

tests. Identifying specific proteins with the potential to become a preventive test should eventually lead to a reduction in morbidity and mortality of PC. The results of this work should lay the foundation that can guide future research.

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### Identifying Gaps in Elderly Fecal Incontinence Management

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**OBJECTIVES/GOALS:** Fecal incontinence is associated with increased caregiver strain, reduced patient dignity and diminished quality of life. A spectrum of incontinence exists, along with a paucity of available solutions for patients and their caregivers. This research aims to stratify this space and identify gaps within the existing solution landscape. **METHODS/STUDY POPULATION:** To understand this problem, a literature review was performed with key search terms specific to fecal incontinence. These included, anal incontinence epidemiology, fecal incontinence in nursing homes, and incontinence management. To determine gaps within the existing solution landscape, key search terms related to existing solutions for fecal incontinence were also included. These included, fecal management systems, rectal incontinence therapies, and anorectal incontinence procedures. To perform a population segmentation, white papers, review articles, and cross-sectional studies were reviewed to break down the burden of incontinence in older adults living in nursing facilities and in the community. **RESULTS/ANTICIPATED RESULTS:** Two unaddressed populations were identified, the first being independent adults over the age of forty, particularly women, who suffer from frequent, bothersome incontinence. These 1.2 million patients are active, living at home, and they restrict their daily activities due to incontinence. However, there are several durable and effective solutions for patients who have sufficient sphincter tone or who are surgical candidates. The second population identified are caregiver dependent older adults residing in nursing facilities who suffer from severe incontinence. This population of 160,000 is affected more severely by consequences of fecal and are poorly served by solutions that are largely absorptive such as diapers and pads. **DISCUSSION/SIGNIFICANCE:** Although two populations were identified, caregiver dependent older adults residing in nursing homes were identified to have a significant unmet need within incontinence care. Current solutions are onerous and transient, preventing ease and duration for use by caregivers and nurses.

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### Identifying Opportunities and Challenges for Translational Informatics Approaches to Real-World Data: A Diabetes Case Study

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**OBJECTIVES/GOALS:** Diabetes is a group of chronic metabolic diseases and significant gaps remain in our understanding of disease etiology, treatment regimens, and diabetes-related complications. The objective of study is to demonstrate how informatics techniques can leverage real-world data for diabetes research and identify barriers for implementation. **METHODS/STUDY POPULATION:** We evaluated informatics applications of real-world data in diabetes research conducted by the Facelli Research Group. The types of real-world data

were categorized into clinical records, diabetes-related repositories, wearable sensors, and other data sources. Translational informatics applications were characterized into thematic groups of 1.) use of electronic health records, registries, and claims and other data sources to generate real-world evidence, 2.) evolution of novel methods to accelerate generation and use of real-world data, and 3.) infrastructure to support the generation and use of real-world data in translational science. A literature review is being conducted to identify additional articles meeting these themes focused on diabetes research. **RESULTS/ANTICIPATED RESULTS:** 6 research projects were included for analysis. The diabetes-focus spanned type 1 diabetes, type 2 diabetes, and general diabetes mellitus. Informatics methods included machine learning and data mining while real-world data sources included electronic medical records, the Environmental Determinants of Diabetes in the Young (TEDDY) study, continuous glucose monitors, and the U.S. Environmental Protection Agency (EPA) air pollution monitors. Overall, computability of real-world data, linkage of medical concepts to standardized terminologies, volume of data, and adoption of novel artificial intelligence methods were major determinants of successful implementation. Future work will systematically evaluate informatics applications of real-world data in diabetes from the academic community at large. **DISCUSSION/SIGNIFICANCE:** Translational informatics approaches are poised to leverage real-world data and better understand diabetes etiology, treatment regimens, and diabetes-related complications. By understanding barriers and opportunities for informatics methods, we can expedite translational applications in diabetes research.

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### Identifying vaginal microbiome profiles that influence tenofovir distribution in the female genital tract\*

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**OBJECTIVES/GOALS:** An ex-vivo tissue model has been developed to predict target concentrations of tenofovir diphosphate (TFVdp; active metabolite of tenofovir) but has not been utilized to see how vaginal dysbiosis affects TFVdp/dATP exposure in female genital tract (FGT). My central hypothesis is that presence of specific anaerobic bacteria will increase dATP in FGT. **METHODS/STUDY POPULATION:** De-identified HIV-negative cervical tissues from women undergoing gynecological surgeries will be procured and a punch biopsy will be used to create explants. TFVdp/dATP concentrations were both tested in both aerobic and anaerobic conditions after a 24-hour incubation in tenofovir (TFV) to determine any changes between conditions. TFVdp/dATP in cervical tissue was measured using LC-MS. Next, media and explants were collected at baseline to characterize donor microbiome for 6 donors. 16S microbiome sequencing was performed on extracted DNA to obtain the relative abundances of each bacteria species present. To test changes in dATP/TFVdp due to the microbiome, explants will be incubated in TFV for 24 hours with *Prevotella* and *Dialister* to specifically see how microbiomes dominated by these taxa affect dATP. **RESULTS/ANTICIPATED RESULTS:** There was no significant difference in TFVdp formation between aerobic and anaerobic conditions after a 24-hour tenofovir incubation ( $p = 0.2$ ) for 8 donors. dATP was not quantifiable at 24 hours in explants, so explants are being collected before 24hrs during a TFV incubation to determine how quickly dATP depletes after collection. We were able to characterize the donor microbiome in media and tissue at baseline and 24hrs which had inter variability. We did not see any presence of *Prevotella* or *Dialister* in any donors. We are working on characterizing