



In Sickness and in Health...

Development of tools for the
electronic health record to
support population care
management

HIT Summit
Washington DC
September 9, 2005
Paul Wallace, MD
Care Management Institute
Kaiser Permanente
Paul.Wallace@kp.org

Overview

- Background
 - Managing the entire population over time
 - Patient-centered care
 - Supporting care outside of the doctor's office visit
 - The role of information technology
- Functions needed to support population-based care
- Filling the gaps in the EHR
- How it all fits together

Kaiser Permanente

- America's oldest and largest private, nonprofit, integrated health care delivery and financing system —
Founded in 1945
- Multi-specialty group practice prepayment program —
Headquartered in Oakland, CA
- 8.3 million members — 6.1 million members in California
- Over 12,000 physicians representing all specialties and
130,000+ additional employees
- Operations in 9 states and Washington, D.C. with 29
Medical Centers and 423 Clinics
- KP Research Centers - \$100,000,000 in external
funding in 2003 for Health Systems Research
- **All employees and their families are KP members**

KP Priority Conditions

Clinical Area	KP Members with this Condition	
Asthma	84,000	(2.4% of members)
Coronary Artery Disease	197,000	(3.4%)
Depression	402,000	(7.0%)
Diabetes	546,000	(9.6%)
Heart Failure	97,000	(1.4%)
Cancer	25,000 new cases/yr	
Chronic Pain	285,000	(5.1%)
Elder Care	869,000	(11.3%)
Obesity (BMI > 29)	~ 33 % of adults	
Self Care & Shared Decision Making	8.3 MM	

Co-morbidities...

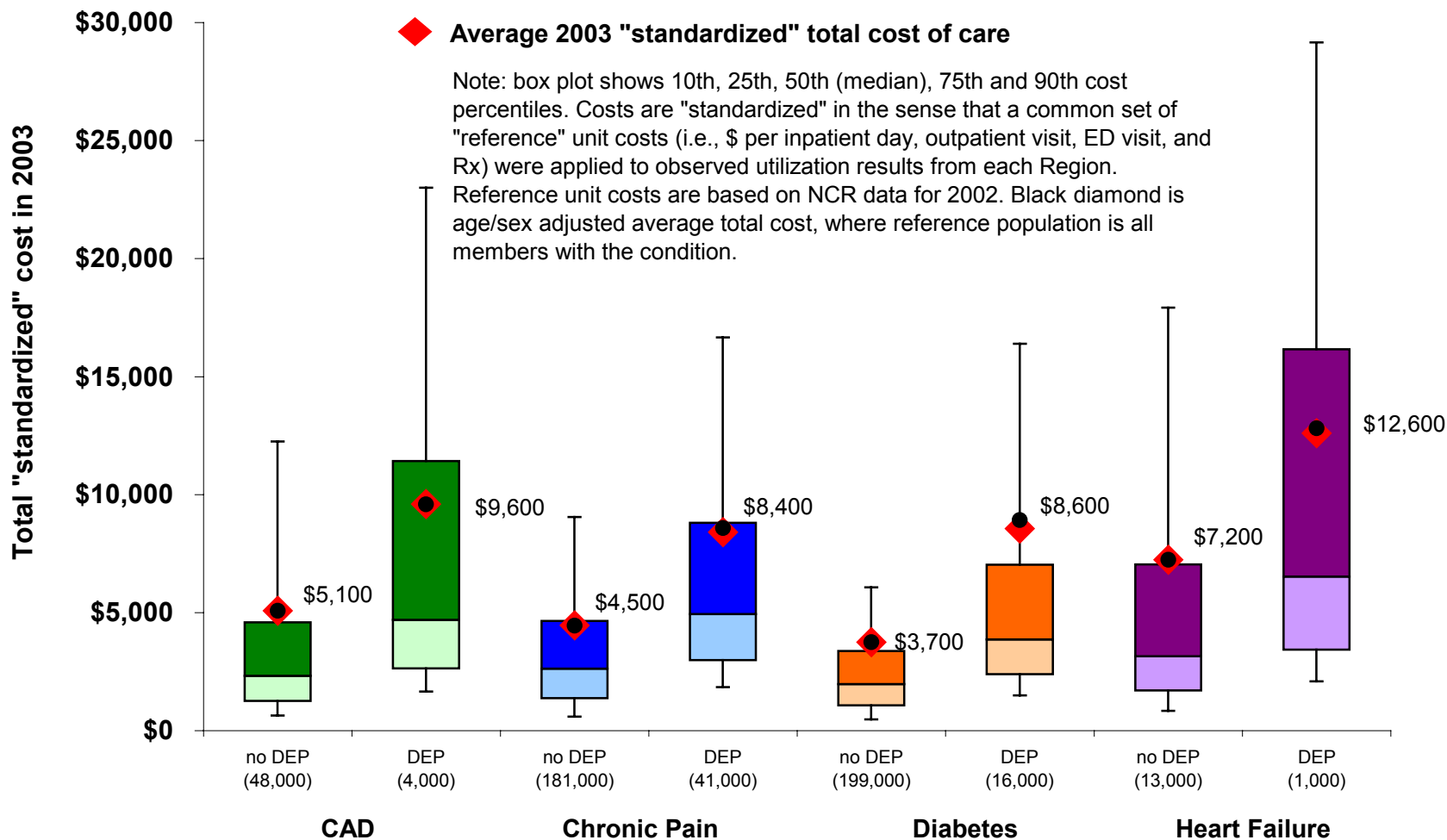
What percentage of
all members
those with CAD
those with Depression
those with Diabetes
those with HF

Were also in this cohort?

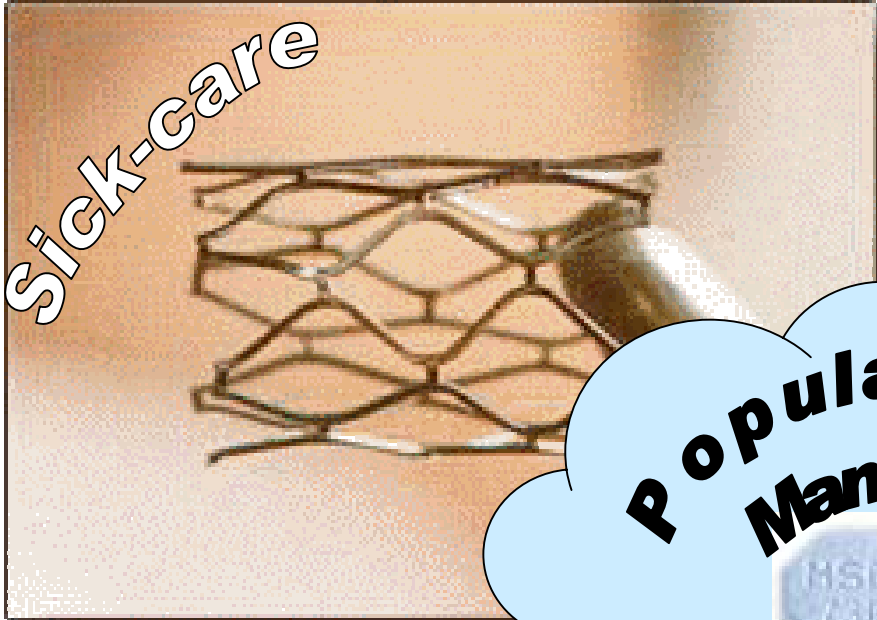
CAD	Depression	Diabetes	Heart Failure
32%	7.1%	7.9%	1.6%
	11.9%	33.9%	22.8%
5.3%		11.6%	3.3%
13.6%	10.4%		8.2%
46.3%	14.9%	41.6%	

Depression as a Co-morbidity

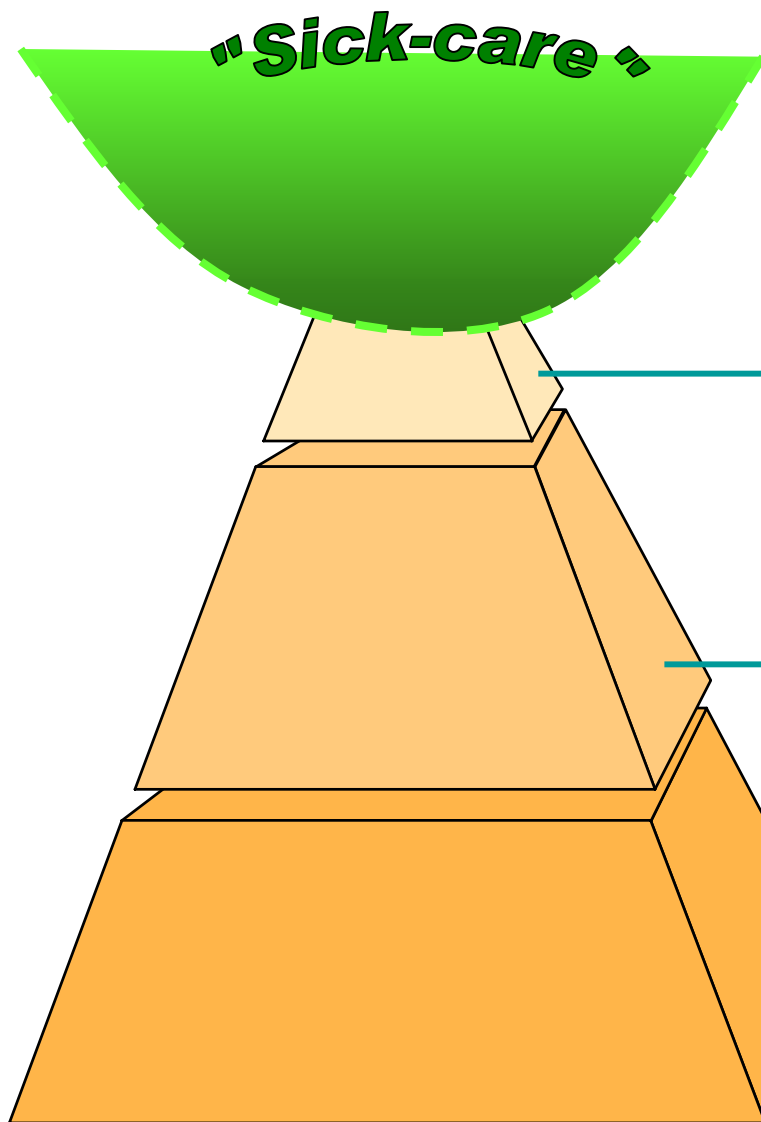
Total "standardized" costs of care for members with chronic conditions, stratified by presence or absence of diagnosed depression (no other comorbidities)
 (adults, 2003, data from CO, GA, NCR, NW, and OH)



Healthcare's "Middle Space" ...



Population-based care: Managing the whole population



"Sick-care"

Intensive Management

Leverage available resources to optimize health status and coordination of care

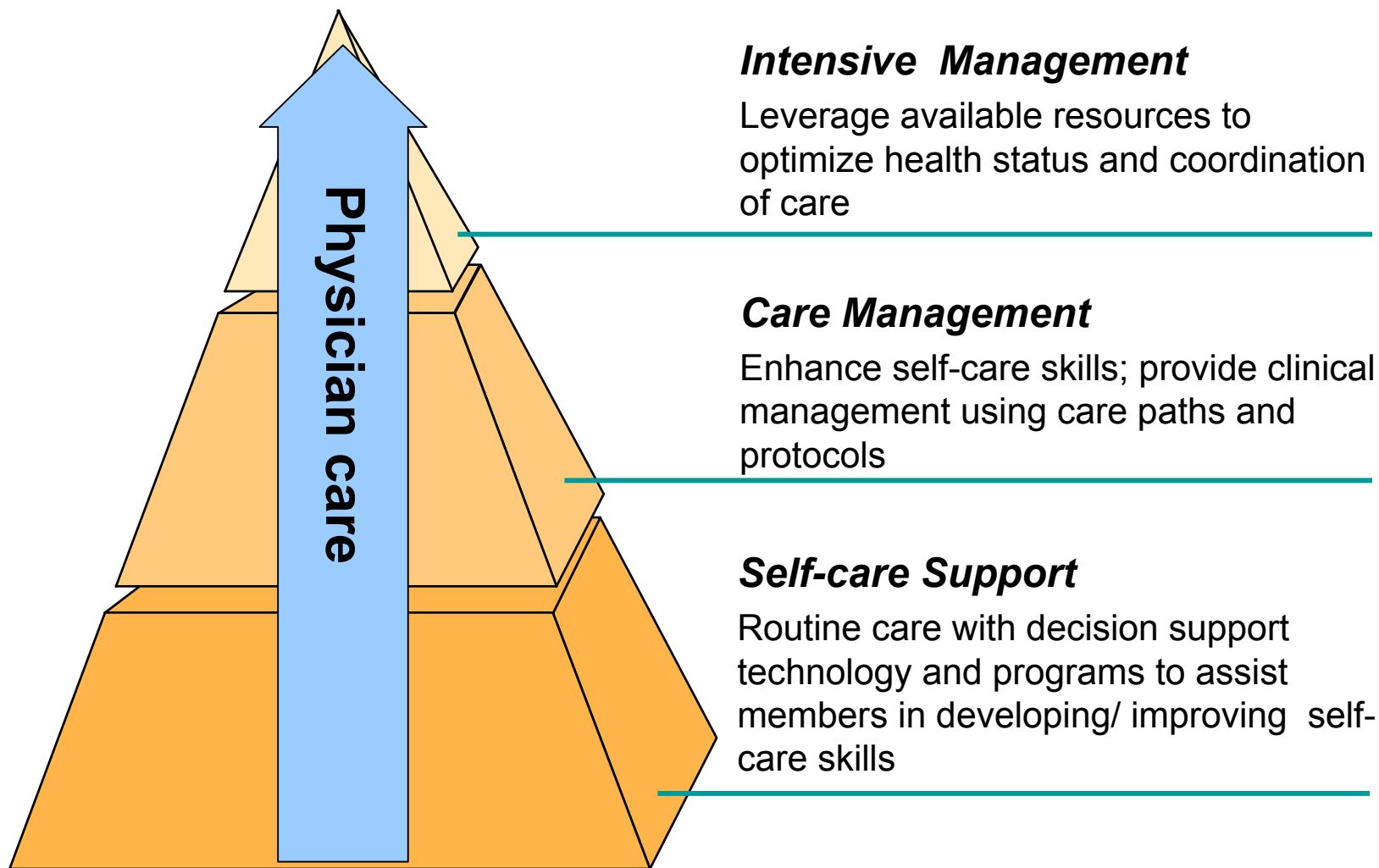
Care Management

Enhance self-care skills; provide clinical management using care paths and protocols

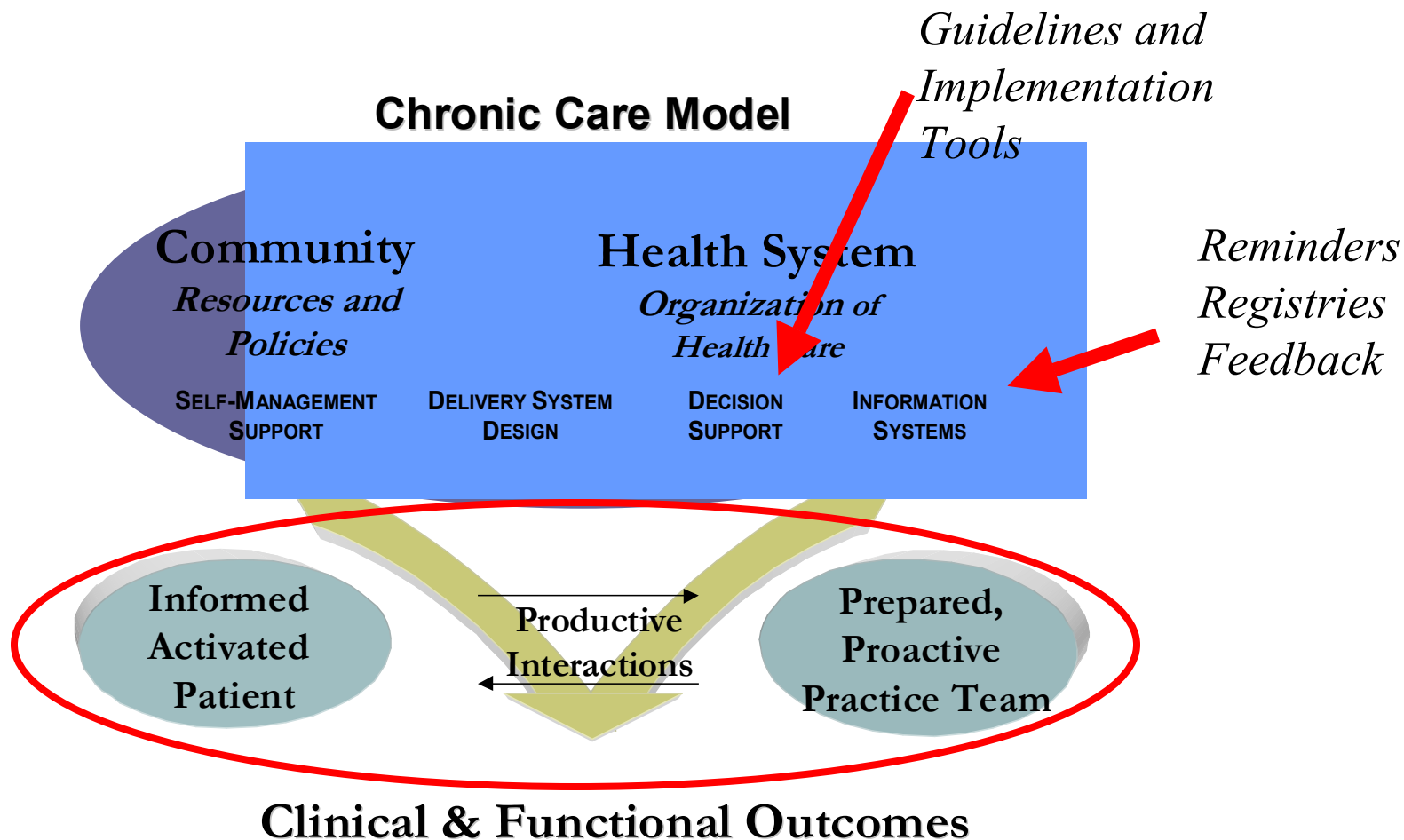
Self-care Support

Routine care with decision support technology and programs to assist members in developing/ improving self-care skills

Population-based care: Managing the whole population



The Blueprint ...



From Improving Chronic Illness Care
Ed Wagner, MD, Group Health Cooperative of Puget Sound

JAMA. 2002;288:1775-1778

JAMA. 2002;288:1909-1914

Where does Disease Management fit with the Chronic Care Model?

COMMENTARY

Disease Management and the Organization of Physician Practice

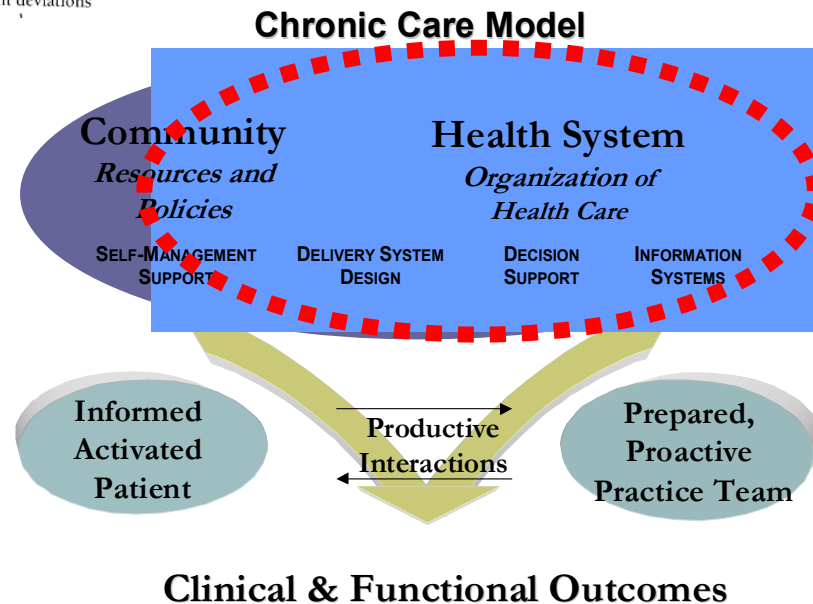
Lawrence P. Casalino, MD, PhD

THERE IS A LARGE GAP BETWEEN WHAT PHYSICIANS DO for patients with chronic diseases and what should be done.¹ Most physicians lack the time, information technology, and financial incentives to develop organized processes to systematically improve the qual-

ers).⁶ When a potential problem such as rapid weight gain is identified, the case manager calls the patient to inquire about symptoms, diet, and medications and transmits the information to the patient's physician, usually via fax, and then follows up with the patient after an appropriate time interval. Disease management companies also notify physicians, and in some cases patients, of apparent deviations from evidence-based care (eg, asthma medications).

JAMA 293(4): 485-488. 2005

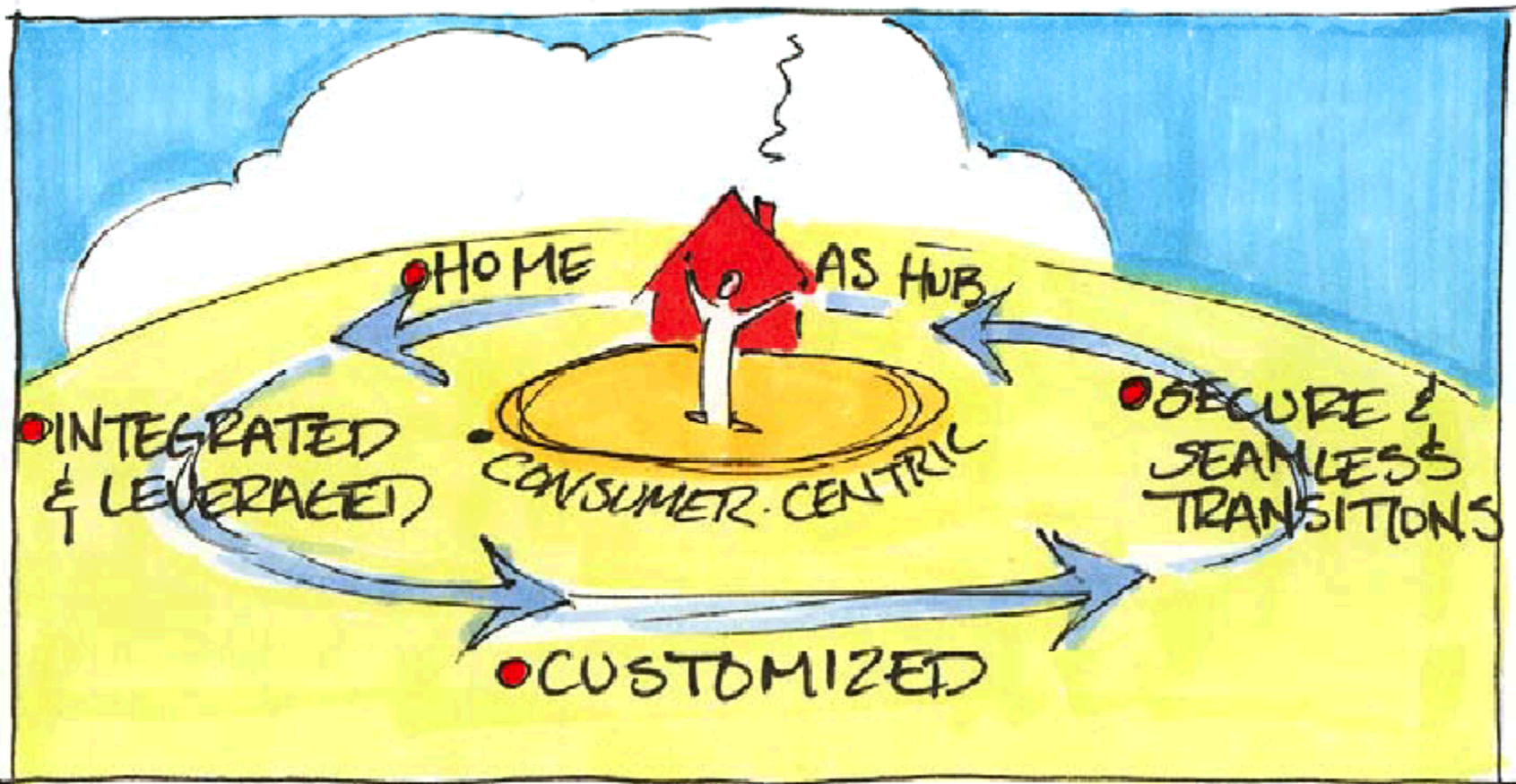
“Make vs. Buy”



How do we get the patient's attention?

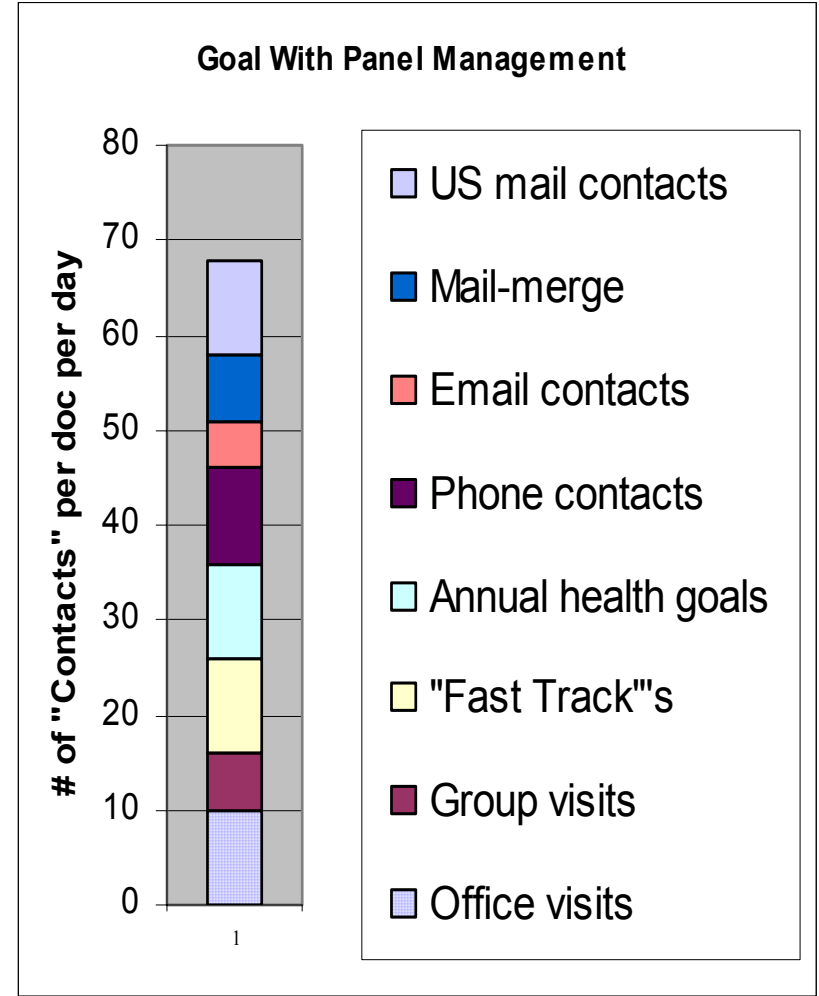
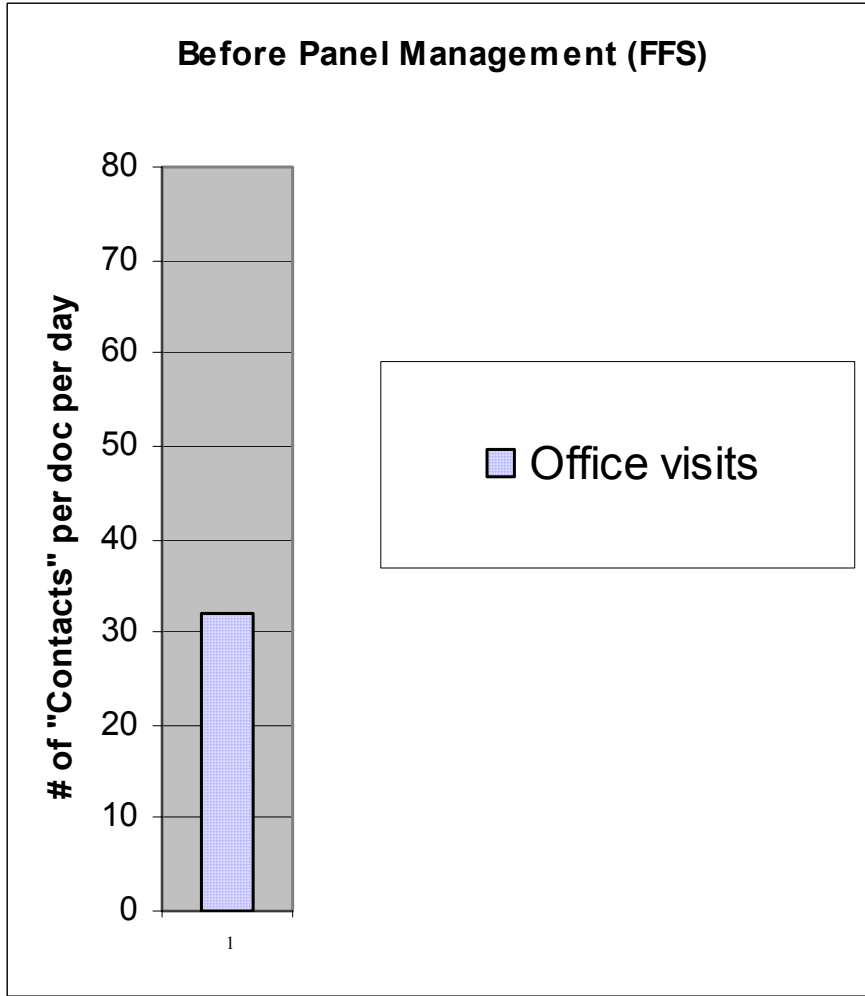
- “Rules of the Game” model
 - (!990’s style “Medical Management” by some HealthPlans)
 - Disease management (some...)
 - Case management for high risk participants
- “Skin in the game” model
 - Tiered co-pays
 - Coinsurance
 - High Deductible Health Plans
 - Tiered networks: hospitals, specialists, PCPs
 - Consumer Directed Plans
- “Brain in the game” model
 - Healthy lifestyles, wellness activities
 - Self management for acute and chronic conditions
 - Shared decision making
 - Web-based decision support tools

The Patient at the Center of Care



Primary Care Physicians and How They are Supported to "Manage" Their Patient Panel

Every system is perfectly designed to produce exactly what it delivers...





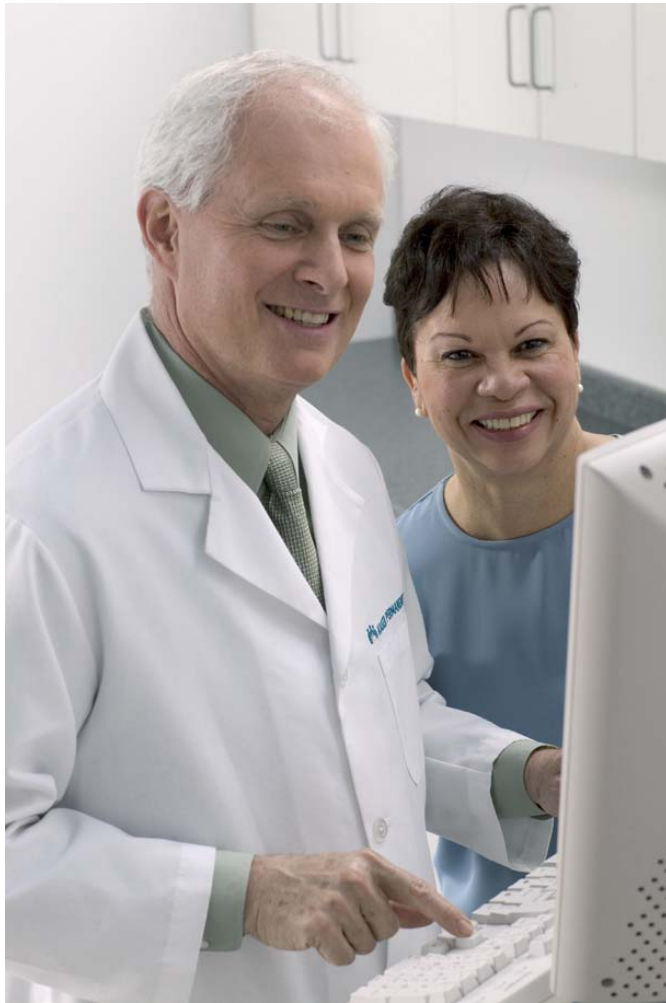
Is There Capacity for Delivering Health?

TABLE 4—Summary of Annual and Daily Time Requirements by Patient Group and USPSTF Rank of Service Recommendation

Patient Group	Hours Required by Rank of Service Recommendation		Total Hours Required Per Year	Total Hours Required Per Day
	A	B		
Adults aged 25 years and older (n = 1618)	262	805	1067	4.4
Children aged 0 to 24 years (n = 882)	169	365	534	2.2
Pregnant women aged 15 to 44 years (n = 36)	10	11	21	0.1
High-risk groups	85	67	152	0.6
Total hours required per year	525	1248	1773	...
Total hours required per day	2.2	5.2	...	7.4

Note. USPSTF = US Preventive Services Task Force.

Yarnall KSH, Pollack KI, Ostbye T, Krause KM, Michener JL. Primary care: is there enough time for prevention? *Am J Public Health* 2003; 93:635-641



While the Medical Office is a key component of population care, only a fraction of the needed care can take place during the doctor's office visit....

....chronic conditions exist 24/7/365

Outstanding Population Care Performance requires outstanding care for both the patients who are seen and for those who are not

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

The Quality of Health Care Delivered to Adults in the United States

Elizabeth A. McGlynn, Ph.D., Steven M. Asch, M.D., M.P.H., John Adams, Ph.D.,
Joan Keesey, B.A., Jennifer Hicks, M.P.H., Ph.D., Alison DeCristofaro, M.P.H.,
and Eve A. Kerr, M.D., M.P.H.

RESULTS

Participants received 54.9 percent (95 percent confidence interval, 54.3 to 55.5) of recommended care. We found little difference among the proportion of recommended preventive care provided (54.9 percent), the proportion of recommended acute care provided (53.5 percent), and the proportion of recommended care provided for chronic conditions (56.1 percent). Among different medical functions, adherence to the process-

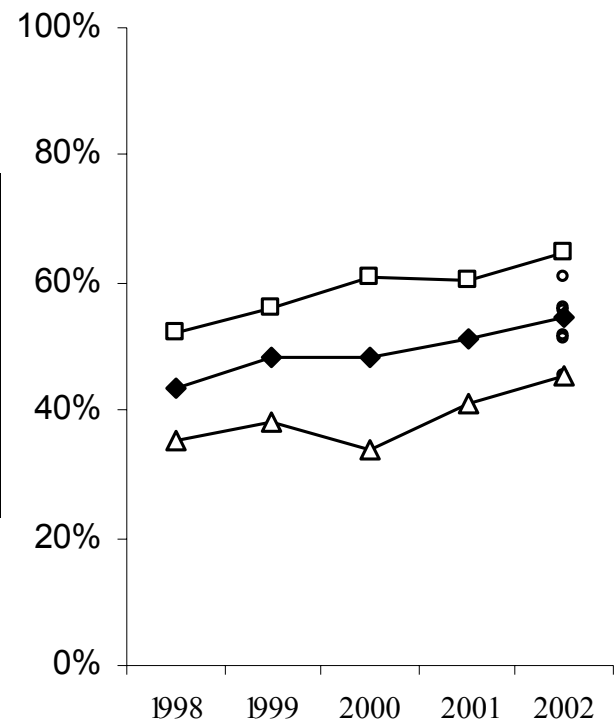
N Engl J Med 348;26 June 26, 2003

Variability – It Happens.

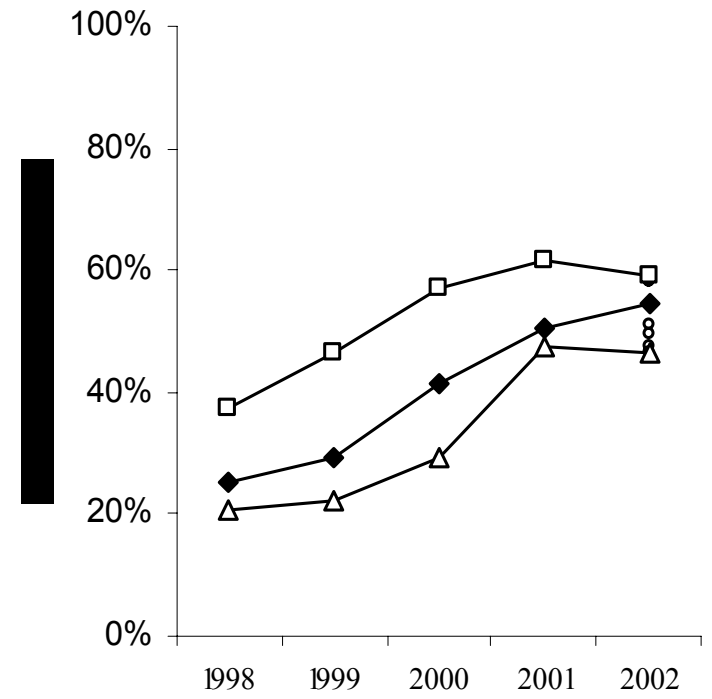
Variability as a Learning Tool

While performance is improving Programwide, we still have wide variation among Regions

Known HbA1c Control for Diabetics



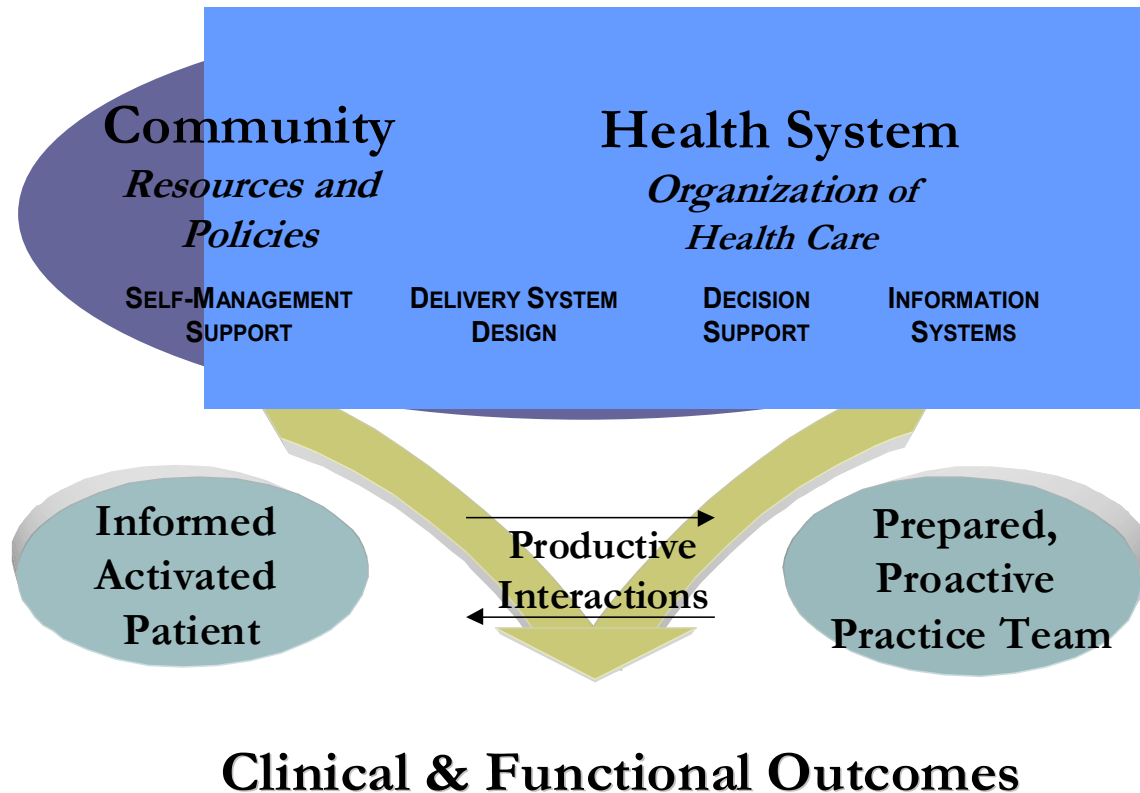
Known Lipid Control for Diabetics



- Highest performing Region
- △ Lowest performing Region
- ◆ KP Average

What Differentiates Higher Performing Groups?

Chronic Care Model



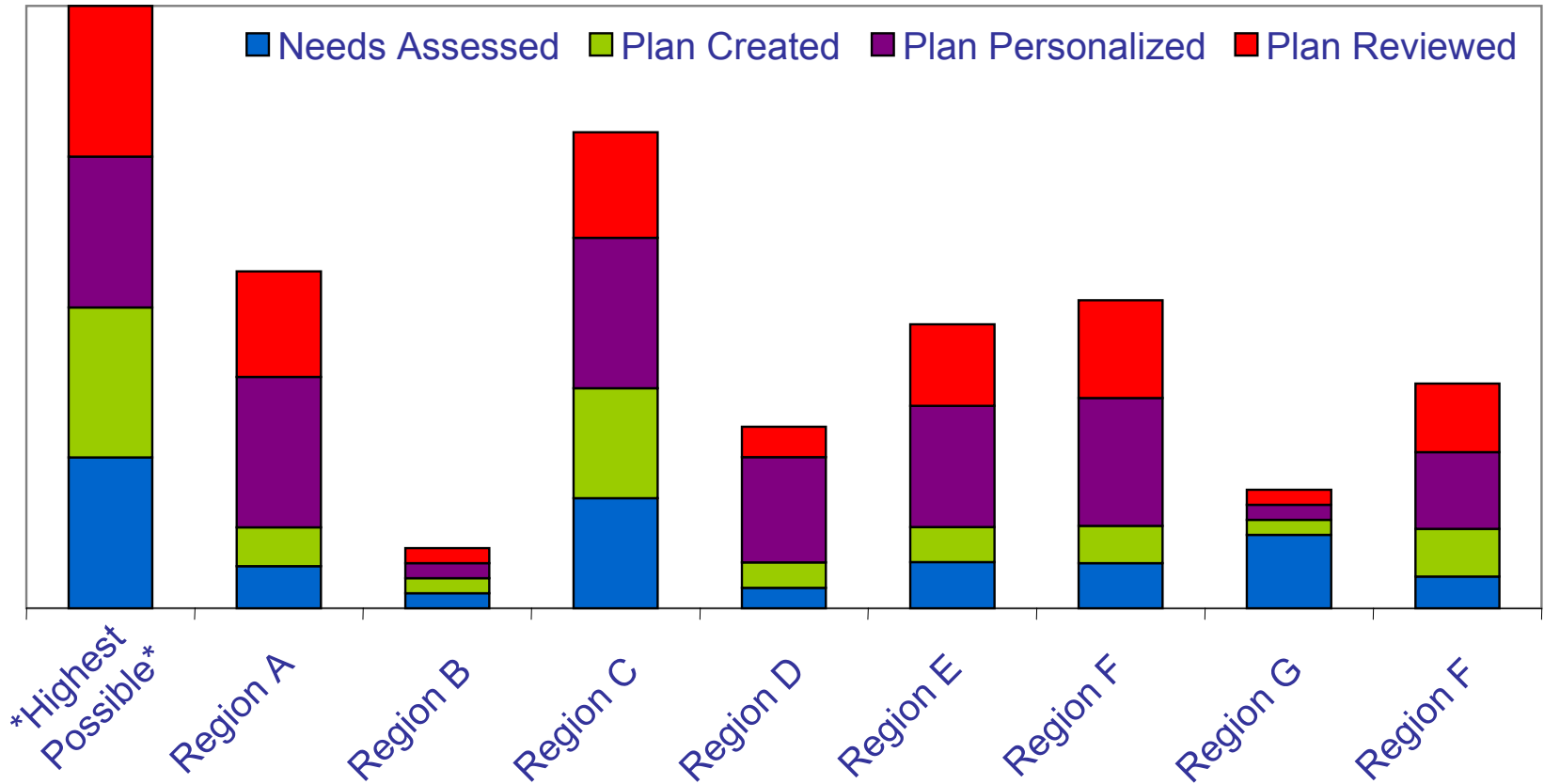
■ Which is the *most* important practice?

- Leadership
- Accountability
- Champions
- Resources
- Financial Incentives
- Provider Feedback
- Program Evaluation
- Patient Action Plans
- Patient Education
- Guideline Training
- Provider Alerts
- AMR
- Defined Care Path
- Risk Stratification
- Registry
- Outreach and Follow-up
- Inreach
- Care Coordination
- Team-Based Care
- Cultural Competence

From Improving Chronic Illness Care
Ed Wagner, MD, Group Health Cooperative of Puget Sound

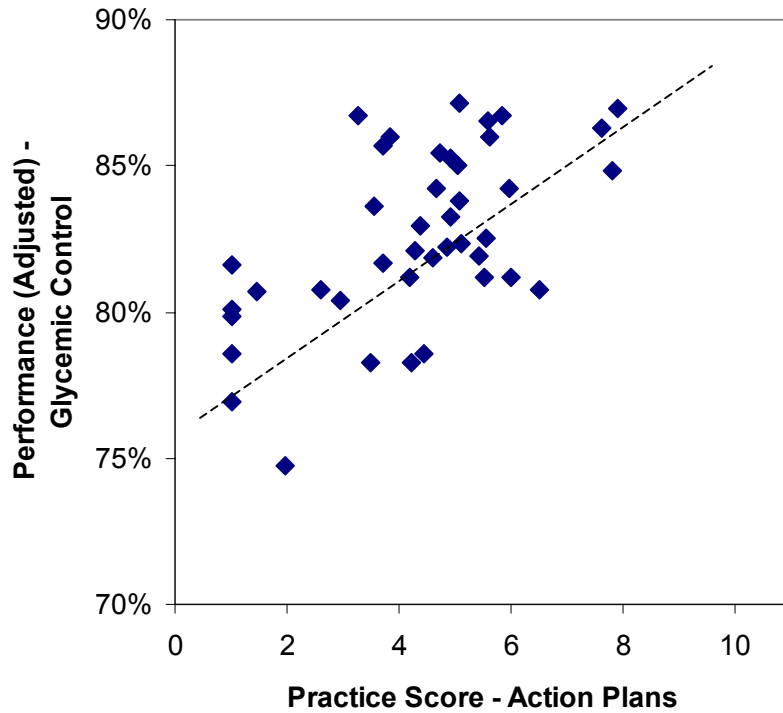
Variation in operational practices underlies performance variation

Regional implementation of Patient Action Plans

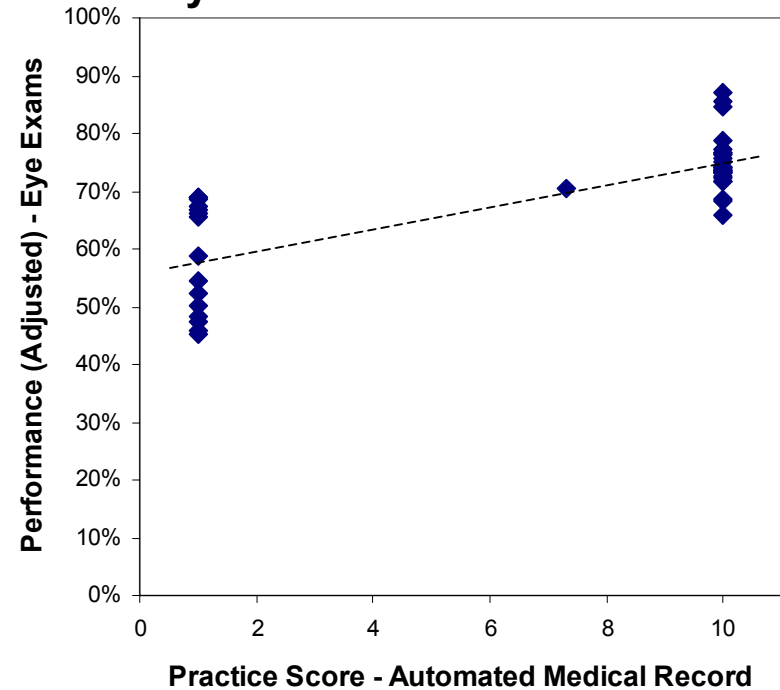


Associating High Performance with Operational Practices- Examples

Glycemic Screening x Action Plans



Eye Exams x AMR



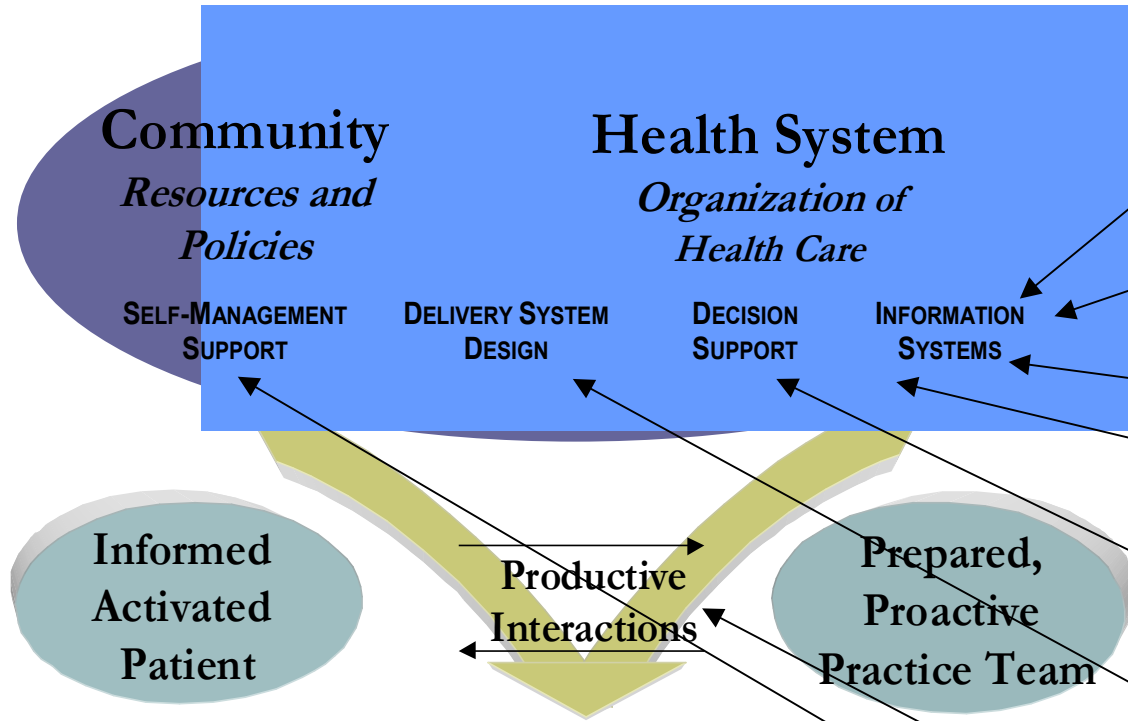
Performance values shown are adjusted for all other Practices, based on model estimates

Associating High Performance with Operational Practices

- Practices most associated with high performance
 - Patient action plans
 - Provider financial incentives
 - Automated medical record
 - Outreach and follow-up
 - Provider alerts and Reminders
- Practices sometimes associated with performance, but with less strength and/or consistency
 - Registry
 - Guideline distribution & training
 - Care coordination

Leveraging the Chronic Care Model

Chronic Care Model



■ Highest Leverage Interventions...

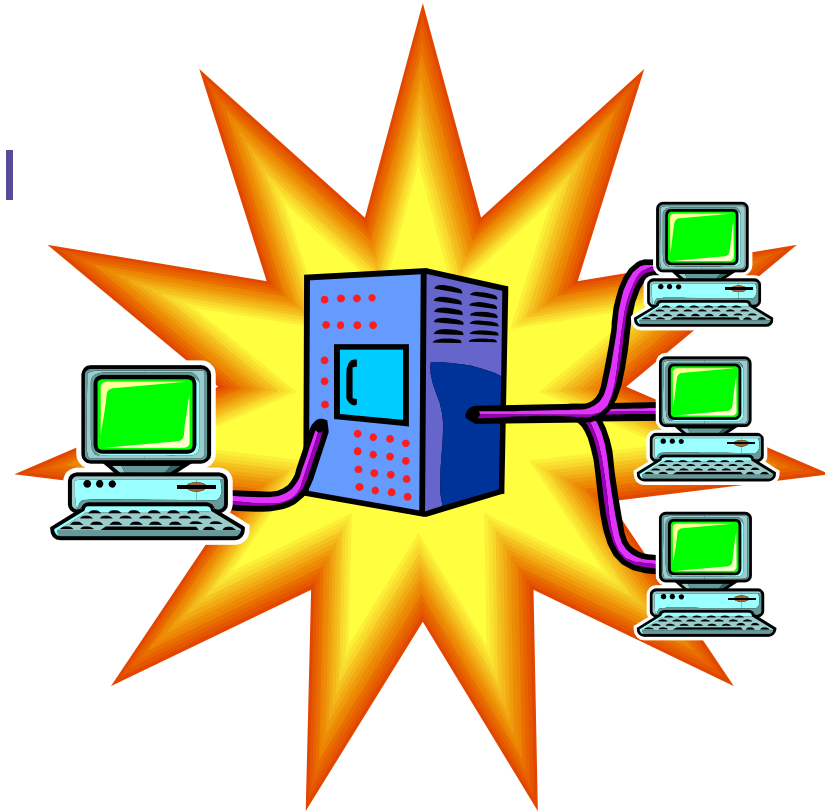
- Automated medical record
- Outreach and follow-up
- Registry
- Provider alerts and Reminders
- Guideline distribution & training
- Provider financial incentives
- Care coordination
- Patient action plans

From Improving Chronic Illness Care
Ed Wagner, MD, Group Health Cooperative of Puget Sound

Currently the EHR is designed to support the doctor's office visit

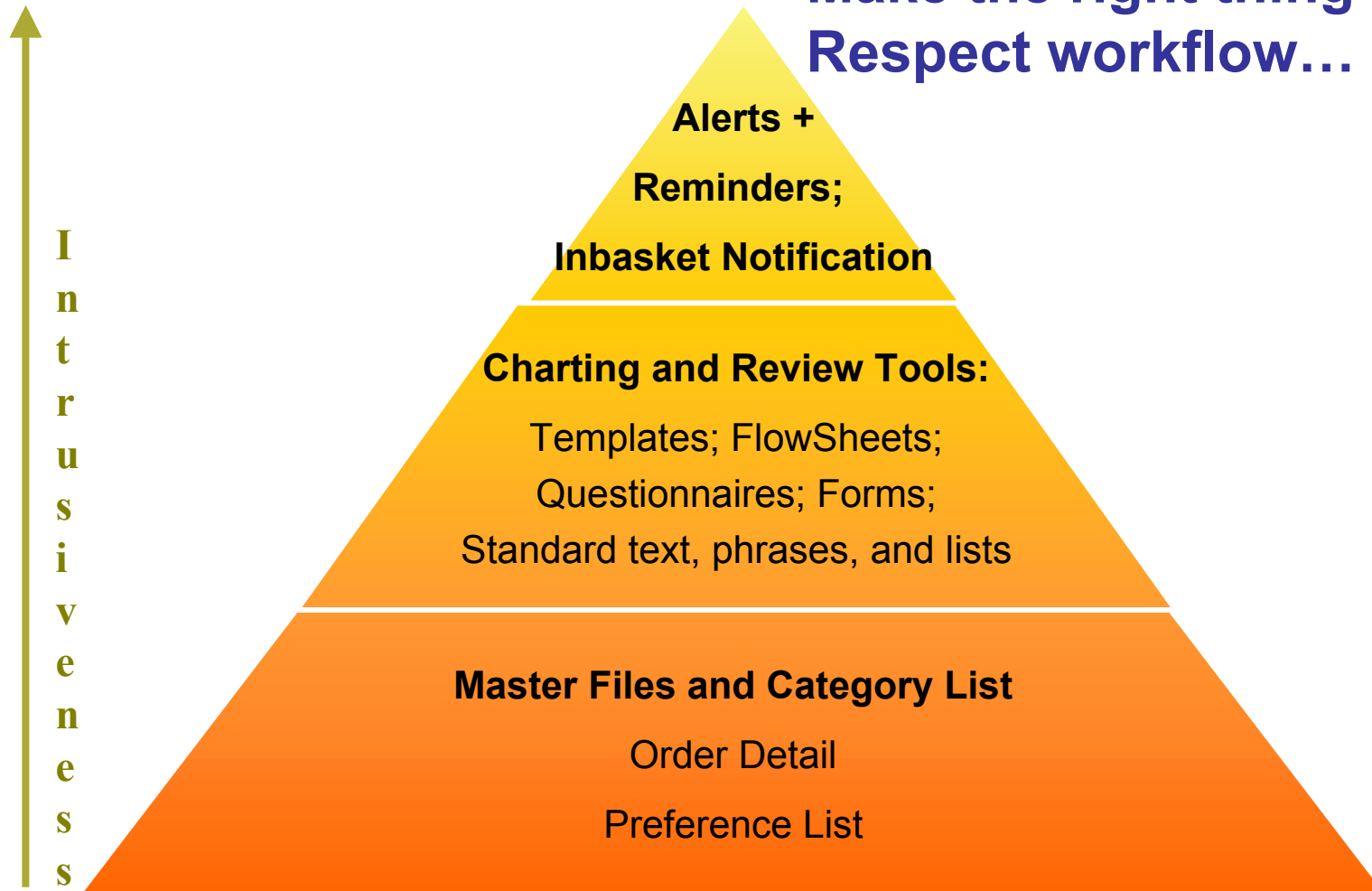
EHR functions include

- Fast access to past medical history
- Results reporting
- Document vital signs and progress notes
- Manage problem list



Ambulatory Clinical Decision Support

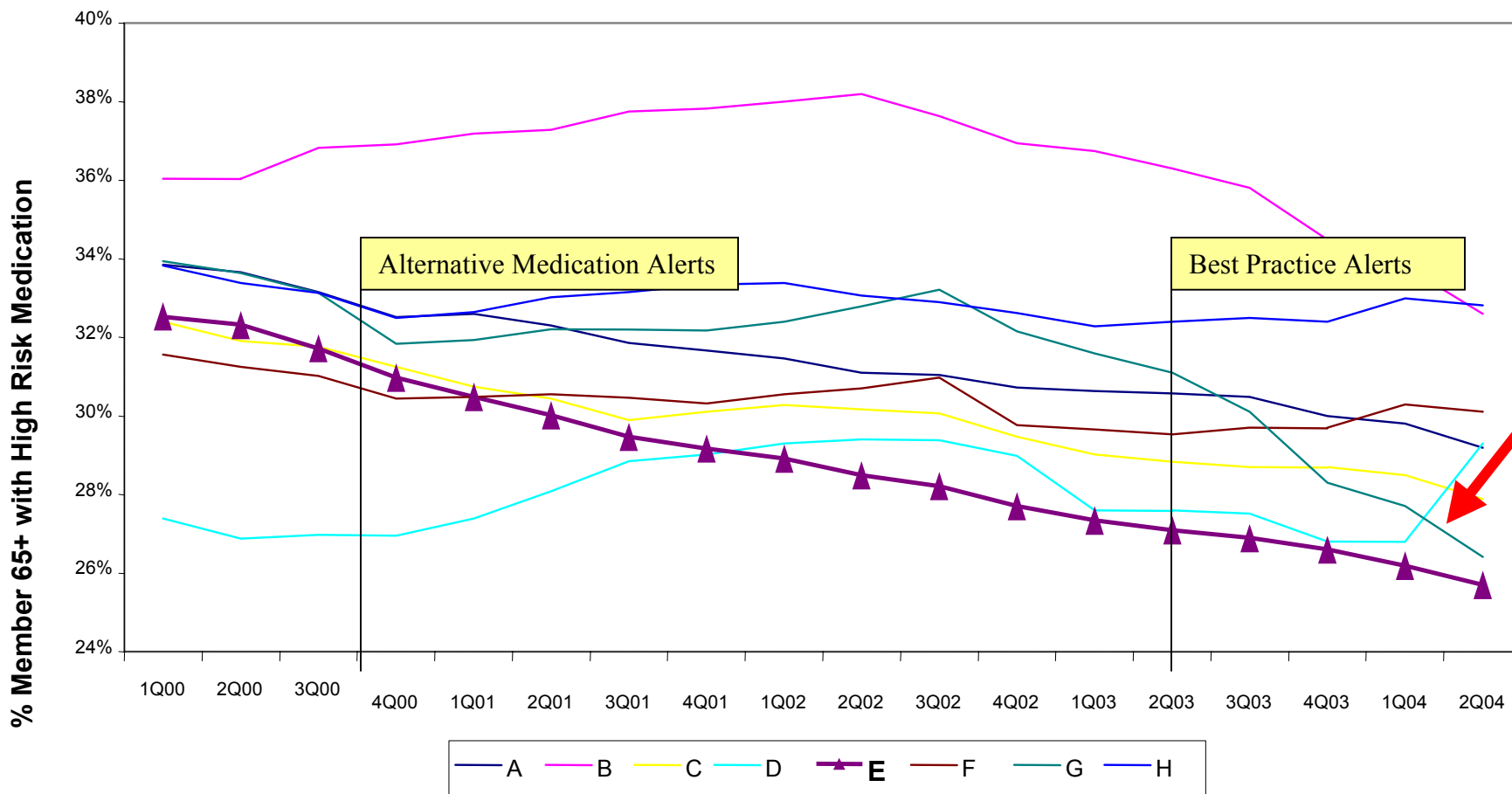
Make the right thing easier...
Respect workflow...



* - Adapted from Michael Krall MD and Terhilda Garrido, KP-HealthConnect

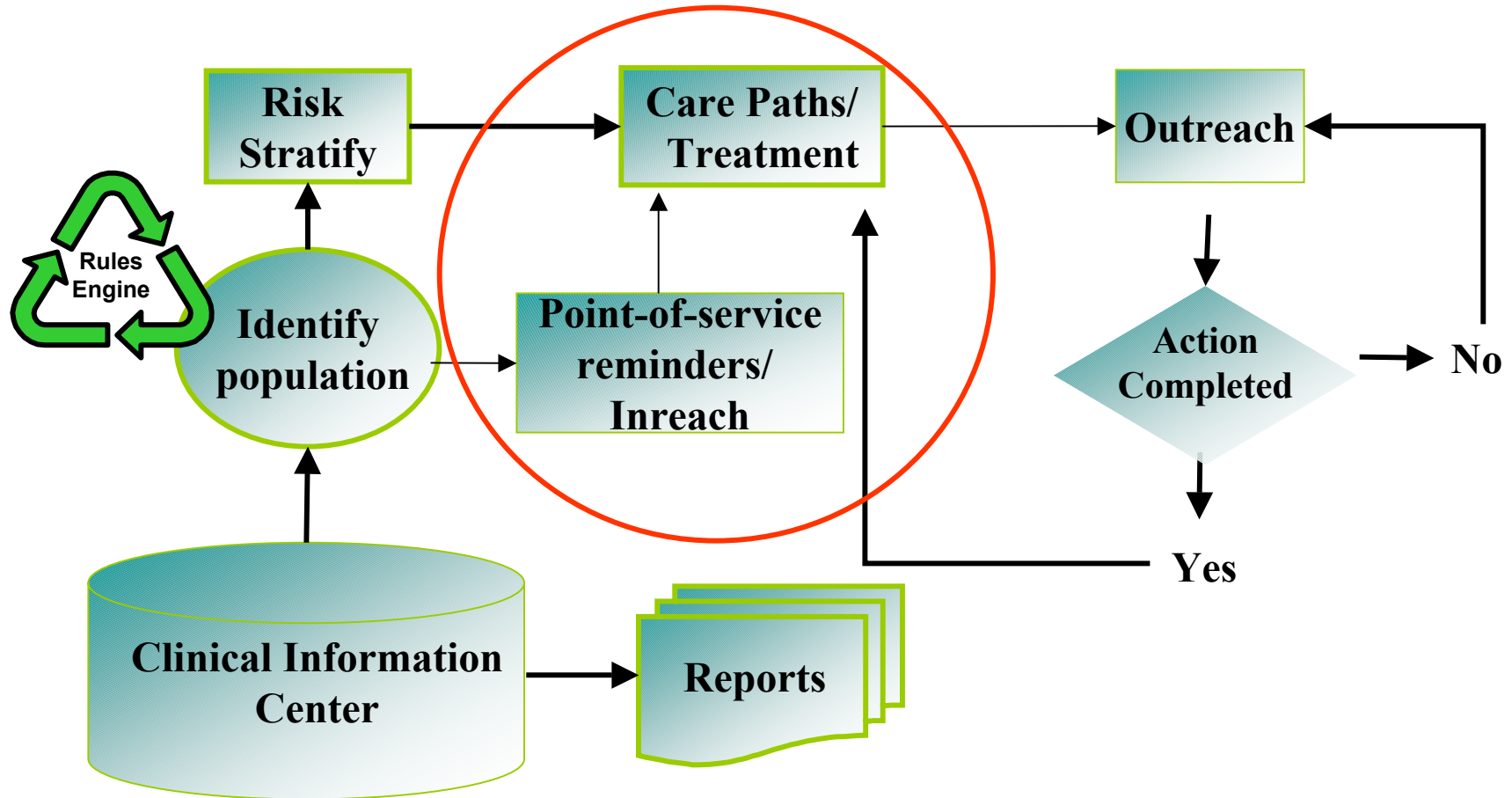
Improving Care...Impact of Decision Support

Older members with any high-risk medication dispensing, by Region, 1Q2000-2Q2004



Process flow for population-based care

Office Visit functions



Functions needed to support Population Care Management

- 1. Population identification**
- 2. Population stratification**
- 3. Member tracking**
- 4. Care/case management**
- 5. In-reach**
- 6. Outreach**
- 7. Patient provided information**
- 8. Monitoring and reporting**

What was missing: the Gap Requirements

1. Population Identification

- Ability to collect and organize patient-level data from multiple source systems

2. Population Stratification

- Ability to calculate and update patients' risk level and display in EHR
- Predictive modeling software

3. Care/case management

- Ability to show in the EHR a patient's care management status
- Ability to query large lists of patient to determine next steps in care plan

4. Out-reach

- Ability to manage large scale out-reach in patient's preferred language and mode of communication

5. In-reach

- No significant gaps

6. Member Tracking

- Ability to track through an episode of care

7. Information provided from patients

- No significant gaps

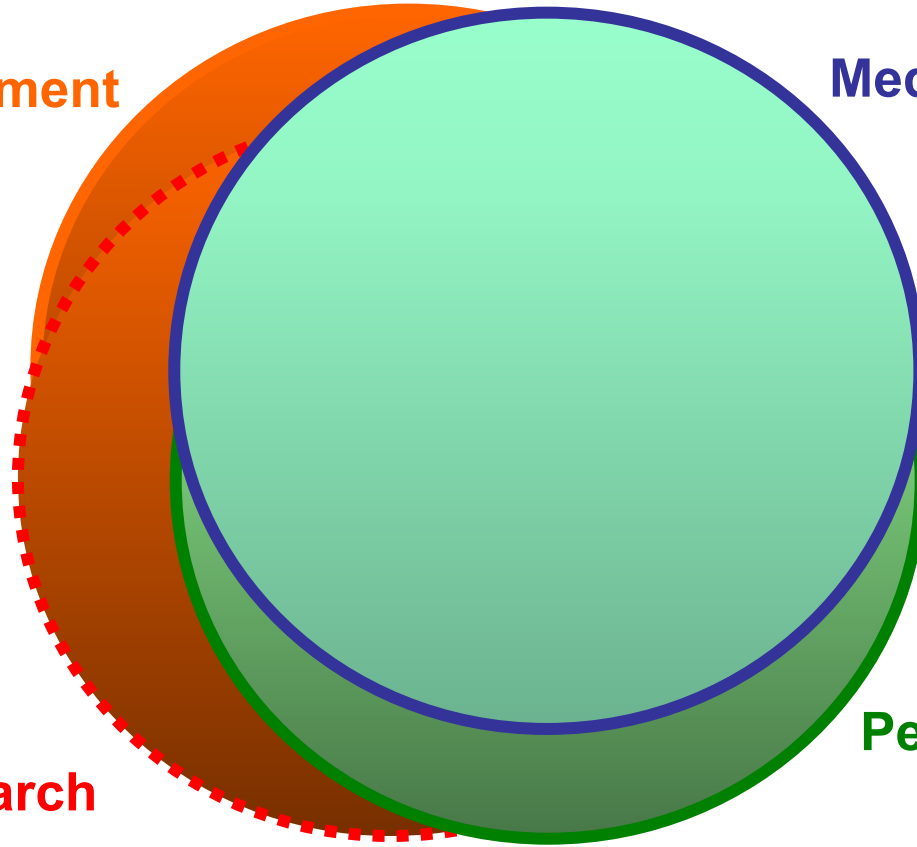
8. Monitoring and Reporting

- Ability to link from report to patient's record
- Ability to easily generate *ad hoc* reports

The Electronic "Health" Record... Encompassing Multiple Needs

**Population
Care
Management**

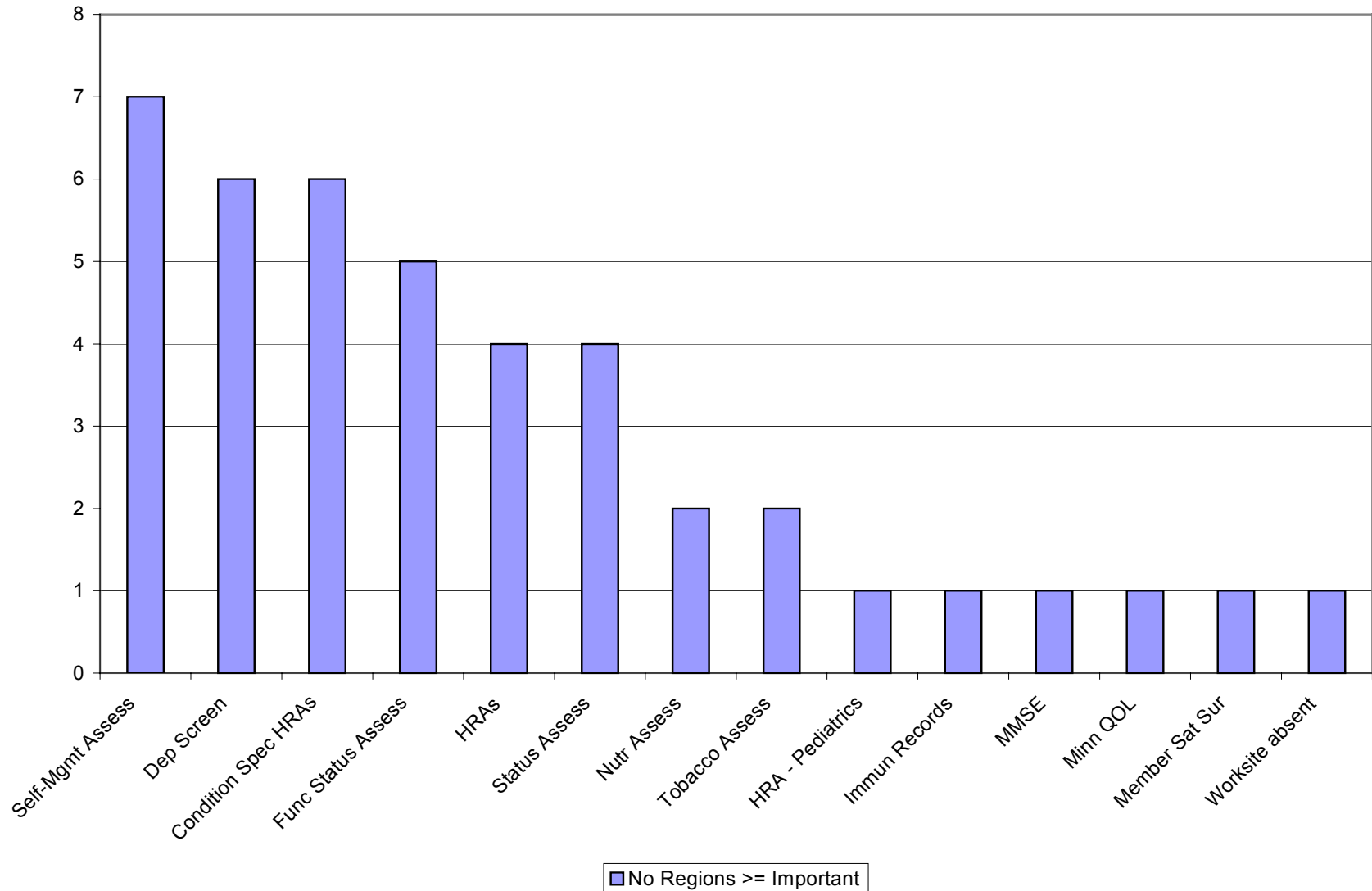
Medical Office Visit



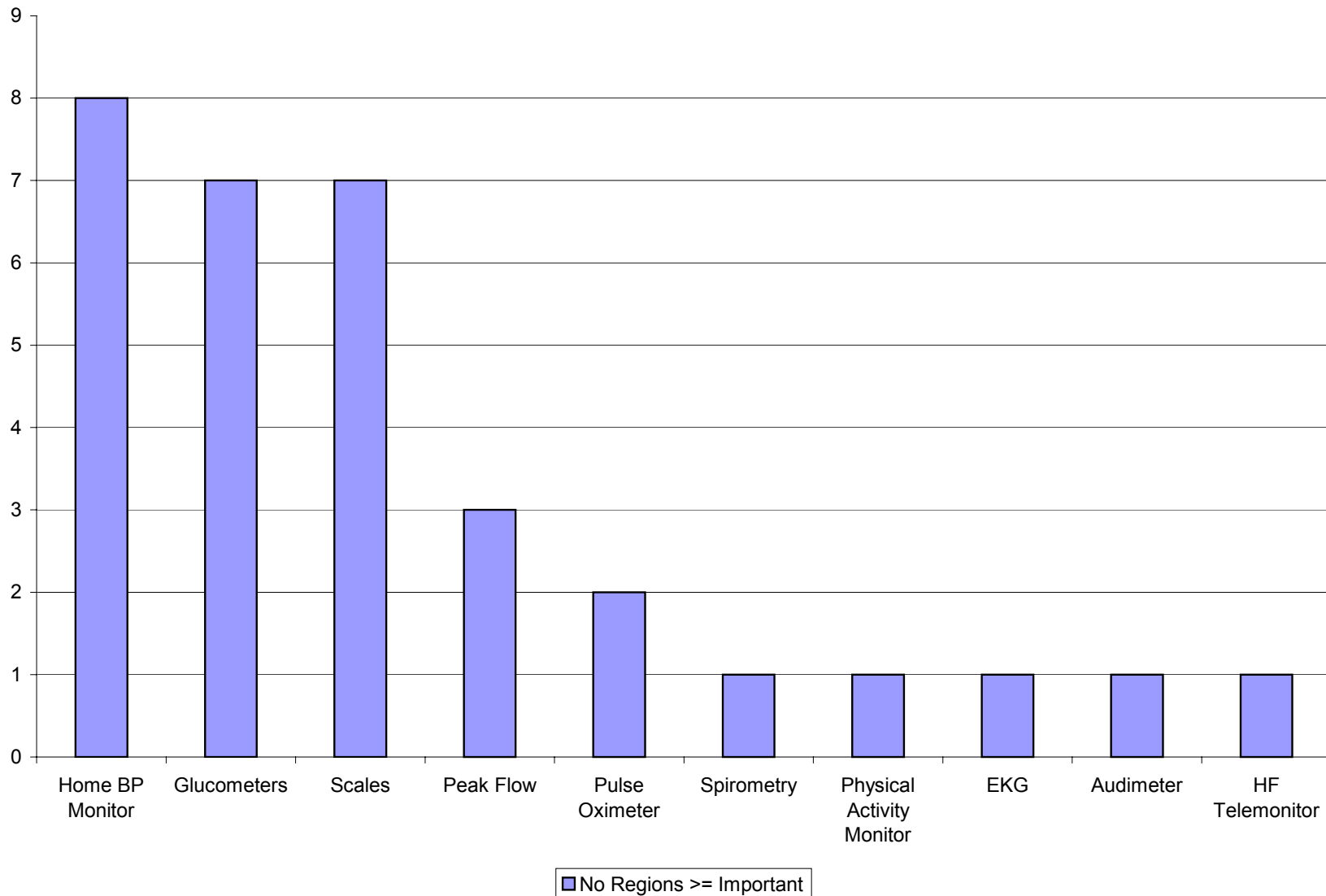
Research

Personal Health Record

PHR: Combined provider priorities for questionnaire data from patients



PHR: Combined provider priorities for remote device data from patients



Direct to the Patient: From the KP.org Home Page

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Kaiser Foundation Health Plan of the Mid-Atlantic States, Inc.
2101 East Jefferson Street, Rockville, Maryland 20852

Live well

[Healthy lifestyle programs](#)

A vital step

[Have you selected a physician?](#)

Featured health topics:

Select a topic

- Allergies
- Arthritis
- Asthma
- Child/teen health
- Colds/flu
- Depression
- Diabetes
- Fitness
- Heart health
- Making health decisions

Announcement about
asthma

Asthma Featured Health Topic
from the pull-down menu

Asthma Featured Health Topic Home Page

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Asthma

- Topic overview
- Basic facts
- Could you have asthma?
- Managing your asthma
- Children with asthma
- Asthma medications
- Related topics
- Health classes
- Message boards

Related links:
 Featured health topics

Breathing easier with asthma

[Información en español acerca del asma](#)

If you have asthma, you're not alone. Over 30 million people in the U.S. have this lung disease. For those living with asthma, this chronic condition can affect nearly every aspect of their lives.

But asthma can be controlled. People living with [asthma](#) can lead full and healthy lives. This is true for [children](#) as well as adults. However, in order to lead active lives, people with asthma need to understand their condition and learn how to manage their symptoms.

So, in addition to the care and guidance you receive from your physician, use the resources we've gathered here to help you with the day-to-day [management of asthma](#). After all, you're living with this condition, so it's important that you become an expert too.

If you need help getting better control of your asthma, we have a variety of [classes](#) to help you.

Select any of the asthma-related topics on the left to learn more, or continue on to [basic facts about asthma](#).

Reviewed by: Richard Roth, MD and Kate Christensen, MD
[Complete list of reviewers](#)
Last updated: December 2003

Información en español

Links to evidence-based content, consistent with KP practice guidelines

Reviewed by CMI lead and subject matter experts

Managing Your Asthma Page

KAISER PERMANENTE

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Asthma

- Topic overview
- Basic facts
- Could you have asthma?
- Managing your asthma
- Children with asthma
- Asthma medications
- Related topics
- Health classes
- Message boards

Related links:
 Featured health topics

Managing your asthma

With the help of your physician, you can be in control of the day-to-day management of your asthma.

Here are some steps you can take to make managing your asthma easier:

- Have a plan. If you have asthma, one of the first steps in managing it is making sure you have your own physician who can help you develop an [asthma action plan](#)—and keep it up to date. Your action plan tells you how to care for your asthma at home. If you haven't seen your doctor within the past year, make an [appointment](#). If you don't have your own physician, you can use our [medical staff directory](#) to help select one.
- Check your breathing every day. Monitor your [peak flow](#) daily to help you know when a flare-up is coming on and the steps you should take to manage it. Your action plan may include the peak flow numbers for your color "zones": green (good control), yellow (losing control), and red (having a flare-up).
- Stop flare-ups before they start. [Identify and control the triggers](#) that can make your asthma worse.
- Use your [metered-dose inhaler](#) (MDI) properly, so that you get the most benefit from your medication.
- If you smoke, get help quitting. We have [classes](#) and programs that can help. [HealthMedia Breathe@](#) will give you personalized strategies to help you kick the habit for good. (This program is for our members only.) Also, read about the role that [nicotine replacement therapy](#) and Zyban ([bupropion](#)) play in quitting smoking.
- If [exercise triggers your asthma](#), talk to your physician about using medicine before you start. This way, you can enjoy exercising without worrying about having an asthma flare-up.

Link to KP-approved asthma action plan

Link to online appointments

Link to Health Encyclopedia content

Link to Asthma Triggers tool

Link to KP asthma classes

Link to HealthMedia (Breathe)

Link to Asthma Action Plan

Asthma Can Be Controlled

If you or your child have asthma, you are not alone. Nearly 20 million Americans also have this condition. Risks of uncontrolled asthma may include asthma attacks, scarring of the airways, Emergency Department visits, hospitalization, and even death. There is no cure for asthma, but it can be controlled in most people.

With proper self-care and the help of your medical team, you can be free of asthma symptoms. Kaiser Permanente wants to help you control your asthma. Using this self-management plan will help you breathe easier so you can live a healthy, active life.

Asthma Medicines

"Controller"/"Preventer" Medicines

Take *daily* as prescribed for long-term control (see Green Zone).

Examples: QVARTM, Advair[®], cromolyn (Intal[®]), Pulmicort[®], Tilade[®], Flovent[®], Singulair[®], Accolate[®], Aerobid[®], and Azmacort[®].

Serevent[®] or Foradil[®] may be used as a booster (or add-on) but not alone.

"Quick-Relief" Medicines

Take for quick relief (see Yellow and Red Zones). Take 5 to 10 minutes before exercise, if needed. Do not overuse — know the "Rule of 2's."

Examples: albuterol (Proventil[®] and Ventolin[®]), Alupent[®], Maxair[®], Xopenex[®], and Atrovent[®].

"Burst" Medicines

These medicines may be prescribed for use during a severe asthma attack (see Red Zone). Ask your asthma care professional if a "Burst" medicine is right for you.

Examples: prednisone, Medrol[®], Prelone[®], PediaPred[®], and OraPred[®].

Green Zone... Go ahead

Your asthma is in good control



No Symptoms:

- You can sleep without waking
- You are wheeze-free
- "Quick-Relief" medicines are rarely needed (except for exercise)
- You can participate in most activities without asthma symptoms
- Work or school is not missed
- You rarely, if ever, need emergency care

Go ahead...

Take "Controller"/"Preventer" medicine(s) *daily* as prescribed to keep asthma in good control.

Always tell your asthma care professional when you have a severe asthma attack.

If you are thinking of changing or stopping your asthma medicine(s) be sure to talk with your asthma care professional first.

care management | institute



Yellow Zone... Be aware

You are having a mild asthma attack



Symptoms may include:

- Some coughing
- Mild wheezing
- Slight chest congestion and/or tightness
- Breathing when resting may be slightly faster than normal
- Peak flow is 50 to 80 percent of your "personal best"

Be aware...

- Take "Quick-Relief" medicine every 4 hours as needed to relieve symptoms.
- Double the dose of the *inhaled* "Controller"/"Preventer" medicine until you no longer need "Quick-Relief" medicine and are back in the Green Zone. Do not double Advair[®], Serevent[®], or Foradil[®].
- If symptoms continue more than 2 days, or if "Quick-Relief" medicine is needed more than every 4 hours, see Red Zone. Call for advice if needed.

Red Zone... Stop and take action

You are having a severe asthma attack



Symptoms may include:

- Constant coughing and/or wheezing
- Difficulty breathing when at rest
- Waking from sleep because of coughing, wheezing, or shortness of breath
- Peak flow level is 50 percent or below your "personal best"

Take action...

If you need "Quick-Relief" medicine every 2 to 4 hours and you still have Red Zone symptoms:

- Start "Burst" medicine if prescribed by your asthma care professional. Keep in mind that it may take 4 to 6 hours for "Burst" medicine to work.
- You may take "Quick-Relief" medicine every 20 minutes for up to 1 hour.

However, if shortness of breath is causing you difficulty walking or talking, or in the case of a child, there is sucking in between the ribs, widening of the nostrils, or blue lips, go to the nearest Emergency Department or call 911 now.

- If you have tried the above steps and there is no relief, you are having a severe asthma attack. Go to the nearest Emergency Department or call 911 now, and continue to take "Quick Relief" medicine as needed.

Link to Online Appointments



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- Get health advice
- Appointments/Rx refills
- Your plan
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Appointments

▫ Help

Important: If you think you have a [medical or psychiatric emergency](#), call 911 or go to the nearest hospital. Do not attempt to access emergency care through this Web site. [Learn more](#) about what a medical or psychiatric emergency is.

If you have an [urgent symptom](#) or you want to speak with a nurse, do not use this Web site. Instead, please call 650-742-2100.

Make a new appointment
Select a facility, dates, and times

Member Age: 51

Select a medical facility

Select preferred dates and times

[Show me the first available appointment](#)

— or —

Start looking for appointments on this date:

Select one or more preferred days of the week:

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday

Select one or more preferred times:

- Morning
- Afternoon
- Evening

[Start over](#)

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Link to KP Health Classes

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Health class information

Location: Roseville Medical Center
Category: Asthma and COPD

Asthma class: breathe easier

This class is for adults and parents of children with asthma. Gain the information and self-care skills you need to decrease your symptoms or your child's symptoms, and learn to live more comfortably with asthma.

This class is open to members only.

Department
Medicine

Number of sessions
1

Contact information
(916) 784-4050

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Date last updated: 02/23/2005
Updated by: Rebecca Wilson

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Related links:

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Asthma

- Topic overview
- Basic facts
- Could you have asthma?
- Managing your asthma
- Children with asthma
- Asthma medications
- Related topics
- Health classes
- Message boards

Related links:

- Featured health topics



Asthma medications

it takes two

People with asthma rely on two kinds of medication to help them breathe more easily. There are medications that help with the long-term control of asthma and medications that provide short-term relief from asthma symptoms (such as coughing, wheezing, chest tightness, or shortness of breath).

Long-term control medications: preventing asthma flare-ups

Many people with asthma need long-term control medication. This type of medicine needs to be taken **every day**—even when you feel well—to keep asthma under control. (Always keep your quick relief inhaler handy, in case of an asthma flare-up.)

Long-term/prevention medications include:

- Accolate ([zafirlukast](#))
- Azmacort ([triamcinolone](#))
- Beclovent, QVAR ([beclomethasone](#))
- Flovent ([fluticasone](#))
- Foradil ([formoterol](#))
- Intal ([cromolyn](#))
- Serevent ([salmeterol](#))
- Singulair ([montelukast](#))
- Theo-Dur ([theophylline](#))

Please note: Serevent or Foradil are rarely used alone for long-term control. They are usually prescribed along with inhaled steroid medications.

Short-term medications: treating asthma flare-ups when they occur

Inhaled quick-relief medicine relaxes and opens airways and relieves asthma symptoms. Quick-relief medicine

Links to Drug Encyclopedia

Link to Message Boards



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Asthma

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- Managing your asthma
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Message boards

share with others, get support

One important way to feel better and to stay in control of your asthma is to remain connected with others. Our [message boards](#) are a good place to give and receive support and understanding from others who are also living with asthma.

You'll find online discussions on living with asthma and childhood asthma (for parents).

Our message boards are moderated by Kaiser Permanente health professionals.

Explore other [featured health topics](#).

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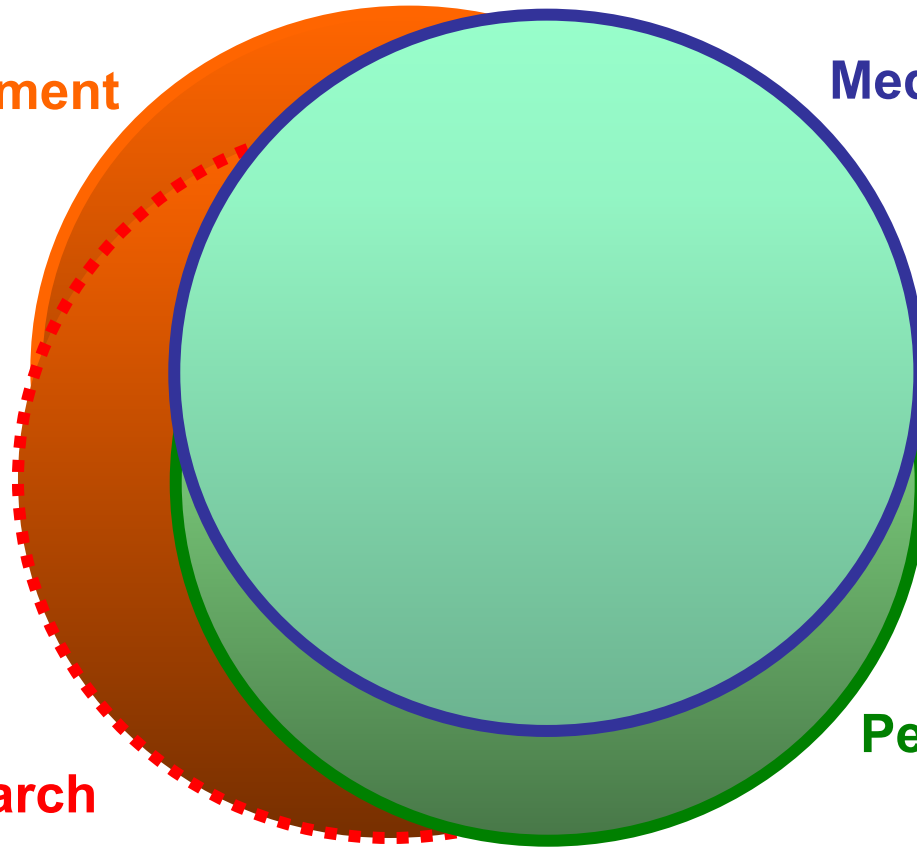
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Reviewed by: Richard Roth, MD and Kate Christensen, MD
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Last updated: July 2003

The Electronic "Health" Record... Encompassing Multiple Needs

**Population
Care
Management**

Medical Office Visit



Research

Personal Health Record

Truth in Advertising...



- Managing the entire population over time
- Patient-centered care
 - Supporting care outside of the doctor's office visit
 - The role of information technology
- Functions needed to support population-based care
- Filling the gaps in the HER
 - Populations
 - Patients
- How it all fits together

