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Expanding the Whipple Accelerated Recovery Pathway (WARP) To All Patients Undergoing Pancreaticoduodenectomy (PD)

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(*) indicates primary project advisor

(**) indicates another student who is declaring the same project as primary for SI

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Introduction

- Background:
  - PD is a high-risk, complex abdominal procedure with high rates of peri-operative morbidity. Prolonged hospital stay increases the risk of debility and increases cost to patients
  - Whipple Accelerated Recovery Pathway (WARP)- developed for highly selected patients
    - Limited comorbidities
    - Firm pancreas texture
    - Resectable disease
  - Randomized Control Trial published in 2018 by *Yeo et al*., showed WARP can safely decrease hospital length of stay (LOS) and time to adjuvant therapy (TTAT) in selected PD patients without increasing readmission risk/rates as compared to the traditional control pathway

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Introduction

- Rationale:
  - If WARP was so successful for low-risk patients, how well would higher-risk patients do on the pathway compared to the standard post-operative pathway?
  - Can WARP be applied to **all-risk** patients undergoing PD similarly resulting in decreased LOS, TTAT, and risk of readmission?

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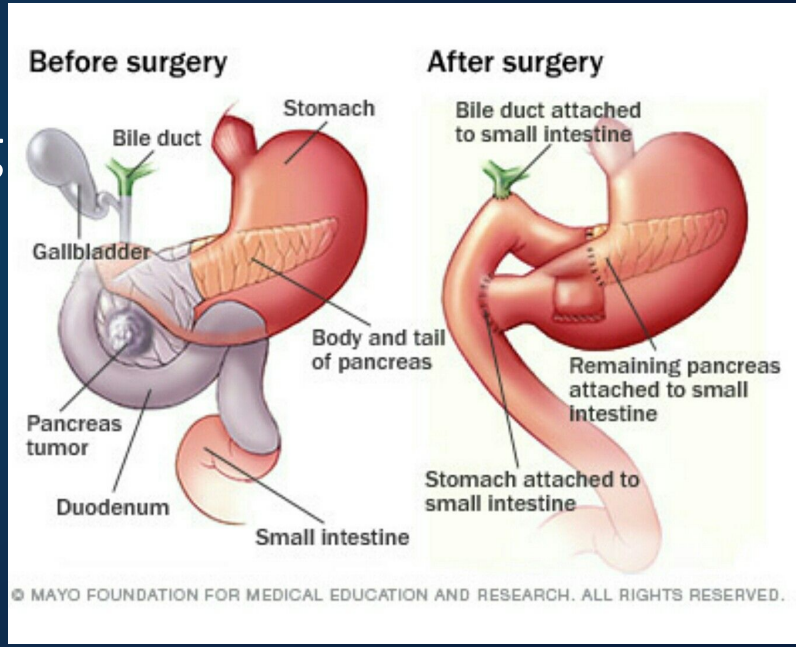
Objectives & Hypothesis

- Research Question
  - Can the WARP be expanded to WARP-eligible (WEPs) and WARP-ineligible patients (WIPs) undergoing pancreaticoduodenectomy (PD) to improve the post-operative course?
- Hypothesis
  - The WARP can be expanded to all patients undergoing PD, which results in lowered length of stay (LOS), post-operative complications (POC), time to adjuvant therapy (TTAT), and readmission rates (RR)



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Approach & Results

- **Study design**
  - Single-institution, retrospective chart review
- **Population / study sample**
  - 281 patients who underwent PD between 2017-2020
    - 230 (81.9%) patients had malignant etiologies
    - 51 (18.1%) patients had benign etiologies
    - 119 (42.3%) were WARP-eligible under the initial criteria vs. 162 (57.7%) WARP-ineligible
- **Intervention**
  - WARP (5 day pathway) in **ALL patients** vs. Jefferson's traditional 7 day pathway
- **Outcome**
  - Primary endpoints: LOS, TTAT, RR, POC
- **Data source and collection**
  - Epic- retrospective chart review
- **Rationale for Approach**
  - Jefferson is a major center for PD in the region
  - Access to hundreds of patients in Epic that have undergone PD

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Approach & Results

- Analysis:
  - Univariate/Multivariate analysis with logistic regression
- Retrospective Analysis Findings:

	WARP-Eligible (WEPs)	WARP-Ineligible (WIPs)	P value
Post-Op Complications (POCs)	28 (23.5%)	73 (45.1%)	<0.05
Length of Stay (LOS)	5 days	6 days	<0.05
Time to Adjuvant Therapy (TTAT)	55 days	63 days	<0.05
Readmission Rate (RR)	12.6%	23.5%	<0.05

POCs: Delayed Gastric Emptying (DGE) & Post-Op Pancreatic Fistulas (POPF) occurred in higher rates in WIPs (DGE: 10.2% vs. 26.2%, $p<0.05$; POPF: 5.1% vs. 21%, $p<0.05$)

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Conclusions

- **Conclusions:**
  - WARP may be expanded to all-risk patients but WIPs may benefit from some additional mitigation strategies to help lower RRs and POC while still minimizing LOS
  - Ex:
    - WEPs- WARP is acceptable, target 4-5 day LOS
    - WIPs- WARP-modification: target lower RR, lower POPF, lower DGE while minimizing LOS (5 days)

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Future Directions

- Next Steps:
  - Continue to analyze patients prospectively that are on the WARP pathway post-PD
  - Work to develop additional mitigation strategies for WIPs to help lower POC, LOS, and RRs on the WARP pathway
  - Develop and pursue additional projects off of the established database

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