How to Build a Research Program from the Ground Up

A Grass Roots Effort

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Disclosures

- No financial disclosures

- The views expressed are those of the presenters and do not reflect the official policy of the Department of the Army, the Department of Defense or the U.S. Government.

Outline

- Brief literature review
- Origin, structure and function of our Department Research Committee
- How we incorporated research into our curriculum
- Structured mentorship to facilitate early success
- Administrative engagement
- Data?
- Way forward

Why Care About Resident Research?

- ACGME requirements
  - II.B.5c - Faculty should encourage and support residents in scholarly activity (core)
  - IV.B.2 – Residents should participate in scholarly activity (core)
- Better physicians?
  - Mayo study of 308 IM residents – improved multisource evaluations, not ABIM-CE or mini-CEX scores
  - Toronto study – scholarly record not predictive
- Increased satisfaction with residency training
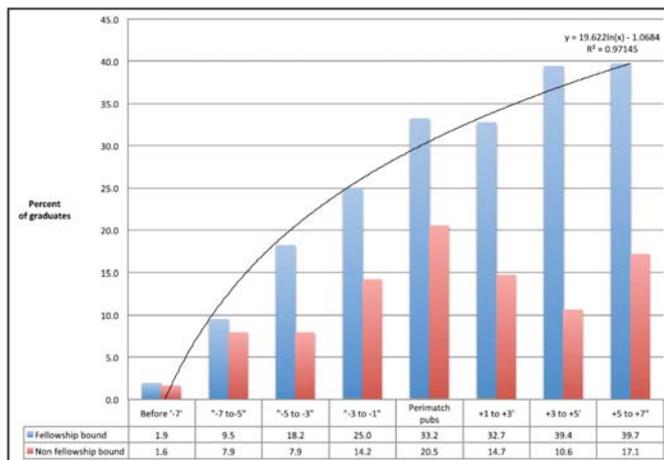- Train future clinician-scientists

Seaburg et al. BMC Med Ed 16:22; 2016
Cavalcanti et al. Med Ed, 44: 468; 2010
Takahashi et al. J Gen Intern Med, 24(6): 716; 2009

Who's Doing What?

Figure 2   Percent of graduates with at least 1 publication.
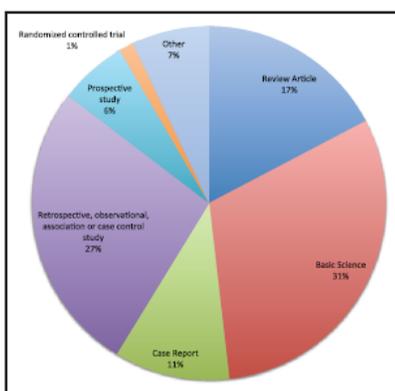

Who's Doing What?

Figure 3   Types of publications by fellowship-bound internal medicine graduates.
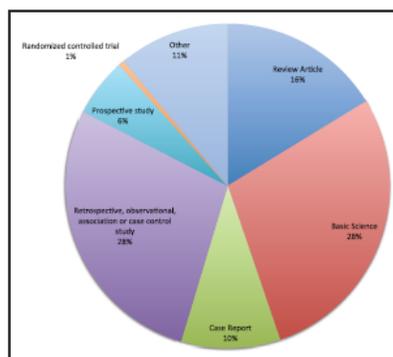
Figure 4   Types of publications by nonfellowship-bound internal medicine graduates.
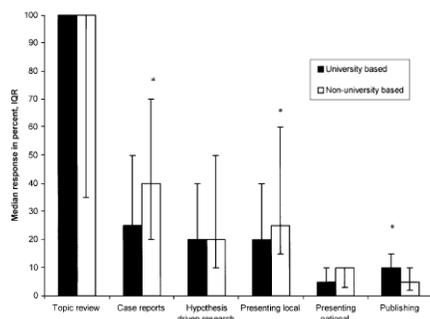
Who's Doing What

– Survey of IM PDs (2005)

FIGURE 1. Median response and interquartile range, percent of internal medicine residents involved in various scholarly activities during the years 1998 through 2001. *$P<.05$, Wilcoxon ranksum test for comparison of university versus nonuniversity programs.

Levine et al. J Gen Intern Med 2005; 20:155-159

Obstacles to Research in IM

- Survey of IM residents
  - 81 residents and 132 research projects
    - 75 (57%) abandoned or incomplete
      - Lack of time - 51 (68%)
      - Lack of interest – 32 (31%)
      - Faculty's lack of interest – 15 (20%)
    - Predictors of publication
      - Men (RR 2.5, CI 1.1-6.1)
      - Level of resident >= PGY3 (RR 2.1, CI 1.3-32.0)
      - Previous research experience (RR 1.6, CI 1.0-2.5)
- Resident Research Skills
- Funding

Gill et al. Acad Med 76:477, 2001

Studied Interventions

- Requiring resident research
- Protected time for research
- Biostatistical and research support personnel
- Residency research director
- Assigned mentors
- Incentives
  - Presentation, awards, funding
- Financial incentives

Rothberg et al. Acad Med, 89(8): 1133; 2014
Kanna et al. BMC Med Educ 6:52; 2006
Levine et al. Teach Learn Med 17(4):328; 2005

Success Stories

- Ochsner Clinic Foundation
  - Consolidated Academic and Research Exposition (CARE) program
    - 110% increase in scholarly activity at 1 year
    - Improved resident satisfaction on ACGME survey
- Wake Forest University
  - Comprehensive 3 year curriculum
    - 2x national presentations; 4x regional presentations
    - After 2 years, 32% vs 7% of residents had at least 1 peer-reviewed publication

Ray et al. The Ochsner Journal 12:367, 2010
Ruiz et al. Am J Med 124(5):469, 2011

Smaller Program Success

- Sidney Kimmel Medical College
  - Series of interventions over 8 years
  - In 8th year, manuscript productivity increased from 0.01 pubs/FTE/year to 1.57 pubs/FTE/year
- Baystate Medical Center
  - Comprehensive resident research program in 2006
    - 2001-2006 – 3 resident pubs,
    - 2006-2012 – 39 resident pubs
  - Increase in fellowship acceptance: 33% → 49%

Alweis et al. J of Comm Hosp Int Med Persp 5:1, 2015
Rothberg et al. Acad Med 39:1133, 2014

Background

- What is Madigan like?
- What were our barriers to a successful research program
- What is our program like compared to other Madigan residencies with successful research programs? (Ortho, MFM, OBGYN, Gen Surg, Urology)

Our Program

- Small size – 36 residents
- Tertiary Academic Medical Center (U.S. Army)
- Robust GME programs
- Department of Clinical Investigation
  - Molecular biologists / chemists
  - Animal research labs supervised by veterinarians
  - Co-located Simulation Center of Excellence
  - Focused clinical research expertise
  - Participation in several large trial groups

Our Barriers

- Inexperienced faculty
  - No grant recipients
  - No MD/Ph.D
- Faculty turnover
  - Scheduled moves
  - Deployments
- No support personnel
  - Clinical Research Coordinators
  - Nurse Research Scientists
- Challenging IRB Approval process*
- No funding/protected time for faculty research

Our Barriers

- Other MAMC Departments have great success
  - Surgical specialties/subspecialties
  - Protected research year
  - Experienced/dedicated staff
    - Grants
    - Bench research
    - Bio-banking
    - "Platform" projects
  - Fellows

So What Did We Do?

DOM Research Committee

- Established circa 2009
- Motto: "How can we help?"
  - Research tracker/Case Report Log
  - Facilitate communication with IRB
  - Publicize meeting submission deadlines
  - Abstract/presentation Review
  - Facilitate funding for publications/presentation travel

First Steps

- Identified DOM Faculty with an interest and experience (at whatever level) with clinical research
- Created a "Research Tracker"
  - Included ideas and approved protocols
  - Allowed us to facilitate "handing off" projects that outlasted the residents
  - Allowed us to easily identify research projects for meetings/competitions
  - Allowed us to feedback information to the IM Program regarding scholarly activity

Research Tracker

Project Title	PI	Coinvestigators	Type of Research	Protocol Status
Pill bottle	PS	R1	Prospective	Idea stage
Pneumococcal vaccine response and HIV progression	CS	R2	Multicenter	Concept sheet writing
Vitamin D status and ARI severity	CS	R2	Retrospective	Multi-center
RDW in sepsis - bacteremia vs non, look at Sepsis notes	CS/CM	R2	Original, retrospective or prospective	Data collection
Pulmonary Function after Intubation	CM	R2	Prospective	Protocol writing
Inpatient - Palliative Care Team	DF/CM	R2	QI	Idea stage
Use of Clinical Psychologist in DM management	RL	R2	Prospective	Protocol writing
LFT abnormalities in Thyroid disease	CH	R2	Retrospective	Idea stage
Post ICU syndrome-ICU diary-PCM checklist intervention	CM	R2 + Nurse Scientist	Prospective vs PI	Idea Stage
CASPE	JS	R2 + TY PD	Original, educational	Active enrollment
Hypercalcemia levels >15 and etiologic diagnosis	PS	R2/R1	Retrospective	Idea stage
CHART Data and handoffs	AN	R3	Original, retrospective	Data complete
PICC lines - indication, use and complication	CS	R3	Retrospective	Idea stage
Pulmonary HTN in stage III CKD	MM	R3	Retrospective	Idea stage
RDW and bacteremia	CM/CS	R3	Original, retrospective	Manuscript submitted
HypoK and replacement	DO	R3	PI	IRB approval pending
Vitamin D in stage III-IV CKD	DO	R3	Original, retrospective	IRB approval pending
PPIs and HypoMg	DO	R3/R1	Review article	Data collection
TeleICU HandOff	CM	R3/R3	PI	Goal start July 1, 2014
Ketamine in Sepsis	CM	R3/R3/R3	Original, retrospective	Active enrollment
"How an intern spends their day"	AN		Original, retrospective	Idea stage
Centralized IRB - HIV Natural History	CS		Multicenter	Centralized IRB
Centralized IRB - Flu Study	CS		Multicenter	Centralized IRB
Hyperimmune plasma for Severe Flu	CS		Multicenter	Centralized IRB
RDW and osteomyelitis	CS		Retrospective	Idea Stage
ITE Directed Reading Program	CS/PS/GM		Original, retrospective	Manuscript writing
Biomarkers and PE outcomes	CM		Retrospective	Idea stage
Phosphoria	DO		Original, prospective	Idea stage
<24 hour admissions	DO		QI	Idea stage
Outpatient protocol for ED for DVT	ED		PI	Idea stage
Hyperglycemia after intraarticular steroids	CM		Prospective	Idea stage

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First Steps

- Case Reports are a "Gateway experience"
  - Easy to complete in less than a year
  - Determined "rules" for case reports
  - Polled faculty for cases that would be conducive to reporting (abstract or manuscript) → Case Report Tracker
  - "Target List" of journals that accepted Case Reports for publication without charging fees

Case Reports ROE

- The resident on the team (outpatient or inpatient) taking care of the patient when the diagnosis is made or first known to us.
- The intern on the team (outpatient or inpatient) taking care of the patient when the diagnosis is made or first known to us.
- The resident > intern on a consulting service peripherally involved with the case.*
- The resident / intern who had no interaction with the patient if no one else has claimed the case*
  - Under this category, it is first-come-first-serve without preference to PGY level.*
  - It is also understood that, if possible, the resident claiming the case will attempt to see that patient at their next follow-up visit related to the condition they plan to present.

Case Report Tracker

Case	Resident	Staff
Autoimmune thrombocytopenia in pulm MAC disease	R3	ID/HO
Type B lactic acidosis in HIV	R2	ID
DM myonecrosis vs NSTI	R2	ID
CMV colitis - GILD/CVID patient	R3	ID
congenital factor VII def	R1	HO
ILD From etanercept	R1	PULM
Hashimoto's encephalitis	R1	ENDO
Lepto outbreak in SF soldiers Guam	R3	ID
Yaws aortiitis	R1	ID
CNS IRIS vs PML	R2	ID/HO
Sevelamer induced duodenitis	R3	GI
Pasturella bacteremia/septic arhtirtis	R2	GIM
Salmonella aortic anerysm	R1	ID
Lactic acidosis from gluteal implants with undiagnosed cirrhosis	R1	CCM
Seizure resolves deirium		CCM
Grp B Strep SC joint arthritis		ID
Significant DISH finds w/ peripheral involvement		GIM
Primary CNS vasculitis		GIM
Sarcoid s/p gemcitabine		PULM
Fusobacterium necrophorum peritonitis s/p C section		ID
Palisaded neutrophilic granulomatous dermatitis		GIM
Reactive arthritis - Dengue infxn		ID/RHEUM
MCTD presenting as SBO		RHEUM

Facilitate Communication

- Determined that the PI for all DOM projects would be a faculty member, with residents as AI
  - Major rate limiting step in IRB approval was closed-loop communication
  - Faculty more available
- Utilized programs already available
  - "Protocol Workshop"
  - Statistician Review
- Progress of a project through IRB noted on Research Tracker and reviewed monthly

Meeting Deadlines

- Set a goal to maximize participation in local, regional and national meetings
  - Built abstract submission deadlines into the Research Committee Agenda
  - Publicized over email and morning report announcements
  - Case Reports OR Research – all were encouraged!

Meeting Deadlines

- Identified common meetings or meetings faculty had submission success with
  - WA ACP Annual Chapter Meeting, WA ACP Spring Scientific Meeting
  - Army ACP
  - National ACP
  - Madigan Research Day
  - Subspecialty meetings (IDSA, SCCM, NKF, AAAAI, ATS, ACCP)
- Submission deadline to Research Committee set 2-3 weeks before meeting deadline

Review and Practice

- **All** abstracts were first sent to the Research Committee
  - Ensured the resident had appropriate faculty mentorship
  - Validated that proper clearances were sought
  - Edited for clarity, content, grammar and spelling
- Once abstracts were accepted residents were scheduled for presentation practice
  - 3 – 4 weeks prior to meeting
  - Podiums → editing of slide presentations and content delivery
  - Posters → layout, grammar, spelling, content, flow and clarity

Funding for Travel

- Difficult in the military
  - Significant hoops involved in funding travel to meetings (even if presenting)
- Ensured all IRB approved protocols had been submitted with funding requests for travel to one meeting
- Built into GME budget request
- Built into DOM budget request
  - Forecast from previous year's acceptances

A dedicated Research Committee was not enough!

MOTIVATION
Some people need more than others...

www.body-builderz.com

Research Curriculum

- Worked with the Program Evaluation Committee to determine:
  - What elements of Clinical Research and scholarly activity should be built into the residency curriculum?
  - How should those elements be distributed to maximize the ability of residents to participate?
  - Are there ready resources that could be used?
  - Is this something the residents will find useful?
  - When do we introduce Research as "something we do"?

Research Curriculum

- CITI online training or Applied Research Training course requirement as PGY1 or PGY2
- Research Manual/Guidebook
- Conference Curriculum
  - Intro to Research
  - How to do a case report
  - How to do a presentation
 - Taking your abstract to the next level

Flea Circus

- Represents the first chance for many to formally present a case to a public audience
  - Longstanding tradition
  - Requirement for all PGY1's
  - 10 minute case presentation& discussion
  - Dressed for a national meeting
  - Feedback circle
- Competition
- This is the case you will now submit for spring meetings OR transition into a manuscript for publication

Research Elective

- Up to 2 months
- Must be approved by Research Committee with clear goals and expectations up front
  - What is your goal by the end of the month?
    - Submit a protocol to the IRB
    - Draft a manuscript for submission
    - Complete data collection on an already approved protocol
- 2nd month not approved unless goals from 1st month are met

Timeline
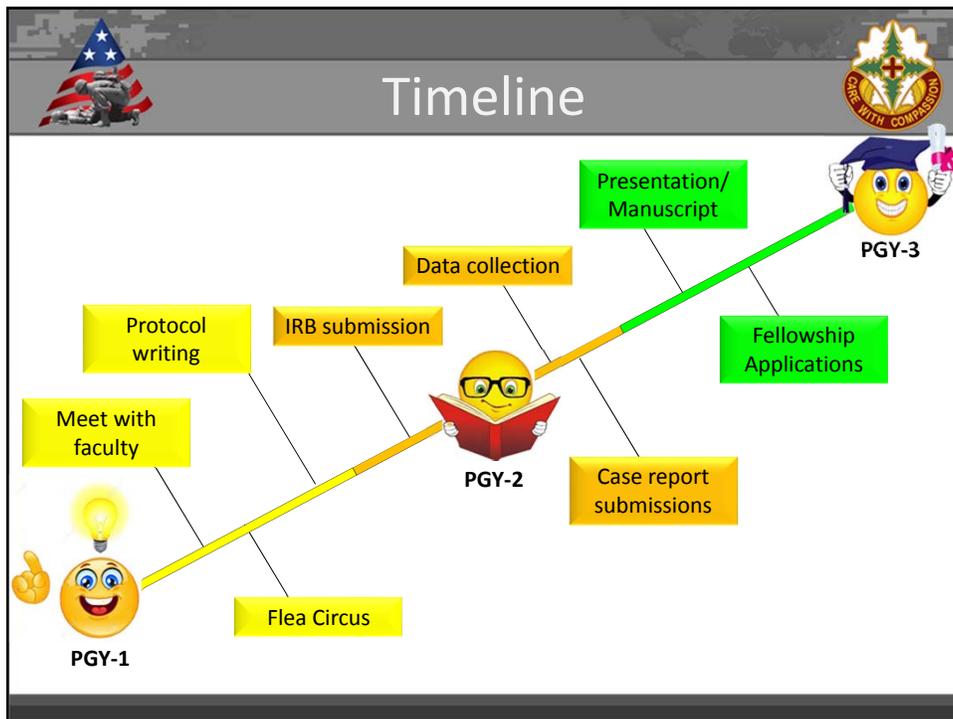
Focused on the Interns

- Orientation week
  - "Introduction to Research"
  - Caveat: focus on mastering your intern activities first!
- Keep an eye out for good case reports
  - AM Report, subspecialty rotations, senior residents with too much to do!
- Interested in research? Fellowship?
  - Identify clinical question, write or join pre-existing protocol during second 6 months of PGY-1 year

Intern Follow-up

- Mid PGY1 year meet with core faculty from Research Committee to review goals:
  - No research -> okay, curriculum meets minimum scholarly activity requirements from RRC
  - Clinical vignettes only-> case report tracker
  - Interest but no ideas-> research tracker
  - Interest with ideas-> suggest mentor
  - Request Research Elective for PGY2
  - Schedule CITI Training or ART Course

Department Effort + Curriculum Revision
Still needs Admin Approval!

Final Link in the Chain

- Consistent involvement in the Research Committee
- PEC approval for curriculum elements
- "Research" still a foreign concept to admin
  - Nice to have but don't NEED to have
  - What % FTE appropriate to devote to research?

Administrative Buy-In

- Several successive Chiefs, Department of Medicine supportive of GME
  - Allowed for staff involved in clinical research with residents to designate "Research Time"
  - Seen as a retention tool for faculty
    - A robust and recognized research program helps recruit the best medical students
    - Best medical students = best residents = happy faculty who want to stay!

Administrative Support

- Facilitated military awards for completed research projects and presentations
- Encouraged public recognition of success
  - Participation in "Madigan Research Day"
    - Abstract posters printed and hung in open areas of the hospital
  - Bulletin boards of published literature from Department researchers in conference rooms
  - Accomplishments routinely publicized in other hospital forums
    - Commander's Biweekly Situation Reports
    - DCI Quarterly Newsletter
    - Madigan Pulse "Shout-outs"

Administrative Support

- Still a struggle
  - Exactly how much time should be "protected"
  - What results should be submitted in order to continue "protected time" for research?
- Hospital doesn't have a method for accounting that includes Research outside of pre-defined roles
  - DCI, IRB Chair, etc.
  - "that's what nights and weekends are for"

Did ANY of this make a difference for our residents?

So How Did We Do?

- Unfortunately, the data isn't so clear!
- Since 2007:
  - 156 abstracts presented (23 research)
  - Number peaked in 2012 with 33
    - Lost our Army ACP Chapter Meeting
    - Funding approval near-impossible
- Since directed mentorship from the Research Committee, have seen increased competition wins
  - 1st place poster and podiums at the local, regional and national level (11 wins from 2011 → 2014)
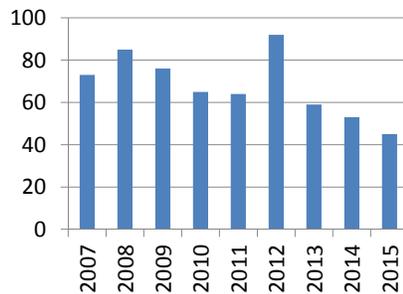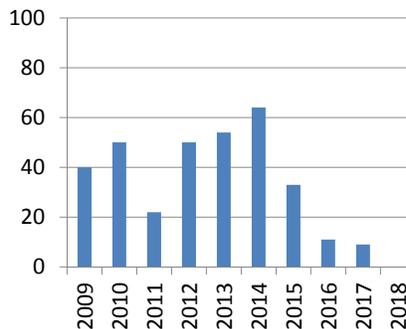
Abstract Submission
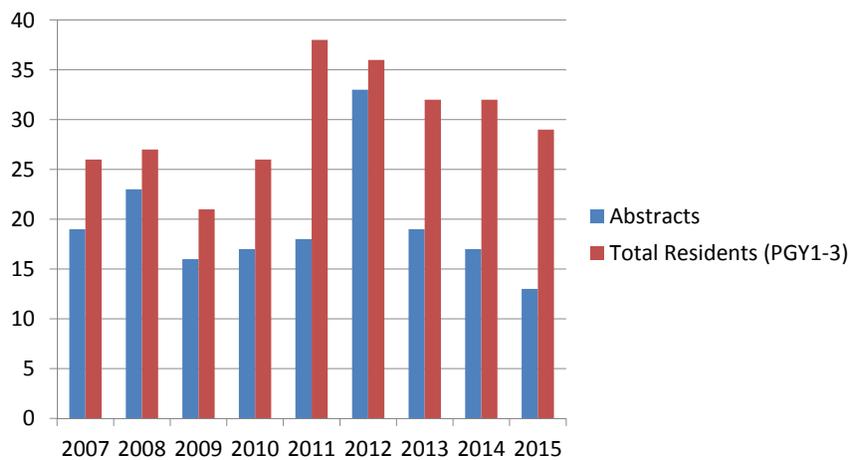
Publications
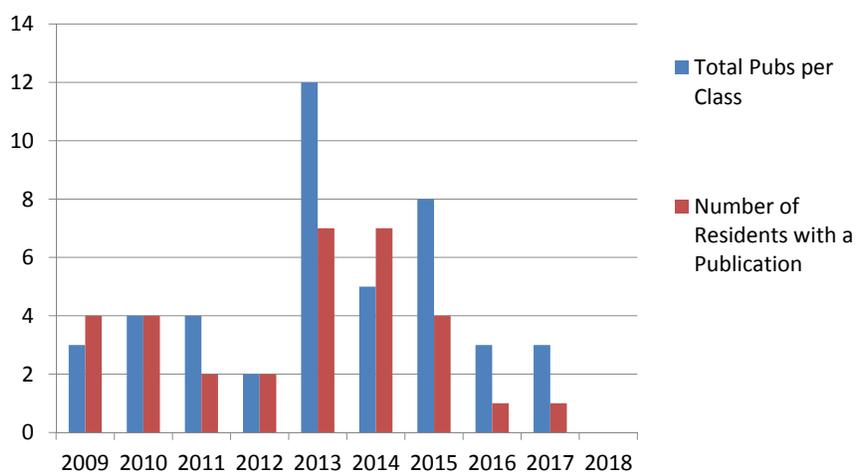
Percent Engaged

Percent Of Residents Participating/Total Residents

Percent of Residents Per Class with a Publication

Future Lines of Effort

- Met with DCI to look at our Department "Portfolio"
  - Opportunities in bench science → biobanking
  - Opportunities in population health → captive audience
  - Become the "experts" → one massive project with many continuing sub-projects
- Engage with the IRB process more directly
  - Inter-department Scientific Review
- Engage with industry and/or larger trial groups
- Cross silos and engage with other Departments
  - Nursing, Tele-Health, Surgery/Trauma, Operational (Army)
- Track data in a more meaningful way

Resources

- Research Manual
- Curriculum (Research Elective)
- Target Journals
- Presentations

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<p align="center">**Research Program: A Grass Roots Effort (Agenda)**</p>

Introductions

Background/Literature Review

-Challenges of doing research in a 3 year residency program

-Description of our hospital and IM Program and barriers to research at our institution

-Brief comparison of our program with other successful residency research programs at our institution

Establishment of Department Research Committee dedicated to supporting Resident Research

-Fellowship applications/scholarly activity

-Research Tracker/mentorship model

-Facilitate IRB communication

-Abstract/Presentation Review

-Tracking of meetings

-Facilitate funding for conference attendance and publications

Making Research "something we do" – weaving research into the IM Residency Curriculum

-"Course of Research during Residency Timeline"

-Intern Outreach

-ART course (DCI)

-Conference curriculum

-Research elective curriculum/setting expectations

-Flea Circus – starting local and expanding

Department Support – how we got administration on-board

-End of year awards for scholarly activity

-Public recognition of success/research bulletin board in conference room

-Incorporation into residency program's Annual Program Review

-Recruiting Tool for medical students

-Protected time for research

Pre/Post implementation Results

Questions