

# consutling

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## Introduction

The main purpose of this project is evaluating the genetic counseling and germline genetic testing process within the pancreatic adenocarcinoma patient population at Roswell Park Comprehensive Cancer Center. We are mainly interested in investigating the reasons that patients opt out of genetic testing and genetic counseling and the trend of referral rate after the guideline came out. The report can be divided into three parts. The first part will analyze the reason in each step on why people drop out. The second part will focus on the overall trend of the referral rate for 30 months. The third part will compare the referral rate before and after the genetic center offered telehealth and help to answer the question whether people prefer telehealth to in-person meeting.

## Data Processing

### I.Referral rate and its analysis

The overall referral rate is 0.3548387. There are 55 patients ordered the germline genetic test among 155 patients. We will divide the referral process into four steps and analyze the reasons of dropping of during each step.

#### Part.I Genetic referrals placed

Options	Number of patients	Ratio
Yes - Acceptance	111	0.716
No	44	0.284
Total	155	-

#### Part II. Genetic meeting scheduled

Options	Number of patients	Ratio
Yes - Acceptance	81	0.730
No	30	0.270
Total	111	-

#### Part III. Genetic meeting attended

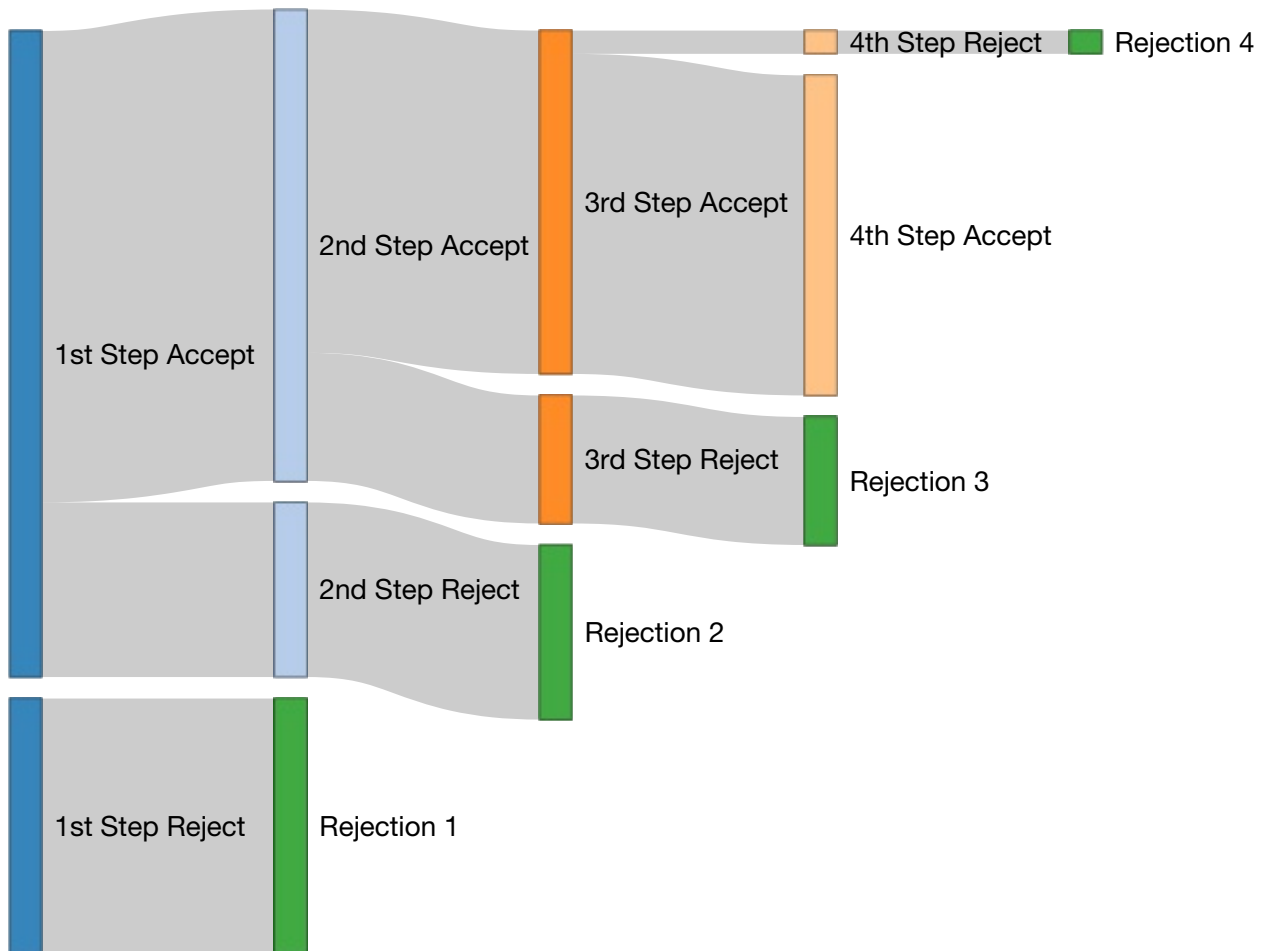
Options	Number of patients	Ratio
Yes - Acceptance	59	0.728
No	22	0.272
Total	81	-

## Part IV. Genetic counseling ordered

Options	Number of patients	Ratio
Yes - Acceptance	55	0.932
No	4	0.068
Total	59	-

## V. Proportions of individuals who proceed through each step of the process:

The following Sankey plot illustrates how many individuals succeed (currently labeled “Accept”) at each step of the genetic counseling process.



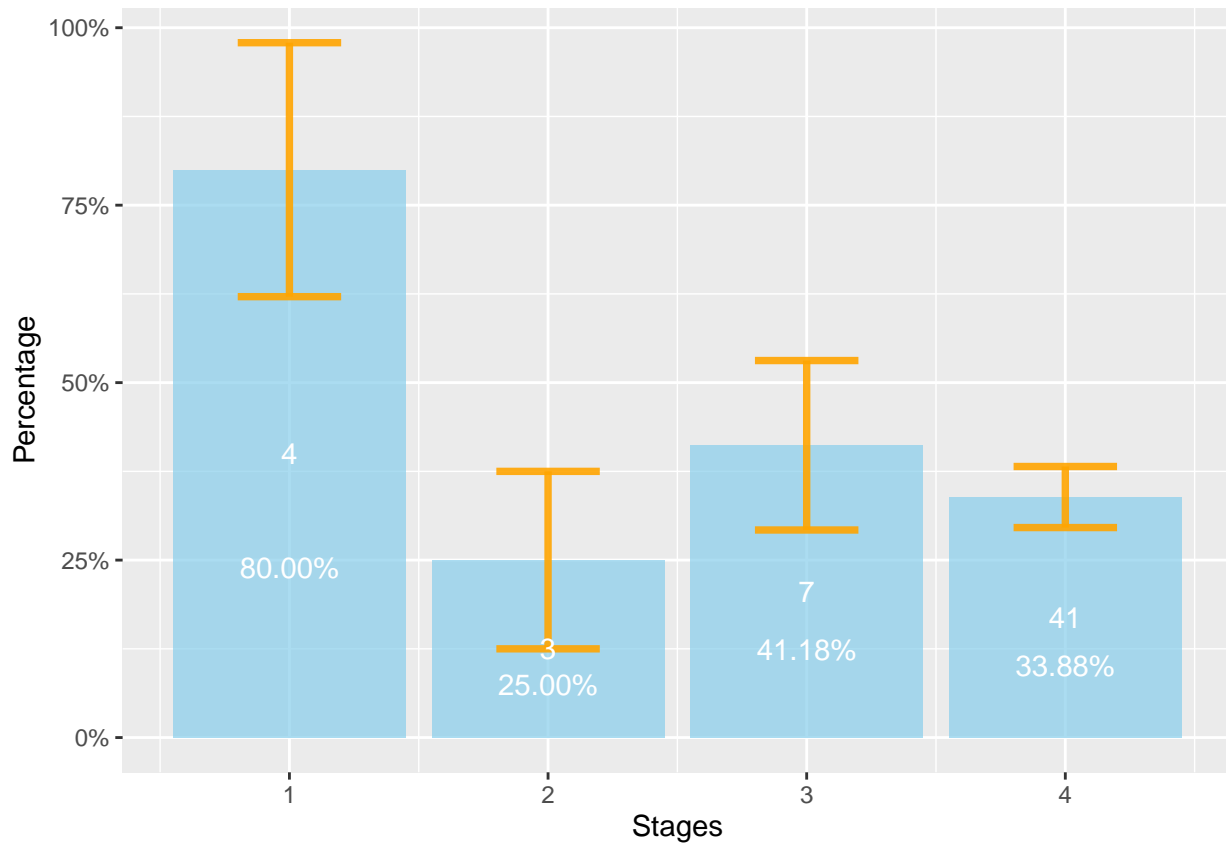
## II. Other Analysis

### I. Cancer Stage and Genetic Counseling Referral Rate

We thought that the stage of cancer might explain some of the variation in referral rate. The following stacked bar plot serves as visualization to the proportions of individuals who ordered testing given that they were diagnosed with certain stages of cancer. We only selected the patients who finally ordered genetic counseling, and labeled the numbers and percentages on each bar. The percentage can be calculated by:

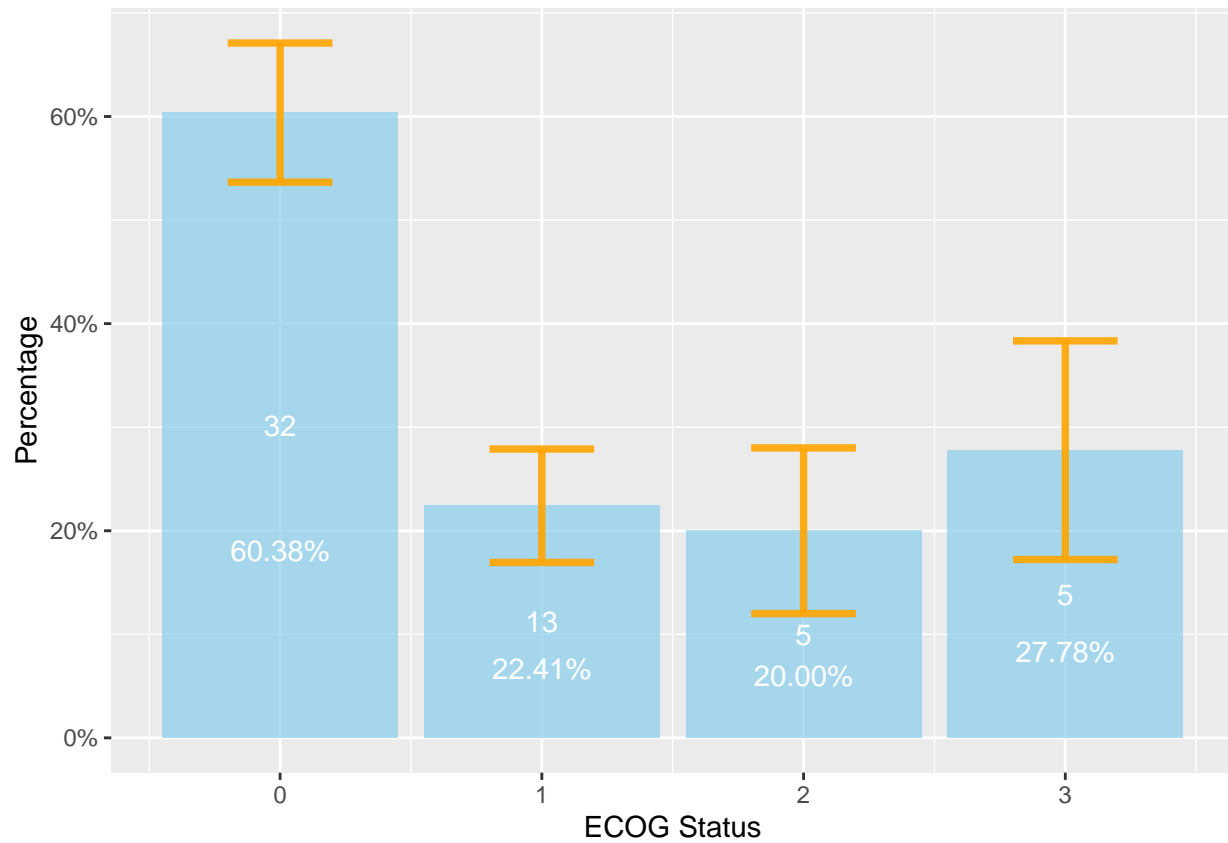
$$\text{percentage} = \frac{\text{number of patients ordered testing}}{\text{number of patients in each stage}}$$

For instance, the total number of patients in fourth stage is 121, and 41 of them ordered genetic counseling, so the percentage is supposed to be  $41/121=33.88\%$ .



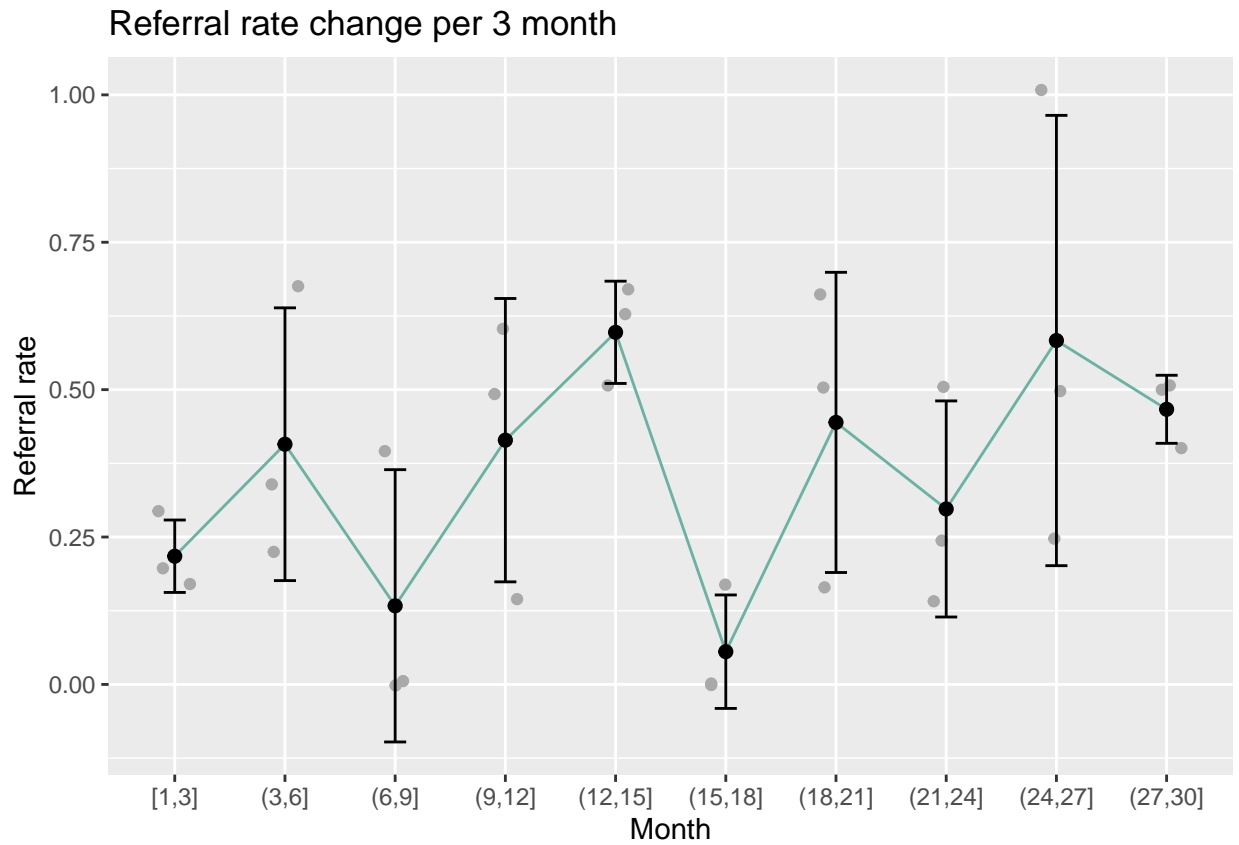
## II. ECOG and Referral Rate

ECOG is an indicator of the wellness level of the patients. In the following section, we want to investigate the relationship between ECOG of patients and the referral rate. As a result, we use the same method as the previous analysis. The stacked bar plot presents the proportions of individuals who ordered testing based on the patient's level of functioning in terms of their ability to care for themselves (ECOG Status).

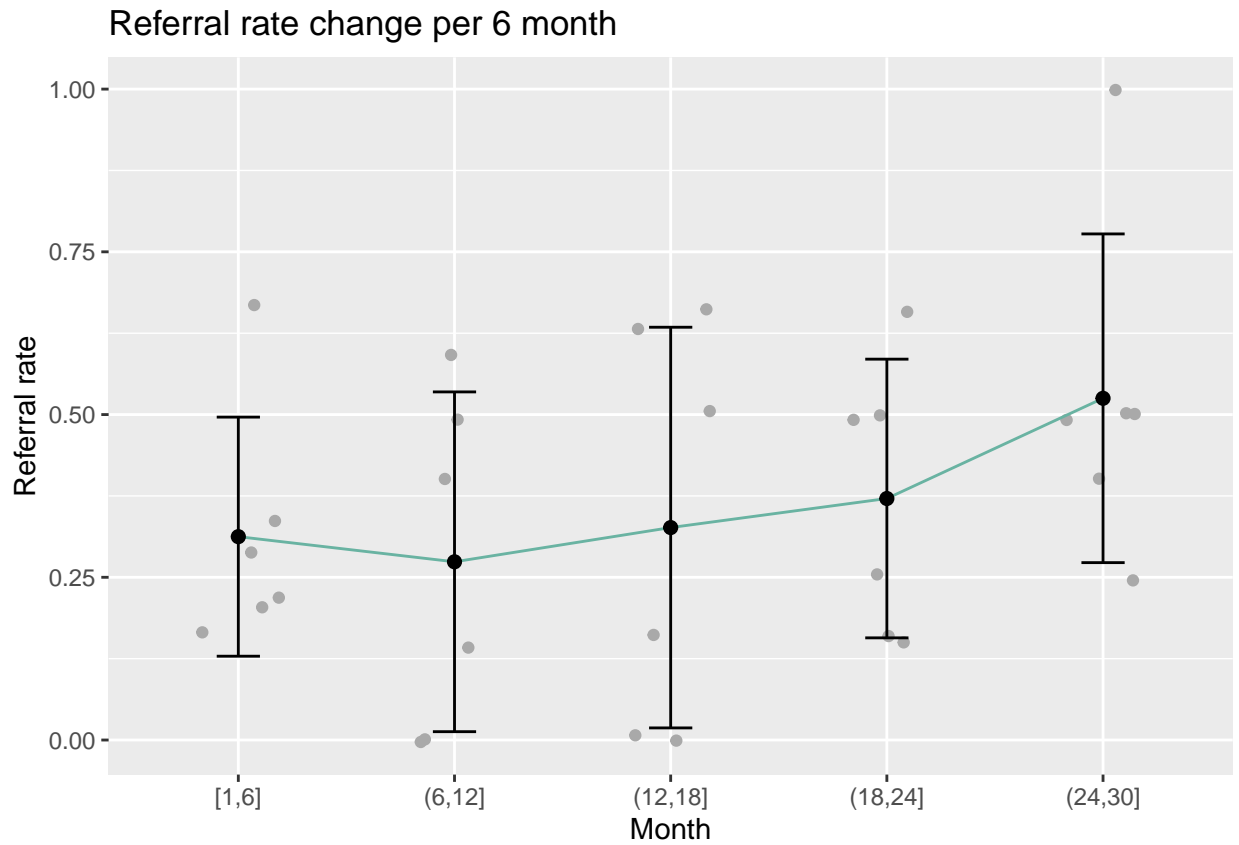


### III. Change of referral rate

In this section, we visualize the trends of referral rate using both 3 months and 6 months as a period. We can learn whether the referral rate is increasing or not through the time.



The plot above shows us the trend of referral rate using 3 month as a period. We jitter the points to avoid overlaps. The plot above does not indicate there is any increasing or decreasing trend.



The visualization above tells us the change of the referral rate per 6 month. Since there are a lot of variations of the referral rate in each time interval, we can not conclude that there is an obvious increasing relationship between time and referral rate.

### III.Virtual/Teleheath Impact

In this part, we want to investigate if there is any difference of the referral rate before and after telehealth is provided as an preference options for the patients.

Period	Total number of patients	Number of patients who placed a referral	Number of Patients who scheduled a meeting	Number of patients who attended the meeting	Number of Patients who ordered the test	Referral rate
Before	120	82	55	40	37	0.3083
After	35	29	26	18	17	0.4857
Telehealth	-	-	17	14	13	-
In-person	-	-	5	4	4	-
NA	-	-	4	0	0	-
Total	155	111	81	58	54	0.3484

Qeustion:

#### IV. Analysis on second opinion patients

Among 65 patients who had second opinion in the data, 3 of them still ordered the germline genetic testing.

Period	Total number of patients	Number of patients who placed a referral	Number of Patients who scheduled a meeting	Number of patients who attended the meeting	Number of Patients who ordered the test	Referral rate
Before	65	11	8	6	3	0.04615



## Appendix