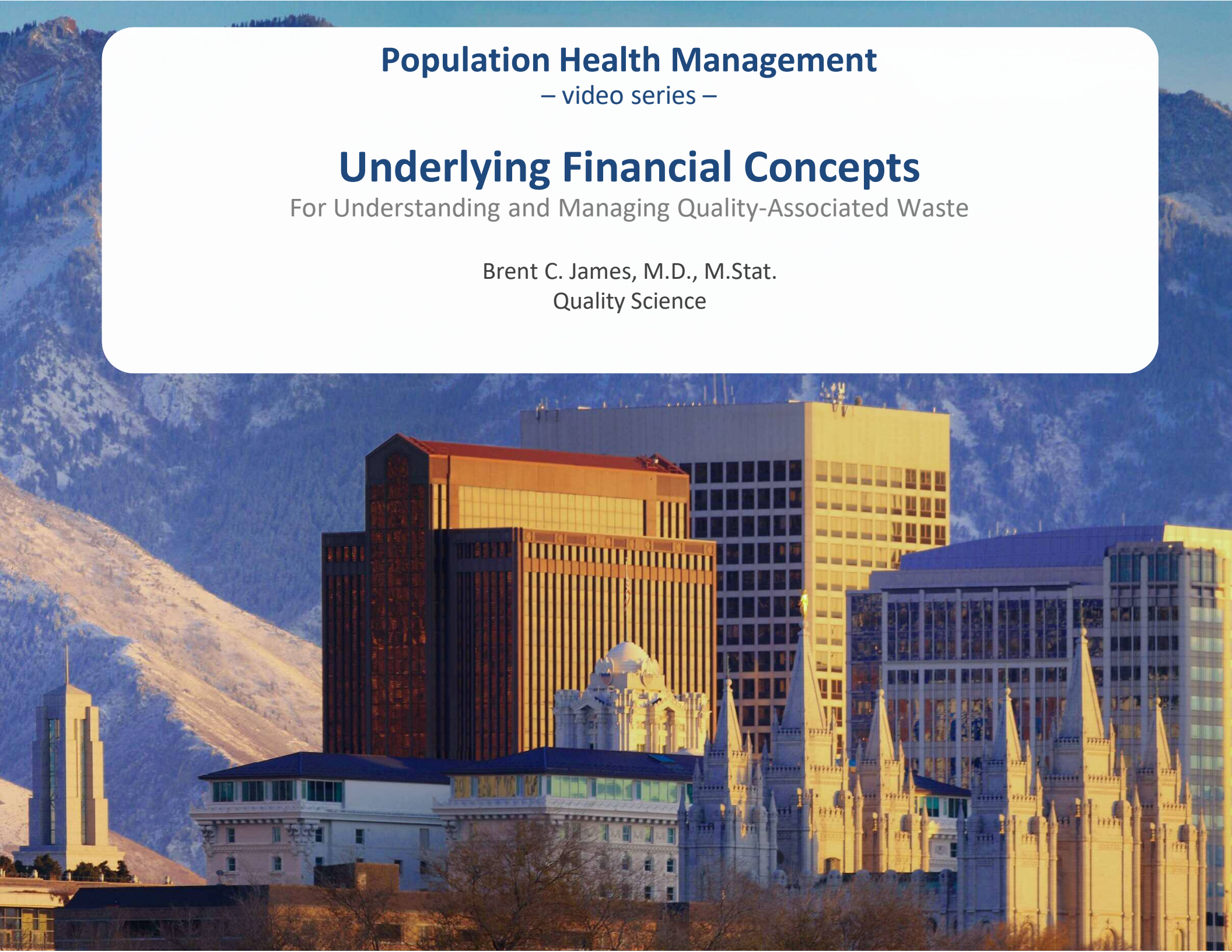


Population Health Management

– video series –

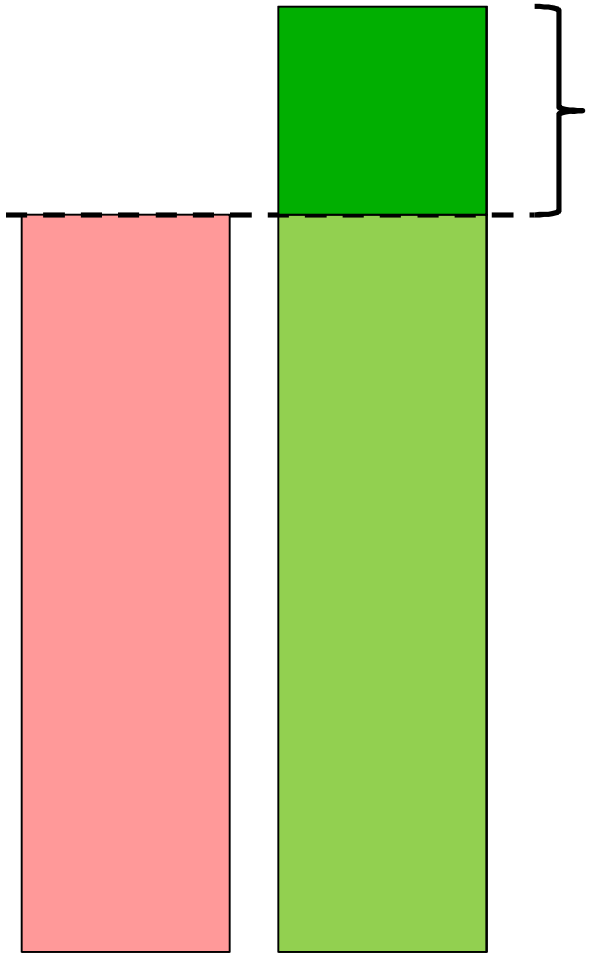
Underlying Financial Concepts

For Understanding and Managing Quality-Associated Waste

Brent C. James, M.D., M.Stat.
Quality Science

Video and slides

In the last section …



Operating margin

Operating expenses

Costs

Revenues

Income

There are 2 ways to maintain and improve operating margins:

1) ***Increase revenues***

2) ***Decrease operating expenses***

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At present,

the cost side offers

dramatically larger opportunities for improved financial performance than does *traditional* ***revenue enhancement.***

At this point the focus shifts to waste

- ***Quality-associated waste happens on the cost side of the operating margin equation.***
- ***When it comes to costs, you definitely "manage what you measure."*** *(a sometimes controversial but still fundamentally true statement; waste elimination relies on making the detailed true underlying costs of care delivery transparent within front-line operations)*
- ***How costs are measured links to billing systems.***
- ***Costs are more complex than revenues.***
- ***We will define some key terms*** *(among others)**:***
  - *units of care*
  - *utilization, in 2 different forms / flavors*
  - *bundling*
  - *variable costs, fixed costs, and duty cycle*
  - *indirect costs* *(which can make costs non-transparent and hard to manage)*

A "unit of care"

It is possible to break all resources used in health care delivery into detailed, granular "units of care"; *for example,*

- *a single dose of a specific drug, including route of delivery*
- *a single specific lab test*
- *a single specific imaging exam (x-ray, ultrasound, CT scan, etc.)*
- *an acuity-adjusted hour of a nurse's time*
- *a 6-minute block of a physician's time, by specialty*
- *any single item from Central Supply (e.g., a bed pan; a box of tissues; the individuals elements of an artificial hip joint)*

*"An item, event, task, or unit of work with a specified purpose …"**

*modified from: Horngren, Datar, and Rajan. *Cost Accounting: A Managerial Emphasis, 14th Edition.* New York, NY: Prentice Hall, 2012; pg. 146.

Two kinds / levels of utilization

1. ***Case-level*** *(within-case)* ***utilization***

A "case" is a time-defined clinical encounter, such as

- *a clinic visit,*
- *a surgical procedure,*
- *an outpatient imaging examination, or*
- *a hospital stay*

A case is sometimes called an "episode of care"

*In this setting, "**utilization**" means*

the number and type of "units of care" consumed to complete the case / episode of care

Case-level ("within-case") utilization takes the form of counts, by type of "unit of care"

Two kinds / levels of utilization *(continued)*

2. *Population-level utilization*

*assumes a **defined population** of people receiving care, such as*

- *a large employer's insured group (employees and family members)*
- *all people covered within a commercial insurance plan*
- *all Medicare Advantage patients managed by a physician group*
- *the population of Medicaid patients within a State*

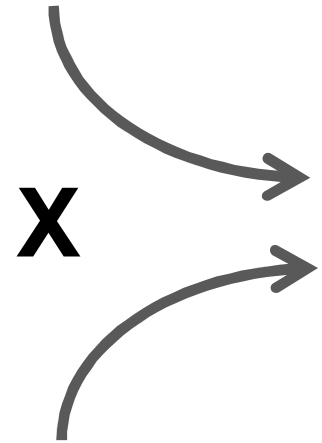
*In this setting, "**utilization**" means*

the number of cases treated, by case type

Population-level utilization takes the form of counts, for each specific case type

Total cost = “# of units” X “cost / unit”

Utilization:
of “units of care” consumed, by type
(a count; how many)



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Total cost

Cost per unit of care
(a $ amount; how much)

How costs are measured

depends on how care delivery payment claims are managed

There are 2 main methods:

1. ***Cost Master approaches***
2. ***Charge Master approaches***

A Cost Master *(bottom-up costing)*

- ***The basis for "Activity-Based Costing"***
- ***A master list of all possible units of care*** *that could be used within a particular care delivery setting; for example,*
- ***Typical hospital: 25,000+ individual items***
- ***Tracks a true bottom-up cost for each item***
  (more on this shortly)
- ***Maps "units of care,"*** *either individually or in groups,* ***into federally-mandated billing codes***
- ***For billing purposes, each item also includes a list price – a "charge" – for each resulting billing code***

Major ABC Cost Master categories

Item id	Special factors	Unit size/ desc	Relative Resource Units	Department *(direct)*					Facility *(indirect)*	
				Variable			Fixed			
				Supplies	Labor	Other	Labor	Other	Variable	Fixed
Employed Physicians										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Nursing										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Pharmacy										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Laboratory										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Imaging/Radiology										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Central Supply/Ancillaries										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Operating/Procedure Room										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪
Other										
▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪▪▪▪	▪▪▪	▪▪▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪▪	▪▪▪▪▪	▪▪▪

(Note: oversimplified – the real Cost Master also includes fixed / variable unit breakouts w/in dept and facility)

Bundling:

- ***Combining several granular "units of care" into a single element*** *(which is itself a "unit of care" –*
  it becomes the entry in the Cost Master, replacing all of its subelements)
- ***Bundling hides underlying cost detail, and the ability to detect variation across the bundled subelements – it makes the variation invisible.***
- ***That makes it impossible to manage the opportunities for cheaper care that those variations might have revealed.***

Real example: *Initially, one system's Cost Master bundled all of the elements of an artificial hip joint (e.g., femoral component, acetabular component, single screws, glue packs, bone paste, etc.) into a single unit of care.*

However, the cost of different individual components varied widely. The femoral and acetabular components of one manufacturer's joint cost less than $3500; the same components from a different manufacturer cost more than $15,000.

By averaging all combined component costs into a single bundled unit of care, the system lost its ability to directly see and manage those widely varying costs.

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A Charge Master *(top-down costing)*

- ***The federal government mandates lists of functional billing codes for payment,***

  maintained by the American Medical Association:

  – *CPT (Current Procedural Terminology) – ~8,800 5-digit numeric codes*
  – *HCPCS (Healthcare Common Procedure Coding System) – ~7,000 additional 5-digit codes*

  all used in the context of

  – *ICD-10-CM (International Classification of Disease, 10th revision, Clinical Modification) – ~72,000 3 to 7-digit alphanumeric codes describing clinical conditions*

- ***All commercial insurers and other payers use that same list of codes for payment.***

- ***Most care delivery groups maintain a Charge Master*** *(not a Cost Master)* ***built around these billing codes.***

- ***Charge Masters bundle heavily*** *compared to Cost Masters (and simply omit some units of care entirely).*

Primary purpose: billing

As care proceeds, each "unit of care" used is recorded in a Transaction File *(a.k.a. "Tran File")*

- *this is the "number of / count" function embodied in "utilization"*
- *many Tran File entries are automated, while*
- *clinicians directly enter others (note: human data entry produces errors)*
- *a typical Tran File entry includes (a) a patient identifier; (b) a code identifying a specific "unit of care"; (c) the number of that "unit of care" that were used; (d) a date / time stamp; and (e) a location code*

At the end of a clinical encounter

- *use the patient identifier to pull all Tran File entries for that patient*
- *abstractors manually add additional codes (note: human data entry produces errors)*
- *map the resulting "unit of care" codes through the Cost or Charge Master*

Create a detailed bill – a list of all services provided during the encounter, along with charges and costs

3 related concepts around costs

1. ***Direct vs indirect costs;***

2a. ***Fixed vs variable costs;*** *and*

2b. ***duty cycle.***

Direct vs. indirect costs

- ***Direct costs*** *– "costs that can be traced / linked to a 'unit of care' in a cost-effective way"*; expenses that reasonably could (and usually do) appear on an itemized bill.*

- ***Indirect costs*** *– allocation of bundled costs from other (overhead) units, such as administrative overhead, utilities, and the like; expenses that do not individually appear on an itemized bill.*

- ***A matter of judgment / choice*** *for most items – this implies materiality – given that measuring cost itself generates costs (consumes resources), direct costs should be used only when they add sufficient management leverage to justify the costs of generating the information.**

*Horngren, Datar, and Rajan. *Cost Accounting: A Managerial Emphasis, 14th Edition.* New York, NY: Prentice Hall, 2012; pg. 147.

Direct cost elements include *things like*

- ***Acquisition costs***
  - *for supplies, medications, implants, and the like. These costs often map directly from a purchase order*
  - *human resources (people) map to actual salary and fringe benefits*
- ***Storage, handling, construction, and distribution costs*** *('construction' is the idea that some 'units of care' are created by combining and processing sub-elements – for example, compounded medications)*
- ***Maintenance*** *(equipment, facilities)* ***and training*** *(humans)*
- ***Wastage / 'shrinkage'*** *– items damaged in handling and transporting, pilferage, items that exceed their approved shelf life*
- *etc.*

Indirect cost elements include *things like*

- ***Administrative overhead***
  - *Management salaries, benefits, and support* *(e.g., office space, computer workstations)*
  - *Non-revenue-generating departments,* *such as human resources, finance, planning, legal services, travel, research support, etc.*
- ***Regulatory compliance and reporting***
- ***Billing adjudication with payers*** *– contract negotiations, preauthorization, resolution of claims denials, etc.*
- ***IT operations and computer support***
- ***Facilities maintenance*** *(repairs, cleaning, landscaping)*
- ***Utilities*** *(electricity, heating, air conditioning, telecommunications)*
- ***Liability and other insurance***
- *etc.*

Fixed versus variable costs

- ***Fixed costs*** *– expenses that accrue regardless of the number of cases seen / number of times a "unit of care" is used,* *e.g., physical plant (buildings and equipment), including maintenance and replacement*

- ***Variable costs*** *– expenses that vary based on the number cases treated / number of times a "unit of care" is used,* *e.g., drugs, supplies, food*

- *In typical hospital operations,*
  - ***Fixed costs*** *are* ***~50 – 65%*** *of total operating costs*
  - ***Variable costs*** *are* ***~35 – 50%*** *of total operating costs*

Quality Science

Duty cycle *is*

the proportion of time or capacity that a fixed unit *(machine, person, facility)* ***actually operates, generating productive value;***

out of the total time or capacity that it *reasonably, theoretically* ***could operate.***

If an operating unit can do several types of work, but the different types of work have different levels of utility,

"duty cycle" includes the concept of focusing the unit at its highest level of utility.

For clinicians, this is sometimes stated as "top of license" –
e.g., expensive physician time is best used diagnosing disease or performing high-end clinical duties, rather than clerical billing functions.

Duty cycle drives fixed cost allocations.

Example: A group buys some hardware

A new blood analyzer *for an uncommon condition –*
Capacity: 50 tests / working day *(maximum duty cycle)*
(5 days / week, 50 weeks / year = 250 days / year @ 50 tests / day = 12,500 tests / year)

- *Initial cost of the machine, with installation: $150,000*

Total annual fixed cost:

Expected useful life of machine: 10 years ⇒	*$15,000 / yr*
Maintenance costs:	*$ 5,000 / yr*
Allocated indirect costs *(floor space, electricity, admin, etc.)*:	*$ 5,000 / yr*
	$25,000 / yr

Variable cost per test:

Disposables *(glassware, reagents)*:	*$ 6 / test*
Allocated technician time *(w fringe benefits, etc.)*:	*$ 4 / test*
	$ 10 / test

Duty cycle's impact on "cost per unit"

Total cost per test *(cost for each instance of this particular "unit of care")*:

- *@ 1 test per day* *(250 tests per year)*
  - *allocated fixed cost per test* *($25,000 / 250)*: *$ 100*
  - *variable cost per test:* *$ 10*
  - ***Total cost per test:*** ***$ 110***

- *@ 10 tests per day* *(2500 tests per year)*
  - *allocated fixed cost per test* *($25,000 / 2500)*: *$ 10*
  - *variable cost per test:* *$ 10*
  - ***Total cost per test:*** ***$ 20***

Low / suboptimal duty cycle

directly *and sometimes quite substantially* ***increases the cost of any "unit of care" that has a significant fixed cost component***

This applies to

- *equipment*
- *physical plant* *(buildings and facilities)*
- *people* *(nurses, physicians, etc.)*
- *and the like*

Quality Science

When you take waste out of a system,

the variable cost subcomponent
of the eliminated waste
accrues directly to operating margins;

while

the fixed cost subcomponent
remains as unused capacity
(reduced duty cycle).

2 ways to extract “fixed cost” waste:

1. ***Manage the “new” excess capacity out***
   – *requires time and additional expense*

– or –

2. ***fill the resulting capacity with new cases***
   – *take market share from competitors*
   – *in growing markets, delay building new, additional fixed capacity (including repurposing the space for other clinical services)*

Measuring costs

A Cost Master:

- ***Tracks a "bottom up" true cost for each item***
  - *cost of initial acquisition (i.e., direct link to purchase order system)*
  - *storage, handling and processing costs*
  - *shrinkage (items that age out, are damaged, or are lost / stolen)*
  - *indirect cost allocations*
- ***Adds a charge for each item*** *(unit of care)*
  - *in the ideal, this starts as an across-the-board standard mark up based on the true cost of each item*
  - *but sometimes, there are subsequent manual modifications, to arrive at a charge that at least equals Medicare's "allowed amount".*

Measuring costs

A Charge Master:

- ***Starts with charges, organized by*** *(federal)* ***billing codes***
- ***then "top down," assigns each billing code a cost***
- ***using a method called "cost to charge ratios"***

Cost to charge ratios *(CCRs)*

- ***Expense data at a department or organization-wide level are accurate;*** *therefore,*
- ***Calculate a "cost to charge ratio"*** *at the level of the whole organization, or within an individual department;*
- ***Then use that ratio to estimate billing code level ("unit of care") costs,*** *based on nationally- published, department-specific, tables of the relative values of each of the billing codes within each department*
- *There is a roughly analogous method that the federal government uses to set payment rates for professional services (physicians and advanced practice clinicians), based on national tables of the average time required to perform the service. These are called* ***Relative Value Units*** *(RVUs)*

Factors affecting charge entries

- ***For Medicare, each federal billing code entry includes an "allowed amount",*** *adjusted to a particular locality by federal estimates of the cost of medical operations in that locality (e.g., salary levels, cost of living, and the like).* *Geographic differences can be quite large. For example, Medicare pays care groups in Nevada and California about 40% more, for the same care, as it pays in Utah or Idaho.*

- ***By law, Medicare pays the lesser of the billed charge*** *(from the care provider)* ***or the "allowed amount"*** *for that item in Medicare master list, for that geographic location.*

- ***The billing codes change each year****, as codes are added, dropped, and modified; and as "allowed amounts" get recalculated and updated.*

On top of that

- ***Commercial payers usually base their payment systems off the Medicare system.***

- ***They typically contract to pay either***
  - *a percentage of Medicare charges (e.g., 150%; 214%)**; or***
  - *a discount from billed charges (the charges the care provider built into their Charge Master, around federal billing codes).*
  - *this translates into an "**allowed amount**" for each billing code, for each separate payer-provider relationship (on both sides).*

“Allowed amount”

is the actual payment amount
a care provider receives
from a particular payer
for a specific “unit of care”/billing code.

The “allowed amount” varies from payer to payer, based on negotiated contracts (for commercial insurance payers) or federal mandates (for Medicare)

As a result,

care providers have very strong incentives to set their charges high.

- ***They want to be absolutely sure that their charges are higher than the Medicare allowed amount, which fluctuates each year;*** *and*

- ***they play "mark it up to mark it down" – some purchasers choose care providers based on the size of the discount they receive, as opposed to the true amount paid*** *– given the complexity of the system, it is hard to assess the true amount paid; they can't get a true "apples to apples" price comparison.*

Even further

- ***Most care providers calculate the size of their organization based on billed charges.***
- ***They account contracted*** *(commercial payers)* ***or mandatory*** *(Medicare)* ***discounts as "contractual allowances" on their financial balance sheet.***
- ***This can make the care delivery organization seem much larger*** *(and more important!)* ***than it actually is.***

Key take away

At best, billed charges bear a very loose relationship to operational reality.

Three important numbers

- ***True cost of operations*** *(in charge-based systems, costs are accurately visible at a department / organization-wide level, but* ***invisible at the level of detailed clinical operations****)*

- ***Allowed amounts*** *– actual payment / revenues received, through Medicare mandated payments or negotiated commercial health insurance contracts*

- ***Charges*** *– very little connection to care delivery operations*

A key implication

Only "self pay" patients ever face actual billed charges.

- ***For Medicare, CMS sets*** *(mandates)* ***payment rates***
- ***Commercial payers negotiate steep discounts from billed charges,*** *with contractual provisions that prevent "balance billing" – billing patients for the difference between billed charges and allowed amounts.*
- ***That leaves "self pay" patients*** *as the only group who face actual billed charges. They tend to be the poor and underserved, the least able to pay.*
- ***This links to 2 other major problems:***

  - Patients sometimes see the charges on a detailed bill, and react very poorly … not understanding that those are not the actual payment rates.

  - ***Surprise billing*** *– "out of network" physicians or facilities serve patients. Patients reasonably believe that they are "in network" (and thus under their insurance company's contracts), but the physicians or facilities don't disclose that they are "out of network;" or the patient has no choice (emergency services). The physicians and/or facility then bill the patient at egregiously high rates, and collect vigorously. Some groups (e.g., private equity-funded care groups) purposefully build their businesses around this method.*

One last idea …

Why does the elimination of quality-associated waste
("move upstream" strategies; clinical quality improvement)

have such dramatically higher financial leverage than traditional "revenue enhancement" strategies?

Which would you rather get?