出國報告（出國類別：開會）

2025 年美國藥物基因體研究網絡會議報告

服務機關：高雄榮民總醫院/藥學部
姓名職稱：梁君安/藥師
派赴國家：美國蒙大拿州
出國期間：2025/09/08-2025/09/14
報告日期：2025/09/22

摘要（含關鍵字）

美國藥物基因體研究網絡會議與 ClinPGx 合作舉辦，時間為 2025 年 9 月 10–12 日，地點在蒙大拿州米蘇拉的蒙大拿大學。國際藥物基因體會議已舉辦將近 20 年，然而，直至近年精準醫療與藥物基因體學在台灣逐漸受重視，會議中討論各國於臨床場域執行藥物基因體檢測方式與臨床應用，以及如何將實驗室中藥物基因體發現與政府政策結合，提升國人用藥的安全性與有效性。會議中除了邀請藥物基因體學專家演講外，也邀請病人家屬、臨床人員與醫院管理階層，多方角度闡述藥物基因體的重要性與不同利害關係人的觀點，提供給在場聽眾更廣闊的觀點。

關鍵字 藥物基因體學、基因檢測、精準醫療。

目次

一、目的

隨著基因檢測的普及和可近性上升，過去，藥物一體適用劑量模式逐漸受到醫療人員質疑，尤其隨著人種不同，藥物在人體間的藥物動力學變化大相逕庭，因此，美國藥物基因體研究網絡會議，提倡應積極透過基因檢測，建立個別化醫療的藥物治療建議。

會議中聚集上百國家及與會人士，從政府醫療決策高層、廠商代表、醫療人員、研究學者至病人代表，利用不同觀點提出藥物基因治療的重要性與執行方式，並且透過分享不同國家的執行方式與資訊共享，呼籲各國、各種族應積極關注藥物基因體議題，替民眾用藥有效及安全性把關。

二、過程

本次會議日期自 2025 年 9 月 10 日至 9 月 12 日，於美國蒙大拿大學舉行，9 月 10 日的大會預先議程將於下午在蒙大拿大學 University Center 舉行，內容豐富而聚焦，涵蓋臨床藥物基因體學推動實務、藥動學建模應用，以及新資源平台介紹。首先，進行兩場並行工作坊。其一為「Implementing PGx」，由多位實務專家分享不同醫療系統中 PGx 計畫的設計與落實，包括計畫架構、電子病歷整合、檢測與報銷流程、臨床工作模式等，並安排小組討論，讓參與者可直接掌握臨床導入的核心要素。另一場「Working with a PK Modeler」則著重於藥物動力學與 PGx 的結合，帶領與會者了解人口藥動學（population PK）、生理基礎藥動學（PBPK）、以及如何運用基因體資訊優化精準劑量設計，最後並以兒科應用及綜合座談作結。接續 ClinPGx 專場，介紹 PharmGKB、CPIC、PharmCAT 等國際資源的整合轉型，展示新平台的內容與功能，並開放現場回饋與操作教學。晚間很特別在市中心 Caras Park 舉辦 PGRN 與 ClinPGx 聯合社交活動，提供與會者在河畔與山景環繞的環境中交流聯誼，享用當地餐車美食與飲品，營造專業與人文兼具的聚會氛圍。

9 月 11 日的大會有一段非常驚心動魄的開場，由來自加拿大的 Scott Kapoor 醫師開啟聽眾對藥物基因體學的重視與鼓舞研究人員，Scott Kapoor 不僅是一位醫師更是一位因藥物基因傷害的受害者，Scott Kapoor 的哥哥 Anil Kapoor 同時也是一位醫師，在 2023 年被診斷結腸癌，醫生對他的預後持樂觀態度，他的家人希望透過治療，他能再活幾年。但幾週後，這位

58 歲的 Anil Kapoor 去世了！可怕的是:他不是死於癌症，而是死於本應挽救他生命的常用抗癌藥物 5-FU。Anil Kapoor 在第一次也是唯一一次使用 5-FU 後的幾天內，他從可以工作的狀態變成了臥床不起，施打藥物的 24 小時內，他的口腔和喉嚨開始發炎。他吃不下任何東西，也喝不下水，而且還嚴重腹瀉，三週後，Anil Kapoor 不幸因此去世，而去世後基因檢測結果出爐，他帶有 *DPYD* 基因變異，而造成此憾事發生。當我聽到這個議題時，一方面感到震驚，因為歐美族群中，帶有此基因變異的比率是 2-8%，因此，歐盟政府要求應在使用藥物前須進行檢測，但由於人種不同，亞洲國家 *DPYD* 基因變異率(<0.1%)，台灣不僅沒有檢測，甚至對這個基因變異的教育與認知都非常微弱，正當我覺得亞洲族群變異率如此低應該事不關己的同時，Scott Kapoor 醫師丟出一個震撼性發言，他們家族族裔人種是南亞人而非歐美人！他也提出雖然亞洲國家基因變異率極低，但這樣的比率有可能低估事件發生率，主因源於直至今日，大部分基因資訊仍是來自歐美白人，亞洲或其他族裔相對較少，極可能是因為取樣的誤差所導致低估基因變異的風險，就以 Kapoor 家族事後針對全家族基因變異進行檢測，就有一半的成員帶有此變異，這項演講不但震撼，而且鼓舞所有世界上各種族裔，應該要為此盡一份心力，不然政策的決定可能就會犧牲掉少數族群的安全。

第二日下午也邀請許多國家首都醫院分享如何將藥物基因資訊應用於臨床生活中，包含：新加坡、芬蘭、美國科羅拉多、南美洲等，總結而言，目前大致以美國 FDA 所建議 actionable 的建議做成基因檢測項目，不論保險或民眾自費，可以進行 preemptive 基因檢測，並將檢測的結果利用各式介面引入院內系統，如:ADR 系統，將藥物基因建議放入，能夠建議或提醒醫師，運用 ADR 系統優點是較符合經濟效益，運用現有系統即可運作，然而共通的缺點就是，過多提醒資訊有提醒疲勞的風險，確實這在目前本院系統中也是有類似的狀況。也有些醫院利用獨立系統作為藥物基因建議治療介面，也可以結合手機 app，讓後續民眾去其他醫療院所也都可以有相類似的資訊，但缺點就是耗費大量人物力。

最後一天的開場演講，提示所有與會的科學家與醫療人員，即使我們現在做的研究看起來很小型，結果或許不受重視，有一天他可能會成為國家政策的依據。其中就有說到台灣之光:carbamazepine 如何透過基因檢測發現族群中 HLA-B1502 變異導致民眾發生嚴重皮膚反應的副作用，並影響到國家政策，硬性規定所有民眾要開方前進行 HLA-B1502 基因檢測，這政策也影響到國外將此藥物基因交互作用列入檢測項目，此外，依照各國基因檢測依著人種不同，

後續各國建立各種不同檢測介面與項目，供各國彼此參考與介入。

除了精彩的演講以外，也有將近百張海報展示各研究學者努力的成果，除了常見的藥物基因檢測項目以外，也看到各種研究方法，像是利用多體學、實驗驗證、跨族群驗證研究結果在不同種族以及機制的可能性，也提供後續研究發展的依據。

三、心得及建議（包括改進作法）

(一)心得

本次會議中有非常多令人振奮的內容，其中最令我覺得共感的就是家屬演講那一場，Anil Kapoor 醫師運用他的生命喚起大家對於藥物基因的重視與激勵世界各角落為藥物基因努力的科學家意義，不論種族佔這世界人口的大小，每個人無論人種都是寶貴的生命，都該正視用藥的安全性，不應該種族比例較少而被政策忽略。反而，族群人口越小的民族更該正視自己的基因獨特性，因為隨著生物技術的發展，基因定序的速度與價錢都讓可近性提高，然而這樣的可近性並不對等，在歐美國家因為檢測取得較易，故能獲得較多族群基因資訊；相反而言，在一些資源稍微比較缺乏的地方，世界上獲得這些基因資訊也相對不易，然而，可惜的是，不論是國家政策或醫療政策考量，為了符合經濟效益，總是會先選擇較符合經濟效益的檢測項目。但需要重視的是，被先忽略的族群，到底是真的事件少發生?還是因為我們資訊不足，所做出偏頗性的抉擇，非常值得大家重視與思考，也鼓勵我及再次點燃對藥物基因研究的熱情，或許，我無法像歐美基因研究，輕易的就能處理與分析上百萬民族的基因建議，僅能使用幾百人醫院資料進行研究，也經常性被質疑族群代表性，然而，應該要知道總是需要呈現出台灣族群的資料，在不同研究中逐漸累積台灣族群樣本數，才能逐漸增加台灣族群藥物基因特異性的能見度。

此外，檢測方式及如何將基因檢測資訊永久的嵌在民眾身上也是各國遇到很大的困難，現行檢測方式較常使用特定基因位點檢測，優點是:速度快、價錢低、可近性較高，然而，缺點是若有新的位點被發現，將無法透過原檢測結果進行解讀，需要重新再次檢測；另一種是進行整段基因定序，可以獲得更完整的資訊，日後也可以針對不同片段重新解讀，然而龐大資訊的存放資訊空間與檢測耗費的人物力及金錢，目前仍然不是一項民眾可以檢測的做法。另外，因為人類基因大部分應該不會突變，重複性的基因檢測可能是一種消耗與浪費，但如何將基因檢測的結果帶在民眾身上，讓他無論去哪個醫療機構甚至國家，都能看到檢測結果，提供給醫療

人員後續用藥安全的資訊，目前依然沒有定論，是未來大家需要努力及政府政策介入的目標。

(二)建議:條列式針對出國目標及學習提出對單位或院方品質提升之建議或改善作法。

1.提供藥物基因檢測機制

目前院內藥物基因檢測皆為 reactive(反應式)的，為了開立特定藥物的目的於開藥前進行基因檢測，如:癌症藥物、carbamazepine 或 allopurinol 等，但完全沒有 preemptive (預先式)基因檢測，或許目前可以先參照美國食藥屬中建議檢測的藥物基因項目建立幾種檢測項目提供民眾進行檢測，並將檢測結果帶入院內開方系統，可以做為後續藥物基因個人化建議的依據。但其可能面臨的困難是，目前現行檢測項目皆為健保給付，因此，若需進行基因檢測，需要民眾自費進行，或許可以考慮作為健檢自費項目，像是目前院內健檢提供的腸道菌檢測一樣，在健檢中心讓民眾認知藥物基因檢測的重要性，並提供民眾紙本報告可至其他醫療院所參考及帶入院內開方系統，讓院內開方進行建議，替民眾用藥安全性把關。

2.提倡及協助基因研究

院內目前有人體生物資料庫可以提供檢體進行基因相關研究，但若需執行相關研究會面臨許多困難，如:(1)基因檢測費用，個案的基因檢測昂貴的花費是基因研究極高門檻，除了進行檢測的花費外，檢體前處理費用、檢體品質檢測費用、送檢冷鏈的運送費用等都需相對應經費進行，另外，院內同一病人的檢體，可能會由多民研究者重複申請出庫及各自花費處理檢體等，這些都屬重複耗費人力、物力與金錢的過程，或許院方可以提供個案基因檢測的資訊，而非原始的檢體，能更加速基因研究進行，也減少研究者間重複的金錢花費。(2)收案困難，由於收案對象需進行同意書說明、同意書簽署、檢體採集及檢體運送至人體生物資料庫，這過程需要耗費許多人物力執行，也需麻煩照護病人的醫師、護理師或人體生物資料庫的研究員一起協助，但或許院內可以提供相關服務，針對院內病人進行人體生物資料庫收案，後續研究者依收案條件向人體生物資料庫申請出庫，而非各自從收案開始，能更加速基因研究的執行。

3.持續派員參加國際會議

藥物基因是目前全球積極進展的主題，且隨著生物科技技術進步，藥物基因檢測相關資訊日新月異，因此，透過國際會議能了解國家間如何執行藥物基因資訊於目前醫療行為中，甚至各國間政策走向、最新研究方法與應用，能為民眾用藥有效、安全性把關，為精準化醫療更進一步。

附錄

附錄一、會議議程

Pre-Conference Agenda

Wednesday, September 10th – University Center, 3rd Floor

12:00P – 3:15P CONCURRENT SESSIONS

Session #1: Implementing PGx 101
University Center Theater

Join us as PGx implementers share their experiences in designing and implementing PGx programs across various health systems and healthcare settings. This session will highlight necessary PGx implementation components, with more focused and interactive discussion on program infrastructure, EHR integration, PGx testing and billing, and clinical workflow development.

Organized by: *Kelsey Cook, PharmD, University of Florida/Nemours Children's Health & Josiah Allen, PharmD, St Elizabeth Healthcare*

ACPE® CE credit *(3 hours) available for pharmacists that attend this Application-Based Activity (UAN: 0181-9999-25-020-L99-P). Refer to the end of this program for full requirements to claim CE.*

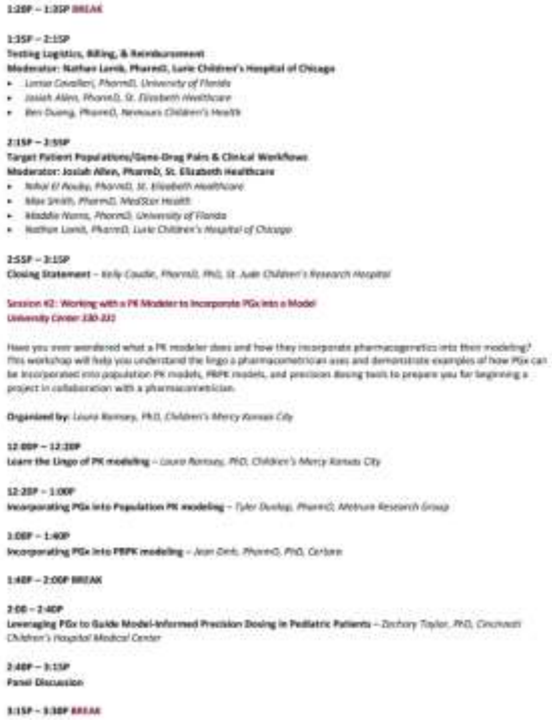
Learning Objectives:
1. Describe the core components required for successful pharmacogenomics (PGx) implementation in clinical practice.
2. Evaluate different strategies for integrating PGx into electronic health record (EHR) systems.
3. Compare approaches to PGx testing logistics and billing/reimbursement.
4. Identify effective workflow models for incorporating PGx into diverse healthcare settings.
5. Apply insights from peer institutions and implementation experts to address common barriers in PGx adoption.

12:00P – 12:05P
Welcome – *Josiah Allen, PharmD, St. Elizabeth Healthcare*

12:05P – 12:15P
Implementation Checklist/Roadmap Introduction – *Kelly Caudle, PharmD, PhD, St. Jude Children's Research Hospital*

12:15P – 12:35P
PGx Program Infrastructure – *Max Smith, PharmD, MedStar Health*

12:35P – 1:20P
EHR Integration with Panel Discussion: PGx-CDS Basics
Panelist Introductions: Epic and Cerner/Other Systems – followed by Breakout sessions
- **Epic Systems** – *Breakout Room: University Center Theater*
  Moderator: Maddie Norris, PharmD, University of Florida
  - *Larisa Cavallari, PharmD, University of Florida*
  - *Ben Duong, PharmD, Nemours Children's Health*
  - *Josiah Allen, PharmD, St. Elizabeth Healthcare*
- **Cerner/Other Systems** – *Breakout Room: University Center 332-333*
  Moderator: Max Smith, PharmD, MedStar Health
  - *Dave Gregornik, PharmD, Children's Minnesota*
  - *Max Smith, PharmD, MedStar Health*



1:20P – 1:35P BREAK

1:35P – 2:15P
Testing Logistics, Billing, & Reimbursement
Moderator: Nathan Lamb, PharmD, Lurie Children's Hospital of Chicago
- *Larisa Cavallari, PharmD, University of Florida*
- *Josiah Allen, PharmD, St. Elizabeth Healthcare*
- *Ben Duong, PharmD, Nemours Children's Health*

2:15P – 2:55P
Target Patient Populations/Gene-Drug Pairs & Clinical Workflows
Moderator: Josiah Allen, PharmD, St. Elizabeth Healthcare
- *Nihal El Rouby, PharmD, St. Elizabeth Healthcare*
- *Max Smith, PharmD, MedStar Health*
- *Maddie Norris, PharmD, University of Florida*
- *Nathan Lamb, PharmD, Lurie Children's Hospital of Chicago*

2:55P – 3:15P
Closing Statement – *Kelly Caudle, PharmD, PhD, St. Jude Children's Research Hospital*

Session #2: Working with a PK Modeler to Incorporate PGx into a Model
University Center 330-331

Have you ever wondered what a PK modeler does and how they incorporate pharmacogenetics into their modeling? This workshop will help you understand the lingo a pharmacometrician uses and demonstrate examples of how PGx can be incorporated into population PK models, PBPK models, and precision dosing tools to prepare you for beginning a project in collaboration with a pharmacometrician.

Organized by: *Laura Ramsey, PhD, Children's Mercy Kansas City*

12:00P – 12:20P
Learn the Lingo of PK modeling – *Laura Ramsey, PhD, Children's Mercy Kansas City*

12:20P – 1:00P
Incorporating PGx into Population PK modeling – *Tyler Dunlap, PharmD, Metrum Research Group*

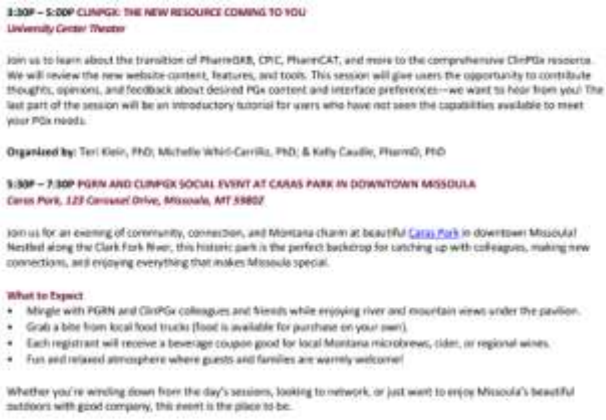
1:00P – 1:40P
Incorporating PGx into PBPK modeling – *Jean Dinh, PharmD, PhD, Certara*

1:40P – 2:00P BREAK

2:00 – 2:40P
Leveraging PGx to Guide Model-Informed Precision Dosing in Pediatric Patients – *Zachary Taylor, PhD, Cincinnati Children's Hospital Medical Center*

2:40P – 3:15P
Panel Discussion

3:15P – 3:30P BREAK



3:30P – 5:00P CLINPGX: THE NEW RESOURCE COMING TO YOU
University Center Theater

Join us to learn about the transition of PharmGKB, CPIC, PharmCAT, and more to the comprehensive ClinPGx resource. We will review the new website content, features, and tools. This session will give users the opportunity to contribute thoughts, opinions, and feedback about desired PGx content and interface preferences—we want to hear from you! The last part of the session will be an introductory tutorial for users who have not seen the capabilities available to meet your PGx needs.

Organized by: Teri Klein, PhD; Michelle Whirl-Carrillo, PhD; & Kelly Caudle, PharmD, PhD

5:30P – 7:30P PGRN AND CLINPGX SOCIAL EVENT AT CARAS PARK IN DOWNTOWN MISSOULA
Caras Park, 123 Carousel Drive, Missoula, MT 59802

Join us for an evening of community, connection, and Montana charm at beautiful Caras Park in downtown Missoula! Nestled along the Clark Fork River, this historic park is the perfect backdrop for catching up with colleagues, making new connections, and enjoying everything that makes Missoula special.

What to Expect
- Mingle with PGRN and ClinPGx colleagues and friends while enjoying river and mountain views under the pavilion.
- Grab a bite from local food trucks (food is available for purchase on your own).
- Each registrant will receive a beverage coupon good for local Montana microbrews, cider, or regional wines.
- Fun and relaxed atmosphere where guests and families are warmly welcome!

Whether you're winding down from the day's sessions, looking to network, or just want to enjoy Missoula's beautiful outdoors with good company, this event is the place to be.

Agenda

Thursday, September 11th – University Center Ballroom, 3rd Floor (unless otherwise specified)

7:30A – 8:30A BREAKFAST – provided by conference

Breakfast Networking Session Tables
- Early Career Committee
- Education Committee
- Communications Committee
- Global Committee
- Membership Committee
- Publications Committee
- Scientific Committee
- Clinical Practice Special Interest Group
- Oncology Special Interest Group
- Psychiatry Special Interest Group
- Implementation Working Group
- All of Us

8:30A – 8:50A WELCOME TO PGRN ANNUAL MEETING IN COLLABORATION WITH CLINPGX
- *PGRN President*
- *University of Montana President*

8:50A – 9:50A KEYNOTE LECTURE
Walking Together: Expanding Pharmacogenomic Research through Tribal Community Partnerships
- *Washington School of Medicine*

ACPE® CE credit *(1 hour) available for pharmacists that attend this Knowledge-Based Activity. Refer to the end of this program for full requirements to claim CE.*

Learning Objectives:
1. Recognize some of the aspects of the history of the Salish, Pend d'Oreille, and Kootenai people.
2. Summarize challenges of healthcare delivery to and health disparities experienced by Indigenous people in the United States and Montana.
3. Explain the key elements of successful community-academic partnerships to increase participation of rural and Tribal communities in pharmacogenomics research.
4. Describe Tribal governance and institutional review board procedures when considering research with Tribal communities.

9:50A – 12:40P NAVIGATING UNCERTAINTY IN PHARMACOGENOMICS: LABORATORY CHALLENGES AND VARIANT INTERPRETATION

ACPE® CE credit *available for pharmacists that attend this Application-Based Activity. Refer to the end of this program for full requirements to claim CE.*

Learning Objectives:

1. Explain the clinical and familial implications of undetected DPYD variants and 5-FU toxicity risk.
2. Identify challenges and gaps in standard pharmacogenomic testing, including the limitations of current variant detection and interpretation.
3. Describe how to overcome laboratory challenges in implementing pharmacogenomic testing.
4. Evaluate innovative research strategies such as experimental saturation mutagenesis, AI-based functional prediction, and large-scale biobank studies, to improve the interpretation of pharmacogenetic variants, including variants of uncertain significance (VUS).
5. Discuss implementation barriers and solutions for pharmacogenomic testing in diverse clinical and laboratory settings, drawing on real-world examples.

9:50A – 10:50A
Laboratory Testing in Pharmacogenomics – Challenges, Gaps, and Perspectives
Moderator: Dan Hertz, PharmD, PhD

- When Standard Testing Falls Short: A Family Perspective on 5-FU Toxicity and Missed DPYD Variants (25 mins) – *Scott Kapoor, MD, Advocates for Universal DPD/DPYD Testing (AUDT)*
- Breaking Barriers: Overcoming Laboratory Challenges in Implementing Pharmacogenomic Testing (25 mins) – *Ann Moyer, MD, PhD, Mayo Clinic*
- Q&A Panel with Speakers (30 mins)

10:50A – 11:10A BREAK
Video Presentation – DPD Deficiency: The Hidden Risk in Chemotherapy (Heather Frankel, Boise State University)

11:10A – 12:40P
The Issue of "Variants of Unknown Significance" in Pharmacogenetics
Moderator: Sue Yang, PhD & Renee Geck, PhD

- The Scale of the VUS Issue in Pharmacogenes: VUS discovery in All of Us and handling VUS in implementation at Pitt (18 mins) – *Phil Empey, PharmD, University of Pittsburgh*
- Improving interpretation of G6PD variation through multiplexed functional assessment (18 mins) – *Renee Geck, PhD, Georgia University*
- What if We Can Experimentally Study Every Possible Variants in Pharmacogenes? (18 mins) – *Seok Wah Yee, PhD, Pfizer*
- How Good (or Bad) is AI-based Prediction of Pharmacogenetic Variant Function? (18 mins) – *Zhenhua Li, PhD, St. Jude Children's Research Hospital*
- Q&A Panel with Speakers (18 mins)

12:40P – 2:00P LUNCH – provided by conference

12:50P – 1:50P CONCURRENT SESSIONS

12:50P – 1:50P
Meet & Greet: Professional Development and Networking for Trainees and Early Career Members
University Center 330-331
Moderators: Amy Pasternak, PharmD & Shayna Killam, PharmD

- Join us for a trainee and early-career networking and professional development session, starting with a multi-disciplinary panel and audience Q&A.
- The second half of the session will consist of informal mingling and one-on-one, meaningful conversations in a low-pressure setting.

4:00P – 5:30P
Navigating the Return and Management of PGx Results
Moderator: Kelly Caudle, PharmD, PhD

- Managing preemptive PGx results occurring due to reactive testing (25 mins) – *Jennifer Hastings, PharmD, PhD, Cleveland Clinic*
- Returning the results of pharmacogenomic testing from research Biobanks (25 mins) – *Christina Aquilante, PharmD, University of Colorado*
- Return of results to patients (25 mins) – *Allison Bragg, PharmD, St. Jude Children's Research Hospital*
- Q&A Panel with Speakers (15 mins)

5:30P – 7:30P RECEPTION, POSTER SESSION, & ANNOUNCEMENT OF TRAVEL AWARD WINNERS

Agenda

Friday, September 12th – University Center Ballroom, 3rd Floor (unless otherwise specified)

7:30A – 8:30A BREAKFAST – provided by conference

8:00A – 8:45A PGRN FORUM – OPEN TO ALL MEETING ATTENDEES

- Election Results
- Announcement of PGRN-CPNDx 2026 Scientific Meeting
- Opportunity for membership to provide feedback to the organization
- Group Photo

8:45A – 9:45A KEYNOTE LECTURE
Keynote: From Bench to Bedside to Policy: Improving Outcomes Through Pharmacogenomics
Moderator: Erica Woodahl, PhD

- *Munir Pirmohamed, PhD, University of Liverpool*

***ACPE® CE credit** (1 hour) available for pharmacists that attend this Knowledge-Based Activity (UAN: 0181-9999-25-024-L99-P). Refer to the end of this program for full requirements to claim CE.*

Learning Objectives:

1. Describe the potential consequences of giving the recommended dose of 5-fluorouracil to a patient with a loss-of-function variant in the dihydropyrimidine dehydrogenase (DPYD) gene.
2. Describe the differences between type A and type B adverse drug reactions.
3. Outline how inequalities in clinical practice can be exacerbated by not considering genetic variability in different ethnic groups.

9:45A – 11:15A ADVANCING PHARMACOGENOMICS THROUGH BIOBANKS, REAL-WORLD DATA, AND CLINICAL IMPLEMENTATION

***ACPE® CE credit** (1.5 hour) available for pharmacists that attend this Knowledge-Based Activity (UAN: 0181-9999-25-025-L99-P). Refer to the end of this program for full requirements to claim CE.*

Learning Objectives:

1. Describe how large-scale biobanks are advancing pharmacogenomic discovery and enabling more inclusive genomic research.
2. Identify the relationship between pharmacogenomic variation—such as CYP2D6 genotype and inhibitor status—and real-world clinical outcomes.
3. Evaluate the integration of electronic health records (EHRs) and biobank-linked genomic data in pharmacogenomic translational research.
4. Assess real-world implications of genome-guided prescribing.

Moderators: Phil Empey, PharmD & Julie Johnson, PharmD

- Harnessing the diversity of the Million Veteran Program (MVP) for pharmacogenomics discovery (18 mins) – *Sony Tuteja, PharmD, University of Pennsylvania*
- Association of emergency department visits with CYP2D6 genotypes/inhibitors during opioid treatment (18 mins) – *Noor Ahmed Nahid, University of Florida*
- Leveraging Electronic Health Records and Biobanks for Conducting Pharmacogenomic Translational Research (18 mins) – *Nihal El Rouby, PharmD, PhD, University of Cincinnati*
- Assessing real-world implications of genome guided prescribing (18 mins) – *Casey Overby Taylor, PhD, Johns Hopkins University*
- Q&A Panel with Speakers (18 mins)

11:15P – 11:55P LIGHTNING TALKS: CONTEMPORARY TECHNIQUES IN PGX
Moderator: Steve Scherer, PhD

- AI Tools for PGx Data Curation in ClinPGx (8 mins) – *Aurae Fonseca, MD, Stanford University*
- Use of artifical intelligence in identifying potential patients who would likely benefit from pharmacogenomics testing for depression and anxiety (8 mins) – *Jessica Wright, PharmD, Mayo Clinic*
- Solving the *1 problem with NGS (8 mins) – *Roy Lorenz, PharmD, Vumedi*
- Q&A Panel with Speakers (16 mins)

11:55A – 1:15P LUNCH – provided by conference

12:05P – 1:05P
ClinPGx Users Meeting: Current and Future Plans
University Center 330-331
Moderators: Teri Klein, PhD, Michelle Whirl-Carrillo, PhD, & Kelly Caudle, PharmD, PhD

- The first half will cover the relationship of ClinPGx with ClinGen, including the work of the ClinGen Pharmacogenomics Interpretation Committee and the role ClinPGx will play.
- The second half will focus on CPIC, including the purpose and work of the Pharmacogene Curation Expert Panels (PCEPs).

1:15P – 2:15P LIGHTNING TALKS: PGRN ABSTRACTS SELECTED FOR PODIUM PRESENTATION
Moderator: Mineli Perera, PharmD, PhD

- Association of White Blood Cell Count Polygenic Scores with Mycophenolate-induced Leukopenia After Solid Organ Transplantation (7 mins) – *Alaa Rashwan, MS, University of Colorado*
- External Validation of a Polygenic Risk Score for Taxane-induced Peripheral Neuropathy: Results from the SWOG S0221 Clinical Trial (7 mins) – *Nam Nguyen Hoang, University of Michigan*
- Statin-Associated Muscle Symptoms in Participants with Cardiovascular disease: Insights from the All of Us Research Program (7 mins) – *Mona Alshahawey, BPharm, PhD, University of Florida*
- Beyond Short Reads: Enhancing hATI Diplotype Prediction and Novel Variant Discovery with Long-Read Sequencing (7 mins) – *Shubova Ishra, PhD, Children's Mercy Hospital*
- Real-world utilization, uptake, and impact of psychiatric pharmacogenomic testing in adults and children (7 mins) – *Luxi Zhang, PharmD, University of Minnesota*
- Cost-effectiveness of Pharmacogenetic-supported Prescribing in Youth with Mental Health Conditions (7 mins) – *Meagan Shields, University of Calgary*
- Q&A Panel with Speakers (18 mins)

Industry Microsessions
University Center 332-333

12:50P – 1:20P
OneOme – PGx into Practice: The Ochsner Health Oncology Program for Safer Chemotherapy
Moderator: Ursula Gresham, PharmD

- Learn how Ochsner Health, in collaboration with OneOme, built a sustainable PGx program in oncology. Panelists will share lessons learned around pre-treatment PGx testing implementation—including overcoming barriers to approval and adoption, integrating clinical decision support, developing test protocols, and improving patient safety through reduced toxicity.
  - *Catherine B. Oliver, PharmD, Ochsner Health*
  - *Sandra Milsky, PharmD, Ochsner Health*
  - *Gillian Bell, PharmD, Ochsner Health*

1:25P – 1:50P
Dupont – Hands-on Session: Generative AI for Pharmacogenomic Analysis

- Bring your laptop and VCF files for in a scientific deep dive into how generative AI can accelerate PGx insights. Through real-time exploration, you will test a real AI tool, interpret its outputs in the context of genetic variation, and discuss relevance to clinical decision-making and biomedical research. Not just a tool preview—this is a working session where science meets innovation. Ideal for researchers and clinicians, we will dissect the system's strengths and limitations to foster a deeper understanding of how AI can support personalized therapeutic decisions.

2:00P – 5:30P GLOBAL IMPLEMENTATION AND RETURN OF PHARMACOGENOMIC RESULTS: CHALLENGES AND INNOVATIONS

***ACPE® CE credit** (3 hours) available for pharmacists that attend this Application-Based Activity (UAN: 0181-9999-25-023-L99-P). Refer to the end of this program for full requirements to claim CE.*

Learning Objectives:

1. Describe global approaches to pharmacogenomic implementation, including the challenges and opportunities in diverse healthcare systems.
2. Discuss strategies for managing preemptive pharmacogenomic results that emerge through reactive testing workflows.
3. Summarize implications of preemptive pharmacogenomic results on clinical care and documentation.
4. Evaluate best practices for returning pharmacogenomic results from research biobanks.
5. Evaluate best practices for returning pharmacogenomic results to patients in a responsible, actionable, and patient-centered manner.

2:00P – 3:40P
PGx Around the Globe
Moderator: Chad Bousman, PhD

- PGx in Latin America (10 mins) – *Leslie Cinpo, PhD, University of Chile*
- Population-level implementation of pharmacogenetic testing in Singapore (20 mins) – *Hwee Lin Wee, PhD, National University of Singapore*
- Drug exposure during pregnancy & lactation: Pharmacogenetic considerations (20 mins) – *Ademuyiwa Olagunju, PhD, University of Liverpool*
- PGx in Europe – Implementation of pharmacogenetic testing in Finland (20 mins) – *Mikko Niemi, MD, PhD, University of Helsinki*
- Q&A Panel with Speakers (30 mins)

3:40P – 4:00P BREAK

2:15P – 2:25P CLOSING REMARKS

- *Erica Woodahl, PhD, University of Montana*
- *Vernon Finley, Ed.D., Confederated Salish and Kootenai Tribes, Director, Ksanka Culture Committee*

2:25P – 2:45P BREAK

2:45P – 3:30P CONCURRENT SESSIONS FOR SPECIAL INTEREST GROUP (SIG) MEETINGS

Clinical Practice SIG
University Center 330

- The Clinical Practice SIG fosters networking, collaboration, knowledge exchange, and professional development among clinical practitioners directly involved in the clinical implementation and practice of pharmacogenomics. This open meeting will introduce the SIG's structure and objectives, gather member feedback, and engage in an exchange of challenges and best practices, all of which will inform a SOP for this new SIG.

Oncology SIG
University Center 331

- The Oncology SIG will chart the next phase of collaboration in oncology pharmacogenetics. This interactive session will focus on identifying key initiatives to advance the field, with an emphasis on fostering collaborative research and accelerating clinical implementation. We will hold an open discussion to reach consensus on priorities for the coming year and to inform a SOP for the SIG. In addition, we will select new leadership to guide the Oncology SIG, ensuring sustained momentum and broad representation across disciplines and institutions. Whether you're a seasoned investigator or new to the field, we welcome your input and engagement in shaping the future of oncology pharmacogenetics through the PGRN community

Psychiatry SIG
University Center 332

- The Psychiatry SIG will begin their session with a group introduction and an opportunity to review a new SOP for the SIG aligned with PGRN goals. We will also discuss topics for next webinars and an expert consensus article. We will conclude with a presentation of Dr. Chad Bousman's new Delphi consensus study proposal, which will focus on for whom PGx testing should be offered in mental health and when.

~4:00P OPTIONAL PGRN-CLINPGX HIKE
The M Trail

- The M Trail is a steep ¾ mile hike that includes 13 switchbacks, 620 feet of elevation gain, and offers a panoramic view of the Missoula Valley.
- Look to the first page of the program to see a photo with "The M" on the mountain in the background. The trailhead is directly across the street from the meeting venue.
- Bring your tennis/hiking shoes and a pair of clothes to change into after the meeting!

附錄二 活動照片