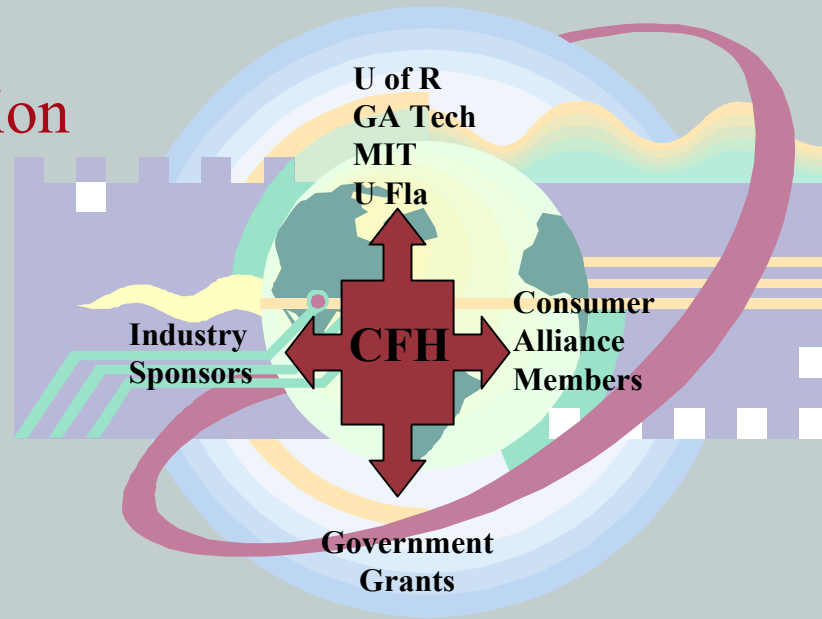


## Smart Health Tools:

Turning Images and Information  
Into Decision Support Tools

*Alice P. Pentland, MD*  
*Medical Director,*  
*Center for Future Health*



# Health and Healthcare Challenges

## Economic Reality

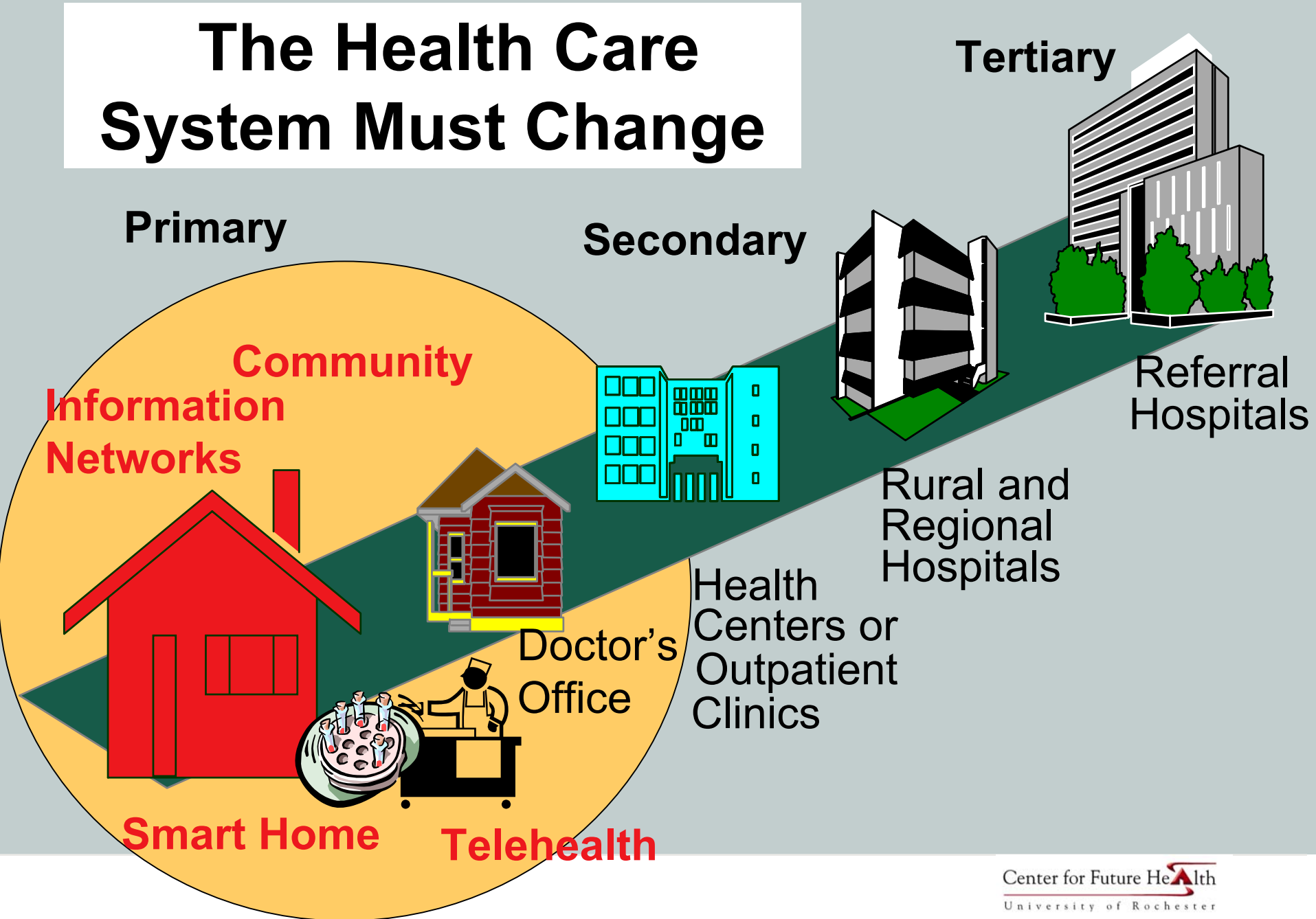
- More than 14% of U.S. GDP is devoted to health care.
- Ratio of wage earners to seniors
  - 4/1 (now)
  - 2/1 (~2025)
- Average cost of assistive care
  - \$60,000 / year / senior adult
- Seniors visit the doctor 6 x more
- often than younger people



## Demographic Trends

- The ratio of caregivers for at-home disabled will decrease from more than 20:1 down to less than 6:1 in 2030.

# The Health Care System Must Change



# Our Solution: Personal Health System

Prevention    Early Detection

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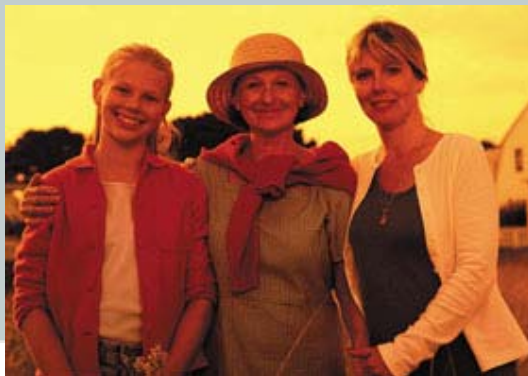
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Disease Management

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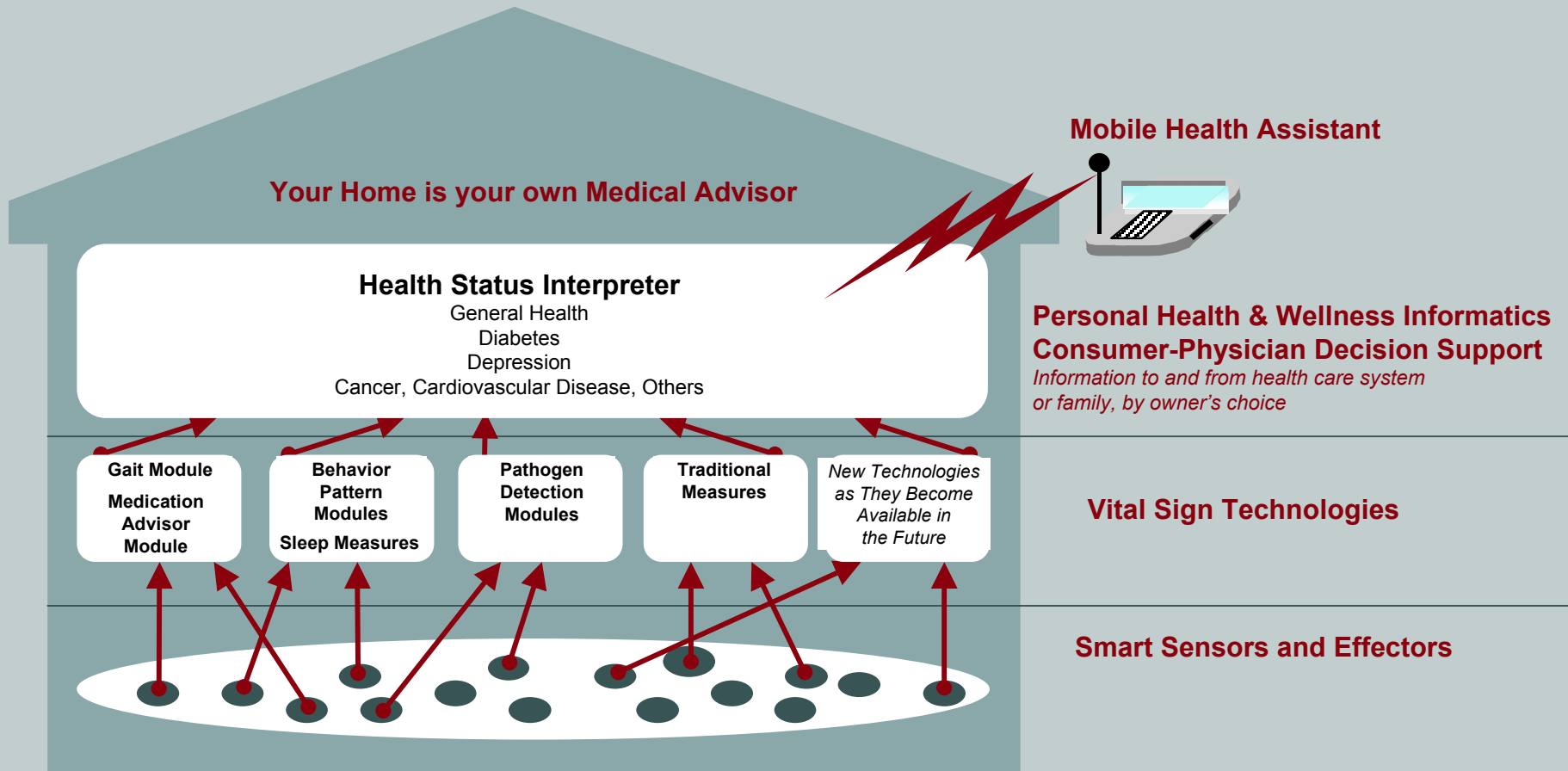
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- Predicts and rapidly responds to health emergencies
- Helps manage chronic conditions
- Detects the onset of emerging health problems well before symptoms are visible
- Promotes preventive measures and healthy lifestyle behaviors

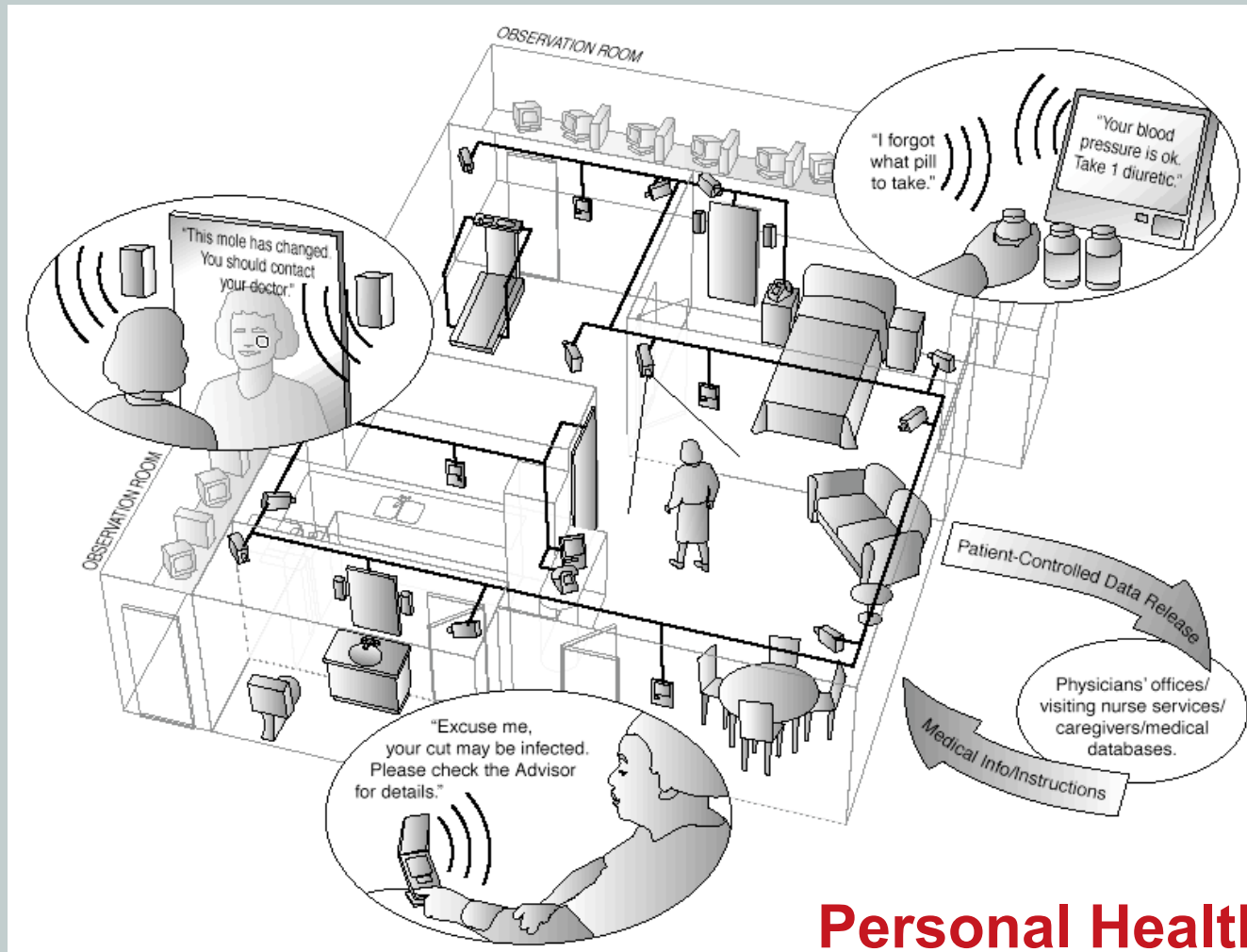


“Stay Healthy & Stay Home!”

# Personal Health System (PHS)



# The CFH Smart Medical Home Research Laboratory



## Personal Health System

# WHAT DO CONSUMERS NEED?

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## Personal Health Status Information & Decision Support Tools

- **Images**
- **Information**

For

- **Making informed choices**
- **Communicating with Providers**



January 7, 2003 Rash that Ms. S/Dr. H. observed. Dr H. inspected and checked for scabies. No evidence with microscope scrapings test. Prescribed 5% permethrin cream applied on 1/7 and again on 1/14 for both my wife and I. Prescribed Dermatotop for the very bad spots. 60mg Allegra 2x per day. Come back in two weeks.



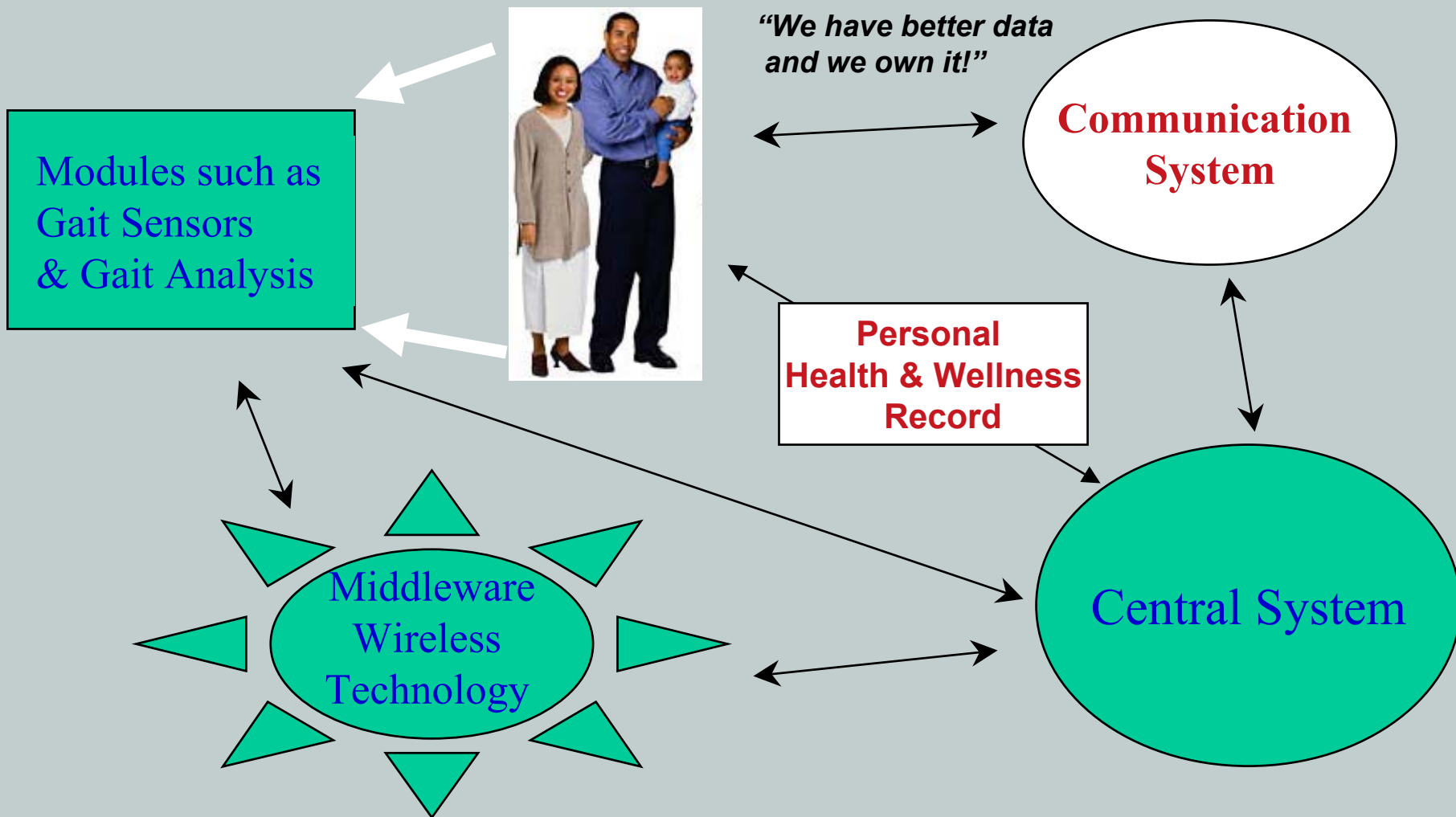
# The Medication Advisor

QuickTime™ and a  
decompressor  
are needed to see this picture.

# Gait Monitor- Video Motion Analysis

QuickTime™ and a  
decompressor  
are needed to see this picture.  
QuickTime™ and a  
decompressor  
are needed to see this picture.

# PHS--The Consumer's View



# WHAT DO PROVIDERS NEED?

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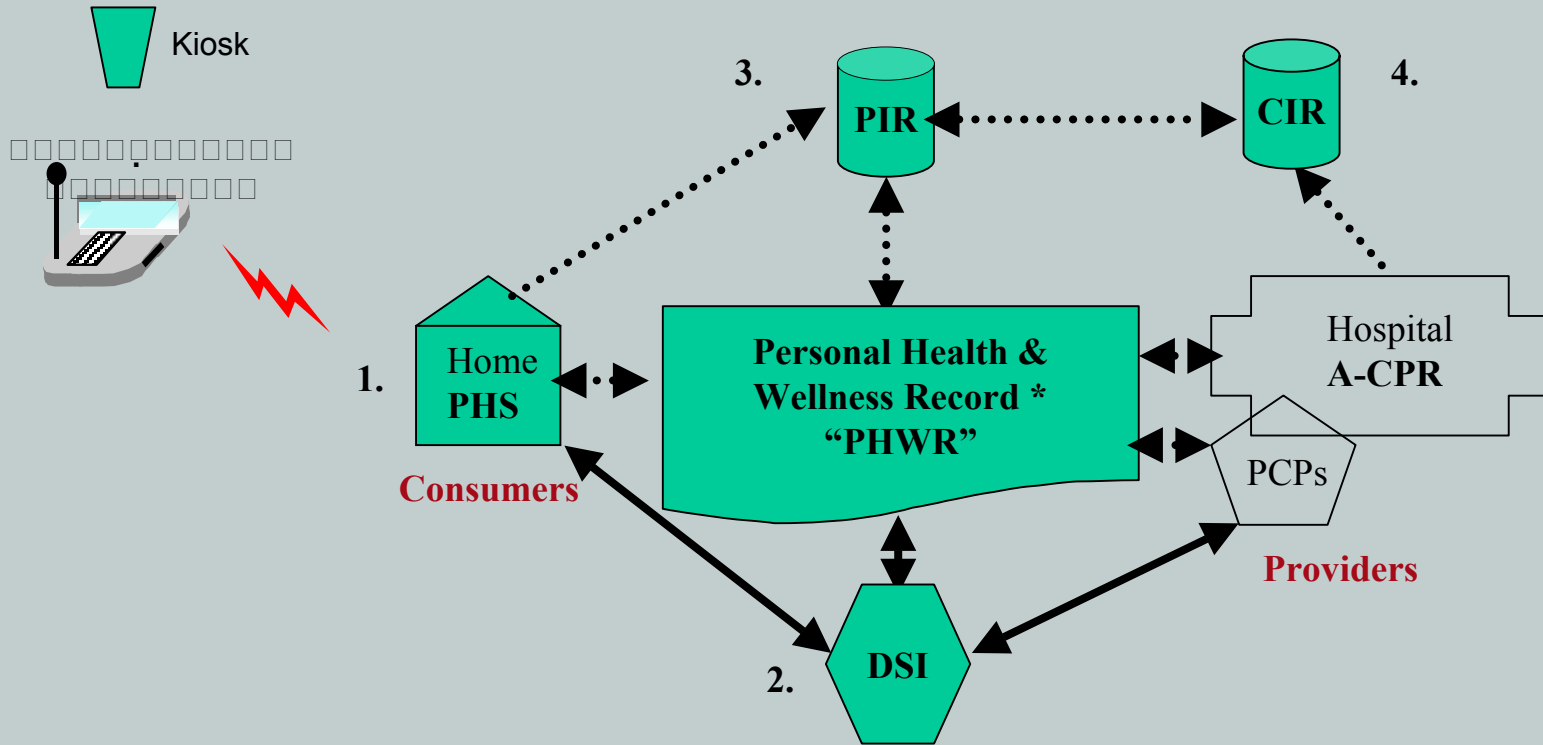
**Window into Behaviors & Vital Signs  
Between Visits  
& New Decision Support Tools**

- **Images**
- **Information**

**For**

- **Longitudinal Medical Record**
- **Improved Consumer Involvement**

# Personal Health & Wellness Information System



**KEY**

- 1. Personal Health System
- 2. Decision Support System
- 3. Personal Image Repository
- 4. Clinical Image Repository

**\* PHWR**

- In the home
- Portable-Memory Stick
- Internet
- Other

# What We Measure Determines What We Can Detect

	<u>Arthritis</u>	<u>Heart Disease/ Stroke</u>	<u>Cancer</u>	<u>Diabetes</u>	<u>Depression</u>	<u>Dementia</u>
<u>Vital Signs</u>						
Blood Pressure		★				
Temperature						
Weight	★	★	★		★	★
Respiration		★				
Urine Output				★		
% Affected (OVER 70)	57%	31%	20%	13%	14%	14%

# What We Measure Determines What We Can Detect

<u>New Vital Signs</u>	<u>Arthritis</u>	<u>Heart Disease/ Stroke</u>	<u>Cancer</u>	<u>Diabetes</u>	<u>Depression</u>	<u>Dementia</u>
Exercise	★	★	★	★	★	★
Nutrition		★	★	★	★	★
Activity Patterns	★	★	★	★	★	★
Gait	★	★	★	★	★	★
Sleep	★	★	★	★	★	★

- Center researchers will:*
- 1) Create tools to measure these key concepts
  - 2) Standardize Their Interpretation In Medical Practice
  - 3) Define Best Practice For Their Effective Use

# New Vital Sign Team Expertise

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**Cardiology**

**Psychiatry**

**Sleep Disorders**

**Engineering**

**Computer  
Science**

**Biostatistics**



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