Methodology to calculate commercial inpatient net patient revenue per case mix adjusted discharge and commercial to Medicare payment-to-cost ratio (PTCR) and to identify high-cost hospitals[1]

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Input data:

1. **Public data link for Selected & Pivot:** [Hospital Annual Financial Data - Selected Data & Pivot Tables - Dataset - California Health and Human Services Open Data Portal](#)
2. **Public data link for Complete datasets**: [Hospital Annual Financial Disclosure Report – Complete Data Set - Dataset - California Health and Human Services Open Data Portal](#)
3. **Public Data link for case mix:** [Case Mix Index - Dataset - California Health and Human Services Open Data Portal](#)

Replication steps:

1. Append 'Financial and Utilization Data' sheet from Hospital Annual Financial Disclosure Report files into one file
2. Merge with Selected datasets to get TYPE_HOSP variables
3. Filter to keep only Comparable hospitals
4. Create year variable by using year of the reporting period end date
5. Merge with the case mix dataset on year and hospital
6. Round case mix index to 2 decimals
7. Remove duplicates
   a. Calculate period length as the difference in days between reporting end date and reporting begin date
   b. Sort by hospital name, year, period length (descending), and end date (descending)
   c. Keep first record per hospital per year with the longest period or most recent

8. Commercial to Medicare PTCR calculation
   a. Perform calculations of cost-to-charge ratio by revenue center as described in the paper by Kronick and Neyaz (2019): [West-Health-Policy-Center-Hospital-Pricing-Analysis-May-2019.pdf](#)

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[1] Note: we use Commercial and Other Third Party interchangeably.

i. For each cost/revenue center, calculate cost as a sum of net costs as reallocated and adjustments for professional components: page 10, column 9, row "x" provides the net cost for each revenue center "x." These costs were added to the Adjustment for Professional Component from page 10, column 13, row x. The sum of columns 9 and 13 were then divided by "Gross Revenue" from page 10, column 11, row x.

$$Cost\_x = (P10C9Lx + P10C13Lx)$$

ii. For each cost/revenue center, calculate cost-to-charge ratio as costs calculated in previous step divided by the revenue for each cost/revenue center

$$Cost-to-Charge\_x = (P10C9Lx + P10C13Lx)/(P10C11Lx)$$

iii. For each revenue center and payer, calculate cost using cost-to-charge ratio from previous step multiplied by the sum of revenue center revenue from inpatient, outpatient, traditional care and managed care payer revenue

$$Medicare\ Costs\ Revenue\ Center\_x = (P12C1Lx + P12C2x + P12C3Lx + P12C4Lx) * (Cost\text{-}to\text{-}Charge\ Ratio\_x)$$

b. Calculate total costs for Medicare and Commercial payers by summing total costs across revenue centers by payer
c. Calculate total costs by summing across payers and across revenue centers
d. Calculate adjustment factor to reallocate other operating revenue as difference of total operating expenses and other operating revenue divided by total costs
e. Adjust total cost by payer by multiplying by adjustment factor
f. Calculate PTCR for Medicare and Commercial payers as a ratio of net patient revenue divided by adjusted total costs
g. Calculate a ratio of Commercial PTCR to Medicare PTCR
h. Round to nearest integer
i. 59 observations (out of 1,832) have missing data. A common reason for nulls would be if a hospital did not report any Medicare or Other Third Party discharges and thus would not have reported any inpatient Medicare or Other Third Party revenue.

9. Calculate commercial inpatient NPR per case mix adjusted discharge (CMAD)

a. Calculate estimated inpatient net revenue for managed care for Commercial payers by multiplying net patient revenue from managed care by a ratio of gross inpatient revenue from managed care to gross revenue from managed care

   *Commercial net patient revenue from managed care * (commercial gross inpatient revenue from managed care / commercial gross revenue from managed care)*

b. Calculate commercial CMADs by multiplying a sum of commercial discharges from traditional and managed care by case mix index
c. Calculate commercial inpatient net revenue per CMAD by dividing a sum of commercial inpatient net revenue from traditional care and estimated inpatient net revenue from commercial managed care by commercial CMADs
d. Round to nearest integer
e. 17 observations (out of 1,832) have missing data. A common reason for nulls would be if a hospital did not report any Other Third Party discharges and thus would not have reported any inpatient Other Third Party revenue.

10. Calculate share of Medicare revenue in gross patient revenue
11. Calculate share of Other Third Party revenue in gross patient revenue
12. For each year, calculate the weighted 85th percentile of commercial inpatient NPR per CMAD using total discharges as weights
13. For each year, calculate the weighted 85th percentile of Commercial to Medicare PTCR using total discharges as weights
14. Calculate number of years between 2018 and 2022 in which a hospital is
    a. above the 85th percentile of commercial inpatient NPR per CMAD and hospitals' share of Medicare revenue and share of Other Third Party revenue are both above 5%
    b. above 85th percentile of Commercial to Medicare PTCR and hospitals' share of Medicare revenue and share of Other Third Party revenue are both above 5%
15. For each year, calculate the 30th percentile of total inpatient discharges
16. Identify hospitals that are below 85th percentile for either metric 8 or 9 in the last reporting year included in the analysis and have a decreasing trend in either metric 8 or 9 for the last two years
17. Define a high-cost hospital as a hospital satisfying conditions in 14.a and 14.b for 3 out of 5 years, above 30th percentile in discharges and satisfy condition as described in 16.