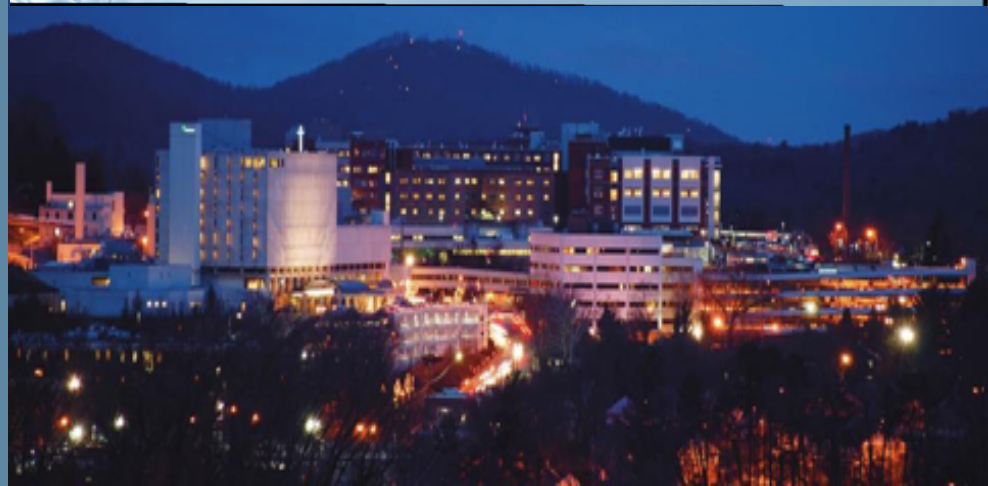
GM5-GM10: Mission Health's Personalized Medicine Program- Implementation, Challenges and Lessons Learned



GM10
May 2, 2017
The Mission Health Experience.

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Who is Mission Health?

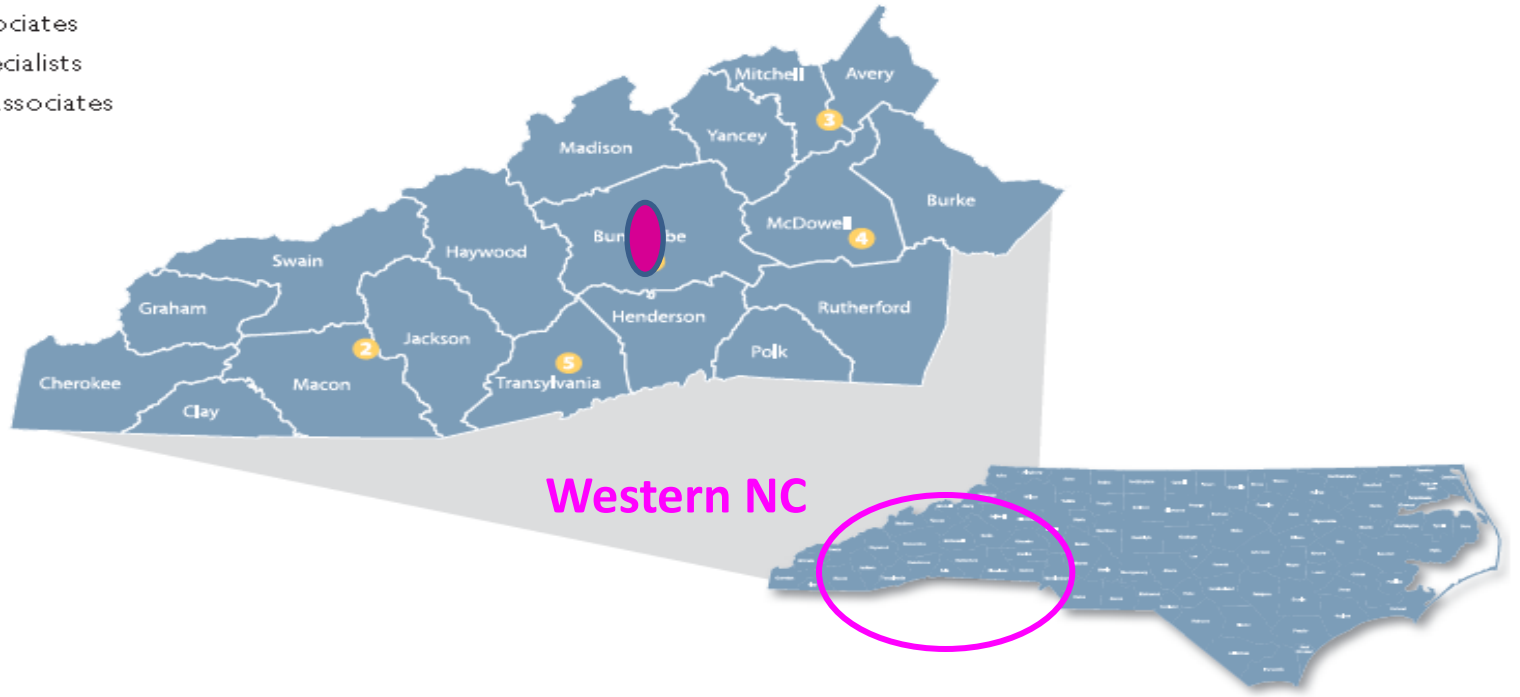
Non-profit rural health care system, Western NC

MISSION HEALTH

The Mission Health Footprint

18 counties (~1million residents)

1. Asheville Surgery Center
   Cancer Care of Western North Carolina
   Carolina Spine and Neurosurgery Center
   Fullerton Genetics Center
   Hope Women's Cancer Centers
   Mission Hospital
   Mission Children's Hospital
   Mission Medical Associates
   Regional Surgical Specialists
   Victoria Urological Associates
2. Angel Medical Center
3. Blue Ridge Regional Hospital
4. McDowell Hospital
5. Transylvania Regional Hospital



MISSION HEALTH

Mission Health System

Mission Hospital
- Flagship, tertiary care regional referral center
- 750 bed hospital

Five smaller hospitals
- Throughout mountains
- Add'l 400 beds

Patient demographic
- -Largely underserved
- -Increase in retirees
- -Mostly caucasian
- - Stable population
- - Payor mix:75%CMS,self

Highly rated quality care:
- Truven/Thomson Reuters: Top 15 health care system (6 yrs)
- Mission Hospital
  - Truven:Top 100 hospitals

Excellent resources:
- Innovative leadership
- HIT/EMR/CDS
- Fullerton Genetics
- New Cancer Center (2010)
- Highly rated cardiology
- Primary care network
- 2015: New ACO (MHP)

MISSION HEALTH

Mission's Personalized Medicine Program Vision and Focus 2013-present

- Utilize genetic and genomic information to minimize adverse drug response and maximize drug effectiveness.
  - **Cancer:** focus on predicting response to anti-cancer drugs, where testing is already standard of care.
  - **Non-Cancer:** focus on addressing drug – gene associations with highest level of evidence, where testing is emerging as a best practice (FDA black boxed drugs/CPIC).

Strategy: FDA Black Box Drugs

Implications for Genetic Testing to Prevent ADRs*

Drug	Corresponding genetic test	Intended use for gene-drug test	Implication of genetic variation (Frequency in population) *
Clopidogrel	CYP2C19 variation	Anti-platelet therapy in PCI patients **Mission 2011: 1432 PCI pts**	Ineffective drug response; Risk for stent thrombosis, other cardiac events **Up to :25% whites; 35% AA; 60% Asian)**
Abacavir	HLA-B*5701 variation	1st, 2nd line treatment HIV/AIDS **Mission 2012: 20 pts**	Potentially lethal hypersensitivity reaction **(5-8% whites; AA, Asian <3.6%)**
Carbamazepine	HLA-B*1502 variation	Epilepsy, bipolar, neuropathy Especially in Asian ancestry **Mission 2012: 3/539 Asian**	Potentially lethal hypersensitivity reaction, especially Han Chinese ancestry **Han: 36%; Asian Indians 20%; Japanese/Korean .5-.1%**
Codeine	CYP2D6 variation	Pain management in children **Mission 2012: 311 ; 106 ED**	Potentially lethal response in children **1-3% white; 28% N Africa**

*: PharmGKB and FDA websites

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Personalized Medicine Implementation in Cardiology -Challenges-

Challenges 2013/2014

- **No clinical problem identified by cardiologists**
- Literature controversial
- Variable uptake in academia
- AHA does not endorse routine testing
- Other efforts:
  - Ginsburg grand rounds
  - Cost analysis shows savings
  - Research Project Identifies ~ 4% of ACS/PCI patients may be Plavix 'failures" based on re-admissions due to MACE (MI, Stroke, Thrombosis, Stenosis)

Revisit in 2016/2017

-New cardiology leadership

-Stouffer, UNC: grand rounds; UNC implementation for all ACS/PCI, IGNITE data, discharge on drug

-Mission Physician experience: stent thrombosis observed 8 days post discharge-CYP2C19 PM

-In process of reconsidering position on testing

-Simplified ordering CYP2C19

-Cost benefit analysis redux

Strategy: FDA Black Box Drugs

Implications for Genetic Testing to Prevent ADRs*

Drug	Corresponding genetic test	Intended use for gene-drug test	Implication of genetic variation (Frequency in population) *
Clopidogrel (under Consideration)	CYP2C19 variation	Anti-platelet therapy in PCI patients **Mission (2011: 1432 PCI pts)**	Ineffective drug response; Risk for stent thrombosis, other cardiac events **(25% whites; 35% AA; 60% Asian)**
Abacavir (in progress 2017,DIGITIZE)	HLA-B*5701 variation/	1st, 2nd line treatment HIV/AIDS **Mission (2012: 20 pts)**	Potentially lethal hypersensitivity reaction **(5-8% whites; AA, Asian <3.6%)**
Carbamazepine (complete 2016)	HLA-B*1502 variation	Epilepsy, bipolar, neuropathy Especially in Asian ancestry **Mission (2012: 6/539 Asian)**	Potentially lethal hypersensitivity reaction, especially Han Chinese ancestry **(Han: 36%; Asian Indians 20%; Japanese/Korean .5-.1%)**
Codeine (complete 2015)	Policy change: Remove codeine from Pediatric formulary	Pain management in children **Mission (2012: 311 ; 106 ED)**	Potentially lethal response in children (**1-3% white; 28% NAfrica)**

*: PharmGKB and FDA websites

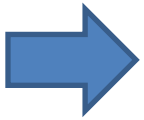
Strategic Approach:
-A work in progress-

- **Raise awareness**
- **In-patient (Mission Health System):**
  - Point of care clinical decision support (ordering test, drug alternatives, results interpretation)
- **Outpatient (throughout region):**
  - Pre-emptive testing: pilot studies
  - POC CDS for those on Mission EMR

Current PM Services/Team

Program Services

- Education/training/resource
- Policy /Best practices
- EMR Clinical decision support
- QI/Outcome Studies
- Clinical research
- Clinical consultation

SILOS  **MATRIX**

Personalized Medicine Team:

- **VP, Jonathan Bailey, MHA**
- **Director, Lynn Dressler, Dr.P.H.**
- **Clinical Pharmacist, Gillian Bell, PharmD.**
- **Coordinator: Paige Krug, B.S.**
- **Part time:**
  - Research Nurse (Pearl Abernathy, RN);
  - Peds Pharmacist (Karl Ruch, PharmD)
- **Trainees**: Students, Residents, Fellows
- **Consultants:**
  - Howard McLeod (Moffit Cancer Center, Tampa)
  - Mark Dunnenberger (North Shore, Chicago)
- **Partners:** UNC, Duke, Vanderbilt, St Jude, UFl, Innova Health,

PM Program Major Projects: Cancer

2013-Present:

Developed first integrated tumor marker program at Mission Cancer Center

- Meet/exceed national guidelines for tumor markers
  - Working groups: internal guideline development (oncology, pathology, genetics, others)
- Instituted first QI studies for tumor markers to ensure compliance with evidence-based guidelines
- Streamline process/communication of test ordering, sample submission and results interpretation-interdisciplinary problem solving

2014-2015: Enhanced access to genomic profiling:

- Partnership with Inter-Mountain Health; Foundation Medicine

2016: Provision of clinical consultation/interpretation for genomic profiling:

- Comprehensive genomic profiling results; matching to drugs/trials;

2015-2016: In-house testing for Leukemia (coordination)

2017: Pilot: PGx and Supportive Care Study in Cancer Patients

2017: CDS: TPMT and Thiopurine: Pediatric ALL

Implementation in Oncology
-Current State-

Services	Project Accomplishments	Challenges
Meeting national guidelines	**Lung**: Stage IV NSCLC ADC: EGFR, ROS, ALK **CRC:** Stage IV, NRAS, KRAS, BRAF; CRC somatic LS testing **Breast:** Oncotype Dx **Endometrial:** somatic LS testing **Head and Neck:** HPV	-Coordination -Communication -Integration across disciplines
QI studies	**Lung:** 62% tested; 38% good clinical justification; **GI:** KRAS and BRAF, not NRAS **LS:** excellent in CRC **Breast:** improved compliance with use of OncoDx scores	-Lack of discrete fields in EMR; -Manual data abstraction;
Best Practices	Comprehensive Genomic Profiling-Operations, Consultation, Interpretation)	-Access to data by pathology-EMR issue;

Major Projects: Non Cancer

- **2015-2016: Removed codeine from MHS pediatric formulary** to minimize risk of lethal response due to genetic variations; developed CDS alerts inpatient and outpatient system-wide; NC Medicaid office to adopt Mission policy (2016).
- **2016: Pilot feasibility study to bring PGx to primary care:** Awarded ~$50K Presidential Award from NC Biotech Center
- **2016: Development of Personalized Medicine clinic** for adults with non-cancer conditions at the Fullerton Genetics Center.
- **2016/2017: CBZ/HLAB*1502 (Asian/Pacific Islanders).** P &T approval; CDS went live, 3/2017.
- **2016/2017: CDS/DIGITIZE :**TPMT and ped ALL, near completion; abacavir in process.
- **April 2017**: Adding tramadol to pediatric alert ; submission to P &T in process.

Implementation in Non-Cancer
-Current State-

Service	Project Accomplishments	Challenges
HIT/CDS for Drug/Gene pairs	-**Codeine** removed from pediatric formulary; tramadol next; alerts and alternatives -**Tegretol /HLAB1502**/Asians -**Thiopurine/TPMT**: ped ALL	-No PGx subcommittee; -Alert averse; -MD champion needed from each service line.
Personalized Medicine Clinic	Started, April 2016: 21 referrals from 17 different practices in region.	-Pt driven -Lack of uptake -Lack of awareness -Out of pocket patient expenses
Pilot Feasibility Studies	PGx in Primary care-funded PGx in cancer-funded Planned: PGx in behavioral health, elder care, employee	Funding

Integrating Personalized Medicine into Primary Care

- **Ongoing community education talks**: Patients starting to request testing from PCP
- **Educational Conference:** Fall 2015
- **Research demonstration project:** Spring, 2015 Barriers when cost and education not an issue.
- **Defacto:** increased marketing of PGx testing to PCP and pediatricians
- **PMP as resource and consultation center** to educate, train, (*we've got your back*)

PM Pilot in Primary Care Preliminary Update: 4 27 17

- **Number of practices:** 4 Practices, 10 clinicians recruited
- **Number of patients:** 32 patients with PGx testing completed
- **Changes recommended for current drugs:** 12/32 (38%)
- **Clinician pre test surveys** (n=10)
  - 100% SA/A: *I would be more inclined to use PGx testing if I had access to an expert consult service I could rely on to help interpret and evaluate difficult cases.*
  - Top 4 barriers to implementing testing in their practice:
    - Out of pocket expense for my patient (80%)
    - Lack of comfort with interpreting and applying results (80%)
    - Lack of expertise to address complex cases (80%)
    - Lack of time to spend with patient to explain results (50%)
- **Patients expect disease susceptibility** in addition to drug response.

PCP Pilot Study:
Barriers and Relevant solutions

- **Testing services:**
  - Lacking in NC at a reasonable price that bills patient's health insurance
  - Software translation for phenotype-genotype translation and report generation
- **Consultation services:**
  - Practices want access to expert consultation for difficult cases
  - Clinical pharmacists, health educators, NPs,
- **Clinical decision support for each practice:**
  - Within PCP EMR; point of care app--what to do with result
- **Data storage and bioinformatics:**
  - Automatic updates for new guidelines, other drug-gene associations, push into EMR for alerts
- **Result sharing approaches:**
  - Interfacing EMRs to allow result sharing among clinicians and hospitals
  - Different CDS software interface needed for retail pharmacy
  - Create "chips" for patients to "carry" results

Lessons Learned

- “Top Down” and “Bottom Up” MD support needed
- Solve existing clinical problems
- Timing:
  - Responding to (national, regional) concerns that have leadership support is critical
  - Education, awareness, marketing aligned with new professional guidelines, popular press
- Pilot “try it”: a research approach first (vs clinical integration), when physician uncertain of clinical utility
- Apply Innovation Theory, Implementation/Diffusion Science and Behavioral Economics up front!
- Know what motivates your organization, community and clinicians

MISSION HEALTH AIM:

"Getting each person to their desired outcome,
Without harm, without waste,
And with an exceptional experience for
the person, family and care team."

Thank You!

Questions and Comments?

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Mission Personalized Medicine Program