Knowledge Activity: Applied Data Analytics III (Informatics)

Prerequisites

1. Use of Microsoft Excel® is required to complete this activity
2. This activity is the third activity in a sequential 5-activity series. Completion of the activities below is required to successfully complete this activity:
    - Orientation to Data Analytics I
    - Applied Data Analytics II

Student instructions

3. If you have questions about this activity, please contact your instructor for assistance.
4. You will review a de-identified patient chart to complete this activity. Your instructor has provided you with a link to the **Applied Data Analytics III (Informatics)** activity. Click on **2: Launch EHR** to review the patient chart and begin this activity.
5. Refer to the patient chart and any suggested resources to complete this activity.
6. Document your answers directly on this activity document as you complete the activity. When you are finished, you will save this activity document to your device and upload this activity document with your answers to your Learning Management System (LMS).

The activity

Recently, the local paper did an article on the nation's high rate of cesarean section deliveries. The journalist featured interviews with Shoreline Birth Center doctors and patients who either perform or had undergone cesarean sections. The Birth Center felt that the press would negatively impact their bottom line and were hopeful that an analysis of birth data would show Shoreline does not perform more cesarean section deliveries than the national average.

However, Shoreline's birth data revealed a cesarean section rate of 34%, 2.1% higher than the national average of 31.9%. The medical director believes that the Birth Center has a higher cesarean section rate because they are the area's only high-risk birth center. Being a high-risk birth center means that Shoreline receives a higher percentage of high risk births. She believes that Shoreline's high rate of cesarean section is related to the high-risk births and that cesarean section results in a safer birth experience for these families. Shoreline's Public Relations officer is happy to hear that Shoreline's high rate of cesarean may be related to a high rate of high-risk patients, but she feels the public also needs to know that Shoreline is the *safest* place to give birth. She would like to know the Perioperative mortality rate (POMR) at Shoreline.

You have been asked to research this issue and present your findings to the Shoreline Board.

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Read the resources listed below (all found under 1: Overview & Resources along with this activity document).

- ***Measuring Perioperative Mortality Rate (POMR)***
- ***Perioperative mortality rate meta-analysis***
- ***Tracking perioperative mortality and maternal mortality***
- ***What is a high-risk pregnancy***

Then answer the questions below.

Questions

1. **What is POMR? POMR** is Perioperative Mortality Rate. It is used as an indicator to determine quality and safety of surgery and anesthesia.
2. **How is POMR measured?**

POMR is Perioperative Mortality Rate is measured two time period. It is determined by death period before and after surgery.

3. **How is the POMR rate expressed?**

Is rated by determining number of deaths over procedures.

4. **What is the median POMR for cesarean section in low- to middle-income countries? Refer to the table on page 5 of the *Perioperative mortality rate meta-analysis* resource that accompanied this activity document under 1: Overview and Resources.**

The median Perioperative Mortality Rate for cesarean section from countries in low to middle income which is 0.12 (0-15.61).

5. **If high-income counties reported lower POMR rates than low-to-middle income countries, what do you think could account for the different POMR rates?**

For lower POMR it demonstrates that the procedure's risk is relatively low. This indicates that countries with higher income tend to perform safer and lower risk procedures.

6. **Why is POMR measurement important?**

Its important as it shows the levels of safety in the facilities.

7. **What are some of the challenges in getting an accurate POMR around the world?**

Collecting appropriate and accurate data.

Review the de-identified EHR that accompanies this activity under 2: Launch EHR and answer the following questions.

8. **Would this case be counted in Shoreline's POMR? Why or why not?**

Yes. The risks are high especially for pregnant woman whose death reported 24 hours after cesarean section.

9. **What procedure did this patient have?**

The patient had low-transverse incision.

10. **What is the ICD-10 code R99?**

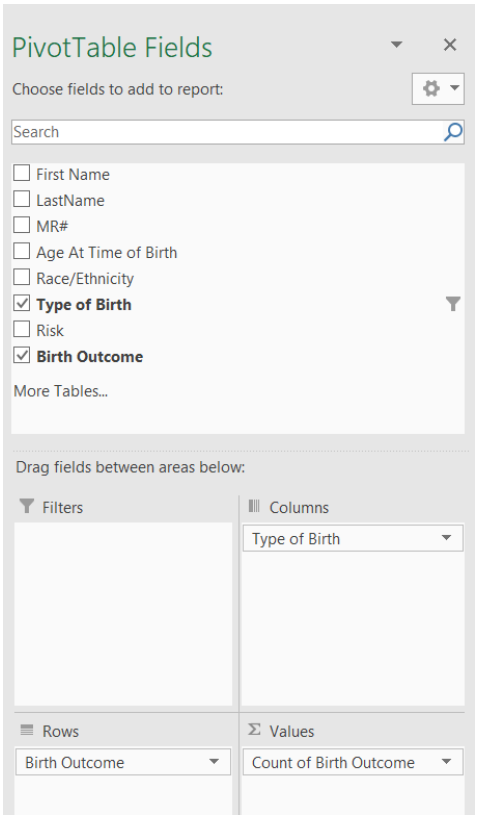
The code is undefined cases of mortality.

11. **According to the resource *What is a high-risk pregnancy,* was this patient's pregnancy considered "high-risk?" Explain.**

Cases attributed to incidences of high-risk pregnancy include change in blood pressure (high), multiple births and women at the age above 40 years. The risk associated patient's pregnancy include eclampsia and preeclampsia

A report has been generated of all birth outcomes for Shoreline in 2016. **Open the resource titled *2016 Shoreline patient data CONFIDENTIAL*** (found under 1: Overview & Resources along with this activity document). A file with 8 columns of data will open.

Generate a pivot table to assist with determining the POMR at Shoreline for each type of birth. One approach is to select 'Birth Outcome' for the rows, 'Type of Birth' for the columns, and 'Birth Outcome' for the ∑ Values (count). See screenshot below. Please refer to the pre-requisite activity *Orientation to Data Analytics I* for a step-by-step refresher on how to create a pivot table.



Use the data in the resulting table to calculate the POMR. You may use a formula function in Excel or calculate it separately.

- Sum the total number of decreased mothers by delivery type and divide by the total number of deliveries. Multiple by 100 to convert to a percent and round to the nearest hundredth.
- Use the same data to also determine the infant mortality rates. Sum deliveries with stillbirths and divide by the total number of deliveries. Multiple by 100 to convert to a percent and round to the nearest hundredth.

12. **POMR of all delivery types:** 16+7=23, 23/8379=27%
13. **POMR of cesarean section:** 11+7=18, 18/2849=63%
14. **POMR of vaginal birth:** 5/5530=9%

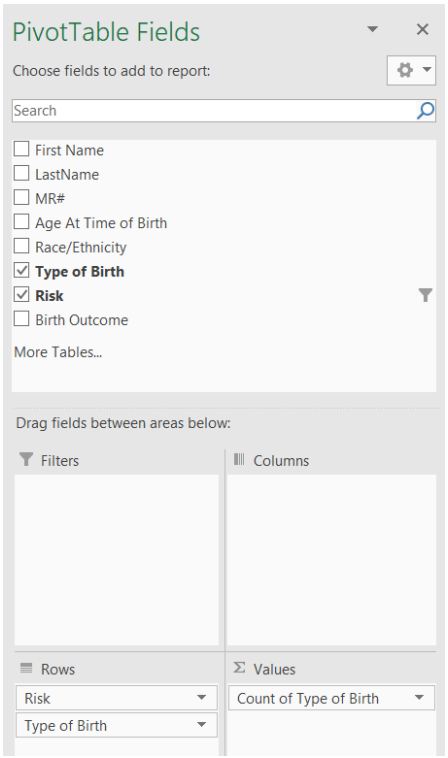
Use the same data to also determine the infant mortality rates. Sum those with still births for cesarean **(include Still Birth and Deceased Mom-Still Birth)** and divide by the total cesarean births. Multiple by 100 to convert to a percent and round to the nearest hundredth. Repeat for vaginal births.

15. Infant mortality rate of cesarean section:7+150=157, 157/2849=5.5%
16. Infant mortality rate of vaginal birth: 8/5530=14%

Continue using the same pivot table data to determine the combined live birth or NICU rates for each type of birth. Sum the Deceased Mom-Live Birth, Live birth and NICU outcomes for cesarean then divide by the total cesarean births. Multiple by 100 to convert to a percent and round to the nearest hundredth. Repeat for vaginal births.

17. Cesarean resulting in live birth or NICU: 1731+477=2208/2208/2849=77.50%
18. Vaginal resulting in live birth or NICU: 3667+926=4593, 4593/5530=80.06%

Generate another pivot table to assess the cesarean rate by risk type. There are multiple approaches to do so. One option is to select both ‘Risk’ and ‘Type of Birth’ as rows and ‘Type of Birth’ as ∑ Values (count). Use a formula function in Excel or another method to compute the following rates.



19. Rate of cesarean for low-risk births: 1520/8379=18.14%
20. Rate of cesarean for high-risk births: 1329/8379=15.86%
21. Rate of high-risk births at Shoreline: 1603/8379=19.13
22. Does the riskiness of the delivery (as indicated by high- versus low-risk) impact the rate of cesarean? Explain.

Generate additional pivot tables to determine if race and/or age impact the rate of cesarean.

23. Does race impact the rate of cesarean? Explain.

Yes. Whether the pregnancy risk is relatively high or low it could change birth delivery. The case makes it hard for a woman to have vaginal birth. The trend would increase risks associated with cesarean section.

24. Does age impact the rate of cesarean? Explain.

Yes. The younger the age the less impact compared to older individuals who experience higher impact.

Refer to the resource *What is a High-Risk Pregnancy* (found under 1: Overview & Resources along with this activity document) and answer the following question.

25. Does Shoreline have a higher than average rate of high-risk pregnancies? Explain your answer.

Yes. At 19% the impact is relatively high with 5-10% average for high-risk pregnancy with preeclampsia.

Submit your work

Document your answers directly on this activity document as you complete the activity. When you are finished, save this activity document to your device and upload this activity document with your answers to your Learning Management System (LMS). If you have any questions about submitting your work to your LMS, please contact your instructor.

Learning objectives

1. Apply graphical tools for data presentations (3)
2. Interpret statistics for health services (5)
3. Examine health care findings with data visualizations (4)
4. Manage data within a database management system (5)
5. Leverage data-driven performance improvement techniques for decision making (5)

References

Ng-Kamstra JS, Arya S, Greenberg SLM, et al. Perioperative mortality rates in low-income and middle-income countries: a systematic review and meta-analysis. BMJ Global Health 2018;3:e000810.

S Arya, J Ng-Kamstra, JG Meara, A Langer. Tracking perioperative mortality and maternal mortality: challenges and opportunities. Lancet Global Health, 4 (2016), pp. e440-e441. Available at: https://ac.els-cdn.com/S2214109X16300821/1-s2.0-S2214109X16300821-main.pdf?_tid=147388c5-38a9-45d9-acdb-4bc66c0e482c&acdnat=1533073289_1e1756956c6e6c97e74f9795c8480bc3

Watters, D.A., Hollands, M.J., Gruen, R.L. et al. Perioperative Mortality Rate (POMR): A Global Indicator of Access to Safe Surgery and Anaesthesia. World J Surg (2015) 39: 856. https://doi.org/10.1007/s00268-014-2638-4

U.S. Department of Health and Human Services. National Institute of Health. What is a high risk pregnancy? https://www.nichd.nih.gov/health/topics/high-risk/conditioninfo/factors