

# Continuity of care: How should we measure it?

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## Kaiser Permanente of Washington FMR at Seattle

### Our Clinic First – First Principles

- **Advanced primary care best classroom**
- **Train like full-spectrum FP**
- **Continuity is the “Secret Sauce”**



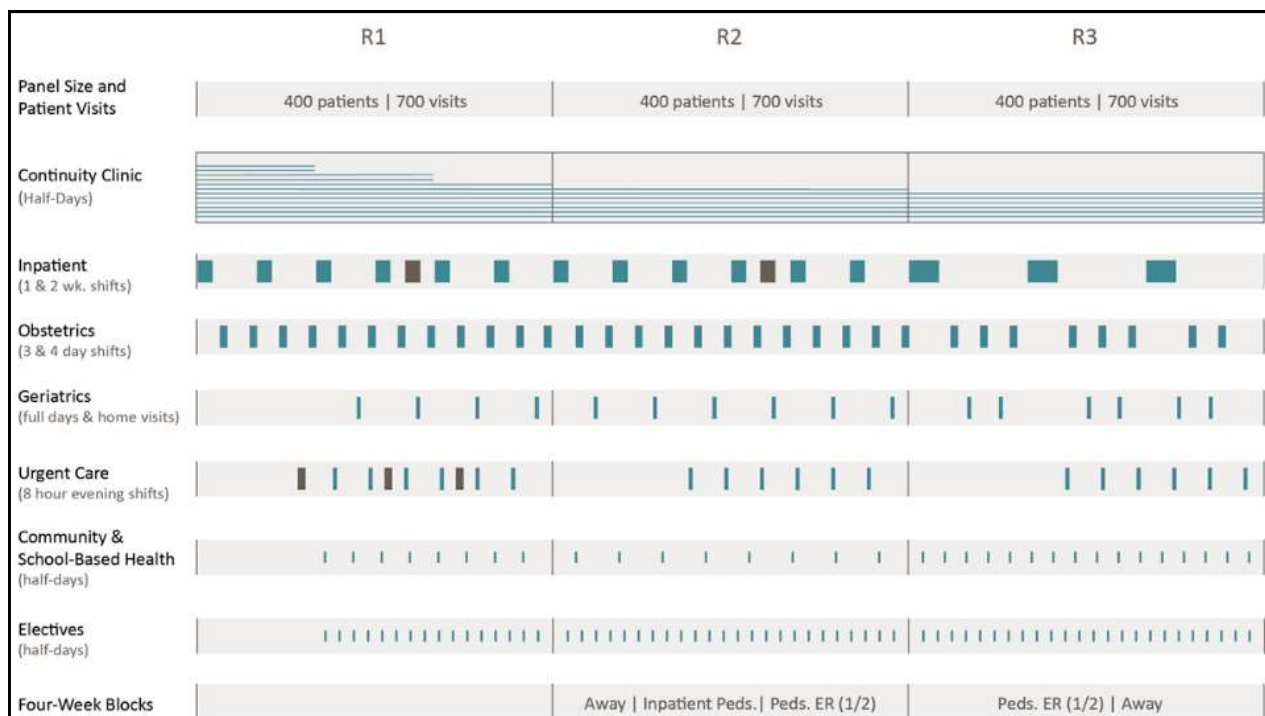
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# Longitudinal curriculum at KPWA FMR

- An attempt to make residency training look more like future practice
  - No blocks
  - Fewer weeks without any clinic
  - Increased ½ days in clinic for interns
  - Increased panel size (~400 patients x 3 yrs)
  - New intern inherits intact panel from graduating resident

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Block 2 (7/25-8/21)	Block 3 (8/22-9/18)	Block 4 (9/19-10/16)	Block 5 (10/17-11/13) Fall Retreat	Block 6 (11/14-12/11)	Block 7 (12/12-1/8) R2 Class retreat	Block 8 (1/9-2/5) R1 Class retreat	Block 9 (2/6-3/5) R3 Class retreat	Block 10 (3/6-4/2)	Block 11 (4/3-4/30) Spring Retreat	Block 12 (5/1-5/28)	Block 13 (5/29-6/25)
OB	PED-BC / ORTHO (Madigan)	MED	OB	SURG (V)	MED	OB	OP (V)	IP (Children's)	OB	SURG (V)	FAM MED
OB	MED	OB	OB	MED	SURG (V)	OB	IP (Children's)	OP (V)	PED-BC / ORTHO (Madigan)	MED	FAM MED
MED	SURG (V)	OB	MED	OB	OB	IP (Children's)	SURG (V)	MED	OP (V)	OB	FAM MED
SURG (V)	MED	OB	PED-BC / ORTHO (Madigan)	MED	OB	SURG (V)	IP (Children's)	OB	MED	OP (V)	FAM MED
PED-BC / ORTHO (Madigan)	OB	MED	SURG (V)	OB	OP (V)	MED	OB	IP (Children's)	SURG (V)	OB	FAM MED
NP-II	OB	SURG (V)	NP-II	OP (V)	OB	IP (Children's)	NP-II	SURG (V)	PED-BC / ORTHO (Madigan)	OB	FAM MED
OB 8/24-8/26		OB 9/17-9/23		OB 10/19-10/25		OB 12/19-12/25		OB 1/21-1/27		OB 5/4-5/10	
										OB 5/15-5/21	OB
AWAY	EAB	OP (BSH) / SCHER	ICU	MED	GYN / MED (V)	ORINO (V)	PSY / CD (V)	ADD / SM / POD (V)	OB	PRACT MGMT	ELECTIVE (V)
NP-II	ORTHO (V)	FAM	ADD / SM / POD (V)	PSY / CD (V)	ELECTIVE (V)	OB	OB	AWAY	OP (BSH) / SCHER	PRACT MGMT	GYN / URO (V)
FAM	MED	AWAY	OB	ICU	ORTHO (V)	OB	OP (BSH) / SCHER	ELECTIVE (V)	PSY / CD (V)	PRACT MGMT	ADD / SM / POD (V)
OB	PSY / CD (V)	ADD / SM / POD (V)	MED	EAB	ELECTIVE (V)	OP (BSH) / SCHER	GYN / URO (V)	ICU	AWAY	PRACT MGMT	OB
ORTHO (V)	ICU	OB	EAB	OP (BSH) / SCHER	ADD / SM / POD (V)	PSY / CD (V)	AWAY	GYN / URO (V)	ELECTIVE (V)	PRACT MGMT	OB
ADD / SM / POD (V)	OB	MED	GYN / URO (V)	SCHER / OP (BSH)	EAB	AWAY	ELECTIVE (V)	OB	ICU	PRACT MGMT	ORTHO (V)
CM / STD / OPHTH	SHP	PCC AWAY	MED	ELECTIVE (V)	DERM	OP (BSH) / SCHER	ELECTIVE (V)	NEURO	DERM	ALL / OTO	ELECTIVE (V)
MED	CM / OCC MED	CM / STD / OPHTH	SHP	PCC AWAY	DERM	ALL / OTO	NEURO	ELECTIVE (V)	SCHER / OP (BSH)	GERI	ELECTIVE (V)
NEURO	SCHER / OP (BSH)	MED	CM / OCC MED	CM / STD / OPHTH	SHP	PCC AWAY	DERM	GERI	ALL / OTO	ELECTIVE (V)	ELECTIVE (V)
ELECTIVE (V)	MED	ELECTIVE (V)	PCC AWAY	NEURO	CM / OCC MED	CM / STD / OPHTH	SCHER / OP (BSH)	SHP	ELECTIVE (V)	DERM	GERI
ELECTIVE (V)	SCHER / OP (BSH)	ALL / OTO	ELECTIVE (V)	NP-II	NEURO	NP-II	CM / OCC MED	CM / STD / OPHTH	SHP	ELECTIVE (V)	DERM
ELECTIVE (V)	PCC AWAY	SCHER / OP (BSH)	ALL / OTO	GERI	ELECTIVE (V)	SHP	ELECTIVE (V)	DERM	CM / STD / OPHTH	CM / STD / OPHTH	NEURO



# Continuity is the “secret sauce”

- Value of primary care: Quadruple Aim
  - Improved health of the population
  - Improve patient experience
  - Decrease cost
  - Improve provider sustainability

Walker J, et al. J Grad Med Educ 2018, epub ahead of print, <http://dx.doi.org/10.4300/JGME-D-17-00256.1>

# Continuity is the “secret sauce”

- Why residents choose family medicine
- The goal of residency training to give residents increased continuity
- ACGME requirement



Walker J, et al. J Grad Med Educ 2018, epub ahead of print, <http://dx.doi.org/10.4300/JGME-D-17-00256.1>

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## Continuity in residency clinics: an oxymoron?

- Most FM residencies have interns in clinic ½ day per week
- Many blocks residents not in clinic at all
- Panel sizes ~80-100 patients
- Very poor continuity with this design

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# Agenda

- Intro: What is continuity of care?
- Current measures of continuity
- Our experience with longitudinal curriculum change
- Discussion



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Poll Question:  
Do you currently measure  
continuity in any way within your  
residency clinic?

1. Yes
2. No
3. I don't know

**Poll Question:**  
**What level of continuity is ideal in a  
residency clinic?**

1. 50%
2. 70%
3. 90%
4. Depends on how you measure it
5. I have no idea

**What does continuity of care  
mean?**

## Definition 1

- “The extent to which services are received as part of a coordinated and uninterrupted succession of events consistent with the medical care needs of patients”

Shortell et al, *Med Care* 1976;5:377-391.

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## Definition 2

- “Continuity is the degree to which a series of discrete healthcare events is experienced as coherence and connected and consistent with the patient’s medical needs and personal context.”

Haggerty et al. *BMJ* 2003;327: 1219-1221.

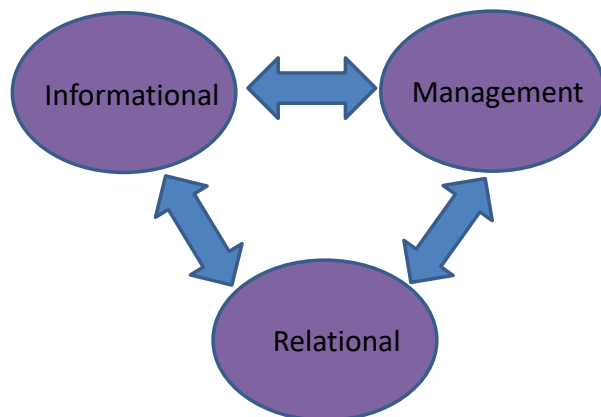
## Definition 3

- “For patients and their families, the experience of continuity is the perception that providers know what has happened before, that different providers agree on a management plan, and that a provider who knows them will care for them in the future.”

Haggerty et al. *BMJ* 2003;327: 1219-1221.

## Three dimensions of continuity

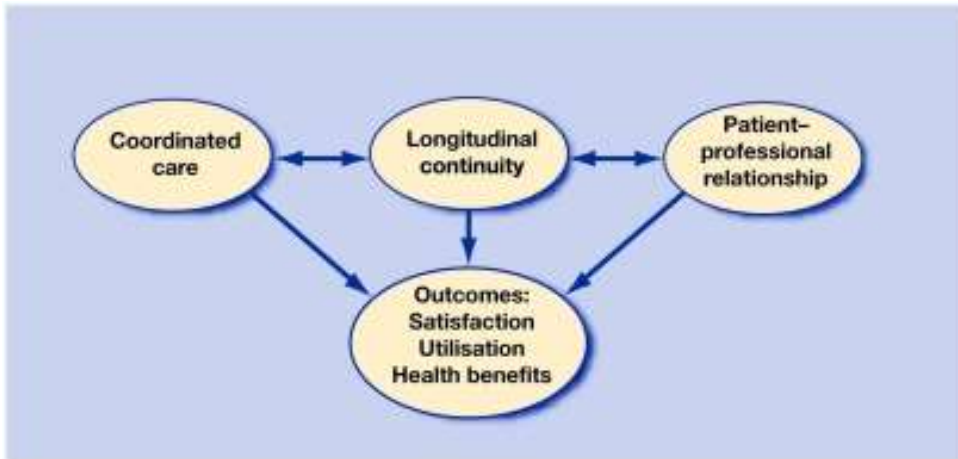
- Informational
- Management
- Relational



Haggerty et al, *BMJ* 2003; 327:1219-21.



# Another model of continuity



Salisbury et al. *Br J Gen Pract* 2009; 59(561): e134-141.

## How do we measure continuity?

- Patient survey data
- Administrative data

# Existing measures of continuity

- Physician-sided continuity (PHY)
- Patient-sided continuity/Usual provider continuity index (UPC)
- Known provider continuity (KPC)
- Continuity of care index (COCI)
- Sequential continuity (SECON)
- Modified Modified Continuity Index (MMCI)

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## Measures of Continuity

- All measures vary from 0-1, with higher values indicating “better” continuity
- No established standard or “best” measure
- No established threshold

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## Poll Question:

### How many of these measures of continuity are you familiar with?

1. I am familiar with 1-2 measures.
2. I am familiar with several measures.
3. I am familiar with all of the measures.
4. You are speaking a foreign language.

## Let's follow the experience of one resident

- Dr. Annie Gayman
- Entering residency class of 2014-2015
- First class to complete entire longitudinal curriculum



# 1. Provider-sided continuity (PHY)

- From provider's perspective:
  - What percentage of total visits are with patients on your panel?

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## Dr. Gayman



Year	PHY Continuity	Average panel size	½ days clinic per week	Total visits
2014-2015 (R1)	29%	191	2.5	502
2015-2016 (R2)	58%	377	2.1	598
2016-2017 (R3)	67%	406	1.8	509

## 2. Patient-sided continuity

- As a patient, how often am I able to see my PCP?
- Usually expressed for an entire panel
  - What percentage of the time do patients paneled to Provider X actually see Provider X, out of all their visits to primary care?

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## Dr. Gayman



Year	Patient sided continuity	Average panel size	½ days clinic per week	Total visits
2014-2015 (R1)	54%	191	2.5	502
2015-2016 (R2)	51%	377	2.1	598
2016-2017 (R3)	45%	406	1.8	509

### 3. Usual Provider Continuity (UPC)

- UPC = what percentage of visits were with your “usual provider”, defined as provider most frequently seen in the past year
  - Denominator is all primary care visits
- If PCP is the provider most frequently seen in past year, then UPC is the same as patient sided continuity

Breslau N, Reeb KG. *J Med Educ* 1975;50(100): 965-9.

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### Poll Question:

Do residents at your program have a defined panel of patients?

1. Yes
2. No
3. Not sure

## Poll Question:

### What is the target panel size for residents at your program?

1. <100 patients
2. 100-250 patients
3. >250 patients
4. I don't know
5. No specific target

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## 4. Known provider continuity (KPC)

- What percentage of the time did a patient see a provider that they had also seen in the prior year?
  - Often limited to primary care
  - Can be extrapolated to specialty or larger practice group of “known” providers

Tousignant et al, *Ann Fam Med* 2014; 12(6): 559-567.

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## 5. Continuity of Care Index (COCI)

- $\sum \frac{n_j^2 - N}{N(N-1)}$ 
  - N = total number of visits
  - n = number of visits to provider *j*
- Measures 'concentration' of visits to multiple providers
  - Only stable for patients with >3 visits per year

Bice TW, Boxerman SB. *Med Care* 1977; 15(4): 347-9.

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## Sequential continuity (SECON)

- What percentage of the time did a patient see the same provider at visit X as they did at their prior visit?
  - Measure of short term continuity

Reid RJ, Haggerty JL, McKendry R: Defusing the confusion - Concepts and Measures of Continuity of Healthcare. 2002, Ottawa, ON: Canadian Health Services Research Foundation  
Saultz JW. *Ann Fam Med*. 2003, 1: 134-143

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# Modified Modified Continuity Index (MMCI)

- $$MMCI = \frac{\left(1 - \left(\frac{P}{[V+0.1]}\right)\right)}{1 - \frac{1}{V+0.1}}$$
  - Where P is total number of providers
  - V is total number of visits

Magill MK, Senf J. *J Fam Prac* 1987;24(2):165-168.

TABLE 1. DISTRIBUTION OF CONTINUITY OF CARE (COC), MODIFIED CONTINUITY INDEX (MCI) AND MODIFIED, MODIFIED CONTINUITY INDEX (MMCI) SCORES

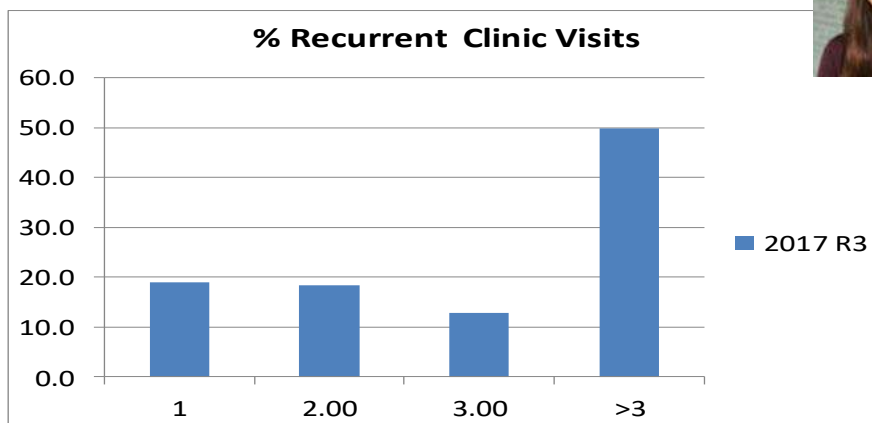
Number of Physicians	Number of Visits	Distribution of Visits to Providers	COC	MCI	MMCI
1	2	2	1.00	.52	1.00
2	2	1, 1	0.00	.05	.10
1	3	3	1.00	.68	1.00
2	3	2, 1	.33	.35	.51
3	3	1, 1, 1	0.00	.03	.04
1	4	4	1.00	.76	1.00
2	4	3, 1	.50	.51	.67
2	4	2, 2	.33	.51	.67
3	4	2, 1, 1	.17	.27	.36
4	4	1, 1, 1, 1	0.00	.02	.03
1	5	5	1.00	.80	1.00
2	5	4, 1	.60	.61	.76
2	5	3, 2	.40	.61	.76
3	5	3, 1, 1	.30	.41	.51
3	5	2, 2, 1	.20	.41	.51
4	5	2, 1, 1, 1	.10	.22	.28
5	5	1, 1, 1, 1, 1	0.00	.02	.03

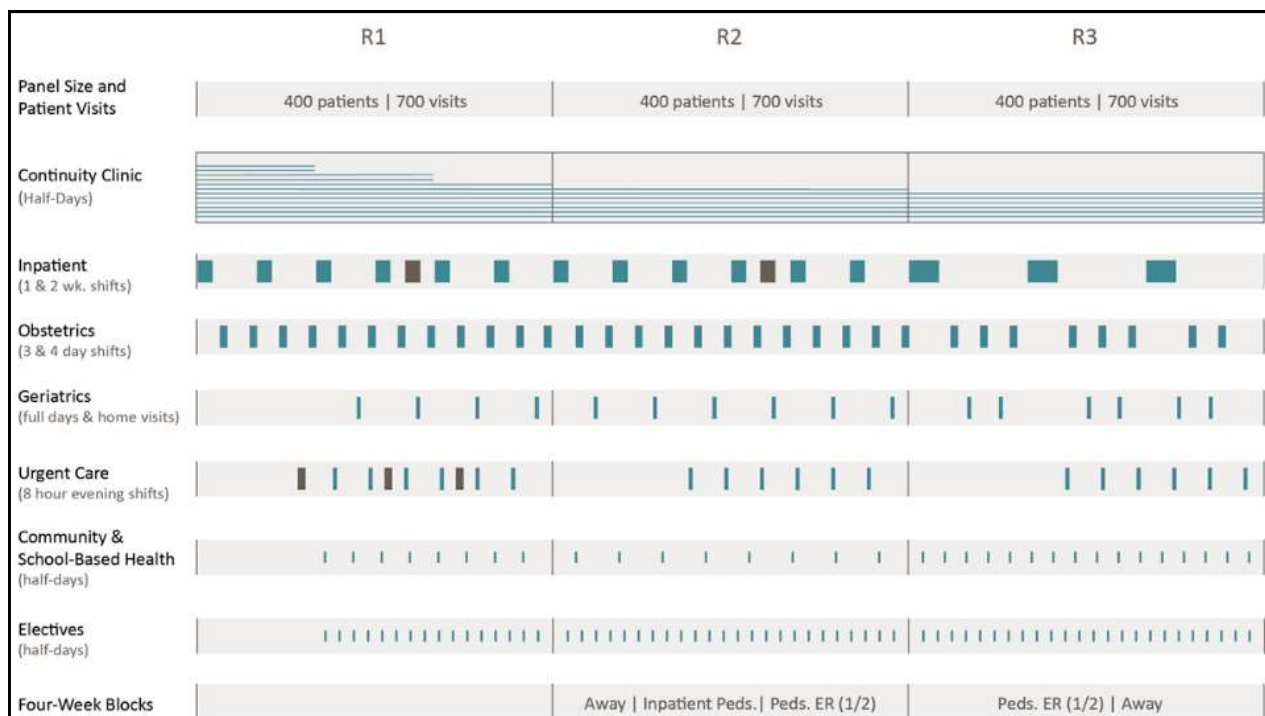
## New measure: “Longitudinal continuity”

- How often did a resident see one of his or her patients once, twice, three times, or >3 times during residency?

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### Dr. Gayman





## Provider continuity (PHY)

	R1			R2			R3		
	Panel Size	Clinic ½ days	PHY%	Panel Size	Clinic ½ days	PHY%	Panel Size	Clinic ½ days	PHY%
2011-2012	129	1.7	18%	333	1.7	39%	364	1.9	48%
2012-2013	168	1.8	28%	253	1.8	24%	347	1.8	43%
2013-2014	151	1.9	33%	247	1.9	37%	286	1.9	29%
2014-2015	233	2.5	37 %	341	2.2	45%	314	1.9	43%
2015-2016	316	3.1	45%	364	2.1	48%	335	1.8	51%
2016-2017	285	3.1	43%	443	2.1	62%	395	1.9	56%

# Following each residency cohort



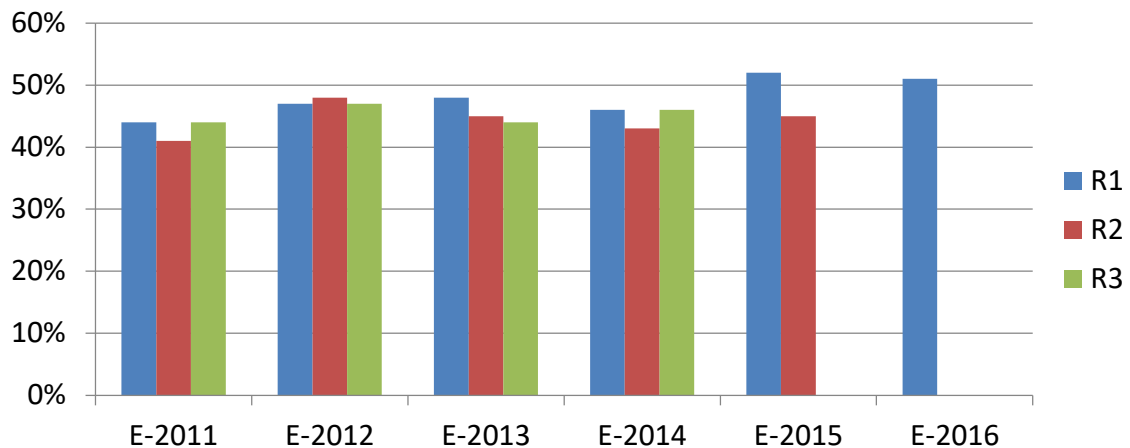
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## Patient sided continuity (UPC)

	R1			R2			R3		
	Panel Size	Clinic ½ days	UPC	Panel Size	Clinic ½ days	UPC	Panel Size	Clinic ½ days	UPC
2011-2012	129	1.7	44%	333	1.7	39%	364	1.9	44%
2012-2013	168	1.8	47%	253	1.8	41%	347	1.8	44%
2013-2014	151	1.9	48%	247	1.9	48%	286	1.9	44%
2014-2015	233	2.5	46%	341	2.2	45%	314	1.9	47%
2015-2016	316	3.1	52%	364	2.1	43%	335	1.8	44%
2016-2017	285	3.1	51%	443	2.1	45%	395	1.9	46%

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## By residency cohort



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## Why didn't patient sided continuity increase?

- Did we have a mismatch between increased panel size and increased time in clinic?
- What are other factors that may affect measures of continuity?

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## Conclusions

- Continuity is difficult to define and measure
- It is affected by resident panel size and time in clinic
- Provider continuity increased after longitudinal curriculum, but patient continuity remained steady

## Lingering questions

- What is a good or acceptable level of continuity?
- Should virtual contacts (phone visits, email visits) be counted in these measures?

## Discussion questions

- What is the current state of continuity training in FM?
- What is the ideal measure of continuity of care?

## Discussion questions

- What makes establishing continuity and teaching it difficult in residency clinics?
- How can we improve continuity within a residency clinic?

## Poll Question:

Enter your email address to be included in any follow-up communication from the presenter(s).



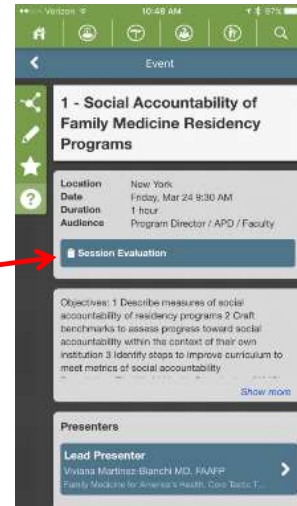
# Social Q & A



Please...

Complete the  
session evaluation.

Thank you.



## References

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