An Investment Perspective on Business opportunities in AAL

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Healthcare - an Exciting Industry

>$16 trillion industry – 8% of world GDP, 15% of US GDP

Strong growth in medical devices and biotech, driven by continues innovation

Important demography trends are shaping the future of the healthcare industry

What are these changes and how influential are they?
Since the beginning of recorded human history, young children have outnumbered older people. Very soon this will change. For the first time in history, people age 65 and over will outnumber children under age 5.

This trend is emerging around the globe. Today almost 500 million people are age 65 and over, accounting for 8 percent of the world’s population.

Report presented at State Department Summit on Global Aging 2007
Some nations experienced more than a doubling of average life expectancy during the 20th century. Life expectancy at birth in Japan now approaches 82 years, the highest level among the world’s more developed countries, and life expectancy is at least 79 years in several other more developed countries.
While the global population is aging at an unprecedented rate, some countries are witnessing an historically unprecedented demographic phenomenon: Simultaneous population aging and population decline.

More than 20 countries are projected to experience population declines in the upcoming decades.

Russia’s population, for example, is expected to shrink by 18 million between 2006 and 2030, a decrease of nearly 13 percent.

Nine other countries are projected to experience a decline of at least 1 million people during the same period, including Japan, Germany and Italy.
Trend 4 – Changing Family Structure

• As people live longer and have fewer children, family structures are transformed.

• This has important implications in terms of providing care to older people.

• In countries with very low birth rates, future generations will have few if any siblings.

• Thus people will have less familial care and support as they age.
Trend 5 - Shifting Patterns of Work & Retirement

- No set of issues has stimulated public discourse about population aging more than work, retirement, and economic security in old age.

- Shrinking ratios of workers to pensioners

- Policymakers struggle with the balance between public and private income security systems.

- In 1960, men on average could expect to spend 46 years in the workforce and a little more than one year in retirement. By 1995, the number of years in the workforce had decreased to 37 while the number of years in retirement had jumped to 12.
Trend 6 – Growing Burden of Chronic Diseases

75% of US and Europe healthcare expenditures is directed towards the treatment of chronic disease (e.g., heart disease, diabetes) which is the key driver of the growth of healthcare spending.

More than 130 million Americans suffer from chronic conditions; that number will continue to rise.

<table>
<thead>
<tr>
<th>Chronic Condition</th>
<th>Prevalence U.S. Population</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>20.8M</td>
<td>$132B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11M lost work days</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>60M</td>
<td>$277B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.9M lost work days</td>
</tr>
<tr>
<td>Asthma</td>
<td>30M</td>
<td>$14B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.3M lost work days</td>
</tr>
<tr>
<td>Depression</td>
<td>21M</td>
<td>$43B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.2M lost work days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$30B in lost productivity</td>
</tr>
</tbody>
</table>

Trend 7 – Healthcare expenditure is up

• Health spending is rising faster than incomes in most developed countries, which raises questions about how these countries will pay for future health care needs.

• The issue particularly acute in the United States, which spends much more per capita on health care than any other country.

• Despite this higher level of spending, the United States does not achieve better outcomes on many important health measures.

Source: OECD Health Data 2007
http://www.oecd.org/document/16/1/0,3343,en_2649_37407_2085200_1_1_1_37407,00.html
Accessed December 4, 2007
Population aging will have dramatic effects on local, regional, and global economies. Most significantly, financial expenditures, labor supply, and total savings will be affected.
Challenges for European Healthcare System

• **Pressure on healthcare systems**
  • Citizens’ expectations for high-quality care
  • Increased prevalence of chronic diseases
  • Demographic changes
    - more people will require prolonged care for longer time
  • Rising healthcare costs
    - faster than the economic growth itself

• **Reducing HC cost will require among others:**
  1) Investing in Healthcare IT
  2) Implementing preventive care and disease management programs
  3) Encouraging coordination of care amongst providers
### Upcoming Modern Healthcare System

<table>
<thead>
<tr>
<th>Invasive</th>
<th>Diagnosis &amp; Treatment</th>
<th>Minimal Invasive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider Centric</td>
<td>Focus</td>
<td>Patient Centric</td>
</tr>
<tr>
<td>Centralised – Hospital</td>
<td>Transformation of Care</td>
<td>De-Centralised–Shift to Community</td>
</tr>
<tr>
<td>One Size Fits All</td>
<td>Approach</td>
<td>Personalised Medicine</td>
</tr>
<tr>
<td>Treating Sickness</td>
<td>Objective</td>
<td>Preventing Sickness – “Wellness”</td>
</tr>
</tbody>
</table>
Opportunities For Market Creation and Growth

• **Healthcare Information Technology (HIT)** - Achieving data liquidity via interoperability of electronic medical systems is the key focus of development. Development of health information networks is primarily hindered by feasible business model. There are numerous opportunities for business models (e.g., devices, preventive medicine) enabled by HIT.

• **Home Health Care** - Larger numbers of chronically ill and senior increases the demand for these services.

• **Novel drugs** - Sales of drugs is anticipated to expand significantly and represents opportunities for all stakeholders in the value chain (e.g., drug companies, retail/mail-order pharmacy chains, pharmacy benefit management).
Venture Capital - “Economic Fuel” for Tomorrow’s Businesses

- Venture capital is money provided to young, rapidly growing companies that have the potential to develop into significant economic contributors.

- Funded by private and public pension funds, endowment funds, foundations, corporations, wealthy individuals governments and foreign investors.

- U.S. companies that received venture capital from 1970-2005 accounted for 10 million jobs and $2.1 trillion in revenues in 2005:
  - This represents 9% of the total private sector work force
  - 16.6% percent of total U.S. GDP

- Venture investment itself represents just 0.2% of U.S. GDP but venture backed companies account for nearly 17% of GDP.

Source: Venture Impact 2007–NVCA and Global Insight
Venture Capital investment represent one of the most efficient economical model for new market creation and can take part in healthcare reform/ modernization

**Industry Impact of VC:**

**Healthcare:** Venture capital has made a significant contribution to the healthcare industry by form of establishing some of the leading Biotech companies; Genentech, Amgen, Alza and Affymetrix.

**Computers/Peripherals** – Venture backed companies dominate the computers and peripherals industry, accounting for nine out of every ten jobs (1.9 million) in the sector.

**Software** - The 2005 employment data show a heavy concentration of venture capital supported jobs in the software industry as well, with almost 90 percent of the total jobs in the sector.
Venture Capital Q&A

**Innovation** - Defensible technology-IP that can be protected to form competitive barriers

**Team** - Domain expertise with core technical strength

**Customers** - How does your product make the patient better, address/resolve disease pathology

**Market** - Emerging & fast growing market

**Reimbursement** - focus on tactics that will reduce the growth of healthcare spending

**Business Model** - How will you make money? How will you sale?
The Healthcare Venture Capital community is actively taking part in seeding companies and financing technologies- facilitating the required HC reform

- Healthcare Information Technology (HIT)
- Home Health Care
- Novel drugs
Information technology innovations will allow critical medical data, including images of the operating field, to be processed and transmitted rapidly, saving both patients and physicians time and speeding delivery of treatment.
Information from devices such as pacemakers, blood-glucose test kits and blood pressure will be monitored over the Internet or via wireless connections achieving better disease management.

**Multidisciplinary Information Technology Program May Help Improve Blood Pressure**

The intervention group had superior 24-hour systolic blood pressure (−11.9 vs −7.1 mm Hg) and diastolic blood pressure (−6.6 vs −4.5 mm Hg) values vs the control group.

46% of participants in the intervention group achieved their goal blood pressure vs only 28.6% of control subjects.

The intervention group also experienced superior reductions in individual self-assessed blood pressure values.
The Artificial Pancreas has been invented to help people with Type 1 diabetes. Their pancreas doesn't make insulin which is needed to control the body's blood sugar levels. It's in its early stages and 12-year-old Ellie, who has this disease, is taking part in a trial to test it out. A sensor under her arm will keep checking her blood sugar.

The scientists from Cambridge University hope it will help diabetics in future as the computer will mean they will no longer need to work out how much insulin to give. A computer uses the sensor to work out how much insulin her body needs. It then tells the pump how much insulin to give the body.
Challenges in HIT

- Technical challenges
  - Secure/reliable wireless connection
  - Battery
- Errorless sensors
- Business model
- Cost
- Interoperability
- Privacy and confidentiality
- Workforce
The transformation of care in the home is required to address demographic changes.

**Inpatient**

Inpatient care is care given to a patient admitted to a hospital, extended care facility, nursing home or other facility.

**Outpatient**

Outpatient care is any health care service provided to a patient who is not admitted to a facility. Outpatient care may be provided in a doctor's office, clinic, or hospital outpatient department.

**Home**
PHILIPS Roadmap Towards Home Healthcare Leadership


Philips leads global home healthcare market
- Core market penetration
- Geographic expansion
- Broad scale insomnia solutions
- Care Cycle approach
- Strategic acquisitions

Philips acquires Respironics
Consolidated leadership in...
- Sleep
- Respiratory
- Managing at-risk individuals in the home

Philips early Home Healthcare
- Lifeline
- HealthWatch
- Raytel
- Motiva

Adapted from Don Spence
CEO Home Healthcare Solutions Philips Healthcare
PHILIPS key Home Healthcare Segments

Sleep
- Sleep Disordered Breathing
- Problem Sleeper

Respiratory Drug Delivery
- Asthma
- Pharma Solutions
- COPD

Home Respiratory
- Oxygen
- Home Ventilation
- COPD

Home Monitoring
- Independent Living
- Remote Monitoring

Adapted from Don Spence
CEO Home Healthcare Solutions Philips Healthcare
**Fall detection system for the elderly**

Falls are common in the elderly and constitute a major health burden.

It is well known that the incidence of falls rises with increasing age.

Prototype is wearable accelerometer for fall detection

(Analog Devices ADXL105)
Take Home Message

- HC reform is a **MUST**
- HC reform is **Happening**
- Reducing inefficiency and saving is the key
- Innovation will accelerate the HC reform/modernization (devices, biotech, business model)
- Venture Capital is one of many ways to facilitate the reform
- Governments should leverage on the VC model and other alternatives to push progress a head (direct support for companies, tax incentive, and others)
Thank You

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