Rural Collaborative Research Reports:

1) Who Really Goes Into Primary Care?

2) Family Physicians Impact on Rural Maternity Care

RTT Collaborative April 2022

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Objectives

- Describe two successful collaborative research projects
- Describe the advantages and disadvantages of collaborative research
- List some recommendations for those thinking about collaborative research

Two research projects

1. **Who REALLY goes into primary care?**
   - Defines primary care and states that medical schools exaggerate their output of primary care physicians
   - Distinguishes primary care choice at time of residency choice v. entry into practice
   - Suggests new methodology for use by medical schools to more honestly state their projected primary care output
2. **Family physicians impact on rural maternity care**
   - Documents extent to which FPs provide maternity care in rural areas
   - Documents how access to maternity care would change if FPs would not provide rural maternity care

Background and timeline

- Both projects were preceded by smaller studies conducted locally in conjunction with medical student “mentored scholarly activity” projects.
- Results of both projects were presented at RME meetings and found to be interesting by others.
- Both projects were formally proposed to the RME group in May, 2017
- Project 1 submitted for publication in October 2019 and January 2020 and was published in August 2020
- Project 2 submitted for publication in January 2021 and May 2021 and was published in September 2021

Contributions of US Medical Schools to Primary Care (2003-14):

Who REALLY Goes into Primary Care?

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Research Objectives:

1. To determine the magnitude by which primary care output is overestimated by commonly used metrics.
2. Identify a more accurate method for predicting actual primary care output.
3. Determine the relative contribution of FM, IM and Peds graduates to the primary care physician workforce.

Methods: Study Category Definitions

- Primary Care Residency Match Method ("Match PC") Commonly used by medical schools and reported in the media: (Also called "The Dean's Lie"): All medical school graduates who match in:
  - Family Medicine residencies
  - Categorical and Primary Care Internal Medicine residencies
  - Categorical and Primary Care Pediatrics residencies
  - Medicine-Pediatrics residencies
- Actual Primary Care:
  - Residency graduates from FM, IM, Peds and Med-Peds residencies who meet the WHO and National Academy of Medicine definition of primary care
  - Excludes medical subspecialties, urgent care, emergency medicine, hospice/palliative care and hospitalists
  - Includes geriatrics
- Intent to Practice Primary Care: ("Intent PC") All medical school graduates who match in:
  - Family Medicine residencies
  - Primary Care Internal Medicine residencies
  - Primary Care Pediatrics residencies
  - Med-Peds residencies

Methods: Schools and campuses

All U.S. regions; public and private, distributed across published primary care rankings

- U. Alabama
- Case Western
- Univ. Colorado
- Dartmouth
- East Carolina

- Univ. Illinois
- Anonymous
- Univ. Minnesota
- Univ. Missouri
- Univ. Nevada, Reno

- Univ. N. Carolina
- Oregon Health Sci. U.
- Univ. S. Florida
- Univ. Washington

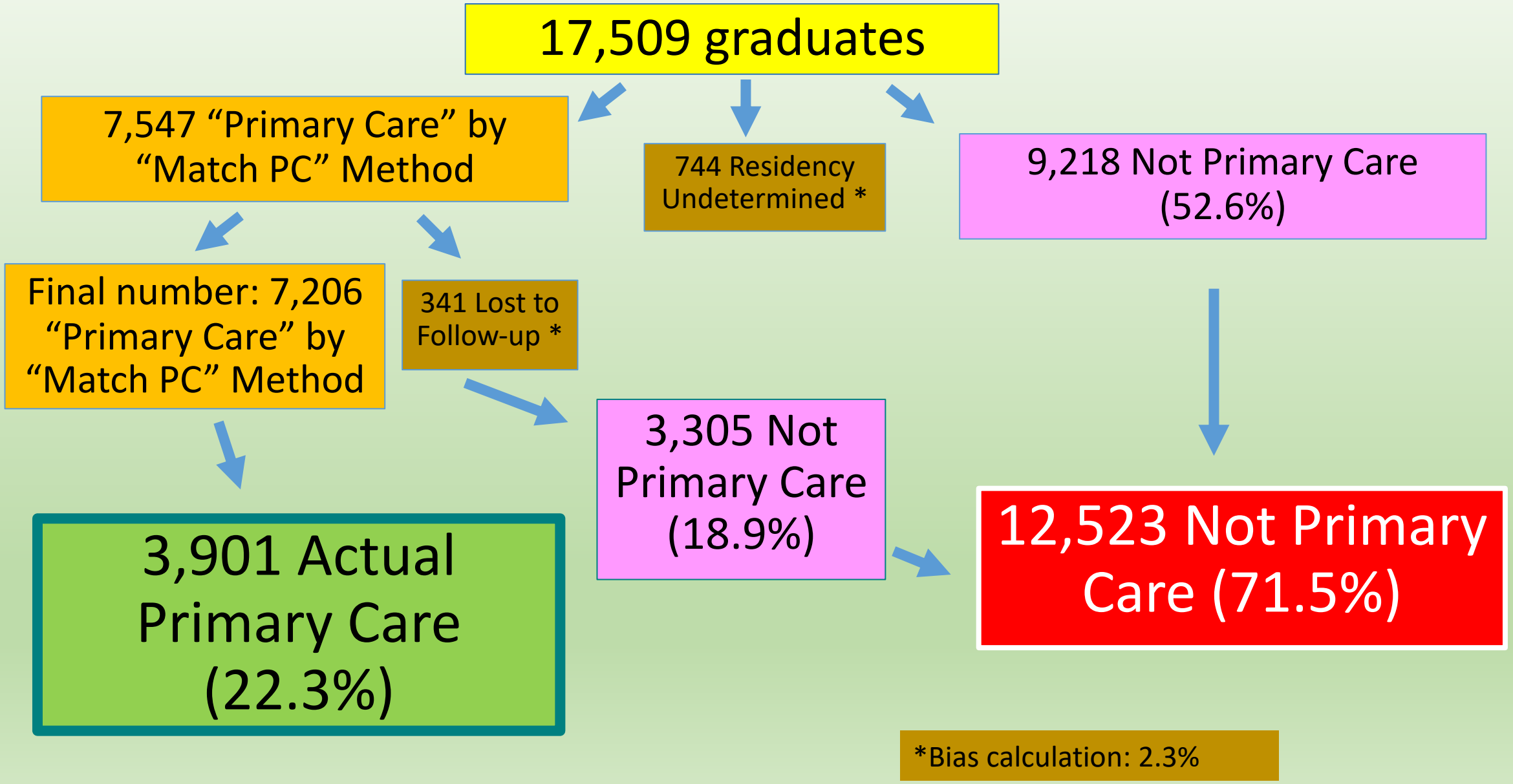
Methods: Graduate Tracking

- Of 17,509 graduates from 14 medical schools across 20 campuses, 7206 (41%) were classified as “primary care” by the Match PC method
- Medical school graduation years 2003-2014; to allow for time to complete residency and enter practice
- Tracking methods:
  - Doximity
  - Google
    - Individuals
    - Practice descriptions
    - Hospital websites
  - NPI
  - Linked In
- Test sample of IM preliminary match graduates to see if any eventually entered primary care rather than subspecializing

Results

- Match PC Method : 41.2%
- Actual PC : 22.3%
- New method 17.1%
- FM is largest contributor to PC workforce

Primary Care by "Match PC" Method ("Dean's Lie") v. Actual



Take-home Message #1

The Match PC method (Dean's Lie) falsely claims primary care by almost double

Detail: Primary Care by Specialty

Match Specialty	Actual Primary Care (7206)	Contribution to Actual Primary Care Workforce (3901)
Family Medicine	**92.8%**	**47.8%** (1866)
Pediatrics Categorical	44.6% to 51.6%	18.4% to 21.3% (718-830)
Internal Medicine Categorical	20.6% to 30%	13.6% to 19.9% (532-775)
Medicine-Pediatrics	61.6%	5.4% (209)
Medicine Primary Care	29.5%	4.5% (176
Pediatrics primary Care	93.5%	1.1% (43)
Medicine – Family Medicine	50%	0.0003% (1)

Take-Home Message #2

Family Medicine is the largest contributor to the M.D. primary care workforce based on the number and percentage of graduates who actually practice primary care after residency completion.

What's a more accurate method of determining primary care output at medical school graduation?

- Intent to practice primary care method ("Intent PC") counts all graduates who match in:
  - Family Medicine residencies
  - Primary Care Internal Medicine residencies
  - Primary Care Pediatrics residencies
  - Med-Peds residencies
- Predicts 17.1% primary care in this sample
  - MUCH closer to the actual primary care rate of 22.3%
  - Can be readily adjusted based on a small sample of any given medical school.

Intent PC Method Advantages

- Rapidly calculated based on basic match data
- Does not require waiting 3 to 4 years and tracking down graduates after they finish residency
- **Intent PC is within 5.2 percentage points of actual (under-count) vs 19 percentage points (over-count) of Match PC method**
- Over-counts for FM, IM Primary and Peds Primary graduates are partly balanced by under-counts of categorical IM and categorical Peds
- Can be adjusted for any specific school with a limited search of IM graduates

How Well Does the Overall Number Yielded by the Intent PC Method Identify ALL of Those Who Actually Practice Primary Care?

- Overall, Intent PC Method predicted that 3001 graduates would practice primary care.
- The Actual PC number was 3901. 3001/3901 = 77% accuracy
- The Intent PC Method missed about 900 graduates who eventually practiced primary care out of the total 17,509 graduates in the study. (5 percentage points)

When the Intent PC Method Indicates That Graduates Will Go Into Primary Care, How Accurate is that Prediction for a Specific School?

- 3 schools: >90% of Intent PC grads actually practiced primary care
- 9 schools: >75% and <90% of Intent PC grads actually practiced primary care
- 2 schools: Intent PC identified only 36.5% and 50% respectively of the grads who actually practiced primary care

Did We Miss Preliminary Year Graduates Who Practice Primary Care or Career Changers?

- A pilot study of University of Colorado preliminary residents found that only 1.4% practiced primary care
- A 10-year analysis at Case Western found that only 1.5% of preliminary residency graduates switched to a primary care residency and eventually practiced primary care.

Intent PC adjustment example: U. Colorado

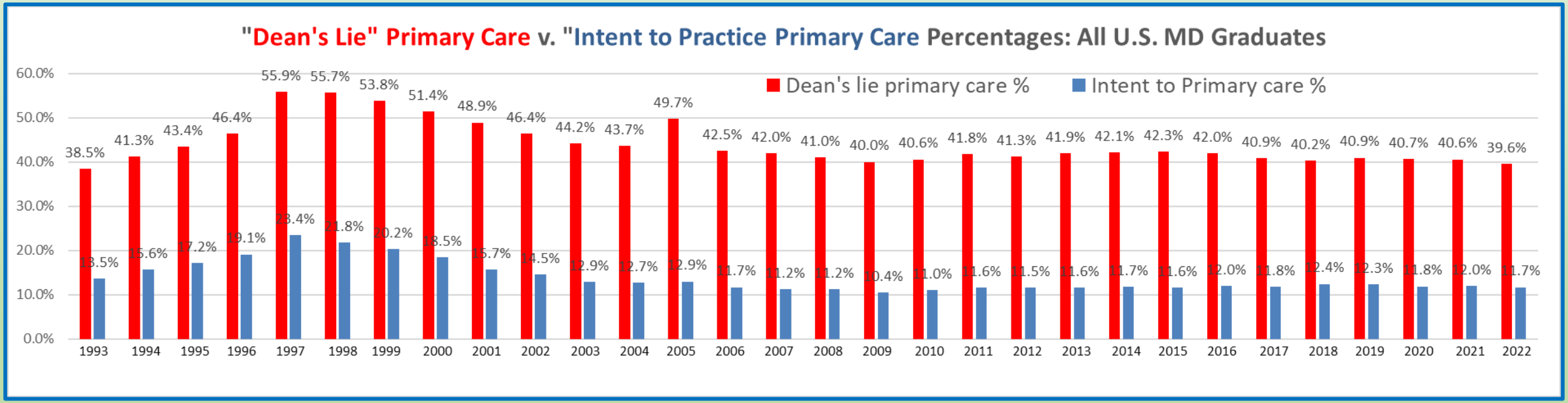
- 1648 “Match PC” graduates
- Intent PC method predicted 11.4% (188) primary care but Actual rate was **18.6%** (306)
- Study a sample of Categorical IM and Peds residency graduates:
  - Add back 72 (19%) of Categorical IM residency grads in Primary Care
  - Add back the 68 (47%)Categorical Pediatrics residency grads in Primary Care
- 188+72+68/1648 = **20%** which is within 1.4 percentage points of actual
- Further local refinements possible, for example sampling FM grads to determine what % enter urgent care or become hospitalists

Take-home Message #3

The Intent PC Method predicts the primary care output of U.S. MD medical schools much more accurately than the Match PC method and can be readily adjusted for specific schools.

- Intent PC Method: 5.2 percentage points under-estimate
- Match PC Method: 19 percentage points over-estimate

Compare “Intent” v. “Dean’s Lie” methods to 30 years of National data on all U.S. MD graduates 1993-2022



Study Limitations

- We studied only U.S. MD granting schools
- Most schools are public
- Mid-Atlantic/New England schools were under-represented
- Graduate data was obtained from public sources not individual survey
- Data is a “snapshot in time” that does not account for physicians who enter or leave primary care during their careers
- We had some missing data but imputing missing values to primary care or not primary care changed the proportions by only 2.3%

Future Opportunities

- Use this data to change medical school reporting of their primary care output
- Use this data to impact workforce planning
- Further refinement of the Intent PC Method
- Additional studies based on direct survey of graduates about their scope of care
- Additional studies of a broader geographic sample of schools and schools granting the D.O. degree

The Impact of Family Physicians in Rural Maternity Care

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Family Medicine and Maternity Care

- Current estimates: 63% of rural providers of Maternity care are family physicians
- National decline in number of medical school graduates entering family medicine
- Maternity care education in family medicine has changed
  - most family medicine programs prepare graduates for only normal vaginal deliveries
  - Few include Cesarean delivery training
  - Fellowships are available for Cesarean delivery training

Definitions

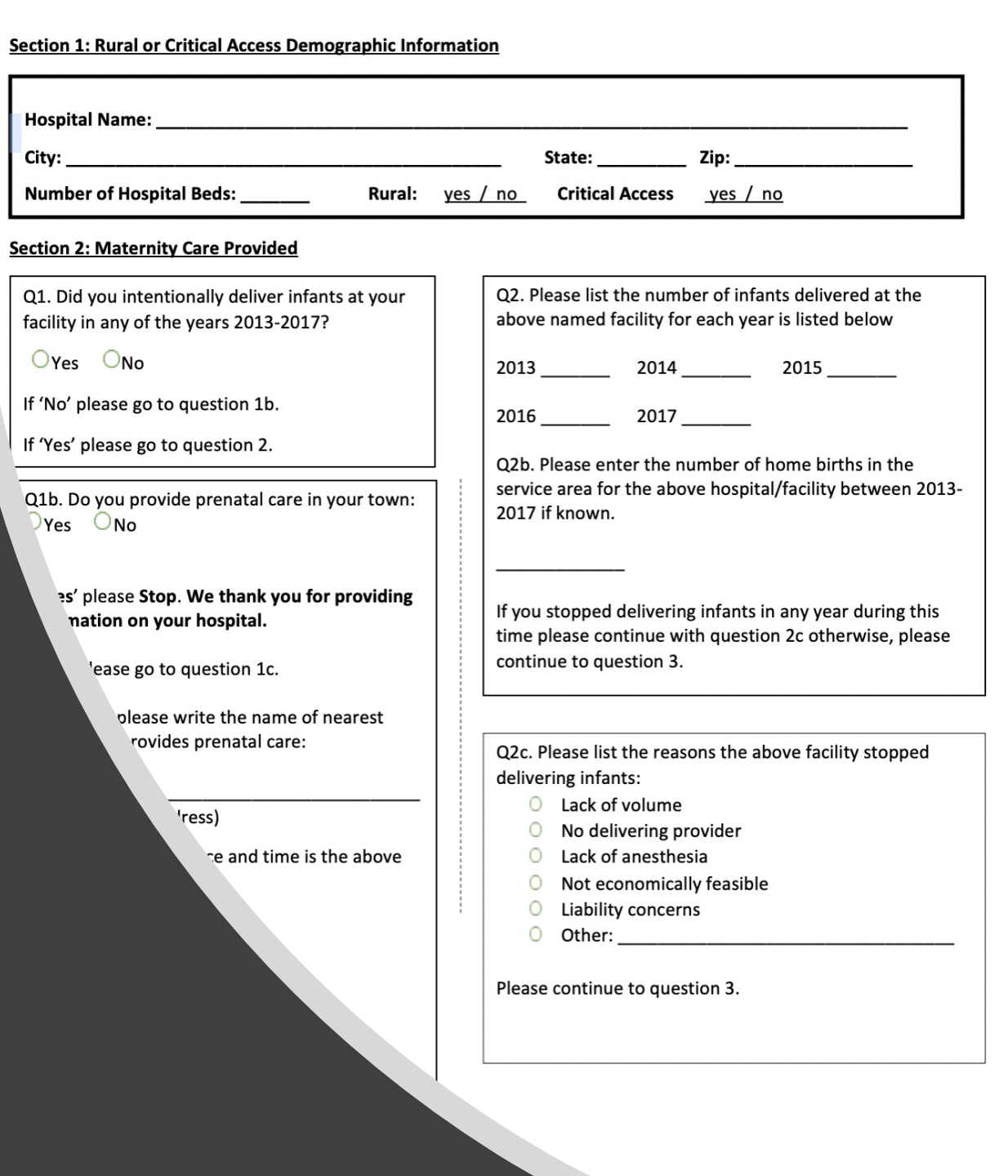
- Rural hospital: located in a county or census tract designated as rural by the Health Resources & Services Administration
- Critical access hospital: subgroup of rural hospitals
  - <=25 inpatient beds
  - >35 miles from nearest hospital
  - <= 96 hours avg length of stay for acute care
  - 24/7 emergency care

Study Objectives

- Characterize rural maternity care in a sample of U.S. rural and critical access hospitals
  - What services are offered
  - Who provides those services
- Determine contribution of family medicine physicians to maternity care in rural areas

Study Sample and Survey

- Invited faculty from 22 universities
  - 7 participated covering 10 states
- Administered short survey via phone or print to rural hospitals
- Survey Questions
  - Hospital size
  - Types of maternity services provided
  - Who performed the services
  - Birth data (# of births, provider type)
  - Distance from nearest hospital that provided an essential service



Section 1: Rural or Critical Access Demographic Information

Hospital Name: _____

City: _____ **State:** _____ **Zip:** _____

Number of Hospital Beds: _____ **Rural:** yes / no **Critical Access** yes / no

Section 2: Maternity Care Provided

Q1. Did you intentionally deliver infants at your facility in any of the years 2013-2017?

○Yes ○No

If 'No' please go to question 1b.

If 'Yes' please go to question 2.

Q1b. Do you provide prenatal care in your town:
○Yes ○No

es' please Stop. We thank you for providing nation on your hospital.

lease go to question 1c.

please write the name of nearest rovides prenatal care:

_____

ress)

ce and time is the above

Q2. Please list the number of infants delivered at the above named facility for each year is listed below

2013 _____ 2014 _____ 2015 _____

2016 _____ 2017 _____

Q2b. Please enter the number of home births in the service area for the above hospital/facility between 2013-2017 if known.

_____

If you stopped delivering infants in any year during this time please continue with question 2c otherwise, please continue to question 3.

Q2c. Please list the reasons the above facility stopped delivering infants:

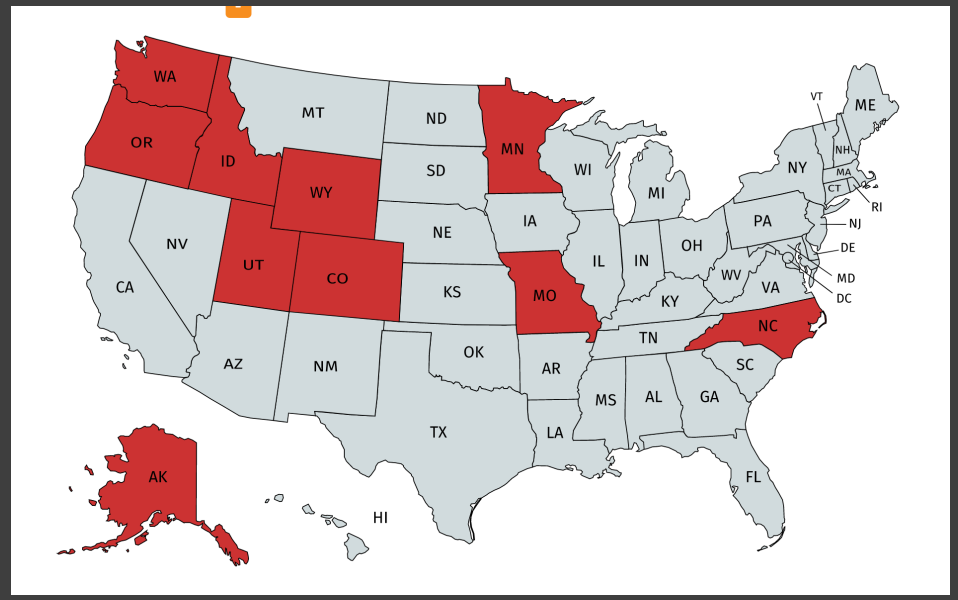
- ○ Lack of volume
- ○ No delivering provider
- ○ Lack of anesthesia
- ○ Not economically feasible
- ○ Liability concerns
- ○ Other: _____

Please continue to question 3.

Analyses

- Number of deliveries by family physicians compared to OBGyns and midwives
- Proportion of rural and critical access hospitals where:
  - FPs deliver
  - Cesareans offered
  - VBACs offered
- Distance traveled to receive maternity services not offered in the rural areas

Study Sample



- 216 target hospitals in 10 U.S. states
  - Response: 161 hospitals (74.5%)
  - Information publicly available: 26 hospitals
  - Excluded: 2 hospitals (too much missing info)
- Final cohort: 185 hospitals (85.6% of target)
- All hospitals rural, of which 116 are also critical access

Overall Maternity Care

- Family physicians delivered babies in 67% of hospitals
  - Were the only clinicians delivering in 27% of hospitals
- % hospitals where family physicians delivered babies varied by state
  - North Carolina: <20%
  - AK, MN, UT, WA, WY: >90%
- % hospitals where family physicians were only clinicians delivering babies varied by state
  - WY: 0%
  - WA: 70%

Rural hospitals (n=185) from Participating States (n=10) and Maternity Care Descriptions

State	# Hospitals	Average # Beds per Hospital (Range)	# Critical Access Hospitals	%(N) Hospitals where FPs and other practitioners deliver	%(N) Hospitals where ONLY FPs deliver
Alaska	13	27 (11-74)	9	92.3% (12)	38.5% (5)
Colorado	19	37 (9-100)	11	73.7% (14)	21.1% (4)
Idaho	7	22 (15-25)	7	85.7% (6)	57.1% (4)
Minnesota*	38	23 (12-25)	38	97.4% (37)	42.1% (16)
Missouri	24	74 (18-244)	7	54.2% (13)	8.3% (2)
North Carolina	37	137 (21-452)	9	16.2% (6)	5.4% (2)
Oregon	22	45 (21-176)	14	59.1% (13)	18.2% (4)
Utah	13	25 (9-54)	9	92.3% (12)	46.2% (6)
Washington*	10	25 (.)	10	90.0% (9)	70.0% (7)
Wyoming	2	25 (.)	2	100.0% (2)	0.0% (0)
Overall	185	57 (9-452)	116	**67.0% (124)**	**27.0% (50)**

***Minnesota and Washington provided data for Critical Access Hospitals only**

Specific Maternity Services: Cesarean

- ~92% of all hospitals performed Cesareans
- FPs performed cesareans at ~46% of hospitals

Rural hospitals (n=185) from Participating States (n=10) and Maternity Care Descriptions			
State	# Hospitals	%(N) Hospitals Offering Cesareans	%(N) Hospitals with FPs performing Cesareans
Alaska*	13	61.5% (8)	46.2% (6)
Colorado†	19	100.0% (19)	47.4% (9)
Idaho‡	7	100.0% (7)	42.9% (3)
Minnesota§	38	92.1% (35)	63.2% (24)
Missouri	24	100.0% (24)	37.5% (9)
North Carolina‖	37	91.9% (34)	10.8% (4)
Oregon¶	22	95.5% (21)	45.5% (10)
Utah	13	100.0% (13)	84.6% (11)
Washington#	10	80.0% (8)	70.0% (7)
Wyoming	2	100.0% (2)	100.0% (2)
Overall	185	**92.4% (171)**	**45.9% (85)**

Specific Maternity Services: VBAC

- ~42% of hospitals offered VBACs
- FPs performed VBACs at ~18% of hospitals

Rural hospitals (n=185) from Participating States (n=10) and Obstetric Care Descriptions			
State	# Hospitals	%(N) Hospitals Offering VBAC	%(N) Hospitals with FPs performing VBACs
Alaska*	13	30.8% (4)	15.4% (2)
Colorado†	19	15.8% (3)	5.3% (1)
Idaho‡	7	42.9% (3)	28.6% (2)
Minnesota§	38	36.8% (14)	26.3% (10)
Missouri	24	58.3% (14)	25.0% (6)
North Carolina‖	37	56.8% (21)	2.7% (1)
Oregon¶	22	18.2% (4)	4.5% (1)
Utah	13	53.9% (7)	46.2% (6)
Washington#	10	60.0% (6)	40.0% (4)
Wyoming	2	50.0% (1)	0.0% (0)
Overall	185	**41.6% (77)**	**17.8% (33)**

Distance Traveled for Services Not Available Locally

Distance to Nearest Hospital Offering Cesareans Among Hospitals that Don't Offer Cesareans		
Distance (mi)	Frequency	Percent
51-99	1	20.00
100+	4	80.00

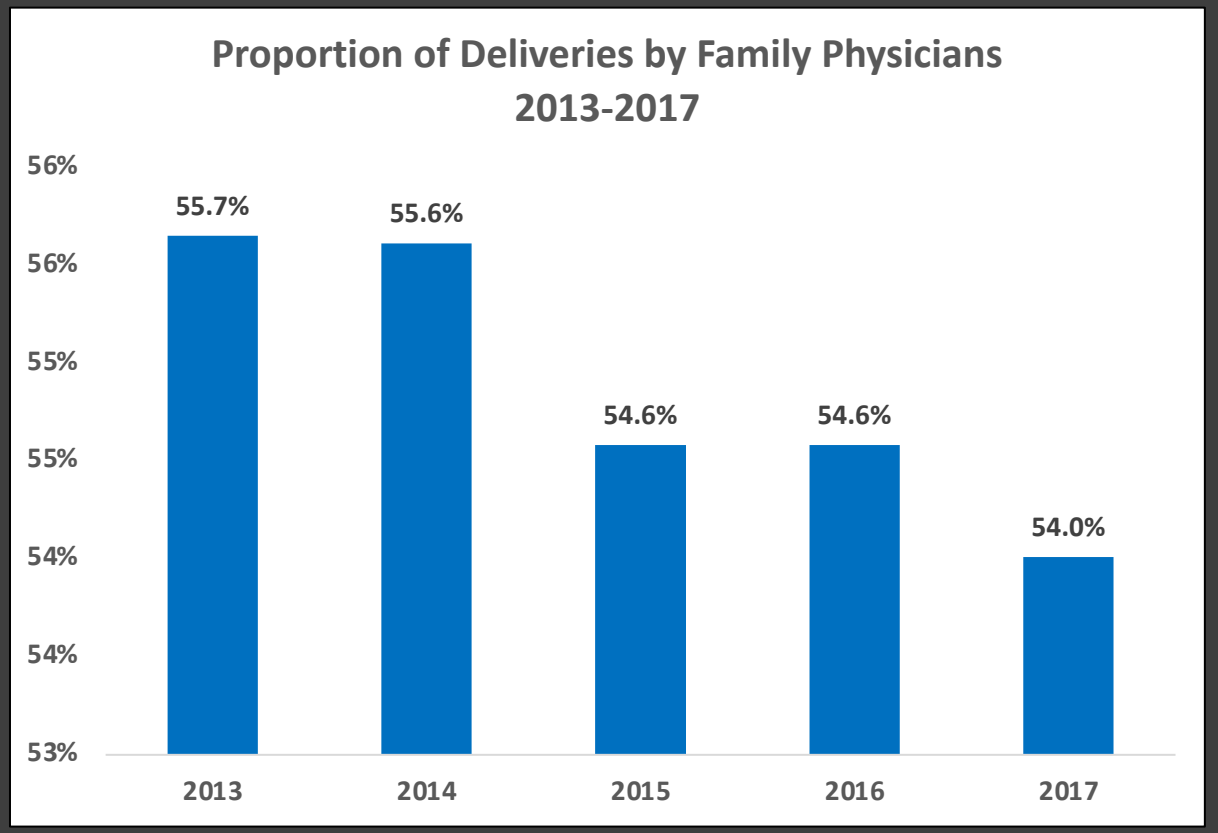
Very few hospitals did not offer Cesareans, but among those that did not, distance to nearest hospital that did was substantial

Distance Traveled to Nearest Hospital Offering VBAC Among Hospitals that Don't Offer VBAC		
Distance (mi)	Frequency	Percent
0-25	15	15.00
26-50	32	32.00
51-99	31	31.00
100+	22	22.00

Among hospitals that do not offer VBAC, distance varied

Proportion of Deliveries by FPs

- number of babies delivered by clinician type available for 77 hospitals (42%)
- % babies delivered by FPs varied by state from 2013-2017
  - Low: 35%
  - High: 100%
- Overall, % babies delivered by FPs was ~54-56% from 2013-2017



Proportion of deliveries by FPs

Proportion of total births performed by Family Practitioners (N=77)																
State	# Hospitals*	Total # Births 2013	# Births delivered by FPs 2013	2013 % of babies delivered by FPs	Total # Births 2014	# Births delivered by FPs 2014	2014 % of babies delivered by FPs	Total # Births 2015	# Births delivered by FPs 2015	2015 % of babies delivered by FPs	Total # Births 2016	# Births delivered by FPs 2016	2016 % of babies delivered by FPs	Total # Births 2017	# Births delivered by FPs 2017	2017 % of babies delivered by FPs
Alaska	5	365	365	100.00%	350	350	100.00%	346	346	100.00%	366	366	100.00%	300	300	100.00%
Colorado	14	2758	1246	45.18%	2855	1177	41.23%	2806	1134	40.41%	2802	1146	40.90%	2537	1011	39.85%
Idaho	5	389	307	78.92%	365	259	70.96%	360	263	73.06%	399	306	76.69%	340	250	73.53%
Minnesota	20	2401	1496	62.31%	2358	1377	58.40%	2428	1300	53.54%	2402	1259	52.41%	2349	1240	52.79%
Missouri	5	1776	882	49.66%	1526	876	57.40%	1485	800	53.87%	1330	698	52.48%	1326	687	51.81%
North Carolina	5	1467	563	38.38%	1378	536	38.90%	1293	581	44.93%	1094	544	49.73%	1185	566	47.76%
Oregon	6	1366	500	36.60%	1226	502	40.95%	1138	434	38.14%	1137	397	34.92%	1101	386	35.06%
Utah	9	1266	904	71.41%	1255	857	68.29%	1237	859	69.44%	1158	795	68.65%	1157	813	70.27%
Washington	7	1361	1018	74.80%	1417	1142	80.59%	1409	1111	78.85%	1341	1023	76.29%	1353	1024	75.68%
Wyoming	1	158	124	78.48%	168	97	57.74%	177	92	51.98%	154	103	66.88%	107	72	67.29%
Overall	**77**	**13307**	**7405**	**55.65%**	**12898**	**7173**	**55.61%**	**12679**	**6920**	**54.58%**	**12183**	**6637**	**54.48%**	**11755**	**6349**	**54.01%**

*Analysis done on subset of study population with information on births and providers that delivered

Estimated Impact on Automobile Driving

- Conducted a sub-analysis of driving distances in 29 FP-only hospitals:
  - one-way distance ranged from 15 to 108 miles
  - averaged **43 miles one-way (86 miles round-trip)**
  - estimates excluded de-identified hospitals (16) and extremely remote Alaska hospitals (5)
- Assuming 8 visits for prenatal care and delivery per pregnancy:
  - 23,664 annual automobile round trips
  - At average of 86 miles, 2,035,104 annual miles of driving
  - At 25 miles per gallon, 81,404 gallons of gasoline per year
  - At 58 cents per mile transportation cost (Federal rate), $1,180,360 in annual transportation cost

Key Findings

Family physicians provide essential access to rural maternity care

- Deliver in most rural hospitals
- Perform complex deliveries
- In 50/124 hospitals where FPs delivered (~40%), **FPs were the only type of physicians providing maternity care**

- Implication – removing maternity care from FP residency programs will negatively impact access to maternity care for rural Americans

Supporting Rural Maternity Care by Family Physicians

- Family Medicine residencies must include robust maternity care training for graduates destined for rural practice
- Family Medicine residencies and/or fellowships must offer surgical training
- Rural hospitals and practices should devise viable, collaborative practice models among FPs OBGyns and CNMs that preserve rural maternity care and support those providing it
- Family Medicine and OBGyn training programs should collaborate to offer surgical training

Study Limitations and Other Considerations

- Limited sample
  - This study involved tedious, unfunded labor from many collaborating individuals
- Record keeping for births is not uniform across the US
  - Quite a bit of missing data eventually obtained from public sources
  - Many smaller hospitals do not have capacity for higher-level data collection and organization

Advantages of collaborative research

- Benefit from the expertise and imagination of collaborators
- Potential dramatic increase of sampling power
- Potential dramatic increase of generalizability
- Decreases isolation of research
- Potential cost-sharing (or cost shifting)

Disadvantages of collaborative research

- Herding cats:
  - Varied expertise and imagination of collaborators
  - Varied understanding and reliability of collaborators
  - Missing targets and deadlines
- Potential need to release collaborators from the project
- Cleaning data collected by others
- Responding to co-authors interpretation of data and edits of writeup

Budget considerations

- Neither of these studies had any dedicated funding
- Neither the PI nor any contributors received any direct salary funding for time spent on the project
- Two researchers from the School of Public Health were included during the data collection, data analysis and writeup process at a cost of about $27,000

Recommendations for collaborative research

- A small pilot run of the research is very helpful to:
  - Test the data collection instruments and process
  - Understand the amount of work that will be required to expand to scale
  - Test the hypothesis
- Think about target journal as part of original planning process
- Collaborate with others who you are reasonably sure will be available for the duration of the project.
- Establish target dates and deadlines for data collection, reporting, analysis, writeup and feedback.
- Coach collaborators on lessons learned from the pilot run about the data collection process.