



2023 SUMMER CPE SYMPOSIUM: HOT TOPICS IN HEALTHCARE

The Financial Effects of Healthcare's Physical Environment

Session 3 | June 23, 2023

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WE ARE AN INDEPENDENT MEMBER OF HLB—THE GLOBAL ADVISORY AND ACCOUNTING NETWORK

Introductions



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Agenda

- I. Economics
- II. Patient, Visitor, & Team Safety
- III. Improving Patient Satisfaction Scores
- IV. Operational Efficiencies

I. Economics



Percentage Change in Producer Price Indexes (PPIs) and Employment Cost Indexes (ECIs) for Construction, 2017-2023

BLS Series ID		12-month percentage change to December:					to January 2023 since:			BLS Series ID		12-month percentage change to December:					to January 2023 since:			
		2017	2018	2019	2020	2021	12/2022	10/2022	1/2022			2017	2018	2019	2020	2021	12/2022	10/2022	1/2022	
Table 1: Changes in consumer, producer & construction prices																				
CUUR0000SA0	Consumer price index (CPI-U)	2.1	1.9	2.3	1.4	7.0	0.8	0.4	6.4	WPU057303	#2 diesel fuel	40.9	4.0	-0.7	-2.8	54.2	7.1	-25.9	22.8	
WPUFD4	Producer price index (PPI) for final demand	2.5	2.6	1.4	0.8	10.0	0.9	0.3	6.0	WPU1394	Paving mixtures and blocks (asphalt)	-0.4	10.5	-1.8	-2.7	8.2	7.9	4.6	14.7	
WPUFD43	Final demand construction	3.1	5.2	3.9	1.2	12.2	1.6	1.8	16.6	WPU136	Asphalt felts and coatings	2.2	10.6	-0.8	2.1	18.1	-2.7	-1.7	7.4	
WPUFD431	Construction for private capital investment	3.1	5.3	3.8	1.3	13.4	1.7	1.9	17.5	WPU1361	Prepared asphalt & tar roofing & siding products	1.6	10.9	-0.8	2.5	19.6	-3.2	-2.1	7.3	
WPUFD432	Construction for government	3.1	4.7	4.0	0.9	10.1	1.6	1.7	14.8	WPU1322	Cement	4.3	2.8	1.9	1.9	4.4	7.7	8.2	17.6	
WPU80	Construction (partial)	2.7	4.5	3.5	0.9	11.6	1.6	1.7	14.6	WPU133	Concrete products	2.9	3.5	3.1	2.2	8.6	1.8	3.6	14.8	
WPU801	New nonresidential building construction	3.1	5.4	4.0	1.3	12.4	1.7	1.8	17.3	WPU1331	Concrete block and brick	2.9	3.1	3.6	3.0	5.1	4.7	4.8	14.7	
WPU801101	New warehouse building construction	3.5	4.0	4.5	-0.1	20.4	0.0	0.0	13.7	WPU1332	Concrete pipe	0.5	2.3	4.1	2.6	14.9	1.7	6.4	21.4	
WPU801102	New school building construction	3.5	5.4	4.7	1.2	9.0	1.4	1.3	16.3	WPU1333	Ready-mixed concrete	3.1	3.2	2.7	2.2	6.8	1.5	3.6	12.9	
WPU801103	New office building construction	2.6	5.6	3.6	1.2	13.0	3.4	3.9	19.6	WPU1334	Precast concrete products	3.5	4.8	3.9	3.0	12.0	1.8	2.6	12.6	
WPU801104	New industrial building construction	4.0	5.9	4.5	2.0	13.4	0.7	0.8	17.3	WPU1335	Prestressed concrete products	1.9	4.1	2.5	-1.2	14.7	0.2	2.1	31.0	
WPU801105	New health care building construction	2.6	5.0	3.1	1.4	11.4	1.7	1.8	17.7	WPU1342	Brick and structural clay tile	1.7	1.3	1.8	3.3	6.1	0.7	0.7	12.9	
WPU802	Maint & repair of nonres buildings (partial)	1.2	2.4	2.2	-0.2	9.5	0.8	0.9	6.3	WPU0721	Plastic construction products	4.7	2.5	0.4	5.4	35.4	-0.3	-1.3	7.0	
Table 2: Changes in PPIs for new, repair & maintenance work by subcontractors																				
PCU23811X23811X	Concrete contractors, nonresidential building work	3.0	6.2	4.7	0.9	17.4	-0.8	-0.3	8.4	WPU1311	Flat glass	1.1	1.4	1.0	3.7	7.4	0.6	1.3	8.7	
PCU23816X23816X	Roofing contractors, nonresidential building work	1.8	1.0	3.6	3.2	9.2	5.5	6.4	22.9	WPU13710102	Gypsum building materials				-7.5	4.6	23.0	0.0	0.2	11.1
PCU23821X23821X	Electrical contractors, nonresidential building work	3.7	4.8	3.6	2.0	9.6	7.2	7.0	19.0	WPU1392	Insulation materials	1.2	5.1	-3.1	1.6	16.9	0.3	0.8	9.6	
PCU23822X23822X	Plumbing contractors, nonresidential building work	3.6	5.2	3.7	0.0	8.4	0.8	1.3	13.4	WPU1004011	Lumber and plywood	11.2	-4.9	-2.2	37.2	18.1	0.0	-6.2	-30.8	
WPU062101	Architectural coatings	2.6	6.7	4.5	1.9	14.0	0.0	0.5	15.8	WPU1017	Steel mill products	7.5	19.3	-16.0	5.2	128.0	-2.3	-8.5	-30.1	
Table 3: Changes in PPIs for inputs to construction industries, excluding capital investment, labor and imports																				
WPUIP230000	Inputs to construction industries			1.4	5.5	18.5	0.9	-2.1	2.8	WPU101706	Steel pipe and tube	10.2	20.0	-9.0	1.9	79.8	-1.3	-5.2	-10.0	
WPUIP2300001	Inputs to construction industries, goods	5.0	3.5	0.8	2.6	22.8	1.3	-2.4	4.9	WPU102502	Copper and brass mill shapes	9.0	-5.7	-0.6	23.6	23.4	2.0	9.2	-4.5	
WPUIP23000012	Inputs to construction industries, energy			3.7	-11.0	51.4	7.5	-19.3	9.0	WPU102501	Aluminum mill shapes	10.1	6.8	-4.4	-1.7	29.5	3.3	2.8	-6.1	
WPUIP23000013	Inputs to construction industries, goods less foods and energy			0.3	4.8	20.3	0.7	0.0	4.5	WPU1073	Sheet metal products	2.2	7.6	-1.3	-0.3	35.5	-0.7	-1.9	6.1	
WPUIP2300002	Inputs to construction industries, services			2.1	9.1	12.1	0.2	-1.6	-0.9	WPU107405	Fabricated structural metal	3.5	14.8	-3.3	-0.5	47.6	-0.6	-2.2	3.2	
WPUIP231000	Inputs to new construction			1.4	5.6	18.9	0.9	-2.0	3.0	WPU1074051	Fabricated structural metal bar joists & rebar	-0.5	12.1	-2.9	0.5	56.9	-1.3	-3.7	-1.7	
WPUIP231200	New nonresidential construction			1.8	4.4	20.2	0.9	-1.8	4.3	WPU10740514	Fabricated structural metal for non-industrial buildr	-1.3	13.1	-3.8	0.2	61.7	-1.5	-3.8	-2.2	
WPUIP231211	Commercial structures			1.6	4.2	21.1	0.6	-1.2	4.9	WPU10740553	Fabricated structural metal for bridges	-0.4	15.0	-6.9	-0.4	41.2	3.3	2.3	8.6	
WPUIP231212	Healthcare structures			1.7	5.0	20.0	0.7	-1.2	4.4	WPU107408	Ornamental and architectural metal work	3.5	11.5	0.1	4.8	48.1	0.0	-0.6	13.3	
WPUIP231220	Industrial structures			3.2	3.8	18.6	0.9	-1.1	5.4	WPU1076	Fabricated steel plate	1.4	2.9	-1.3	1.8	45.5	0.0	-1.7	0.9	
WPUIP231230	Other nonresidential			1.7	4.3	19.9	0.9	-2.0	4.2	WPU1079	Prefabricated metal buildings	3.1	11.7	-5.3	12.0	41.4	0.0	-1.4	-4.3	
WPUIP231231	Highways and streets			1.4	1.8	19.8	1.1	-2.1	4.9	WPU112	Construction machinery and equipment	0.9	3.4	2.3	1.1	10.0	3.4	3.7	12.2	
WPUIP231232	Power and communications structures			1.5	3.6	20.4	0.9	-2.5	3.7	WPU07120105	Truck & bus (incl. off-the-highway) pneumatic tires	1.8	2.5	-0.1	0.3	10.9	2.3	5.5	17.4	
WPUIP231233	Educational and vocational structures			1.8	5.8	19.5	0.5	-1.4	3.3	Table 4: Changes in PPIs for unprocessed goods important to construction										
WPUIP231234	Other misc. nonresidential construction			1.9	4.8	19.9	1.1	-1.9	3.7	WPU058102	Asphalt (at refinery)	28.3	24.9	-17.1	-13.9	70.6	21.7	-29.8	-7.2	
WPUIP231100	New residential construction			1.0	6.7	15.9	0.8	-2.1	1.0	WPU1321	Construction sand/gravel/crushed stone	4.2	3.8	4.2	4.3	4.1	3.0	3.4	11.0	
WPUIP231110	Single-family			1.0	6.6	15.4	0.7	-2.1	0.4	WPU1012	Iron and steel scrap	18.5	14.1	-26.2	40.6	37.9	11.3	16.0	-14.2	
WPUIP231120	Multifamily			1.0	7.6	15.5	0.6	-2.0	0.2	WPU101212	Stainless and alloy steel scrap	3.9	-15.6	-0.1	27.4	47.9	6.4	24.5	-24.1	
WPUIP232000	Maintenance and repair construction			1.4	5.7	16.8	1.0	-2.3	2.4	WPU102301	Copper base scrap	17.5	-9.0	-5.9	30.1	24.5	3.0	14.7	-7.3	
WPUIP232200	Nonresidential maintenance and repair			1.3	5.2	18.4	1.0	-2.5	2.3	Table 5: Changes in ECIs for total compensation, wages & salaries (through December 2022)										
WPUIP232100	Residential maintenance and repair			1.0	6.1	14.8	0.6	-1.8	1.4	CIU201000000000	Private industry--total compensation	2.6	3.0	2.7	2.6	4.4	0.8	5.1		
Table 6: Changes in PPIs for services important to construction																				
WPU4531	Architectural services	2.7	-1.2	-1.7	0.6	2.8	0.1	0.3	2.0	CIU2012300000000	Construction--total compensation	2.4	2.8	3.5	2.4	3.5	0.8	4.3		
WPU4532	Engineering services	2.8	2.1	2.0	1.5	2.1	1.3	1.6	3.9	CIU2020000000000	Private industry--wages and salaries	2.8	3.1	3.0	2.8	5.0	1.0	5.1		
WPU3012	Truck transportation of freight	4.5	6.5	0.0	2.2	17.9	-1.2	-2.0	4.9	CIU2022300000000	Construction--wages and salaries	2.5	3.1	3.8	2.8	3.8	1.1	4.8		
WPU443	Const, mining & forestry mach & eq rental & leasing	3.4	-0.5	-1.3	-4.6	2.1	-0.3	0.0	6.8											

Reference: Associated General Contractors of America
 Updated 2/16/2023
 Source: BLS: www.bls.gov/cpi for CPI, www.bls.gov/ppi for PPIs; www.bls.gov/ect for ECIs. Compiled by Ken Simonson (ken.simonson@agc.org), Chief Economist, Associated General Contractors of America, www.agc.org.

I. Economics

- Financial Effects of the Healthcare Environment
 - Project Types in Healthcare
 - Minor Renovations & Appearance Upgrades (refresh)
 - Infrastructure & Energy
 - Major Renovations & Additions
 - New Construction (inpatient, surgical, diagnostics, outpatient, on-campus/off-campus)
 - Key Results
 - Patient Satisfaction (comfort & perception)
 - Clinical Outcomes (safety, quality)
 - Brand Strength
 - Operational Costs (ROI, utility rebates/ incentives, repairs/ maintenance)

I. Economics

- Master/ Strategic Planning
 - Current Physical Assets (Facility Condition Assessment)
 - Renovate, Re-Purpose, Remove, or Rebuild
 - Strategic Initiatives (Growth/ Expansion)
 - Phased Approaches
 - On-Campus vs Off-Campus
- The Right Service Lines in the Right Environment
 - Healthcare Occupancy vs Business Occupancy
 - Parking & Logistics (on-campus vs off-campus)

POLLING QUESTION #1 - DISCUSSION

Average dollar per square foot (\$/SF) construction cost of a new 3-story hospital?

1. \$150.26/sf
2. \$322.27/sf
3. \$419.18/sf

Building Design + Construction, April 13, 2023

(location and complexity of design will drive costs)

Recent Examples (below are total project costs):

- UChicago Freestanding Cancer Care Center: 500,000sf @ \$633,000,000 total cost = \$1,266/sf
- The Ohio State University Wexner Medical Center: 1,900,000sf @ \$1,790,000,000 total cost = \$942/sf
- Vanderbilt University Medical Center Inpatient Tower: 500,000sf @ \$500,000,000 total cost = \$1,000/sf

I. Economics

- Unintended Consequences in Healthcare

- More than 250,000 people in the U.S. die every year from medical errors
- Third leading cause of death in America in 2018

Source: hopkinsmedicine.gov

- Medical errors cost approximately \$20 billion a year

Source: nih.gov

II. Patient, Visitor, & Team Safety

- Infection Prevention
 - Hospital Acquired Infections (HAI's)
 - 1 in 31 U.S. patients contracts at least one infection in association with their healthcare each day.
 - Surgical Site Infections (SSI's) account for 20% of all HAIs
 - Est. annual cost of \$3.3B
 - Extended hospital stay of 9.7 days
 - Cost of hospitalization increased by more than \$20,000/admission

Source: cdc.gov, Jan 2023

II. Patient, Visitor, & Team Safety

- Health of the Environment
 - Water Quality
 - Bacteria
 - Legionella
 - Air Quality
 - Contaminants
 - Pressurization
 - Volume (air changes per hour)
 - Maintenance (& lack thereof)
 - Water Treatment
 - Sewage
 - Mold

II. Patient, Visitor, & Team Safety

- Hazards
 - Security & Access Control
 - Preventative Maintenance (electrical, plumbing, HVAC)
 - Event Recovery

- Fire
- Floods

Example: a broken fire sprinkler head can release 25 gallons of water per minute → assuming it takes 4-6 minutes to identify, respond, & close the valve, that equates to approximately 100–150 gallons of water on the floor → the average bathtub holds approximately 40 gals of water.

- Weather
- Utility Interruptions

- Behavioral Health
 - Inpatient Care Units
 - Emergency Department Observation Unit (waiting for facility transfer)

II. Patient, Visitor, & Team Safety

- Construction & Maintenance Activities
 - Pre-Planning & Coordination
 - Schedule
 - Communication
 - Key Performance Indicators (associated Issues)
 - Medication/ Dosing Errors (*distraction, utility interruption*)
 - Errors Related to Anesthesia (*disruption, distraction*)
 - Hospital Acquired Infections (*air quality, water quality, contamination*)
 - Missed/ Delayed Diagnosis & Treatment (*accessibility, disruption, distraction, utility interruptions*)
 - Surgical Errors (*disruption, utility interruption*)

POLLING QUESTION #2 - DISCUSSION

ALL OF THE ABOVE!

(trick question)

POLLING QUESTION #2 - DISCUSSION

- IC.02.02.01, EP 2: **The hospital implements infection prevention and control activities** when doing the following: Performing intermediate and high-level disinfection and sterilization of medical equipment, devices, and supplies.
- NPSG.15.01.01, EP 1: For psychiatric hospitals and psychiatric units in general hospitals: **The hospital conducts an environmental risk assessment that identifies features in the physical environment that could be used to attempt suicide;** the hospital takes necessary action to minimize the risk(s) (for example, removal of anchor points, door hinges, and hooks that can be used for hanging). For nonpsychiatric units in general hospitals: The organization implements procedures to mitigate the risk of suicide for patients at high risk for suicide, such as one-to-one monitoring, removing objects that pose a risk for self-harm if they can be removed without adversely affecting the patient's medical care, assessing objects brought into a room by visitors, and using safe transportation procedures when moving patients to other parts of the hospital.

POLLING QUESTION #2 - DISCUSSION

- MM.06.01.01, EP 3: **Before administration, the individual administering the medication does the following:**
 - Verifies that the medication selected matches the medication order and product label.
 - Visually inspects the medication for particulates, discoloration, or other loss of integrity.
 - Verifies that the medication has not expired.
 - Verifies that no contraindications exist.
 - Verifies that the medication is being administered at the proper time, in the prescribed dose, and by the correct route.
 - Discusses any unresolved concerns about the medication with the patient's licensed independent practitioner, prescriber (if different from the licensed independent practitioner), and/or staff involved with the patient's care, treatment, and services.
- EC.02.06.01, EP 1: **Interior spaces meet the needs of the patient population and are safe and suitable to the care, treatment, and services provided.**

POLLING QUESTION #2 - DISCUSSION

- EC.02.05.01, EP 15: **In critical care areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air exchange rates, filtration efficiencies, temperature, and humidity.** For new and existing health care facilities, or altered, renovated, or modernized portions of existing systems or individual components (constructed or plans approved on or after July 5, 2016), heating, cooling, and ventilation are in accordance with NFPA 99-2012, which includes 2008 ASHRAE 170, or state design requirements if more stringent.

III. Improving Patient Satisfaction Scores (HCAHPS)



- Your Care from Nurses/ Doctors
 - Disruptions
 - Communication
 - Behavioral
- The Hospital Environment
 - Cleanliness
 - Noise & Disruptions
- *Your Experiences in this Hospital*
- *When You Left the Hospital*

III. Improving Patient Satisfaction Scores (HCAHPS)



- Overall Rating of Hospital
 - Experience
 - Perception
- *Understanding Your Care When You Left the Hospital*
- About You
 - Admission through the ED
 - Overall Mental/ Emotional Health
- Survey Goals
 - Patient's Perspective on Services Received
 - Quality of Care to Patients
 - Accountability

IV. Operational Efficiencies



- Engineering
 - Energy Consumption
 - Food Sales & Service
 - Healthcare
 - Retail
 - Technology & Science
 - Energy Uses
 - Lighting
 - Heating/ Cooling
 - Water

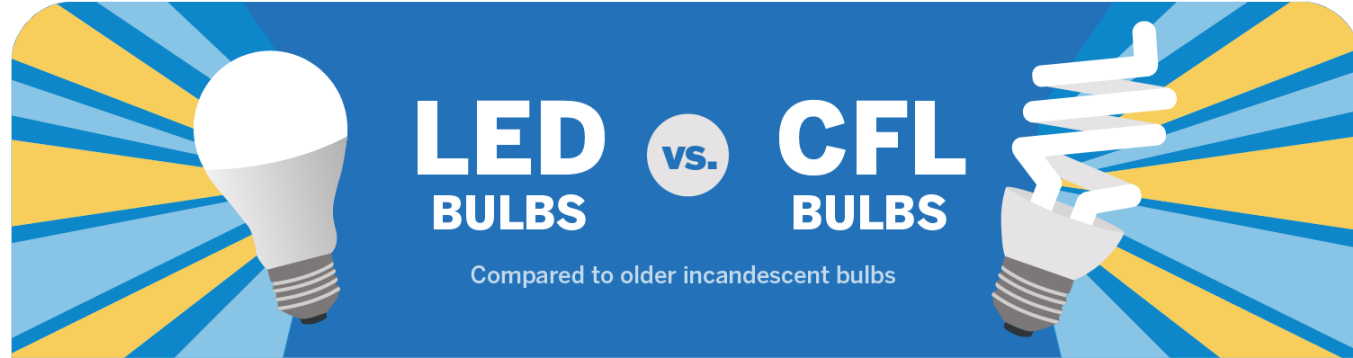
U.S. National Median Reference Values for All Portfolio Manager Property Types

Broad Category	Primary Function	Further Breakdown (where needed)	Source EUI (kBtu/ft ²)	Site EUI (kBtu/ft ²)	Reference Data Source - Peer Group Comparison
Food Sales & Service	Convenience Store	Convenience Store with Gas Station	592.6	231.4	CBECS - Food Sales
		Convenience Store without Gas Station			
	Restaurant/Bar	Bar/Nightclub	297.0	130.7	CBECS - Bar/Pub/Lounge
		Fast Food Restaurant	886.4	402.7	CBECS - Fast Food
		Restaurant	573.7	325.6	CBECS - Restaurant/Cafeteria
		Other - Restaurant/Bar			
	Supermarket/Grocery Store*		444.0	196.0	CBECS - Grocery Store/Food Market
	Wholesale Club/Supercenter*		120.0	51.4	CBECS - Retail Store
	Other	Food Sales	592.6	231.4	CBECS - Food Sales
Food Service		527.7	270.3	CBECS - Food Service	
Healthcare	Ambulatory Surgical Center		138.3	62.0	CBECS - Outpatient Healthcare
	Hospital	Hospital (General Medical & Surgical)*	426.9	234.3	Industry Survey
		Other/Specialty Hospital	433.9	206.7	CBECS - Inpatient Healthcare
	Medical Office*		121.7	51.2	CBECS - Medical Office
	Outpatient Rehabilitation/Physical Therapy		138.3	62.0	CBECS - Outpatient Healthcare
	Residential Care Facility		213.2	99.0	Industry Survey
	Senior Living Community*		213.2	99.0	Industry Survey
	Urgent Care/Clinic/Other Outpatient		145.8	64.5	CBECS - Clinic/Outpatient

Energy Star Portfolio Manager; U.S. Energy Use Intensity by Property Type Technical Reference, April 2021 (EUI Benchmarking)

IV. Operational Efficiencies

- Engineering
 - Preventative Maintenance
 - Repair vs Replacement
 - Emergency Shutdowns
 - Efficiency of Automation vs. Manual Operations
 - Life Cycle
 - Upfront Costs
 - Life Expectancy
 - Operational Expenses



LED BULBS vs. **CFL BULBS**

Compared to older incandescent bulbs

	 LEDs 10W/800 LUMENS	 CFLs 10W/450 LUMENS	 INCANDESCENT 10W/81 LUMENS
ENERGY EFFICIENCY	Best	Good	Average
TYPICAL LIFESPAN	25,000 hrs	8,000 hrs	1,200 hrs
YEARLY COST	\$1.34/yr	\$1.73/yr	\$3.05/yr

IV. Operational Efficiencies

- Maintenance
 - Material Selections
 - Serviceable Life
 - Equipment & Parts Availability
 - Domestic vs Imported Parts
- During Construction & Facility Upgrades
 - Facility Access
 - Parking
 - Wayfinding
 - Intake/ Discharge
 - Police & Fire
 - Staff Circulation & Support (additional FTE's)

Closing Thoughts

- Economic Challenges
 - Inflation
 - CMS/ Insurance Reimbursement
- Safety & Quality of Care
 - Improved Outcomes
 - Staff Retention
 - Brand Recognition
- Operations
 - Efficiency
 - Old Habits

How Can We HELP?





A national healthcare advisory services firm
providing consulting, audit, and tax services