

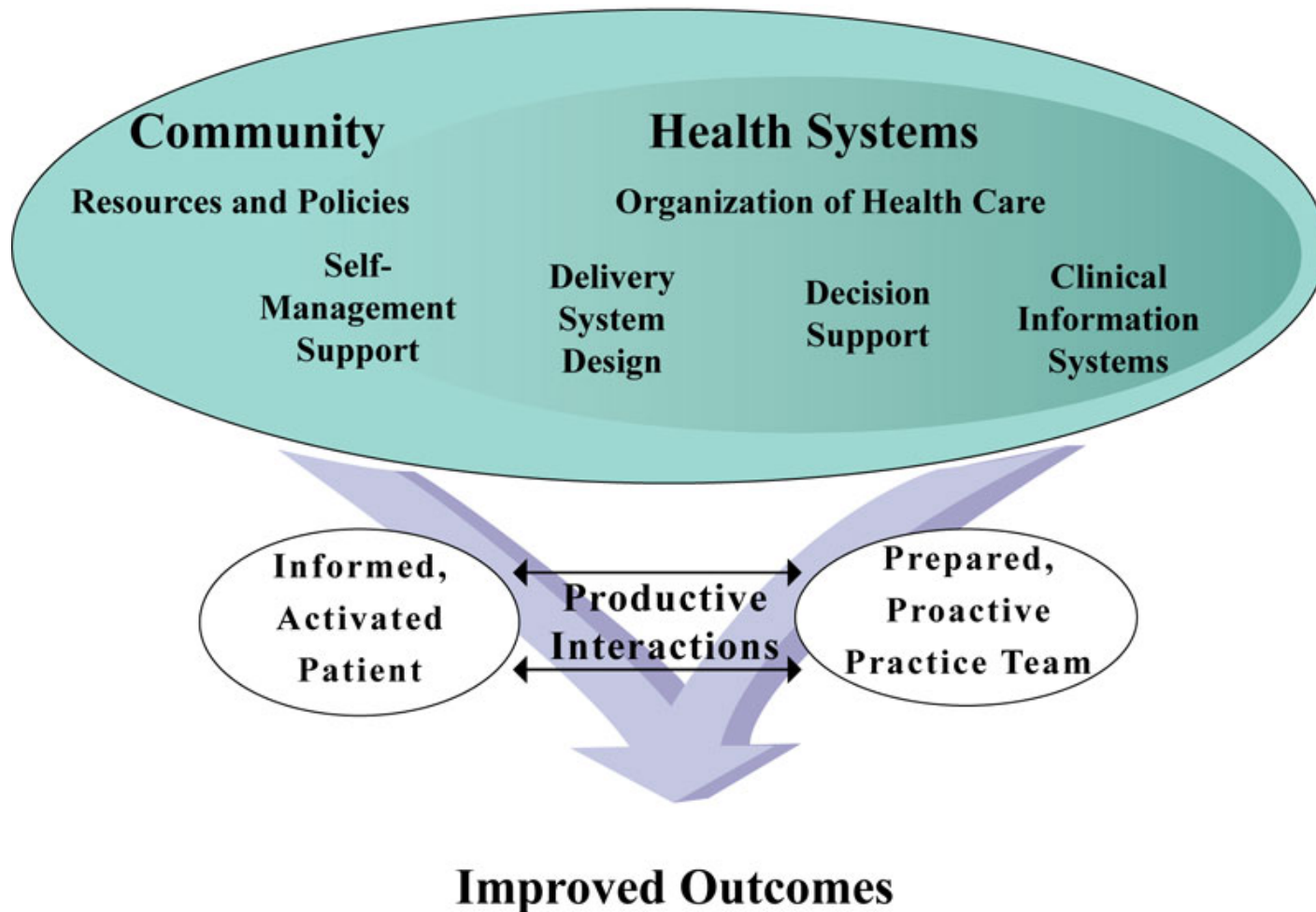
Patient Gateway:

Practice-Linked Online Personal Health Records for Type 2 Diabetes

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Wagner's Chronic Care Model (1998)



Wagner EH. Chronic disease management: What will it take to improve care for chronic illness? Effective Clinical Practice. 1998;1(1):2-4.]

RCT in a primary care setting

Question

- Will use of an electronic journal improve diabetes care and outcomes?

Approach

- Randomized, 12 month prospective cohort study in 11 outpatient clinics using Patient Gateway (PG), an EHR-connected patient portal, and LMR (ambulatory EHR: the Longitudinal Medical Record)
- “Active Control”: All patients received “core” PG features: Communication, Chart information, Reference information
- Intervention patients asked to complete/submit an electronic journal focusing on diabetes care before their visit

Measures

- HbA1c, BP, Cholesterol control
- Knowledge, satisfaction, usage of electronic journals

Electronic Journal (Diabetes focus)



Source

- **Doctor's office chart information**

- Medication list

LMR

- Allergy list

LMR

- Last diabetes measures

- HbA1c, LDL-C, BP

CDR/LMR flowsheet

- **Patient responses**

- Changes in Medication use? Allergies?

Patient

- Concerns re: Diabetes care plan? Want to discuss?
Want to test?

Patient

- Glucose control, Cholesterol control, Blood pressure control

- Concerns re: Self care areas? Want to discuss?
Want a referral?

Patient

- Eye, Foot, Nutrition

- Exercise program, Smoking cessation, Aspirin use

Diabetes journal - goals

Patient Gateway :: Research Home :: Journal :: Diabetes Care - Microsoft Internet Explorer provided by Partners HealthCare Syst

Goals | Referrals & Self-Care

- Blood sugar control
- Cholesterol control
- Blood pressure control

BLOOD SUGAR CONTROL

Last HbA1c entry: **6.9%** (09/21/2004) Continue

Blood sugar control medications: **Glipizide**

»Your changes are saved
» Added to Diabetes Care

PLEASE ANSWER BELOW:

Your most recent HbA1c blood test result, **6.9%** (09/21/2004), is from over one year ago. Please discuss having your HbA1c tested at your visit with your provider.

Would you like to improve your blood sugar control?

Yes

Comment:

No – I am satisfied with my blood sugar control

Not sure

Skip

Medications:

Medications that can play an important role in controlling blood sugar were found in your medical record. (Your medication concerns from this journal are also shown below).

- Glipizide (concerns you listed: incomplete)

Would you like to discuss adding/adjusting medications for blood sugar control?

Yes No

Monitoring:

Would you like to discuss/schedule future HbA1c testing?

Yes No

Diabetes journal – Referrals & Self-Care

Goals **Referrals & Self-Care**

- ▶ Eye care
- ▶ Foot care
- ▶ Nutrition
- ▶ Exercise program
- ▶ Smoking cessation
- ▶ Daily aspirin

EYE CARE

Continue

PLEASE ANSWER BELOW:

Annual eye exams by your doctor are an important part of good diabetes care. Have you had an eye exam in the past year? If not, you may wish to ask your doctor for an eye exam referral.

Would you like to discuss eye care with your provider?

- Yes
- No
- Not sure
- Skip

More Information:

People with diabetes do have a higher risk of vision loss or blindness than people without diabetes. Diabetes-related eye problems can be prevented ... [\(More\)](#)

Additional information: www.diabetes.org

Continue

Diabetes journal - meds



https://webqa.partners.org - Patient Gateway :: Research Home :: Journal :: Medications - Microsoft Internet Ex...

Current Medications

- Amoxicillin
- Bactrim DS (TRIM)
- Glucophage (METF)
- Glucophage XR (M)
- Lipitor (ATORVAS)
- Lisinopril
- Robitussin AC (G)

GLUCOPHAGE (METFORMIN) *i*

1000 MG (1000MG TABLET take 1) by mouth twice a day ; Refills: 5
(prescribed by ? on 05/09/2005)

▶▶Your changes are saved

PLEASE ANSWER BELOW:

Are you still taking this medication **as shown above**?

- Yes -- I take it as shown above
- No -- I take it a **different way** (e.g. amount or how often I take it)
- No -- I am **no longer** taking it
- No -- I have never taken it
- I am not sure
- Skip

Please tell us how you take it now.
(Please use your prescription bottles, if necessary, to help answer these questions.)

Is this a medication that you take regularly? Regularly As needed Don't Know

How often do you take it?

What is the form of the medication?

What is the strength of the medication?
(eg., 40 mg tablet, 1% solution, 10 mg per puff)

How much do you take, each time you take it?
(eg., 2 tablets, 2 puffs, 4 drops in left ear)

Who changed this medication?

Please tell us about any medication concerns you might have.
(If this is not a medication, please skip to the last question below.)

Are you having any trouble at all with this medication? (For example, too expensive, side effects, does not work, etc.) Yes No Dont Know

Discrepancy

Details

Diabetes care plan



DIABETES CARE:

Goals:

★	Blood sugar control	Is satisfied; Wants to discuss medications; Wants to discuss HbA1c testing
★	Cholesterol control	***Would like to improve; Wants to discuss medications; Wants to discuss cholesterol testing
★	Blood pressure control	***Would like to improve; Wants to discuss medications; Wants to discuss blood pressure monitoring

Referrals & Self-Care:

	Eye care	Doesn't want to discuss; Doesn't want a referral;
★	Foot care	Would like to discuss; Doesn't want a referral;
	Nutrition	Doesn't want to discuss; Doesn't want a referral to a nutritionist;
	Exercise program	Doesn't want to discuss; Doesn't want a specific exercise program;
	Smoking cessation	Doesn't want to discuss; Doesn't want a referral;
★	Daily aspirin	Would like to discuss; Not allergic to aspirin; Doesn't take aspirin

Diabetes care plan (continued)

MEDICATIONS:

Current Medications:

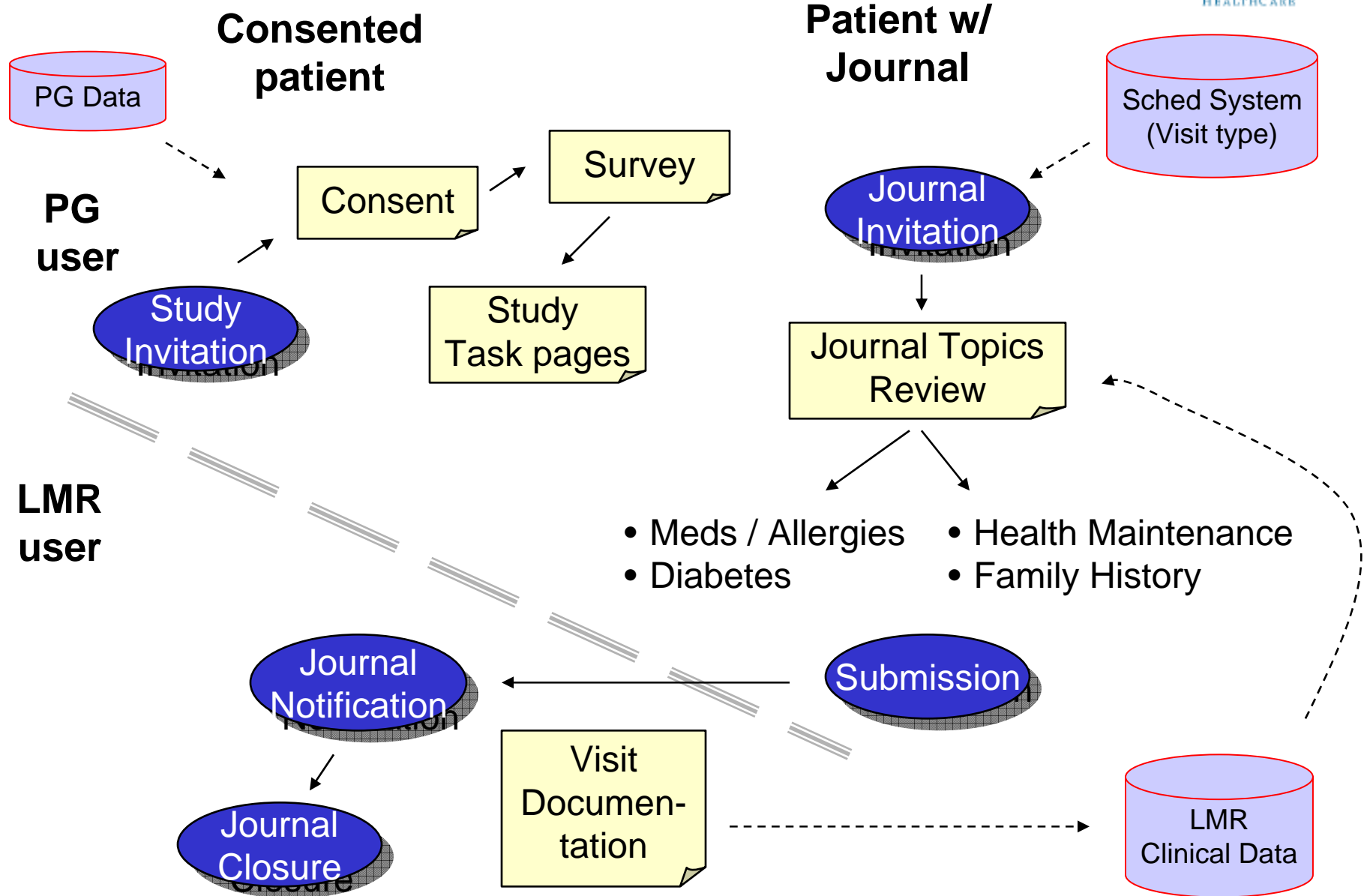
★	Ceftin (CEFUROXIME AXETIL) 500 MG by mouth twice a day	*** No longer taking (Stopped By Other, Don't Know). It was no longer needed; Don't know if PCP is aware of change;
★	Gemfibrozil 600 MG (600MG TABLET take 1) by mouth twice a day	Taken as listed. *** Concerns: Yes. I'm not sure this medication is helping; Also: No trouble taking this; Not having side effects from this; I take this medication for: Cholesterol. No refill requested;
★	Indocin 25 MG by mouth three times daily	*** No longer taking (Stopped By Other-Don't recall, Don't Know). It was no longer needed; Don't know if PCP is aware of change;
	Lisinopril 10 MG by mouth every day ; Refills: 3	Taken as listed. Also: No trouble taking this; Not having side effects from this; I feel this medication is helping; I take this medication for: High Blood Pressure. No refill requested;
★	Metformin 500 MG (500MG TABLET take 1) by mouth twice a day , one tab with breakfast for first week, then add one tab with dinner; Refills: 3	*** Changed (Changed By Other -Marcy Bergeron) . Form - tablet; Strength - 500 mg tablet; Dose - 250 mg; Frequency - Twice a day Taken Regularly; Don't know if PCP is aware of change; Also: Not having side effects from this; I feel this medication is helping; I take this medication for: Diabetes. No refill requested;

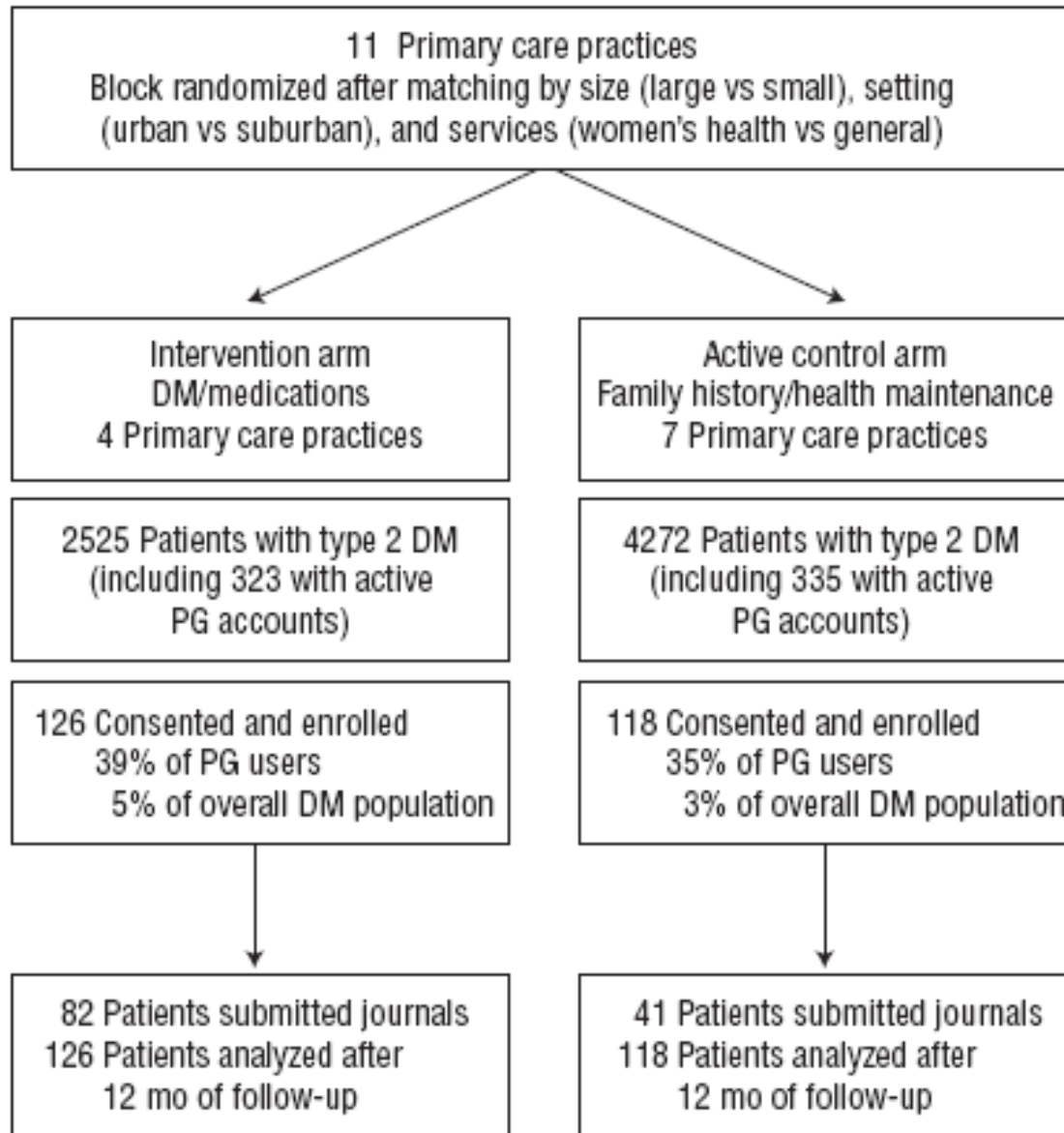
ALLERGIES:

Current Allergies:

★	Penicillins Reaction(s): Unknown	I am unsure if this information is correct.
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High-level workflow





Flowchart of a clinic-randomized trial comparing type 2 diabetes mellitus (DM) management among patients receiving access to a DM and medications personal health record (intervention arm) vs a family history and health maintenance personal health record (active control arm).

Eligible participants had DM and an active Patient Gateway (PG) account for secure Internet access within the health network.

Baseline comparison

Table. Baseline Characteristics Comparing Study Participants by Study Arm

Characteristic	Study Participants (n=244)		P Value ^c
	Intervention Arm	Controls	
Patients with type 2 DM, No.	126	118	
Age, mean (SD), y	58.8 (10.1)	53.3 (12.3)	<.001
Women, %	43	56	.04
Nonwhite race or ethnicity, %	7	16	.04
Insurance status, %			
Private insurance	67	77	.002
Medicare	33	16	
Medicaid or free care	0	7	
Neighborhood income, \$ ^d	54 950	52 529	.06
HbA _{1c} level, mean (SD), %	7.3 (1.5)	7.4 (1.6)	.69
At goal (<7.0), %	60	55	.42
LDL-C level, mean (SD), mg/dL	81.4 (27)	86.7 (31)	.33
<100 mg/dL, %	73	68	.48
BP, mean (SD), mm Hg	127 (14)/74 (9)	126 (13)/76 (9)	.71
<130/80 mm Hg, %	51	47	.49
PCP visits during prior year, mean (SD), No.	2.6 (2.1)	2.7 (3.1)	.82

Intervention group: More visit medication changes

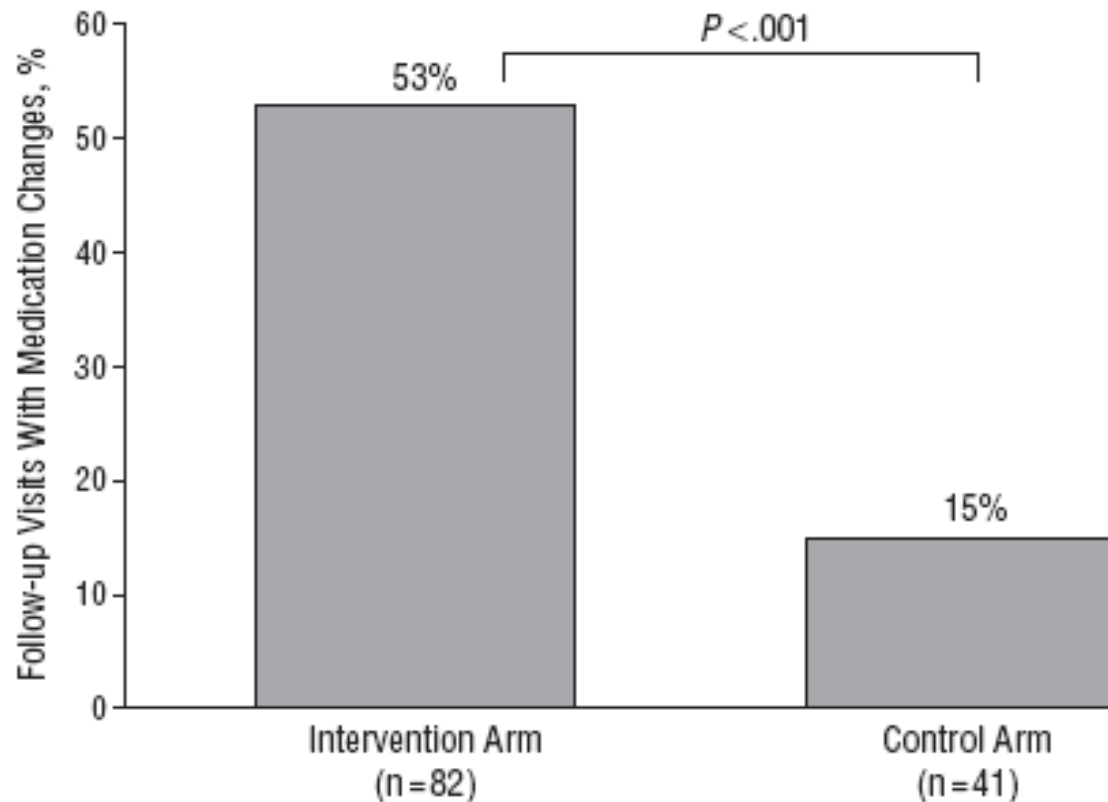


Figure 2. Proportion of follow-up visits with diabetes mellitus–related medication changes among patients who submitted personal health record journals to their physician’s electronic medical record (“on-treatment analysis” comparing intervention and control arms).

Narrative comments – journals & visits

- A) **“I WANT TO SHOW [MY WIFE] HOW TO USE OUR COMPUTER TO COMPLETE THE SURVEYS YOU SEND, IT DOES HELP APPOINTMENT GO BETTER.”**
- B) **“... [My] medications list seemed @ odds w/ what I submitted, but perhaps that was my error. Anyway, we corrected them together.”**
- C) **“The medication section, while improved, is still very tedious. I think it would be better if you could have the patient deal only with exceptions or, duplicate responses.”**
- D) **“I expect that my doctor knows all this stuff. She always brings my test results up on her computer. Isn't this [journal] just wasting her time? I find the med information useful for me but I don't think the doctors need to see it twice.”**
- E) **“...the patient gateway is an excellent idea, much needed - but only if it proves to be used by the practice, it isn't clear that this is the case so far... ”**
- F) **“...it helps me prepare and get myself organized...”**
- G) **“I have been seeing my doctor for many years. I don't need a journal to aid in conversations. Since this goes to my home e-mail, I generally don't even look at it so it may go unattended in the future.”**
- H) **“there does not seem to be any connection between the visit and the journal, however the journal requests a lot of private detail that i do not like having sitting in someone's data base and potentially open to the thousands of people with access to the medical record...”**