

Disease Fundamentals and Treatment Options



Bob Barnes and Marilyn Lombardi



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Disease Fundamentals – How do physicians “see/interpret the patient”



1. Anatomy and physiology

2. Pathophysiology

3. Clinical Presentation

4. Clinical Outcomes

5. Epidemiology

6. Economic Impact



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Zenios, Stefanos, et.al., Biodesign, 2010, ISBN 978-0-521-51742-3, page 64

Five Questions

Disease Fundamentals – Ethnographic Perspective

Innovator/Entrepreneur

- ⑤ 1. What are the **complaints**? (symptoms)
- ④ 2. What has **changed**? (pathophysiology)
- ③ 3. What are the **consequences**? (outcomes)
- ① 4. What is the **frequency**? (epidemiology)
- ② 5. What are the **broader impacts**? (economics)

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1. What are the complaints?

Symptoms

- * Complaint
- * Clinical presentation
- * Effect of the disease or ailment specifically
- * Effect of long term consequences
- * Effect of treatment
- * Variation: age, gender, ethnicity, other conditions

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2. What has changed?

Pathophysiology

- * Change from normal biologic and physiologic perspective
- * Causal associations: age, genetics, lifestyle, etc.
- * Rate of attack

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3. What are the consequences?

Outcomes

- * Morbidity
 - * Quality of life
 - * Quantifiable endpoints
- * Mortality

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4. What is the frequency?

Epidemiology – key background for market assessment

- * Population

- * Incidence

- * Dynamics



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5. What are the broader impacts?

Economics

- * Cost of treatment
- * Cost of hospitalization
- * Lost productivity



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Disease Fundamentals and Treatment Options Part B



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... and the associated gaps and opportunities for improvement!

Part B

Treatment Options

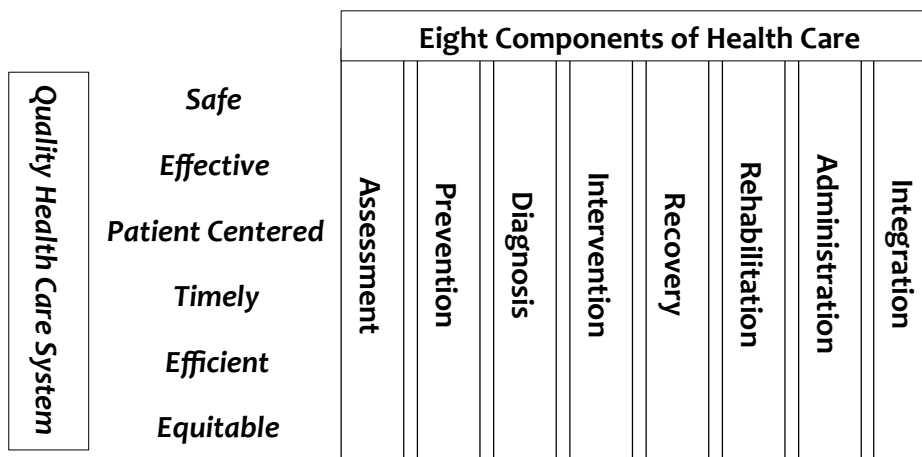
Treatment Analysis:

involves detailed research to understand what established and emerging therapies exist, how and when they are used, how and why they work, their effectiveness, and their economics ...

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Treatment & Focus



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Gaps & Opportunities

Acute Care

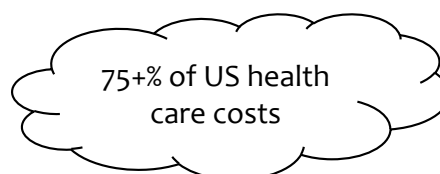
http://en.wikipedia.org/wiki/Acute_care

... a branch of secondary health care where a patient receives active but short-term treatment for a severe injury or episode of illness, an urgent medical condition, or during recovery from surgery. ... the opposite from chronic care, or longer term care

Chronic Care

http://en.wikipedia.org/wiki/Chronic_care

... medical care which addresses preexisting or long term illness



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Chronic Diseases

- | | |
|--|-----------------------------------|
| * Alzheimer's disease | * Chronic Kidney Disease |
| * Autoimmune diseases | * Chronic respiratory diseases: |
| * Blindness | * Deafness and hearing impairment |
| * Cancer | * Hypertension |
| * Cardiovascular diseases | * Diabetes mellitus |
| * Myalgic encephalitis | * Fibromyalgia |
| * Chronic hepatitis | * Epilepsy |
| * Cerebral palsy | * Osteoporosis |
| * Chronic pain syndromes | * Periodontal disease |
| * Osteoarthritis, rheumatoid arthritis | * Sickle Cell Anemia |

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Success

Episode of care

Individual patient

Population wide

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Population wide

Example: Diabetes

Treatment Analysis

- 20% of health care consumers in US account for 80% of costs
- many complications: eyes, heart, kidneys, skin, feet, psyche ...
- many specialties: nutrition, ophthalmology, cardiology, nephrology, neurology, social worker, mental health

7% Compliance

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Herzlinger, Regina E., "Healthcare reform and its implications for the U.S. economy", Business Horizons, 1010 53, 105 - 117

Opportunity

- City of 50,000 people – 1/6 diabetic
- $8300 * \$10,000$ per year = \$83 million
- integration = **Innovation**
- **Entrepreneurship** = replication

CER - ICER

A not-so-distant
future opportunity?

Comparative Effectiveness Research

http://en.wikipedia.org/wiki/Comparative_effectiveness_research

... the direct comparison of existing health care interventions to determine which work best for which patients and which pose the greatest benefits and harms. The core question of comparative effectiveness research is which treatment works best, for whom, and under what circumstances.

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