

Ritik Kumar

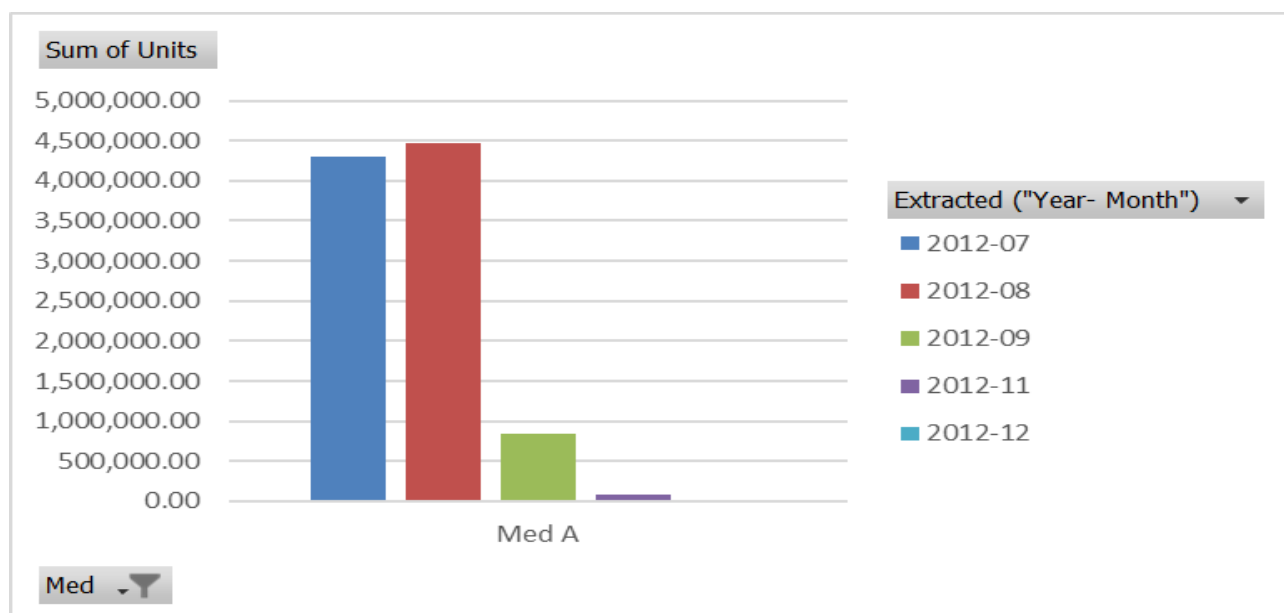
3.602 – Rutgers The State University of New Jersey-Newark

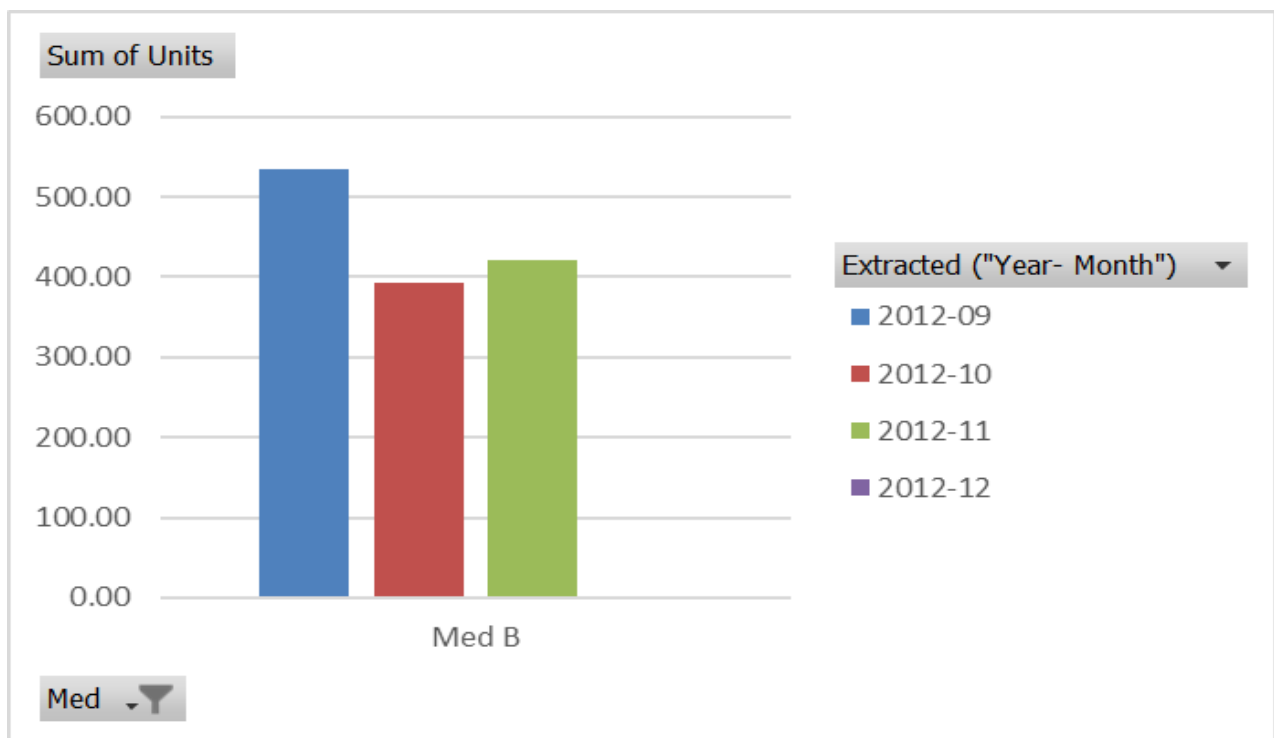
Question1: What is the total number of units utilized/administered (how much was used) in each month for each medication across all patients?

[17 mins]

Answer: The total units administered for Med A and Med B across all patients are as follows:

Medication	Extracted (Year-Month)	Total Units
Med A	2012-07	4303700
Med A	2012-08	4477100
Med A	2012-09	849900
Med A	2012-11	75300
Med A	2012-12	10200
Med B	2012-09	535
Med B	2012-10	393
Med B	2012-11	420
Med B	2012-12	1





Question 2: How many patients received Med A in each month from July to Nov? Med B? [15 mins]

Answer: From July to November 2012, the unique patients receiving medications were:

Medication	Extracted (Year-Month)	Unique Patients
Med A	2012-07	92
Med A	2012-08	92
Med A	2012-09	73
Med A	2012-11	4
Med B	2012-09	76
Med B	2012-10	66
Med B	2012-11	72

1. Med A: 92 patients each in July and August, 73 in September, and 4 in November.

2. Med B: 76 patients in September, 66 in October and 72 in November.

Although Med A had consistent usage in July and August before declining sharply, while Med B showed steady growth starting in September.

Question 3: What's the average total monthly dose per patient for each medication in each month (July to Nov)? [13 mins]

Answer: The Calculated Average Total Monthly Dose per Patient for each medication from July to November:

Medication	Extracted (Year-Month)	Total Units	Unique Patients	Average Total Monthly Dose per patient
Med A	2012-07	4303700	92	46779.35
Med A	2012-08	4477100	92	48664.13
Med A	2012-09	849900	73	11642.47
Med A	2012-11	75300	4	18825.00
Med B	2012-09	535	76	7.04
Med B	2012-10	393	66	5.95
Med B	2012-11	420	72	5.83

Med A had high average doses per patient in July (46,779.35) and August (48,664.13) but declined in September (11,642.47) and November (18,825.00). Med B had minimal usage with an average dose of 7.04 per patient in September, 5.95 in October and November (5.83) is very less.

Question 4: In each month separately (September, October, and November) and also all together across these 3 months, how many patients are switched from Med A to Med B? In each month separately (Sept, Oct, Nov), how many patients are started on Med B having not been on Med A before? [35 mins]

Answer: 1. To determine whether patients switched from Med A to Med B, the following formula was applied:

=IF (COUNTIFS ('Med A'! \$A: \$A, A2,'Med A'! \$C: \$C,"<"&C2)>0, "Switched", "Not Switched")

This formula helps classify each patient into two categories: Switched (patients who were on Med A before switching to Med B) or Not Switched (patients newly starting on Med B without prior Med A usage).

2. To identify patients who started directly on Med B without previously being on Med A, the following formula was applied:

=IF (COUNTIFS ('Med A'! \$A: \$A, A2,'Med A'! \$C: \$C,"<"&C2) =0,1,0)

This formula helps classify patients who are newly introduced to Med B (i.e., they were never on Med A before starting Med B).

Admin Date	Switched Med A to Med B	New to Med B
Sep	71	5
Oct	10	5
Nov	0	6
Grand Total	81	16

Question 5: In each month separately (September, October, and November) and across all 3 months, for patients switched to Med B, what is the average number of weeks the patients were on Med A before being switched to Med B? (see time on medication definition below) [29 mins]

Answer:

1. In September, patients who switched to Med B spent an average of 9.43 weeks on Med A before switching.
2. In October, patients who switched to Med B spent an average of 14.47 weeks on Med A before switching.
3. Across both months (September and October), the overall average time patients spent on Med A before switching to Med B was 10.05 weeks.

Time on Med A (Multiple Items)	
Row Labels	Average of Time on Med A
+ Sep	9.428571429
+ Oct	14.47142857
Grand Total	10.05114638

Question 6: What is the average total monthly dose per patient per month (in patients that switched) of Medication A before switching to Medication B (use time from question 5)? What is the average total monthly dose per patient per month of Medication B (in patients that switched – assume Med B dose is for 1 month)? [25 mins]

Answer:

1. Med A (Before Switching): The average total monthly dose per patient for Med A (before switching to Med B) was 5268.28 units. To calculate the total monthly dose of Med A for each patient before switching to Med B, the following formula was applied:

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=SUMIFS(D:D, A:A, A1804, E:E, E1804, B:B, "Med A")
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2. Med B (After Switching): The average total monthly dose per patient for Med B (after switching)

was 5269.64 units. To determine the **average monthly dose per patient for Med A**, the formula used was:

`=G1804/COUNTIFS(A:A, A1804, E:E, E1804)`

3.Key Observation: The monthly dose for Med A and Med B is very similar, with only a slight increase in Med B doses after switching.

Medication ▾	Average monthly dose (per patient) ▾
Med A (before :)	5268.27942
Med B (after Sw	5269.64331

Question 7: If Medication A cost \$1 for 100 units, what is the breakeven price point for Medication B (per unit of B)? [5 mins]

Answer:

1.Monthly Cost of Medication A: The monthly cost of Medication A was calculated by multiplying the Average Monthly Dose of Medication A with the Cost per Unit.

Formula used:

Monthly Cost of Medication A = Average Monthly Dose of Medication A × Cost per Unit

Breakeven Price for Medication B: The breakeven price for Medication B was determined by dividing the Monthly Cost of Medication A by the Average Monthly Dose of Medication B.

Formula used:

Breakeven Price for Medication B (per unit) =
Monthly Cost of Medication A /
Average Monthly Dose of Medication B

Monthly Cost of Medication A	52.68
Breakeven Price for Medication B	\$0.009997 per unit

Key Insights: For Medication B to break even with Medication A, its price must not exceed \$0.009997 per unit, assuming the same monthly usage.

Question 8: How much does the average total monthly dose per patient (Medication A and B) change for patients switched September vs October vs November? [10 mins]

Answer:

The analysis compares the average total monthly dose per patient for Med A and Med B in September, October, and November. Key findings reveal:

- A significant decrease in the average dose per patient transitioning from September to November.
- The average dose for Med A was higher in September and November compared to Med B, showing a notable reduction in Med B usage.
- The overall change in total dose highlights a downward trend in medication usage over time for these patients.

Month ▾	Avg Dose Med A ▾	Avg Dose Med ▾	Change ▾
September	2533.333333	7.039473684	-2526.29386
October	No Data	5.835820896	N/A
November	10025	5.6	-10019.4

Question 9: In patients that were switched to Med B, what percent of the 2nd Med B dose (total dose in month following 1st dose) was the same as the 1st Med B dose? Higher than the 1st dose? Lower than the first dose (but not a zero dose)? No dose at all (a zero dose)? (calculate for patients switched in September only, October only, and Sept and Oct together, assume Med B dose is for 1 month only)
[50 mins]

Answer: The analysis compares dose changes for patients switched to Med B across September, October, and both months combined. Results show the percentage of patients whose second-month doses were classified as:

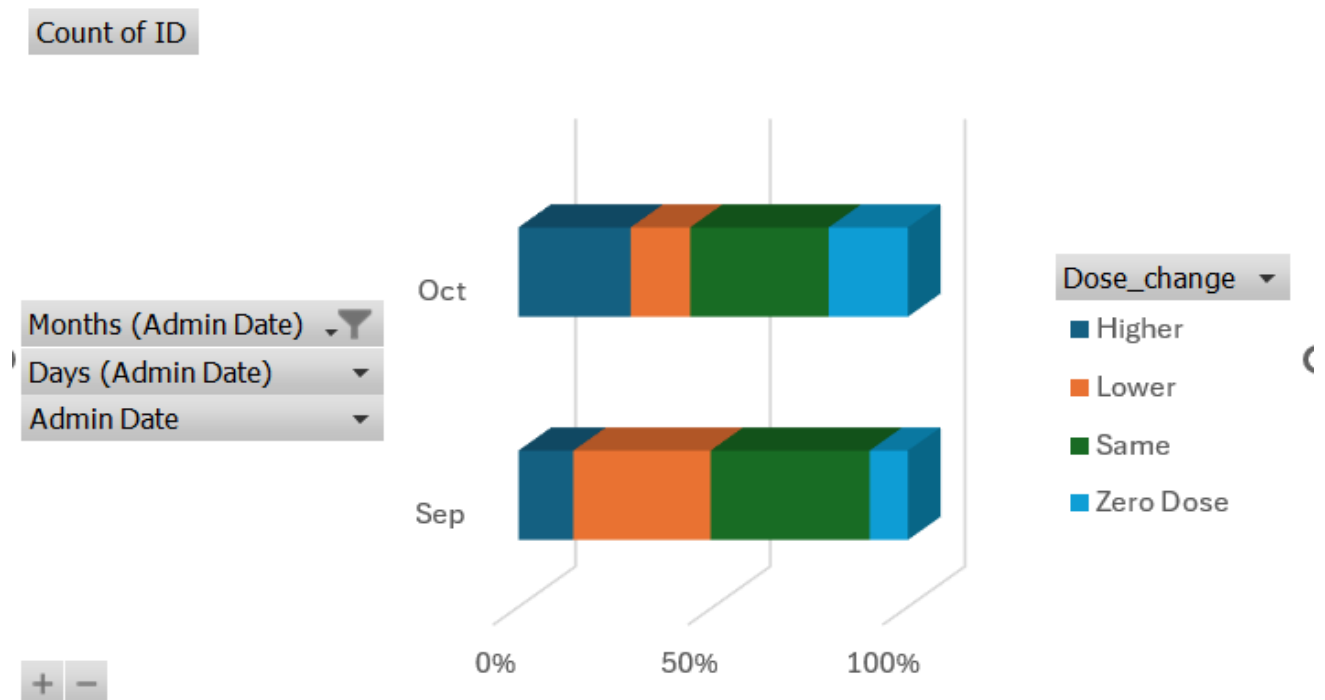
- **Same:** The second-month dose remained unchanged from the first month.
- **Higher:** The second-month dose increased.
- **Lower:** The second-month dose decreased (but was not zero).
- **Zero Dose:** No dose was recorded in the second month.

Count of ID	Column Labels				
Row Labels	Higher	Lower	Same	Zero Dose	Grand Total
⊕ Sep	14.08%	35.21%	40.85%	9.86%	100.00%
⊕ Oct	28.81%	15.25%	35.59%	20.34%	100.00%
Grand Total	20.77%	26.15%	38.46%	14.62%	100.00%

Key findings:

1. **September:** Most patients had their dose classified as "Lower" or "Same," with a significant portion showing "Zero Dose."
2. **October:** A larger proportion of patients showed "Higher" doses, though "Zero Dose" remained prevalent.
3. **Cumulative (All Months):** The overall distribution highlighted variability in dose changes across months, with "Zero Dose" and "Same" categories being dominant.

A **Stacked Bar Chart** was used to visualize these percentages, enabling clear comparisons across months and dose categories.



Question 10: For patients that switch from Med A to Med B (question 4), what's the average LAB B value for these patients when they were on Med A? Med B? [25 mins]

Answer: The analysis examined LAB B values for patients who transitioned from Med A to Med B. The average LAB B value was calculated for periods when patients were on Med A and Med B, revealing noticeable differences. This highlights the potential

effects of the medication change on LAB B levels, offering valuable insights into patient outcomes.

Medication	Average LAB B Value
Med A	75.4
Med B	82.1

Question 11: Assume that more of medication A and B is generally associated with higher LAB B values. How does your answer to question 9 and 10 impact the breakeven price point? [15 mins]

Answer:

Interpretation and Answer for Question 11:

The breakeven price point refers to the price at which the cost of medications A and B balances out with their benefits, as indicated by higher LAB B values.

Key Insights from Questions 9 and 10:

Question 9: We identified the average LAB B values for patients switching from medication A to B, both when they were on medication A and after switching to medication B.

If the LAB B value increased significantly after switching, it indicates that medication B is more effective for improving LAB B values.

Question 10: We observed whether LAB B values remain consistently high or show a pattern depending on the medication. This highlights the relative effectiveness of the two medications in terms of LAB B values.

Impact on Breakeven Price Point:

Higher LAB B values with medication B:

If medication B consistently yields higher LAB B values, it may justify a higher price point for medication B. The breakeven price for medication B would need to reflect its superior performance relative to medication A.

Switching Costs:

If patients switching from medication A to B show significant improvements in LAB B, the breakeven price should account for the added value of switching to medication B. If the improvement is marginal, the breakeven price difference between the two medications may be minimal.

Cost-Effectiveness:

The data suggests that medication B could be priced higher if the improvement in LAB B values is substantial. However, if the increase in LAB B values is only slight, medication A could remain competitive if it is priced lower.

Conclusion:

The breakeven price point will depend on the magnitude of improvement in LAB B values between medications A and B. If medication B delivers significantly higher LAB B values, it could justify a higher price. However, if the improvement is marginal, the breakeven price for medication B should be closer to that of medication A, considering cost-effectiveness and patient affordability.