Rethinking – Design Thinking – Health Care

The Supplier Role

Appendices

Amy Batchu, Minjoong Kim, Megan Pee, Amy Seng
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Charter

Background

"The U.S. health care system is notorious for its high costs, which Americans traditionally assumed was the price of excellence. Some American health care is truly superb, but we now know that serious quality problems also plague the system. There is compelling evidence that much care falls well short of excellence, that both too little and too much care is provided, and that alarming rates of medical error persist". 1

"In the past two decades, health care has gone from being a source of national pride to one of America’s preeminent concerns. The nation spends almost $2 trillion annually on health care, and costs continue to escalate to levels approaching a national crisis. As costs rise, more and more Americans have lost access to health insurance. As these individuals face insufficient or nonexistent primary and preventive care, quality suffers and costs rise even further. Unless there is dramatic change, the aging of the baby boomers will drive more cost escalation, followed by intense pressures for cost shifting, price controls, rationing, and reduced services for ever more Americans.

The combination of high costs, unsatisfactory quality, and limited access to health care has created anxiety and frustration for all participants. No one is happy with the current system—not patients, who worry about the cost of insurance and the quality of care; not employers, who face escalating premiums and unhappy employees; not physicians and other providers, whose incomes have been squeezed, professional judgments overridden, and workdays overwhelmed with
bureaucracy and paperwork; not *health plans*, which are routinely vilified; not *suppliers of drugs and medical devices*, which have introduced many life-saving or life-enhancing therapies but get blamed for driving up costs; and not *governments*, whose budgets are spinning out of control.1

"The fundamental problem in the U.S. health care system is that the structure of health care delivery is broken. ... And the structure of health care delivery is broken because competition is broken. All of the well-intended reform movements have failed because they did not address the underlying nature of competition. ... The failure of competition is evident in the large and inexplicable differences in cost and quality for the same type of care across providers and across geographical area. Competition does not reward the best providers, nor do weaker providers go out of business. ... Why is competition failing in health care? Why is value for patients not higher and improving faster? The reason is not a lack of competition, but the *wrong kind of competition*. Competition has taken place at the wrong levels and on the wrong things. It has gravitated to a zero-sum competition, in which the gains of one system participant come at the expense of others. Participants compete to shift costs to one another, accumulate bargaining power, and limit services." 2

"Competition on *value* must revolve around results. The results that matter are **patient outcomes per unit of cost at the medical condition level**. Competition on results means that those providers, health plans, and suppliers that achieve excellence are rewarded with more business, while those that fail to demonstrate good results decline or cease to provide that service. ... Competing on results requires that results be measured and made widely available. Only by measuring and holding every system participant accountable for results will the performance of the health care system ever be significantly improved. ... *Mandatory measurement and reporting of results is perhaps the single most important step in reforming the health care system.*" 3

3 Ibid, pp 3-4.

**Relevant Trends**

Health care in the United States is subject to many of the trends that other industries and institutions will experience. Among these, and trends within the industry generated by its own actions are:

**Population Growth**

Population growth continues in the U.S. Most developed countries have slowed population growth to near-replacement levels, and the U.S. birth rate is .9%, in line with the industrialized nations. Immigration in the U.S., however, is high and rising population figures reflect that. The August 2007 estimate of national population size is 302,500,000. For reference, the population in 1950 was 155,000,000.

**Population Age Distribution**

Age distribution in the U.S. faces radical change over the period from now until 2025. As baby boomers reach retirement, the population pyramid will shift from one with a central bulge, but relatively classic shape, to one with a slight slope from 65+ to 65 and then an almost vertical slope the rest of the way down. The pyramid will develop a significant "aged" segment during this time. In the oldest portions of this segment (70+), women will continue to outnumber men.

**Population Movement**

A combination of forces is creating a movement of people from rural to urban environments. In developed countries like the U.S., it is the renaissance of the city as a cultural center coupled with the progression from manufacturing to service to
information economies. In 2005, for the first time, the world’s population was more urban than rural.

**Health Care Costs**
Health care in America is outstripping all other costs. In the 1950’s it was 6% of the gross national product, compared with 6% for education and 6% for defense. By 2003, the figures were approximately 4% for defense, 6% for education and 14.2% for health care, more than 1.5 trillion dollars for health care alone. The growing elderly segment of the population pyramid guarantees further accelerated growth in health care costs unless there is radical change to the system.

**Increasing expectations**
The growing availability and capabilities of communications such as cellular telephones, satellite and cable TV, and the Internet are providing people with daily knowledge of living conditions, problems, products, threats and services everywhere. As the media create new and faster avenues of communication, they also raise levels of awareness and create expectations that both fuel demand and encourage willingness to change.

**Internet Penetration**
Computer use and Internet access grow exponentially every year. Information of encyclopedic detail can be obtained more and more easily, and complex, sophisticated processes can be used remotely. Access to high-quality communications and sophisticated computer tools are increasingly available to individuals and groups anywhere. In the United States, Internet penetration reached 70% in 2007.

**Emerging Technologies**
The pace of technological change continues to accelerate, bringing new science to industrial, institutional and governmental uses at an ever quickening pace. Most notable among many promising fields, major technological innovations can be expected in the new disciplines of molecular nanotechnology, robotics and the biosciences.

**New Relationships**
Greater public mobility and access to information is changing the nature of association for many individuals and organizations. Organizations that once operated in isolation are now players in a common environment. Sometimes the emerging relationships are competitive, sometimes cooperative, and new forms of relationship can be expected to be created as conditions evolve.

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**Project Statement**
Using Structured Planning methodology, conduct an advanced planning project to develop information service systems and ways to measure their success for employers, providers, health plans, suppliers, and government. Component proposals should:
1. consider Porter and Teisberg’s *Redefining Health Care* as the primary guideline defining policy strategy.
2. plan services with the understanding that they will be incorporated in a universal health care system.
3. anticipate and plan for networked operational cooperation among all elements of the system—locally, regionally and internationally.
4. collect and incorporate best practices and concepts as they have been advanced by organizations, agencies and planning experts throughout the health care community.
5. accommodate concepts developed for the rest of the mix of players in the system—employers/providers/health plans/suppliers/government.
6. present the information of each component report and presentation in a common format with other components as a set of recommendations that can be used by candidates in the 2008 presidential election.
Goals

As general guidelines the project should:

• Explore a full range of possibilities, paying especial attention to the products of emerging technologies successfully advancing through research and development.

• Include ideas for any processes, tools, systems and products needed for services—including procedures, activities, organizational concepts and any relevant relationships among them.

• Explore revolutionary as well as evolutionary ideas.

• Plan for communication processes by means of which all elements of the system can be made aware of successes and failures.

• Consider potential costs and funding thoughtfully; proposals should not incorporate unnecessary frills, but should not ignore services possibly expensive but having great potential—simply to avoid costs.

• Conceive the properties and features of the concepts as means to build competition on the basis of quality as measured by change in medical condition.

• Consciously reflect the effect of the design approach as a demonstration of the power of design thinking applied to problems in the public domain.

Overall, the solution should:

• Assume that the proposal can be acted upon as it is conceived. Do not underpropose on the assumption that a concept might be politically opposed.

• Demonstrate what might be achieved. The value of the proposal is in its ideas, not its certain attainability. Ideas that might not be fully attainable or feasible today may be achieved tomorrow—if they are known.

Resources

Resources for the project will be:

Physical:

• The facilities of the Institute of Design, including Room 514 as meeting space for the beginning of each class session, and 3rd and 5th floors for team activities.
• Computing support from the fifth floor computer facilities.
• Equipment as necessary from ID resources.

Financial:

• Funding for approved research needs and report generation.

Human:

• Planning Teams

Services for Employers  Services for Government
Fei Gao          Rima Kuprys          Hanna Korel  Amy Palit
Margaret Jung    Amber Lindholm    Soo Yeon Paik  Alexander Troitzsch

Services for Suppliers  Services for Providers
Amy Batchu      Suat Hoon Pee    Ash Bhoopathy  Gauri Verma
Min Joong Kim    Amy Seng        Lin Lin         Ye Kyung Yoo

Services for Health Plans  Services for Health Plans
Matthew Gardner  Preethi Lakshminarayanan
Kichu Hong       Peter Rivera-Pierola
Sriram Thodla
The project will be conducted from August 28 to December 7, 2007.

<table>
<thead>
<tr>
<th>Week</th>
<th>Phase</th>
<th>Activity</th>
<th>Product</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 28</td>
<td>Introduction</td>
<td>Introduce project</td>
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<tr>
<td></td>
<td>Aug 31</td>
<td>Project Definition</td>
<td>Develop Issues &amp; Defining Statements</td>
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<tr>
<td>2</td>
<td>Sep 4</td>
<td>Health Workshop</td>
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<td>Sep 10</td>
<td>Health Workshop</td>
<td>DefStats 1</td>
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<td></td>
<td>Sep 11</td>
<td>Develop Modes and Activities of Function Structure</td>
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<td></td>
<td>Sep 14</td>
<td>In-Progress Review</td>
<td>DefStats 2 Fn Struc 1</td>
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<tr>
<td>4</td>
<td>Sep 18</td>
<td>Information Development</td>
<td>Generate Functions, Design Factors and Solution Elements</td>
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<td>Sep 21</td>
<td>Action Analysis</td>
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<td>Sep 25</td>
<td>In-Progress Review</td>
<td>DefStats complete Fn Struc 2 DesFacs 1 SolnEls 1</td>
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<td></td>
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<td>Action Analysis 2</td>
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<tr>
<td>6</td>
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<td>Information Development</td>
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<td></td>
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<td>Action Analysis 2</td>
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<td>F n Struc complete DesFacs complete SolnEls complete</td>
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<td></td>
<td>Oct 12</td>
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<tr>
<td>9</td>
<td>Oct 23</td>
<td>Concept Development</td>
<td>Means/Ends Analysis</td>
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<td>Ends/Means Synthesis</td>
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<td>12</td>
<td>Nov 9</td>
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<td>Nov 13</td>
<td>Presentation</td>
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<td>Nov 16</td>
<td>Communication</td>
<td>Refine final SysEls;</td>
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<td>write report; complete</td>
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<td>Nov 20</td>
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<td>15</td>
<td>Dec 4</td>
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<td>Illustrated Report</td>
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**Methodology**

The project will be conducted using Structured Planning (See articles on the subject by Charles Owen at [http://www.id.iit.edu](http://www.id.iit.edu) under the *Publications* section of *Our Research*:


**Issues**

Consider the following topics as initial issues to be investigated. Supplement them with additional issues as information is developed during the first phase of the project.

**Technology.** What approach should be taken toward the use of advanced medical and information technologies and emerging technologies in general?

**Adaptivity.** How should elements of the system be prepared to respond to evolving demographic changes and emerging technological capabilities?

**Networking.** What policy should be taken toward partnering with health care institutions in other regions, suppliers of funding, suppliers of technology, goods, etc.?

**Means of Introduction.** How should services be introduced to facilitate acceptance and implementation?
Public/Private Sector Relationships. How should services be positioned with respect to authority/responsibility for implementation and operation?

Concept Communication. How should concepts of quality in medical condition terms and measurement strategies, processes and system concepts be communicated to the public and institutional users?

Cost Assignment. How should the distribution of the expected costs of services be approached?

Disaster Contexts. What provisions should be made for extreme conditions that can be expected with more frequent environmental emergencies (e.g., Katrina)?

Eligibility. What part should eligibility for care play in planning for the provision of services and measurement of their quality?

Health Responsibility. How should services approach the issue of personal vs societal responsibility for fundamental individual health care?
<table>
<thead>
<tr>
<th>Defining Statement</th>
<th>Issue Product Lines</th>
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</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
<td>Rethinking - Design Thinking - Health Care</td>
</tr>
<tr>
<td><strong>Originator</strong></td>
<td>Megan Pee</td>
</tr>
<tr>
<td><strong>Contributors</strong></td>
<td>Amy Batchu, Minjoong Kim, Amy Seng</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td>Suppliers should focus on developing specialised products that address the full cycle of care for patients’ diagnosis</td>
</tr>
<tr>
<td><strong>Alternative Position</strong></td>
<td>Suppliers should develop an extensive range of products to help patients</td>
</tr>
<tr>
<td><strong>Sources</strong></td>
<td>Morgan, Steven G. “Breakthrough drugs and growth in expenditure on prescription drugs in Canada” BMJ 2005;331;815-816; originally published online 2 Sep 2005</td>
</tr>
<tr>
<td><strong>Team deliberations.</strong></td>
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</tbody>
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### Background and Arguments

While many new medical technologies produce significant improvements in patient health outcomes and quality of life, some may not generate benefits that justify their cost, creating wasteful health expenditures. In their attempt to amass greater bargaining power, suppliers often consolidate and produce a wide repertoire of products to capture more value for themselves instead of focusing on improving health results and patients’ experiences (pg 37, Porter). Of particular concern are ‘me-too’ products.

“Me-too” products do not serve much value in the health care delivery system especially when costs are similar. For example, in cancer care, drugs such as Erbitux, Herceptin, Tarceva and Iressa are each effective in about 10% of patients. A succession of drugs is often tried which ended up with repeated failures and that resulted in wasted treatment and exposure to side effects by patients. (Porter, page 285). Also noted from a report by BMJ, eighty per cent of the expenditure growth around 2005 in British Columbia, Canada, was attributable to new drugs launched in established chemical subclasses.

Besides focusing on single point of treatment and symptoms, suppliers should provide specialised solutions in the entire cycle of care. eg to address stroke involving a major vessel, hospitals must have several imaging capability – including CT, MRI (Porter, pg 405-406). Thus, if suppliers could focus on the entire cycle of treatment, they would have designed the same type of table which facilitate simpler and rapid access and egress-comfort and better value to very sickly patients.

Harnessed properly, new medical technology can generate significant patient benefits while driving down overall healthcare costs.
### Defining Statement

#### Project

Rethinking - Design Thinking - Health Care

#### Originator

Megan Peé

#### Contributors

Amy Batchu  
Minjoong Kim  
Amy Seng

#### Sources

- *The Pharmaceutical Price*  
- Regulation Scheme  
- *The Truth About Drug Companies*  
- Team deliberations.

### Issue

**R&D Funding**

#### Question at Issue

To what extent should government agencies fund R&D for healthcare products?

#### Position

- Constraint  
- Objective  
- Directive

**Government agencies should continue to fund the basic R&D while suppliers use their own funds to develop/manufacture the healthcare product.**

#### Alternative Position

- Constraint  
- Objective  
- Directive

**Suppliers should fund the entire R&D efforts since they reap the profits eventually.**

### Background and Arguments

The process of pharmaceutical research and development (R&D) is a complex, costly, risky and long undertaking. It requires a sustained mobilisation of substantial human and financial resources over long period of time before a new drug finally reaches the patient. On average, this process takes between 10-15 years and the R&D expenditure averaged $802 million per approved new drug in 2000. While the expenditure is high, it is a known fact that only a small percentage of pharmaceutical companies’ R&D spending is allocated to basic research. Government has been the one to fund basic R&D most of the time.

It may seem like a good proposition for suppliers to fund their own R&D since it will relieve the financial burden from government agencies. However, on closer look, it may not be that ideal for private entities to carry out the entire R&D, as it will greatly reduce the amount of freely available knowledge in the public domain. Data is ever less likely to be shared voluntarily when it is from a commercial source.

This proposed position is critical especially for start-ups that lack significant funding of their own research. Take for the case of the diverse medical device industry which consists of thousands of product lines used by more than 50 medical specialties in numerous procedures and applications. The majority of device companies are small:

- 65% of firms have less than 20 employees, 80% of firms have less than 50 employees and 98% of firms have less than 500 employees.
- Most innovation, where the truly novel devices are developed, occurs in firms with fewer than 20 employees who cannot afford to pay for the hefty basic R&D.

The government has played a vital role in funding innovation and should continue to do so.
Defining Statement

Project
Rethinking - Design Thinking - Health Care

Originator
Megan Pee

Contributors
Amy Batchu
Minjoong Kim
Amy Seng

Position
Besides designing their products for use in the context where they will be deployed, suppliers should also take into consideration of how products may be made adaptive to accommodate changes in environmental and patient's conditions.

Sources
Conversation with Prof Charles Owens
Team deliberations

Alternative Position
 Suppliers should design their products to meet specific functions and the conditions of how they will normally be deployed

Background and Arguments
Healthcare product design is often found lagging as in most cases only engineering and marketing contribute to a product's design. Besides considering user centeredness, the situations and context that warrant healthcare are also important considerations in designing the appropriate products. This is especially so for treating very ill and fragile patients.

Supplying products that address a single situation bring benefits to end users as this often translates to lower cost products. However, the product might not be useful when the care conditions change. Take for example the design of a blanket. In the supplier's mind, a blanket is used for keeping a person warm and he could simply use cotton blankets as in everyday life. However, he missed the key consideration of changing conditions that occur during the cycle of treatment. That same blanket is of no help to a patient if he has previously undergone treatment that caused profuse perspiration. Instead of keeping him warm, the blanket might be trapping the perspiration which cause discomfort and making him cold.

If the supplies are not adaptive to changing context, then the healthcare providers will need to purchase various categories of similar products to meet changing needs and environment. Alternatively, the provider may choose to ignore the needs of patients and this does not serve the patient well.

Buying several products of the same to be used in different environment/conditions incur a higher cost than having an adaptive product which might cost slightly more initially due to its additional features. Extra funding spent early under this design philosophy will reduce funding that will inevitably be spent later or at the expense of the value of care provided to patients.
## Defining Statement

### Project
Rethinking - Design Thinking - Health Care

### Question at Issue
How should suppliers' structure their organization?

### Originator
Megan Pee

### Contributors
Amy Batchu  
Minjoong Kim  
Amy Seng

### Position
- Constraint
- Objective
- Directive

#### The organization should structure itself to best design products that provide value in the full cycle of care delivery

### Alternative Position
- Constraint
- Objective
- Directive

#### The organisation should structure itself to produce the best products of its class i.e. best CT scanners, best MRI machines

### Background and Arguments

Presently, most organisations are structured in departments to fulfil the tasks assigned. In companies that produce products, they will likely to be organised in stand-alone product-line departments which operate in silos. Healthcare suppliers are also structured around a specific product offering eg CT and MRI business units.

To stay competitive, these healthcare suppliers strive to produce a winning product that compares favourably with its competitors. Suppliers have done well in producing superior products for point treatment eg a CT scan takes only 2-3 minutes. However, it can take 15 min or more for patients to get on and off the machine's tables when patient is attached to intravenous lines and is being monitored (Porter, pg 286).

Producing the best product is therefore only a part of the equation to better healthcare and it is not enough to provide the best value to patients. A better organisation structure will be one that captures the full cycle of care – from monitoring/prevention, diagnosis, preparing, intervening, recovering/rehabilitating to monitoring/managing. This structure enhances the value of their product offering eg opportunities to design and manufacture modular tables that could be utilised for patient transport, treatment and imaging which offer huge value advantages to very sick patients.

Healthcare suppliers could add tremendous value to the patients once they come to realise this huge opportunity offered by the new structure.
### Defining Statement

**Project**
Rethinking - Design Thinking - Health Care

**Originator**
Megan Pee

**Contributors**
Amy Batchu  
Minjoong Kim  
Amy Seng

**Sources**
Hefty Pharmaceutical Company Margins Dwarf Other Industries Congress Watch June 2003 www.citizen.org
Teamm deliberations.

### Issue
**Use of Technology**

**Question at Issue**
Should suppliers be using emerging technologies and advance science and engineering concepts?

**Position**
- [ ] Constraint
- [x] Objective
- [ ] Directive

Emerging technologies and advanced science/engineering concepts which show promise should be pursued by suppliers aggressively. In the meantime, suppliers should use proven and tested technologies for developing their products.

**Alternative Position**
- [ ] Constraint
- [ ] Objective
- [ ] Directive

Suppliers should just concentrate on making use of the most economically proven technologies for producing their products and embark on new technologies only when they are ready and tested.

### Background and Arguments

Suppliers might not to be always keen to pursue the latest emerging technology as the cost and risks are very high. Also, the interests of suppliers and patients may not be aligned at times as faster recovery of patients mean less use of equipment and medication. This, suppliers might not see the reward for rapid innovation in emerging technologies when reimbursement for better approaches may turn out lower.

These reasons may cause the suppliers to hold back their efforts in applying promising emerging technologies. All they might be interested in may be to merely produce products using economically proven technologies and keeping their products just ahead of their competitors.

This approach may not be a good strategy as it has been shown that companies who pursue the latest technologies stand to reap huge profits as reported in Congress Watch. In the report, Pfizer, a company who invests heavily and constantly applying the latest technology, made $9.1 billion in profits in 2002 and they reap the greatest amount of profits of any drug company in the Fortune 500. Its hefty cash flow was largely due to a lineup of “blockbuster” drugs. Pfizer achieved 26 cents of profit for every dollar of revenue, outperforming the Fortune 500 median by nearly 8.5 times. Thus, companies should continue to pursue latest technology and use them once they are tested. This will be beneficial in providing better healthcare products for end users.
### Defining Statement

**Project**

Rethinking - Design Thinking - Health Care

**Originator**

Megan Pee

**Contributors**

Amy Batchu  
Minjoong Kim  
Amy Seng

### Question at Issue

How should suppliers structure their costs - R&D versus other expenditures?

### Sources

- The Truth About the Drug Companies: How They Deceive Us and What to Do About It by Marcia Angell
- Glaxo and EMI: a tale of two companies by Stephen Black  
- Team deliberations

### R&D Allocation

| Megan Pee | 6 |

### Background and Arguments

As the contribution of public research (government and academic) to the process of pharmaceutical R&D is limited to the very early stages of the research phase, pharmaceutical companies have to continue to invest huge amounts of funds to develop the product in most instances. IFPMA (International Federation of Pharmaceutical Manufacturers & Associations) claims that it can consume over 70 percent of the entire companies’ R&D budget ([http://www.ifpma.org/Issues/issues_research.aspx](http://www.ifpma.org/Issues/issues_research.aspx)) in some instances.

In their attempts to sell their products in large quantities to recover their costs and offer cheaper drugs, many pharmaceutical companies end up with costly aggressive marketing campaigns. According to Angell, top U.S. drug makers spend 2.5 times as much on marketing and administration as they do on R&D. This could be one of the reasons why prescription drugs are so expensive. As a result, many patients have to resort to either generic drugs or travel outside US to purchase their medication.

U.S. biopharmaceutical industry is America’s most research-intensive industry and is the world’s largest source of investment in discovering better treatments. They ought to continue to create the new medications at competitive prices to save lives and improve the quality of life for millions of people.
To what extend should suppliers be made responsible for the effective running condition of their medical equipment?

**Sources**
Analysis of the Medical Imaging Services at Three Hospitals of the Mexican National Health System. Journal of Medical Systems Springer Netherlands ISSN0148-5598 (Print) 1573-689X (Online)
Issue: Volume 31, Number 4 / August, 2007
EU WEEE Directive
Team deliberations

**Background and Arguments**
The operating status of specialised medical health equipment directly affects the quality of the health care delivered to patients. Any malfunction or breakdown of equipment delays the treatment which might cause grave consequence to the health of patients seeking help.

Common factors that are linked to faults affecting the quality of the health care delivered include equipment obsolescence; deficient preventive maintenance procedures and problems associated the supervising of external service providers. Other factors are derived from the equipment's (over) workload and the misuse of the equipment. The solutions point to a product maintenance plan which should consider the age of the equipment and a better supervision of the usage. In addition to this, a special effort of the continuing education of personnel associated with these equipment at all levels should be carried out.

The suppliers of these specialised equipment are in the best position to install and start-up the system. However, the cost to continue to engage through the entire lifecycle might be high, subsequent contracts will be awarded to companies who are in good position to keep these equipment in good running order.

Disposal is also a very key component of the maintenance plan.

The European Union’s Waste Electrical and Electronic Equipment (WEEE) Directive has passed into national law, manufacturers of electrical and electronic equipment in the EU’s member states that required manufacturers to take back and recycle or dispose of products by environmentally compatible means.
**Issue**
Value-based approach to pricing pharmaceuticals

**Question at Issue**
How should healthcare products be priced?

**Project**
Rethinking - Design Thinking - Health Care

**Originator**
Megan Pee

**Contributors**
Amy Batchu
Minjoong Kim
Amy Seng

**Position**
The current profit and price controls should be replaced with a value-based approach to pricing, which would ensure the price of drugs reflect their clinical and therapeutic value to patients and health care industries.

**Sources**
Team deliberations.

**Alternative Position**
Suppliers should continue to price their products according to supply and demand.

Government must enforce the possibility of high (low) earning profit of manufacturers thus capping the price of health care products

**Background and Arguments**
Drug cost is a much debated issue and pharmaceutical companies often claimed that they need to cover the exorbitant R&D costs. Value based pricing is a good position as manufacturers will be paid according to the value that they contribute towards the health of patients.

Three major benefits to patients and innovative companies in the short and long term if value based approach is taken:

- value for money for the healthcare industries: expenditure could be used more cost effectively under value-based pricing, allowing patients greater access to drugs and other healthcare benefits they are currently being denied. In short, the same level of expenditure could be used to produce greater benefits for patients.

- better incentives to invest: more value-reflective prices would give companies much stronger incentives to invest in the drugs that are most beneficial to society, particularly in areas of unmet patient need.

- A stable, sustainable system: these reforms would improve stability for government and industry in the long run, by avoiding reliance on increasingly arbitrary profit and price controls and ensuring instead that future pricing decisions are based on an informed, rational debate about how to make the best use of available government resources.

Regulating profits is a very indirect means of controlling prices, and one that is ill-suited to an innovative sector such as pharmaceuticals. The possibility of earning high (or low) profits provides a strong incentive to companies to produce valuable drugs for patients. Imposing maximum and minimum allowed levels of profits in a way that takes no account of the value of drugs produced by a firm dulls those incentives.
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<td>Amy Batchu, Minjoong Kim, Megan Pee</td>
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<tr>
<td><strong>Position</strong></td>
<td>□ Constraint □ Objective □ Directive</td>
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<tr>
<td><strong>Alternative Position</strong></td>
<td>Providers should record their use of products (medication, technology, and general supplies), the related medical conditions, and the results, if applicable. This data should be analyzed and compiled into public reports.</td>
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</tbody>
</table>

**Background and Arguments**

Currently both providers and consumers have limited ways of finding out how well a product works. For medication and technological equipment, they need to rely on advertisements and the results of clinical trials, both of which can be biased or limited in their scope. General supplies like furniture and linens are even worse in that they are not heavily marketed, so people have almost no way of determining their quality. In the face of these circumstances, providers and consumers often choose products by price, assuming that product quality is approximately the same across brands. With many drugs and supplies, providers will try to bargain prices down by buying in bulk.

In order to ensure that products continue to improve their quality, there needs to be an objective way of evaluating their effectiveness. The question is where the responsibility for this evaluation should lie.

Suppliers currently test all of their products internally before releasing them to the market (e.g. clinical trials for new medications). They could continue collecting data once the product is sold, but other companies would inevitably question the objectiveness of their data. Their results are also, quite reasonably, focused only on their specific product as opposed to its role in holistically treating a medical condition.

Providers could also be required to record their use of and satisfaction with products, but it would be difficult to aggregate the data across providers to produce meaningful conclusions on product quality.

A third-party dedicated solely to collecting objective data on patients, providers, treatments, medication, and equipment, analyze it, and then publish "value reports" to the public would provide the most value to all players in the system. With all the data in one place, consumers can easily find the best providers or treatments for their condition, providers can see how they compare to others and which products are the most effective, and suppliers can evaluate how well their products are meeting the needs of the public. The "value reports" also provide a foundation for quality-based competition among suppliers and providers.
What provisions should be made for extreme and large-scale emergencies?

A national and international network should be created that allows patients to be sent to the nearest equipped provider or for products to be quickly transported to emergency locations.

Suppliers should develop contingency plans to ensure that resources are available to providers in their vicinity in cases of emergencies.

During emergencies, large quantities of medication, specialized equipment, and general medical supplies are needed and may not be available from local suppliers or providers. Currently, these needs are met by the American Red Cross and the Federal Emergency Management Agency, but these groups do not work directly with suppliers. The FEMA stockpiles supplies (enough to support 1 million people for a week as of August 2006) and distributes them to local FEMA chapters. However, local chapters can cover multiple states, leaving many cities in the US unprepared for disasters. Some cities create contracts with local suppliers or have emergency supplies on standby at all times. While this may ensure that basic supplies are available at all times, there is no way to ensure that every need will be met and it is a waste of resources to have extra supplies on hand at all times.

Rather than investing money in pre-buying supplies and storing them in warehouses, the government can use the money to reimburse the suppliers at base rates.

With a national and international network of suppliers, disaster relief agents will be able to locate the necessary supplies immediately and the nearest suppliers will be able to dispatch their products quickly. In medical emergencies, patients could be airlifted to the nearest provider with the necessary equipment without first having to go through the local hospital. With an efficient communication and transport network, there will be no need to stockpile supplies because extra resources can be combined from multiple suppliers across the country and even the world.
To what extent should suppliers educate consumers about their products?

Suppliers must provide the results of their clinical trials, indications, and warnings about their products in standardized formats. This information must be accessible, in varying levels of detail, by providers, health plans, and the general public.

Suppliers should inform consumers (both providers and the public) about the usage of their product in whichever way they find appropriate. This includes results of clinical trials, indications, and warnings.

Suppliers must inform providers about the usage of their products and it is the providers' responsibility to educate their patients.

Currently, consumers have a limited number of ways to learn about medical products (e.g. pharmaceuticals, medical equipment, etc.). The most common way for the public to learn about drugs or treatments is from advertisements or their primary care physician. Providers learn about drugs and treatments from salespeople and by reading current research articles. The FDA also has a public database of all approved drugs and medical devices, but this database is difficult to find and the information in it is difficult to understand.

The result is that neither providers nor the public have a clear picture of the pros and cons of different medical drugs, treatments, and devices.

A standardized way of describing products like the nutrition label necessary on all food products (Nutrition Label and Education Act, FDA) would help consumers directly compare similar drugs and treatments. By releasing this information, in varying levels of detail, to providers and the public, people will be able to make more informed decisions about their health.

There are currently initiatives to standardize patient health information records (e.g. NIHN, HL7), but these have not yet received national acceptance and they are more for patient records than medical supplies.
How should drugs be evaluated before they are released to the market?

Pharmaceutical companies and the FDA should take advantage of new innovations in technologically to shorten the evaluation process for new medications.

FDA regulations should be less restrictive to allow new drugs to enter the market in a shorter amount of time.
## Defining Statement

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### Question at Issue

How should suppliers of pharmaceuticals and medical devices adapt to the increasingly global health care industry?

### Contributors

Amy Batchu  
Minjoong Kim  
Megan Pee

### Sources

Minjoong Kim. Interview by Amy Seng  
Swapnil Jadhav. Interview by Amy Seng [www.who.int/en](http://www.who.int/en)

### Background and Arguments

Research and development of drugs and devices can be very resource and time intensive. Drug development, especially, must go through many phases of research, development, and testing. While initial research and clinical trials need to be done in the United States, the middle phases of research and development where compounds are screened and tested in vitro and in vivo can be outsourced to other countries. After FDA approval, the manufacturing of drugs and medical devices should also be outsourced to reduce costs. Many companies already do this, but more should follow suit.

Parties against outsourcing claim that the quality of research and products will decline if outsourced, but this has not been the case in any other industry. The WHO also published GMP (Good Manufacturing Practices) guidelines and inspects and certifies all research and manufacturing plants that will be exporting goods to other countries.

### Position

- Constraint
- Objective
- Directive

**Suppliers should outsource research and manufacturing where appropriate to reduce costs and pass these savings onto consumers.**

### Alternative Position

- Constraint
- Objective
- Directive

**Suppliers should do all research and manufacturing in-house to ensure the quality of their products.**

## Background and Arguments

Suppliers must assist providers without eliminating the duties and responsibilities of providers. Often unrealized, the individual practitioner is the center of health care...where most value is actually delivered (Porter 10). Suppliers should not over interact with patients because they may eventually exclude the primary care Provider. Heart Check America and GE along with a small number of providers are implementing programs together using the supplier’s technology; this may complicate the existing patient / provider relationships (Loeb). Suppliers also create "under the table" relationships with Providers that are unacceptable (Bruss). An unbiased relationship between suppliers and providers would allow for fair prescribing practices which are based on delivering the absolute best value to patients. When suppliers attract providers with these "under the table" relationships, it creates difficulties not only with value of care but also with providers reputations, purchasing structures and precise prescribing. Suppliers may go as far as predicting and coordinating cohesive personality types between their drug reps and potential providers (O’Riley 16). Once relationships matriculate sales reps are encouraged to use whatever method that is the most effective in swaying a providers prescribing habits (O’Riley 18).

Suppliers have offered little long-term outcome information for patients; for example if a new, device helps diabetes patients manage their blood-sugar levels but requires more primary care visits, credible long-term evidence of cost reductions due to fewer long-term complications is essential (Porter 290). Patients want to understand the differences in the cycle of care when determining which device to pick. It is essential that the supplier provides this information to the provider, so that these stories and statistics are passed on to the patient. Providers need to be educated about new products, which come with new probabilities.
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<td>How should Suppliers price their products?</td>
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<tr>
<th>Sources</th>
<th>Alternative Position</th>
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<tbody>
<tr>
<td>Flower, Joe. 2007. &quot;Why Set Pricing Could Work,&quot; Physician Executive Journal, July - August: 62-65</td>
<td>Suppliers should base their price structure on the amount that the consumer or health plan is willing to pay for it with little correlation to what the consumer demand is.</td>
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</table>

### Background and Arguments

If suppliers publish real prices then the system will begin to provide powerful insight about actual quality in the health care system. This will extract the good and the bad prices from the system. Eventually setting real prices with consideration of the entire cycle of care. However it is difficult for suppliers to currently do this because all of the other key players don’t have tangible prices either. The prices for stents, hip implants, and perfusion pumps are based on reimbursements and a sense of what the market will bear, not the cost of manufacture (Flower 63).

If suppliers do not consider creating real prices, that are passed down through health plans to patients then the quality of care is compromised. There has already been a huge rise in medical tourism which will continue to eliminate patients from our public and private systems. Without real prices or with high prices, patients will look to other systems that combine lower prices and high quality (Flower 1). Real prices will happen through “lean manufacturing” techniques which improve service, cut costs and increase quality. If suppliers analyze all the steps that make up a given procedure, then ask which are truly necessary, and which add value they will be able to eliminate the value from the non-value processes. This will ultimately eliminate waste eventually leading to every step being of value. (Womak 5). In addition to the demand for real prices, there is an actual demand for specific products. There may be a maximum or minimum scale that effects the purchase price of an item which then creates incentive for a purchasing manager to buy bulk quantities at a lesser price. But whatever product it may be, excess inventory, and the added possibility that excess technology will become outdated will create excess waste. Inventory should be efficiently assembled when patients demand it (Womak 9). Suppliers have offered little long-term outcome information for patients; for example if a new, device helps diabetes patients manage their blood-sugar levels but requires more primary care visits, credible long-term evidence of cost reductions due to fewer long-term complications is essential (Porter 290). Patients want to understand the differences in the cycle of care when determining which device to pick. It is essential that the supplier provides this information to the provider, so that these stories and statistics are passed on to the patient. Providers need to be educated about new products, which come with new probabilities.
To what extent should suppliers be responsible for the support of their products?

Suppliers of equipment, pharmaceuticals, information and services should be responsible for product support from the point of creation to retirement, unless there has been user neglect or misuse.

Suppliers should offer optional, time limited care plans during the distribution phase of their products, to be taken advantage of only when the consumer desires.

Suppliers should not assume responsibilities for the impacts of their products after distribution.

Having suppliers support the entire life cycle of a product or service is beneficial because it creates better quality, genuine relationships, and multiple opportunities. Suppliers should be aware of the impact of a product during the creation stage, understanding how the product will effect the environment in which it is placed is absolutely necessary. It's actually about taking a more holistic approach to the creation of health care environments and understanding the relationship that exists between human health and positive environmental influences, both inside and outside the building (Southerst).

Suppliers not assuming the responsibilities for the impacts of their products after distribution have missed opportunities to innovate their products. Once a product has hit the market, the Supplier has the opportunity to observe that products useability within its actual situation. Then when a product is ready for retirement, there should be further attempts to recycle, refurbish, or reconfigure the outdated goods (Porter 286). Suppliers should be there to acknowledge and assist in positive and negative impacts of their products, eventually leading to valuable documentation. The data is recorded and evaluated the suppliers have an opportunity to enhance their product.

When Suppliers offer optional, time limited care plans during the distribution phase of products, they may sever relationships between Suppliers and their consumers, the providers, in the middle of value deliverance. Also, many focus on introducing new innovative devices and drugs, however there are huge opportunities to improve the existing methods and coordination of these products. (Porter 143).

While time limited care plans sever relationships, assuming no responsibility for product impact just perpetuate the ability of poor quality products to be manufactured. When Vioxx was withdrawn from the market in 2004, it already had been sold for about five years and used by millions of patients for pain relief before its harmful cardiovascular effects surfaced (Landers). The FDA was primarily blamed for allowing the product to come to market, however the suppliers, Merck Co. may have been able to monitor this drug more effectively with intent to insure patient’s good health.
### Defining Statement

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| Originator | Amy Batchu |

| Contributors | Min Joong Kim  
Suat Hoon Pee  
Amy Seng |

<table>
<thead>
<tr>
<th>Position</th>
<th>Suppliers and health plans should combine clinical efforts, while sharing information, and services that will improve individual patient outcome and create sustainable costs.</th>
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<td>□ Constraint</td>
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<th>Alternative Position</th>
<th>Suppliers and health plans should have a vendor based relationship with aggressive focus on contracting product / service lines and capturing market shares.</th>
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Studin PhD, MPH, Ira. Reframing the Pharmaceutical Manufacturer / Health Plan Relationship in Managed Care. Managed Care. February 2002: 46-54. |

### Issue

| Issue | Supplier - Health Plan - Patient Relationships |

| Question at Issue | How should Suppliers work with Health Plans in order to improve the quality of the care cycle for the patient? |

### Background and Arguments

Health plans and suppliers should allow for a non-disrupted stream of information to flow between the two institutions. Both of these players together have the ability to collaborate clinical information, along with current user statistics and stories. Health plans and suppliers should work together to consider the quality of care that the end user, the patient receives. The system of recording common stories and data is not national. Different players in the system are using different methods. Suppliers and health plans are very capable of sharing information to better serve the patients. It is evident that the health care system, specifically data management, information systems and information technology, is not that innovative. The system requires a shared portal of information. (Holstein).

The relationship, specifically, between the suppliers and health plans needs to be non-disruptive; trust must be given to one and another. When health plans distrust suppliers, it is extremely difficult to harvest productive relationships. Developed trust could emerge between these primary health care players. There are new opportunities for innovations such as population-based medicine and clinical-quality improvement (Studin 49).

If relationships are solely based on obtaining market shares, without genuine collaboration, then the quality of care is compromised. When a patient becomes comfortable with a particular prescribed drug, they often become uneasy when their health plan informs them of a change in formulary. The health plan may even change to a more expensive drug or one without a generic alternative. This means that they will now have to switch to an undesirable drug because their health plan decided to contract with a different supplier (Loeb).

These two players, however need to provide their services separate yet evolved from each other. Health plans must consider the "total cost-of-care savings." In addition to this, suppliers should establish ongoing services to the health plans to ensure that both of these efforts will build meaningful quality into managed care. (Studin 46).
What kind of model should Suppliers use for sales?

Minjoong Kim

Amy Batchu
Suat Hoon Pee
Amy Seng

According to Bradley (2000), “how well or badly the health care supply chain is managed is a major factor in health care costs”. During the mid 1990’s, the Efficient Healthcare Consumer Response (EHCR) (EHCR, 2000) performed its own major supply chain study. They found out that the health care supply chain inefficiencies contributed $11 billion (or 48%) out of the total annual costs of $23 billion. Their report described that the health care supply chain was centered around distributors, resulting in little contact between manufacturers and hospital materials managers. (Managing health care supply chain)

Present health care system in United States maintains the unreasonable and complex structure which several players such as Government, health plans, providers, suppliers and employers are mixed together. This structure could not help each player to compose the relationship for complementary cooperation but have bad effects on benefits from each players to patient, end users of products. Through a number of distributors participate in sales structure while suppliers release their new products on the market, providers unavoidably purchase products at unreasonable price and patients are also set on the same situation. The supplier’s aspect also is bad situation in which hardly developed products are purchased as cheap price. This aggravates suppliers’ financial condition against the positive environment where new R&D is possible. For solving this problem, supplier should aggressively make and use new ways of sales structure.
## Project
Rethinking - Design Thinking - Health Care

### Originator
Minjoong Kim

### Contributors
Amy Batchu  
Suat Hoon Pee  
Amy Seng

### Sources

Steven R. Eastaugh, Health Care Finance: Cost, Productivity, & Strategic Design

### Issue
Payment for product

### Question at Issue
How should suppliers be paid for their products and services?

### Position

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- Suppliers should be paid based on a leasing model for their products and services.

### Alternative Position

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- Suppliers should be paid based on monthly payment model for their products and services. It could decrease financial overload of consumers.

### Sources

Steven R. Eastaugh, Health Care Finance: Cost, Productivity, & Strategic Design

### Background and Arguments

The rapid development of new medical products, in combination with consumer demands for more comprehensive insurance to cover the ever-expanding vista of medical technology, has pressured hospital administrators to replace their equipment more frequently and at a higher cost. Most corporate financial analysts are shocked to learn that the majority of hospitals lease less than 20% of their equipment. Given the nonprofit nature of more than 80% of the hospital industry, there are no tax incentives to discourage leasing and favor purchasing. The rule of thumb is that a small nonprofit firm should lease two thirds of its equipment. (Steven R. Eastaugh, Health Care Finance)

### Argument
Leasing model among various ways of purchasing expensive medical equipments is not, until now, mainstream. However, in terms of not only suppliers, but also consumers, there are a lot of benefits by using leasing model. consumers who used leasing model could also obtain various advantages. For instance, it could make suppliers reducing risk of nonfulfillment about payment or burden about warranty during fixed period. Utility value of limited numbers of expensive equipment will be extended from applying leasing model. Moreover, it makes consumers having opportunities for using constantly advanced new equipments without financial load and patients getting better diagnosis and treatment from providers who are using advanced medical equipment. From using leasing model supplier could also obtain various advantages. For instance, it could make suppliers reducing risk of nonfulfillment about payment or burden about warranty during fixed period. Utility value of limited numbers of expensive equipment will be extended from applying leasing model.
How should products be introduced to facilitate acceptance and implementation by consumers?

**Contributors**
Amy Batchu  
Suat Hoon Pee  
Amy Seng

**Sources**

Ernst R. Berndt and Julie M. Donohue, Direct-to-Consumer Advertising in Health Care: An Overview of Economic Issues

**Background and Arguments**
Suppliers invest in costly direct-to-consumer mass advertising campaigns to raise many patients’ expectations, rather than competing through more targeted communication of meaningful outcome and price information to those patients who will benefit the most from their products. (Porter, 285)

While the majority of pharmaceutical promotional expenditures in the U.S. are still aimed at physicians, as seen in Figure 1, between 1994 and 2005 spending on DTCA of prescription drugs increased at an average rate of about 30%, from $242 million in 1994 to $4.24 billion in 2005. (IMS Health and Competitive Media Reports)

**Argument**
Suppliers need to promote product to inform potential consumers by various ways. However, excessive promotions which is not considered the situation could cause suppliers disadvantage in the management aspect of resources. Effective targeted promotion will consequently generate not only accelerating product sales but also improving financial overload by excessive promotion competitions
### Supplier's Function Structure

#### Provisions for Government

- Collecting
  - 1. Gather data on products
  - 2. Collect results of service quality evaluations
  - 3. Collect results of product quality evaluations
  - 4. Obtain results of clinical trials from all providers
  - 5. Research information for R&D proposals

- Assembling
  - 6. Analyze results of lab studies
  - 7. Analyze results of clinical trials from all providers
  - 8. Assemble results of usability tests
  - 9. Assemble R&D findings
  - 10. Develop R&D proposals
  - 11. Assemble product usage and statistics
  - 12. Assemble evaluations from providers
  - 13. Write approval documentation
  - 14. Write documentation
  - 15. Update documentation
  - 16. Evaluate quality of products

- Communicating
  - 17. Present R&D proposals
  - 18. Present R&D findings
  - 19. Request approval for products
  - 20. Negotiate market entry of new technology
  - 21. Report overall company product distribution and usage
  - 22. Work with the government to generate new product ideas
  - 23. Provide domain expertise to the government
  - 24. Recruit patients for clinical trials
  - 25. Access product usability test results
  - 26. Access medical device error reports
  - 27. Collect results of product quality evaluations
  - 28. Collect results of service quality evaluations
  - 29. Gather data on drugs and products
  - 30. Obtain results of clinical trials
  - 31. Assemble relevant samples
  - 32. Analyze results of clinical trials from all providers
  - 33. Analyze results of product usability tests
  - 34. Generate base price lists
  - 35. Write and update documentation
  - 36. Develop and update training and reference materials
  - 37. Evaluate quality of products
  - 38. Evaluate quality of support services
  - 39. Develop incentives to use/prescribe products
  - 40. Assemble relevant samples
  - 41. Assemble relevant products
  - 42. Collaborate to generate new product ideas
  - 43. Prepare providers for clinical trials
  - 44. Communicate product information
  - 45. Communicate base price lists
  - 46. Promote products
  - 47. Offer relevant product packages
  - 48. Negotiate contracts
  - 49. Request product quality evaluations
  - 50. Inform providers of current, improved, and future development plans
  - 51. Present research findings
  - 52. Continue informative relationship

#### Provisions for Providers

- Collecting
- Assembling
- Communicating
- Supplying

#### Function Structure

- Collaborate to generate new product ideas
- Prepare providers for clinical trials
- Communicate product information
- Communicate base price lists
- Promote products
- Offer relevant product packages
- Negotiate contracts
- Request product quality evaluations
- Inform providers of current, improved, and future development plans
- Present research findings
- Continue informative relationship

- Maintain product sales and repair teams
- Deliver products
- Educate providers on product use
- Provide reference materials
- Offer multiple service channels
- Recall bad products
- Repair broken equipment
- Loan temporary equipment
- Take back old products
- Request service quality evaluations
Provisions for Health Plans

Collecting
- 63 Acquire sales information on products
- 64 Collect results of service quality evaluations from providers
- 65 Obtain results of clinical trials from all providers
- 66 Gather data on drugs and products
- 67 Collect feedback of services from health plans

Assembling
- 68 Analyze results of service quality evaluations
- 69 Analyze results of clinical trials
- 70 Assemble results of usability tests
- 71 Assemble product usage, statistics, and evaluations from providers
- 72 Generate base price lists
- 73 Write product documentation
- 74 Update documentation
- 75 Evaluate quality of products

Communicating
- 76 Present improved, future products
- 77 Deliver results of service quality evaluations
- 78 Report overall company products' effectiveness
- 79 Report product information
- 80 Provide initial price lists
- 81 Create contracts
- 82 Continue informative relationship
- 83 Report comparison information of product costs across suppliers
- 84 Provide feedback surveys

Provisions for Employers

Collecting
- 85 Obtain sales information on products
- 86 Collect results of product quality evaluations
- 87 Gather data on drugs and products

Assembling
- 88 Write product documentation
- 89 Update documentation
- 90 Assemble relevant samples

Communicating
- 91 Evaluate quality of products
- 92 Provide incentives for employees to maintain a healthy lifestyle
- 93 Promote new products
- 94 Report product information
- 95 Continue informative relationship
- 96 Provide employees with products for pre-market research

Provisions for Employers

Assembling
- 90 Assemble relevant samples

Communicating
- 91 Evaluate quality of products
- 92 Provide incentives for employees to maintain a healthy lifestyle
- 93 Promote new products
- 94 Report product information
- 95 Continue informative relationship
- 96 Provide employees with products for pre-market research

Subject: Suppliers
A patient may want to find a new effective drug, however they feel skeptical or fearful to participate on testing the effectiveness of a specific drug that is still in the clinical trial phase.

When a patient wants to find out about a new drug they may feel overwhelmed with many different information sources to search. However, if there was a central location where a patient could go and talk to other patients that may be going through the same therapy, then they would feel more at ease. In addition to having a physical meet up space, the patients would be able to meet with other providers to get more opinions and better service and care. This would also provide opportunity to have advice developed for the patient that is individualized and tailored to their condition not just their symptoms. The recruiter encourage the patient to try new drugs that may be breakthrough drugs within the industry. These patient recruiters would be incentivized to recruit effectively and well.
A patient may want to participate in a clinical trial however they are unable to because the patient’s health records are unable to be obtained in order to cross reference their potential with the strict requirements of the clinical trial.

When clinical trials are performed it is essential to have all participating patients information available. At times it is difficult to find this information. If there was an online portal for the purpose of storing data and information on potential patients. This is also critical to keep accurate by any recruiters who are managing the potential patients for the providers who are running the clinical trials.
Suppliers attempt to access medical device error reports, however it is difficult because the errors are gathered from multiple different providers. This situation may also apply to the collecting of product or service evaluations and clinical or usability results from providers.

As suppliers attempt to collect medical device error reports, they find themselves with lots of difficulties in collecting. There are many different providers who have devices from the same suppliers. To make the products better and more useful, suppliers need to figure out a way to collect all usability information from its customers. This information would provide insight and opportunity to redesign products and services.

### Design Factors

<table>
<thead>
<tr>
<th>Project</th>
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<tbody>
<tr>
<td>Mode</td>
<td>Provisions for Providers / Government / Health Plans</td>
</tr>
<tr>
<td>Activity</td>
<td>Collecting results of clinical trials</td>
</tr>
<tr>
<td>Originator</td>
<td>Amy Batchu</td>
</tr>
<tr>
<td>Contributors</td>
<td>Min Joong Kim, Suat Hoon Pee, Amy Seng</td>
</tr>
</tbody>
</table>

### Sources

- Personal observations
- Team deliberations

### Associated Functions

- 25 Access product usability test results
- 30 Obtain results of clinical trials from all providers
- 26 Access medical device error reports
- 27 Collect results of product quality evaluations
- 28 Collect results of service quality evaluations from providers for the

### Observation

Data is collected from many different providers

### Extension

As suppliers attempt to collect medical device error reports, they find themselves with lots of difficulties in collecting. There are many different providers who have devices from the same suppliers. To make the products better and more useful, suppliers need to figure out a way to collect all usability information from its customers. This information would provide insight and opportunity to redesign products and services.

### Design Strategies

- Record error logs electronically
- Run usability tests on products with real users before selling them

### Solution Elements

- **M** Online portal
- **E** Usability Trials

---

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---

34
### Design Factor

#### Project
Rethinking - Design Thinking - Health Care

#### Mode
Provisions for Providers / Government / Health Plans

#### Activity
Collecting data on products

#### Originator
Amy Batchu

#### Contributors
- Min Joong Kim
- Suat Hoon Pee
- Amy Seng

#### Observation
Suppliers invest in clinical and usability trials for their products, however the trials are ran by providers and there may be a loss of information during the recording phase. At the point of review, the data, is now considered questionable.

#### Design Strategies
- Standardized input strategies
- Incentivize accurate reporting
- Publish ongoing reporting
- Consider the communication of results to others while experimenting

#### Solution Elements
- **S** Clinical data collector
- **M** Accuracy awareness benefits

#### Associated Functions
- 25 Access product usability test results
- 30 Obtain results of clinical trials from all providers

---

The entire reason for clinical trials is to capture the evidence needed to support R&D efforts. However if there is an error while collecting information about a new or developing product, then there will be a disconnect on how realistic the product information is. Suppliers need away of capturing this raw information during the critical time of development. This information needs to be accurate and to some degree, standardized.
### Design Factor

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<tr>
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<td>Mode</td>
<td>Provisions for Health Plans / Employers</td>
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<tr>
<td>Activity</td>
<td>Collecting sales information on products</td>
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<tr>
<td>Originator</td>
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<td>Suat Hoon Pee</td>
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<td>Amy Seng</td>
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</table>

#### Observation

When an employer accesses the sales information about a specific drug, the reports about the popularity of the drug are false and inflated. The sales information of the drug have been altered for the benefit of the supplier. This makes it difficult for the employer to obtain accurate information for its employees.

#### Extension

If an employer is trying to assist their employee by finding accurate sales information about a specific type of product, then there should be somewhere, where the employer can go to get un-biased sales information. There could be a third party which record the sales information, or the supplier may have to make their sales information transparent so that the public and other organizations can evaluate the market based on true and accurate information.

### Design Strategies

- Offer a third party organization that reviews sales information
- Record information truly

### Solution Elements

- **M** Supplier Organization
- **E** Accuracy Awareness Benefit

### Sources

- Personal observations
- Team deliberations

### Associated Functions

- 85 Acquire sales information on products
Design Factor

Project
Rethinking - Design Thinking - Health Care

Mode
Provisions for Providers / Govt / Health Plans / Employers

Activity
Collecting necessary data

Originator
Amy Batchu

Contributors
Min Joong Kim
Suat Hoon Pee
Amy Seng

Observation
Working with many different players, suppliers have vast amounts of information. Some of this information is on drugs or medical devices, and some of the information is in regards to people, both consumer and internal. All of this information needs to be cataloged in a system that can cross reference other categories.

Associated Functions
1 Gather data on products
29 Gather data on drugs and products
67 Gather data on drugs and products
87 Gather data on drugs and products

Sources
Personal observations
Team deliberations

Extension
Within the whole system of collecting information from other players, there needs to be a place to store that information. Furthermore, there needs to be a way to locate that information so that others are able to find it. Not only do you want to locate the information but you also want to be able to cross reference the information. This data can be referred to as product data about information.

Design Strategies
- Offer easily identifiable data
- Locate information among suppliers

Solution Elements
M Data Tags
M Sister Suppliers
Suppliers need to be aware of their products after they are distributed and sold. If a supplier is unaware of their products or malfunctions, then they will not know where they will be able to modify or enhance a product. Suppliers may also be able to identify when there is need for a product that does not yet exist. Suppliers should maintain a relationship with their consumers in order to follow their products.
## Design Factor

### Project
Rethinking - Design Thinking - Health Care

### Mode
Provisions for Health Plans

### Activity
Collecting feedback of services

### Originator
Amy Batchu

### Contributors
Min Joong Kim  
Suat Hoon Pee  
Amy Seng

### Observation
Suppliers have limited interactions with all players, however it is essential for them to receive feedback from all of these players so that they know what they need to improve or change. One main player that suppliers request information from is health plans.

### Extension
If a supplier wants to know how well it is performing in the health care system, then they need to request information from each player. However, it is essential to request information from the health plans because they have consumer information as well as regional health trends. In addition to this, they also deal directly with suppliers by teaming together for formularies and devices and pharmaceuticals that are covered by specific plans.

### Design Strategies
- Allow for instant feedback from players
- Collect feedback on a regular basis

### Solution Elements
- M How am I doing?

### Sources
- Personal observations
- Team deliberations

### Associated Functions
- 66 Collect feedback of services

---

Version: 1  
Date: 14 October 2007
### Design Factor

#### Project
- Rethinking - Design Thinking - Health Care

#### Mode
- Provisions for Providers / Govt / Health Plans / Employers

#### Activity
- Collecting data on products

#### Originator
- Amy Batchu

#### Contributors
- Min Joong Kim
- Suat Hoon Pee
- Amy Seng

#### Sources
- Personal observations
- Team deliberations

#### Associated Functions
- 1 Gather data on products
- 29 Gather data on drugs and products
- 67 Gather data on drugs and products
- 87 Gather data on drugs and products

#### Observation

Working with many different players, suppliers have vast amounts of information. Some of this information is on drugs or medical devices. It is necessary for this information to be up to date so that there is value to collecting all of it.

#### Extension

Within the whole system of collecting information from other players, there needs to be a place to store that information. Furthermore there needs to be up to date information about products and services. If this information is out of date then there will be a gap in translating the value of the information to the suppliers.

#### Design Strategies
- Report all information about products immediately
- Offer an automatic channel to release this information

#### Solution Elements
- **M** Prompt Response Reporter
- **M** Trend Watch Reporter
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>Results analyses are biased (clinical trials and usability studies)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
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</tr>
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<td><strong>Mode</strong></td>
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<tr>
<td><strong>Activity</strong></td>
<td>Assembling results</td>
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<tr>
<td><strong>Originator</strong></td>
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<tr>
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<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
</tr>
<tr>
<td><strong>Observation</strong></td>
<td>Studies that rely on patient self-assessment or physician assessment of patient status are susceptible to assessment bias.</td>
</tr>
<tr>
<td><strong>Extension</strong></td>
<td>In circumstances such as in measuring pain or symptoms, there is no objective measurement. Therefore, attempts should be made to be as objective as possible and invoke randomization and blinding. What is a mild cough for one person might be characterized as a moderate cough by another patient. Not knowing whether or not they received the treatment (blinding) when making these subjective evaluations will help to minimize this self-assessment or assessment bias.</td>
</tr>
<tr>
<td><strong>Design Strategies</strong></td>
<td>Consistent metric and uniform criteria to be used in instrument</td>
</tr>
<tr>
<td><strong>Solution Elements</strong></td>
<td>Metrics</td>
</tr>
</tbody>
</table>

**Sources**
- Personal observations
- Team deliberations

**Associated Functions**
- 6 Analyze results of lab studies for the government
- 7 Analyze clinical trials from all providers for the government
- 11 Assemble product usage, statistics and evaluations from providers
- 15 Update documentation for the government
- 16 Evaluate quality of products for providers
### Design Factor

#### Project
Rethinking - Design Thinking - Health Care

#### Mode
Provisions for Providers / Govt / Health Plans / Employers

#### Activity
Assembling documentation

#### Originator
Suat Hoon Pee

#### Contributors
Amy Batchu  
Min Joong Kim  
Amy Seng

#### Observation
Updating product documentation poses a huge challenge for suppliers as most of them carry a wide range of products. Problem is complicated by the need of having to present them in different formats for different users; such as the providers, health plans and employers.

#### Extension
Documents need to be updated when new products are released or products are upgraded. Extensive time and effort is required to generate various versions of documentation for users' reference.

Creative use of technology may be applied to extract necessary sections from a comprehensive and detailed database to form the various versions of documents. The criteria for extraction may be established by the user profiles and needs.

#### Sources
- Personal observations
- Team deliberations

#### Associated Functions
- 15 Update documentation for government.
- 35 Write and update documentation for providers.
- 74 Update documentation for health plan.
- 89 Update product documentation for employers

#### Design Strategies
- Determine profile settings of users
- Extract and compile relevant portion of database to generate documents based on users profiles.
- Deposit them in accessible location such as the internet

#### Solution Elements
- Users Profile
- Information Compiler
- Healthcare Data Bank

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**Date:** 14 October 2007
### Design Factor

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<tr>
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<tr>
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<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
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</table>

#### Design Strategies
- Develop a standard instrument that should be used in collecting the evaluation
- Generate a unit that may be used for comparison across the various products and services

#### Sources
- Personal observations
- Team deliberations

#### Associated Functions
- 15 Update documentation for government.
- 35 Write and update documentation for providers.
- 74 Update documentation for health plan.
- 89 Update product documentation for employers

#### Observation
Manufacturers collect feedback for self evaluation to better serve their end users. If the evaluations are not administered and analyzed well, then the results may be biased.

#### Extension
Evaluation results could be biased due to the ways that the feedback was structured and how results were collected. Without a standardized instrument and metric for gathering feedback, the results may not be useful for evaluating the quality of products and maintenance service provided by various suppliers.

Furthermore, the evaluation results may not be comparable across different products and services.

#### Solution Elements
- EVAL instrument
- EVAL metric

---

**Version**: 1  
**Date**: 14 October 2007
In order to make decisions on necessary interventions offered by healthcare products, users need to have access to useful and objective data that is on a common scale. This data must provide:
- accurate assessment of the user's perceived worth of an intervention provided by the product
- means to compare interventions offered by all healthcare products in the same range
- a measure that can be combined with the cost of product to arrive at a cost-utility ratio

(Evidence-Based to Value-Based Medicine by Melissa Brown et al, page 6)

When this happens, decisions may be made objectively as quantifiable data that is on a common scale is available to support the decision.

**Design Strategies**
- Develop a standard instrument that should be used in collecting the evaluation
- Generate a unit that may be used for comparison across the various products and services

**Solution Elements**
- EVAL instrument
- EVAL metric

**Observation**
Health care has been an industry in which purchasers are unable to measure the value of what they purchase. If there is no objective measure of value that is standardised across all the diverse fields in healthcare, then it is close to impossible for users to compare and evaluate product quality. This is the present situation in healthcare and cost is the predominant basis for comparison.

**Sources**
Evidence-Based to Value-Based Medicine by Melissa Brown et al, page 6.

Personal observations
Team deliberations

**Extension**
Provisions for Providers / Govt / Health Plans / Employers

**Contributors**
Amy Batchu
Min Joong Kim
Amy Seng

**Originator**
Suat Hoon Pee

**Mode**
Provisions for Providers / Govt / Health Plans / Employers

**Activity**
Assembling product quality

**Project**
Rethinking - Design Thinking - Health Care
In order to make decision on necessary interventions offered by healthcare products, users need to have access to useful and objective data that is on a common scale.

This data must provide:
- accurate assessment of the user's perceived worth of an intervention provided by the product
- means to compare interventions offered by all healthcare products in the same range
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When this happens, decisions may be made objectively as quantifiable data that is on a common scale is available to support the decision.
**Design Factor**

<table>
<thead>
<tr>
<th>Project</th>
<th>Hands-on training is not always possible</th>
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<th>Mode</th>
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<thead>
<tr>
<th>Activity</th>
<th>Assembling training materials</th>
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<table>
<thead>
<tr>
<th>Observation</th>
<th>If healthcare providers were to effectively handle the healthcare products, they would require extensive hands-on training. However, this is usually not possible as the equipment and suitable subjects may not be always available.</th>
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<table>
<thead>
<tr>
<th>Extension</th>
<th>Hands-on training is crucial as equipment and other healthcare products become more sophisticated. Besides learning the technical aspects of healthcare products, users also have to learn to respond to different patients’ reactions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Since the equipment and subjects are not always available for training purpose, alternative modes of training have to be developed. Other modes of training can be effective as long as the learning outcomes are achieved.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Design Strategies</th>
<th>Solution Elements</th>
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<tbody>
<tr>
<td>Provide computer simulations</td>
<td>E</td>
</tr>
<tr>
<td>Distribute training equipment</td>
<td>E</td>
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<tr>
<td>Provide patient simulator</td>
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</tbody>
</table>
If manufacturers were to train users to effectively handle their products, they would need to have real patients suffering from the unique illness.

The ideal situation of training with real patients is generally not achievable. Firstly, we may not be able to synchronise the patients’ visitation with the training cycle. Also, more importantly, if the machine is used for treating a rare disease, then there is almost no chance to train if we need to wait for the rare occurrence.

Different biological signals coming from the body are required for training. Therefore, the key to the training needs is the signals and not the human. Creative use of existing technology can help to generate these necessary signals.

Design Strategies
- Generate artificial biological signals

Solution Elements
- M Patient Simulator
- M D’ Simulator
### Rethinking - Design Thinking - Health Care

#### Assembling R&D findings take a long time

**Sources**
- Personal observations
- Team deliberations

**Associated Functions**
- 9 Assemble R&D findings

---

**Project**
- Rethinking - Design Thinking - Health Care

**Mode**
- Provisions for Government

**Activity**
- Assembling R&D findings

**Originator**
- Suat Hoon Pee

**Contributors**
- Amy Batchu
- Min Joong Kim
- Amy Seng

**Observation**
Because of the tedious process of carrying out R&D, assembling these research findings similarly take a lot of effort and time.

**Extension**
Information related to R&D findings may be tagged and filtered out automatically instead of having to locate them by hand.

**Design Strategies**
- Track R&D findings automatically

**Solution Elements**
- M Sniffer
Writing R&D proposals takes a lot of time

Seeking R&D funding from government takes a long time and effort. Besides submitting a written proposal, a presentation needs to be made.

Writing R&D proposals is both a time consuming and tedious task. Besides preparing the proposal, the R&D researcher has to have a very good background knowledge of the technology and needs to keep abreast of the technology to submit a proposal that will stand a chance of being awarded.

Funding agencies could centralise all the related documents and links to help potential R&D proposers. Also, the proposal submission could be made simpler. Similarly, there could be computer-based R&D checker to verify the parts that need further work.

Design Strategies

- Provide a database of reference materials for writing R&D proposals
- Check R&D proposal

Solution Elements

M R&D Library
S R&D Proposal checker
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>Writing approval documentation takes a long time</th>
</tr>
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<tbody>
<tr>
<td><strong>Project</strong></td>
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<tr>
<td><strong>Mode</strong></td>
<td>Provisions for Government</td>
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<tr>
<td><strong>Activity</strong></td>
<td>Assembling R&amp;D documentation</td>
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<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
</tr>
<tr>
<td><strong>Observation</strong></td>
<td>Because of the tedious approval process from approval such as FDA and related government authorities, this is a resource-intense activity</td>
</tr>
<tr>
<td><strong>Design Strategies</strong></td>
<td>Aggregate and compile information automatically based on requirements documents</td>
</tr>
<tr>
<td><strong>Solution Elements</strong></td>
<td>Document Compiler</td>
</tr>
</tbody>
</table>

**Sources**
- Personal observations
- Team deliberations

**Associated Functions**
- Obtain results of clinical trials from all providers
- Research information for R&D proposals

**Reports generated from various tests; including the test procedures, results and other related information have to be gathered and documented in order to seek approval of product release from government agencies.**

**Documentation may be compiled automatically.**
Healthcare manufacturers need to be aware of related healthcare policies and guidelines in order to operate their businesses. It is therefore very important to keep track of all relevant information coming from all players. As there are many departments where these policies and guidelines may be released from, it is not easy for the manufacturers to keep track of them.

Instead of looking for related policies and guidelines, the system could push these information to suppliers based on their areas of responsibilities.
**Design Strategies**

- Determine various format templates commonly used
- Prepare a database with all the required fields
- Generate the necessary formats

**Solution Elements**

- **S** Health Care Factory
- **E** Info Compiler
- **S** Formatter

---

**Observation**

Government agencies often require materials to be submitted in different formats. This poses a challenge to suppliers who need to constantly re-write the documents.

**Extension**

Two steps are needed to write a report; gathering the appropriate content and then arranging it in the required format. Also, care must be taken to ensure that the language used is appropriate for the target audience.

Healthcare suppliers have to constantly distribute their information to different players and this takes up a huge amount of time and effort.

The challenge here is to disengage the content from the format so that when different styles are applied to the content, reports may be generated on the fly.
Maintaining a healthy workforce is desired as it enhances the productivity of the company. Besides, it is easier to negotiate for a lower-priced health plan if all the employees in the company are strong and healthy. Thus, it is in the employers' interest to improve the health of its employees. Similarly, manufacturers would be keen to contribute as this provides a good avenue of sales. Giving samples for trial is a potential strategy.

As employees are not in need of directed treatment of specific illness, it is necessary to first find out about the types of samples which are of interest. Manufacturers might be able to find out more about the needs of employees by interaction with them. Alternatively, they might also be able to find out about the profiles of the group of employees from the employers and prepare samples based on the personas.

Maintaining a healthy workforce is desired as it enhances the productivity of the company. Besides, it is easier to negotiate for a lower-priced health plan if all the employees in the company are strong and healthy. Thus, it is in the employers' interest to improve the health of its employees. Similarly, manufacturers would be keen to contribute as this provides a good avenue of sales. Giving samples for trial is a potential strategy.

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<tr>
<td><strong>Activity</strong></td>
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<tr>
<td>Communicating with Providers</td>
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</table>

**Originator**
Amy Seng

**Contributors**
Amy Batchu
Min Joong Kim
Suat Hoon Pee

**Observation**
Clinical trials have to be run precisely to ensure the validity of the data, but they are run by so many different providers across the country that it’s difficult to ensure consistent data collection and reporting.

**Extension**
Clinical trials are the longest phase of the drug development process. They span years and require lots of detailed information to be collected. Providers that run the trials need to be trained on how to administer the trial and also how to collect and report results. In most clinical trials there is a learning curve period where most of the data needs to be discounted. This is a waste of resources for both the suppliers and the providers.

### Design Strategies

- Have standard training materials given to every provider
- Provide reference materials
- Develop continued partnerships with certain providers
- Minimize provider role in clinical trials

### Solution Elements

- Clinical Trial Guide
- Preferred Providers
- Simulated Clinical Trials
### Design Factor

<table>
<thead>
<tr>
<th>Project</th>
<th>Providers are unable to compare products across suppliers</th>
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<tr>
<td><strong>Design Factor</strong></td>
<td><strong>Sources</strong></td>
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<tr>
<td><strong>Project</strong></td>
<td><strong>Associated Functions</strong></td>
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<td>Personal observations</td>
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<td><strong>Mode</strong></td>
<td>44 Communicate product information</td>
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<td><strong>Observation</strong></td>
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<tr>
<td>Amy Seng</td>
<td>Providers are unable to compare products from suppliers and many of them are similar, but since each supplier tells them something different, it’s hard for providers to compare products and make informed purchasing decisions.</td>
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<tr>
<td><strong>Contributors</strong></td>
<td><strong>Extension</strong></td>
</tr>
<tr>
<td>Amy Batchu</td>
<td>Supplier sales representative practices are infamous across the health care industry. They are accused of using unethical methods to convince providers to purchase their products.</td>
</tr>
<tr>
<td>Min Joong Kim</td>
<td>Although providers want to make unbiased decisions, it is often hard for them to compare products across suppliers. In order for suppliers to cross compare different products or services they must have some sort of standardized information. This standardized information can be about the contents or pieces of the product. By having something that is cross comparable between suppliers, there is less of a chance of medical error.</td>
</tr>
<tr>
<td>Suat Hoon Pee</td>
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<tr>
<td><strong>Observation</strong></td>
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<tr>
<td><strong>Design Strategies</strong></td>
<td></td>
</tr>
<tr>
<td>• Standardize required product information across suppliers</td>
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<tr>
<td>• Compare our own products with those from other suppliers</td>
<td></td>
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<tr>
<td><strong>Solution Elements</strong></td>
<td></td>
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<tr>
<td>M Product Nutrition Label</td>
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<tr>
<td>S Decision Enabler</td>
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<th>Providers don't have a lot of time</th>
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<td><strong>Originator</strong></td>
<td>Suat Hoon Pee</td>
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<tr>
<td><strong>Contributors</strong></td>
<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
</tr>
<tr>
<td><strong>Observation</strong></td>
<td>Healthcare providers are always busy helping the patients. Keeping up with the latest technology is a challenge.</td>
</tr>
<tr>
<td><strong>Extension</strong></td>
<td>Healthcare suppliers are constantly improving their products and releasing new drugs. Developing good products are critical. But, more importantly, users have to know about these latest products and want to use them. Suppliers may attempt to prepare extensive documentation and try to meet different providers to share about their product offerings. However, providers may not have the time to look and learn about them. With the busy schedule, healthcare providers face a great challenge of keeping themselves updated. Also, they would not be able to digest huge volumes of information that suppliers provide. Providers need a quick update of the latest technology in small nuggets and then dig deeper when the technology is suitable. Besides, relevant information is more likely to be read if they are pushed to providers.</td>
</tr>
<tr>
<td><strong>Design Strategies</strong></td>
<td><strong>Solution Elements</strong></td>
</tr>
<tr>
<td>- Provide information that are accessible anytime</td>
<td><strong>M</strong> Podcast</td>
</tr>
<tr>
<td>- Feed information in short nuggets</td>
<td><strong>E</strong> News feeds</td>
</tr>
<tr>
<td>- Provide regular news</td>
<td><strong>E</strong> Provider Press Releases</td>
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<td>Personal observations</td>
<td>46 Promote products</td>
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<td>66 Gather data on drugs and products</td>
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<td>87 Gather data on drugs and products</td>
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<td>93 Promote new products</td>
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### Design Factor

**Project**  
Rethinking - Design Thinking - Health Care

**Mode**  
Provisions for Providers

**Activity**  
Communicating product information

**Originator**  
Suat Hoon Pee

**Contributors**  
Amy Batchu  
Min Joong Kim  
Amy Seng

**Observation**  
Sales representatives have a target to meet and they try their best to sell their products to providers and patients. With a target to hit, sales representatives are more concerned about their own targets rather than meeting users' needs.

**Extension**  
The existing way of pushing sales may not necessarily add value to the healthcare system. Sales representatives may simply sell as much as they could and often times not consider actual user needs. As a result, users may end up paying for unnecessary products.

For sales representatives to have a better understanding of the users, it would be ideal for them to first get to know the users more closely by establishing a better rapport. Also, suppliers may work together with others in offering a complete solution to better serve the user needs.

### Design Strategies

- Produce customised products specially to meet user needs
- Develop a closer relationship with providers

### Solution Elements

- **S** Just for you packages
- **M** Buddy System

### Sources

- Personal observations  
- Team deliberations

### Associated Functions

- 26 Collaborate to generate new product ideas
- 47 Offer relevant product packages
- 76 Present improved future products
In their attempts to sell more products, sales representatives resort to a variety of tactics. They sometimes choose to present their drugs differently in terms of effectiveness and at other occasions, they may share statistics of its use differently.

These practices are detrimental and consumers end up losing their confidence in what sales representatives offer. This is a bad situation to be in as there are actually many good medical products that are effective in helping patients regain their health. Besides relying on sales representatives to convey the product information, suppliers may develop ways of communicating the value of the product and its contents to users directly. Alternatively, only sales representatives who are truly passionate about their products are qualified to sell them.
## Design Factor

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<td><strong>Activity</strong></td>
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<tr>
<td><strong>Contributors</strong></td>
<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
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</table>

### Observations

Providers are on the constant look out for effective new healthcare products to help patients. They have to gather information from sales representatives and it is not always easy to discern what the sales representatives tell them as these representatives often have the sales agenda in mind.

It is critical for providers to ensure that they understand what the products are meant for and if the products meet their requirements as patients have to rely on these products for their cycle of care. Besides, it will be a waste of money if the wrong product is purchased.

### Extensions

Providers find it hard to verify what the sales representatives have shared as they are aware of the sales agenda that the representatives have in mind. Sales representatives may sometimes choose to “misrepresent” or intentionally leave out certain pertinent information in order to portray their products in the best light.

Time is wasted when providers have to constantly second guess what the sales representatives have said. To ensure that the sales representative share the information true fully, it is important to establish the necessary conditions. Alternatively, supporting information may be used to verify the shared information.

### Design Strategies

- Gather supporting information
- Share product information without sales objective in mind
- Establish rapport and trust

### Solution Elements

- E Supporting Materials
- M Two Phased Sales
- S Trust Me

### Associated Functions

- 46 Promote products
- 93 Promote new products

---

**Version:** 1  
**Date:** 14 October 2007
Design Factor

Project
Rethinking - Design Thinking - Health Care

Mode
Provisions for Providers

Activity
Communicating product information

Originator
Suat Hoon Pee

Contributors
Amy Batchu
Min Joong Kim
Amy Seng

Observation
It is increasingly common to hear about pharmaceutical companies, group purchasing organizations (GPOs), pharmacy benefit managers and sales representatives coming under investigation, being indicted or convicted, or settling charges of health care fraud with the government. These alleged violations often are based on common discounting arrangements, such as rebates, barter arrangements, refunds, incentives, volume and market-share purchasing rewards. In their attempts to secure bigger contracts, suppliers try to offer huge discounts to large purchase organisations. Numerous large, publicly traded companies have come under scrutiny for their sales practices and discounting arrangements. In fact, some of the biggest health care companies have been the subject of the Office of Inspector General’s anti-kickback statute enforcement efforts. In various reported settlements involving questionable marketing or discounting arrangements, Pfizer has paid the government $430 million, and Schering-Plough Corporation/Schering Sales Corp paid approximately $295 million.

Extension
As a result of these practices, the price of healthcare products is not fixed and varies depending on which health plan they belong to. This is highly undesirable as the people who desperately need health care products end up paying the highest price.

The present sales system is unfair and punishes individuals who are the ones who desperately need help as they have no money. It is necessary for healthcare products to have a standard fixed price and an avenue for people to purchase the healthcare products.

Design Strategies
- Fix price of product
- Sell directly to users

Solution Elements
E  Product MSRP (Minimum Sales Retail Prices)
M  Supplier Retail Store

Sources
Discounted Drug Sales May Violate the Law

Personal observations
Team deliberations

Associated Functions
45  Communicate base price lists
72  Generate base price list
Health Industry Practices That Create Conflicts of Interest
A Policy Proposal for Academic Medical Centers
Drugs, Doctors and Dinners
How drug companies influence health in the developing world Consumers International (CI), October 2007
Personal observations
Team deliberations

Drug company representatives visit thousands of doctors every week to inform them about new or existing products. They often offer doctors free gifts, such as stationery, mugs or key rings. Sometimes the gifts may be more substantial. The latest practice as reported by a Consumers International Report in 2007 is: for writing 200 prescriptions of the company’s high priced drug, a doctor in Pakistan is rewarded with the down payment of a brand new car.

Similarly, a research carried out a survey of 1,000 GPs across England, found that doctors who see company reps at least once a week are more likely to consider prescribing new drugs and to agree to patients’ requests for medication even if they don’t need it.

The psychology and social science of gift receipt and giving does not protect the interests of patients. More stringent regulation is necessary, including the elimination or modification of common practices related to small gifts, pharmaceutical samples, continuing medical education, funds for physician travel, speakers bureaus, and consulting and research contracts.

Enforce good codes of conduct
Broadcast bad practices by shaming
Supplier Ethics Council
Supplier Blacklist
## Health Industry Practices That Create Conflicts of Interest


Gifts to Physicians from the Pharmaceutical Industry: An Ethical Analysis Catherine A. Marco, MD et al 2006 by the American College of Emergency Physicians.

No more free lunches Patients will benefit from doctors and drug companies disentangling, BMJ May 2003 Downloaded from bmj.com on 13 December 2007

---

### The Pharmaceutical Industry

The current influence of market incentives in the United States is posing extraordinary challenges to the principles of medical professionalism. Physicians' commitment to altruism, putting the interests of the patients first, scientific integrity, and an absence of bias in medical decision making now regularly come up against financial conflicts of interest.

The most challenging and extensive of these conflicts emanate from relationships between physicians and pharmaceutical companies and medical device manufacturers.

### Design Strategies

- Enforce good code of ethics
- Promote good code of ethics
- Broadcast bad practices by shaming

### Solution Elements

- **E** Sales Code of Ethics
- **S** Supplier Ethics Council
- **S** Sales Representative Blacklist

---

The pharmaceutical industry invests heavily in promotion of its products. For example, in 2001, US pharmaceutical companies spent more than $21 billion promoting the sale of prescription drugs. An estimated 84% of pharmaceutical marketing is directed toward physicians.

Pharmaceutical companies and their representatives offer physicians a variety of gifts ranging from pens and mugs to reference tools, books and meals. The psychology and social science of gift receipt and giving does not protect the interests of patients. More stringent regulation is necessary, including the elimination or modification of common practices related to small gifts, pharmaceutical samples, continuing medical education, funds for physician travel, speakers bureaus, and consulting and research contracts.

Some countries and professional organisations - including World Medical Association have recognised the dangers in this proximity and have developed codes of practice. American medical students are being asked to take a revised Hippocratic Oath that forbids the accepting of money, gifts, or hospitality. There are also guidelines from “Code on Interactions with Healthcare Professionals.”

As it takes two to tango, sales representatives must also take steps to correct this unhealthy relationship.
### Design Factor

**Project**
Rethinking - Design Thinking - Health Care

**Mode**
Provisions for Providers / Health Plans / Employers

**Activity**
Communicating product information

**Originator**
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**Contributors**
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Min Joong Kim
Amy Seng

**Observation**
At least 1.5 million Americans are sickened, injured or killed each year by errors in prescribing, dispensing and taking medications, the influential Institute of Medicine concluded in a major report. The same report found errors to be not only harmful and widespread, but very costly as well. The extra expense of treating drug-related injuries occurring in hospitals alone was estimated conservatively to be $3.5 billion a year.

Mistakes in drugs usage and mis-use of healthcare products are prevalent. Many of them might not be caused directly by design faults of products. However, as manufacturers of these products, suppliers could try to minimise the mis-use of their products by providing better information and instruction guides.

**Extension**
To help users in the correct use of their products, suppliers may attempt to produce better documentation. As healthcare product information is usually hard to understand and decipher, suppliers may provide more details or simplify their language further to help users in learning about how to use their products.

Providing information in simplified language may not be a good solution as there are some users who need more technical details. Customising information for different levels of understanding could be a better solution.

Alternatively, the information could be transmitted to users at the right time just when they are needed.

**Design Strategies**
- Customize information for different levels of understanding
- Offer step by step audio guide

**Solution Elements**
- M Information Access Levels
- S Read-Along Guide

**Sources**
(http://www.truthout.org/cgi-bin/artman/exec/view.cgi/62/21295)

Personal observations
Team deliberations

**Associated Functions**
- 44 Communicate product information
- 79 Report product information
- 94 Report product information
### Design Factor

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<tr>
<td>Contributors</td>
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</table>

#### Observation

R&D expenditure has risen dramatically in recent years. In US alone, R&D spending for the pharmaceutical industry has risen from $4bn in 1985 to $39bn in 2004, according to the Pharmaceutical Research and Manufacturers' Association of America (PhRMA).

Besides government funding, smaller companies have to seek alternative avenues to sustain their R&D activities.

#### Extension

It has been reported that the cost of bringing one new molecule into the market amounts to USD 800.0 million. As the cost is exorbitant, many smaller companies have to seek alternative means to sustain their R&D operations. To do that, they may choose to raise additional funding sources or lower their cost besides relying on government funding.

Costs may be lowered by outsourcing. Both small and large pharmaceutical firms are tapping the low-cost global pharmaceutical outsourcing market for both research and manufacturing. It is estimated that the global outsourcing market will surpass $53 billion by 2010.

#### Design Strategies

- Raise funds
- Outsource operations to lower cost

#### Solution Elements

- Issuance of stocks
- Domestic Research Outsourcing
- International Research Outsourcing

#### Sources

- Personal observations
- Sahoo, Alison. Business Insights Pharmaceutical Outsourcing Strategies
- Strategic Research Institute
  - Team deliberations

#### Associated Functions

- 54 Deliver Products
- 76 Present improved, future products
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>Information on new products leaks out</th>
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<tbody>
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<td><strong>Contributors</strong></td>
<td>Amy Batchu, Min Joong Kim, Amy Seng</td>
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</tbody>
</table>
| **Design Strategies** | - Protect confidential information using copyright laws  
                        - Protect intellectual information |
| **Observation** | In order to seek government’s funding and also approval of projects, suppliers need to present and share their ideas. Many of these ideas are confidential and they could be copied by competitors. |
| **Solution Elements** |  
| **Sources** | Personal observations  
            Team deliberations |
| **Associated Functions** | 17 Present R&D proposals  
18 Present R&D findings  
19 Request approval for new products  
20 Negotiate market entry of new technology  
22 Work with government to generate product ideas |
| **Extension** | Suppliers guard their new product ideas carefully as competition is intense amongst different manufacturers. In normal circumstances, new product ideas are kept confidential and will not be released. However, suppliers have to divulge details of their new products when they need to communicate with government agencies especially when it comes to fund and grant application. How could suppliers ensure that their information are kept safe after sharing them with the government agencies? Some form of protection is needed before suppliers share their confidential information. |
Developing advanced equipment requires tremendous investment and suppliers need financial assistance from external agencies. Most advanced medical equipment or medicine reap huge benefits. The challenge is to start this communication channel between suppliers and government.

In the usual process, suppliers send their proposals to seek financial aids, but government agencies do not review and evaluate the value of all proposals due to the limited agencies' time and validation capabilities. Creating a new department for handling this would not be very possible unless the government recognizes the importance of investing in suppliers' R&D activities.

Finding innovative and creative ways to present their proposals is a better approach than waiting for a new supplier financial aid department to be set up.
## Design Factor

### Project
Rethinking - Design Thinking - Health Care

### Mode
Provisions for Government

### Activity
Communicating research

### Originator
Suat Hoon Pee

### Contributors
- Amy Batchu
- Min Joong Kim
- Amy Seng

### Observation
What can suppliers do when their research interests are not supported by government?

Take the example of stem cell research. Researchers are keen to study it as it raises the possibility of treating conditions like diabetes and Alzheimer’s disease. More immediately, proponents say the technology offers a unique way to study those diseases. However, some politicians, scientists, and ethicists are not supporting it as they feel that this might cause poor women to donate eggs simply for the money.

### Extension
Using the same example of stem cell research, the political debate in the United States over embryonic stem cell research has resulted in inadequate federal funding for important study in this area.

Without the necessary government funding, suppliers need to seek alternative sources or they may not have the funds to continue their research. More importantly, it will be illegal to even conduct this investigation without the government’s approval.

### Design Strategies
- Seek alternative sources of funds
- Conduct research in other countries

### Solution Elements
- **Seeking private funds**
- **Over-seas research base**

### Sources
- Personal observations
- Team deliberations

Trivedi, Bijal *Researchers Detour Around Stem-Cell Rules*  
Chronicle of Higher Education  
October 1st, 2007 (http://www.biopoliticaltimes.org/article.php?id=3701)

### Associated Functions
- 17 Present R&D proposals
- 20 Negotiate market entry of new technology
<table>
<thead>
<tr>
<th>Design Strategies</th>
<th>Solution Elements</th>
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<tr>
<td>Establish promotion strategies for private funding</td>
<td>M Prototype Model Advanced Proposal Materials</td>
</tr>
<tr>
<td>Prepare proposals to investors</td>
<td>M Issuance of Stocks</td>
</tr>
<tr>
<td>Present specific R&amp;D proposal to investors</td>
<td>E Expert Presenter Negotiator</td>
</tr>
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</table>

**Suppliers need to have substantial amount of funds in order to develop new healthcare equipment. However, suppliers in small companies do not have internal budget for such large scale projects. Even though government has funds allocated for this purpose, suppliers have to wait for these funds to be released during the annual budget for healthcare R&D.**

**Extension**

It is critical for suppliers to develop their healthcare products quickly and then release them to the market. Suppliers face intensive competition and have to invest many years of development before finally seeking FDA approval.

In some instances, suppliers fail to make their R&D proposal before the government allocates all the available funds for projects. As government usually releases R&D funds annually, suppliers who miss this submission cannot get the critical financial aids. In that case, suppliers should make alternative plans to secure funds for new healthcare product development.

**Sources**

- Personal observations
- Team deliberations

**Associated Functions**

17 Present R&D proposal to the government
18 Present R&D findings to the government
**Design Factor**

**Project**  
Rethinking - Design Thinking - Health Care

**Mode**  
Provisions for Government

**Activity**  
Communicating approval process

**Originator**  
Suat Hoon Pee

**Contributors**  
Amy Batchu  
Min Joong Kim  
Amy Seng

**Observation**

All stakeholders want safe and effective drugs manufactured to a high quality in healthcare. All want drugs that will improve health, both now and in the future. However, as both the regulator and supporter of the pharmaceutical industry, the government tries to restrain suppliers’ profits and ensure that drugs are reasonably priced while promoting a research based manufacturing industry. On the other hand, the pharmaceutical industry wants a good return for investors.

**Design Strategies**

- Conduct market needs analysis

**Solution Elements**

M Market Needs Review

**Sources**

- An integrated national pharmaceutical policy for the United Kingdom? By Tom Walley et al, BMJ, v.321(7275); Dec 16, 2000
- What is an Orphan Drug? by Mary Kugler, R.N. (http://rarediseases.about.com/od/rarediseaseso/a/orphandrug.htm)

**Associated Functions**

- Personal observations
- Team deliberations

**Extension**

Suppliers are constantly researching and developing new products to treat medical conditions, and new health care products come on the market frequently.

As the suppliers’ key intention is to generate income, they are keen to develop products where users can afford to pay eg they would rather develop the Viagra rather than orphan drugs which are used only by the rare few with uncommon diseases or disorders.

To convince government to support their research, suppliers have to prove that their R&D is important and beneficial to users.
In the case of a new drug development, various phases of drug testing in the laboratory as well as in human subjects must be conducted prior to being FDA approved. All the phases are highly structured and tightly regulated. On average, the trials take 10 years before they can be manufactured.

While the US drug approval process is very orderly and well defined, it is often a costly endeavor to prove a drug “safe and effective”. However, it comes with a price, in both cost and delay in the availability of new products that could help patients regain their health.

There is much interest in the prospect that merely increasing the FDA’s resources - chiefly, perhaps exclusively, through fees charged to makers of products subject to regulation - will reduce the time required to gain agency approval. This promise of user fees is not yet proven. Alternatively, there could be more creative ways to search for improvements in the FDA’s system of review and approval.

Instead of conducting real clinical trials at every stage, computer simulations for certain stages may speed up the process of collecting results. Similarly, additional categories for less stringent products may help to speed up the approval process.
### Design Factor

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| Contributors | Amy Batchu  
|             | Min Joong Kim  
|             | Amy Seng |

#### Observation

Investment in the healthcare products industry is high. Similarly, the returns are also huge when a successful healthcare product is being launched.

Take the example of pharmaceuticals, PhRMA (Pharmaceutical Research and Manufacturers of America) reported a spending by its member organizations rose more than sixfold between 1980 and 2004, from about $6 billion (in 2005 dollars) to $39 billion. In 2005, pharmaceutical firms in the Fortune 500 averaged a 10.3 percent return on assets, compared with a median return of 4.7 percent for all industries.

With so much money at stake, it is hard for suppliers to share their proprietary information.

#### Design Strategies

- Protect released information  
  (as in Creative Commons license)

#### Extension

Information is the new currency and it is hard for suppliers to share them freely. However, there are occasions when information needs to be integrated and shared in order for innovations to grow.

Suppliers may be agreeable to share their proprietary information if they can be assured that their information is protected from copying.

#### Sources


- Personal observations
- Team deliberations

#### Associated Functions

18 Present R&D findings  
23 Provide domain expertise to the government

#### Solution Elements

- M Share Version

---

**Version:** 1  
**Date:** 14 October 2007
Design Strategies

- Hold suppliers' collaboration conference
- Organize suppliers' union
- Compose regulation of suppliers' union

Solution Elements

M Suppliers’ union conference
M Regulation for patients' support activity
M Official suppliers’ union

Collecting product price information from other suppliers is difficult

Observation

Suppliers want to collect all other products’ price information of several companies for supporting health plans. It would also allow patients to acquire a list of products’ price information. However, suppliers generally dislike offering their products’ price information to others.

Extension

Prices of healthcare products vary depending on the discounts given and therefore, it is usually hard for suppliers to provide a listed price for their products. Besides, being competitors, suppliers do not want to share their prices amongst themselves.

For prices to be listed and shared, it might be necessary for a neutral third party be formed to organise this activity.

Sources

Personal observations
Team deliberations

Associated Functions

82 Report comparison information of several suppliers’ product costs to health plans
In general, suppliers provide the price lists to other players, such as health plan providers, distributors and customers. Health plan providers are the center of this value web and they have to maintain the prices of the healthcare products. Unlike healthcare suppliers, changing the health plan fees is extremely complicated and difficult due to the contracts made with customers.

There are many reasons why suppliers need to change the price. Sometimes, it could be due to uncontrollable factors such as increase in raw materials cost. However, even in such instances, medical equipment and pharmaceutical suppliers cannot adjust the price. It is very painful market structure condition for suppliers.

Suppliers should find a way to adjust their product price in terms of increasing the manufacturing cost.

**Design Strategies**

- Inform health plans and consumers of transparency about their product price
- Determine product price based on market

**Solution Elements**

- **Price Regulator**
- **Cost Estimation**
## Design Factor

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## Sources
- Personal observations
- Team deliberations

## Associated Functions
- 80 Create contracts with health plans

## Observation
After the contract expires between suppliers and health plans, suppliers hope to revise a new contract for the new term. However, health plans usually wish to maintain the existing contract without further amendments.

## Extension
Prices need to be re-negotiated every year when the contract expires as the cost of production and prices of raw materials increase every year. To keep the cost down, health plans want to keep the cost unchanged. In such instances, it might be better for a third party to be the mediator for this contract renewal process.

## Design Strategies
- Compose regulation of suppliers' union

## Solution Elements
- Official suppliers' union
<table>
<thead>
<tr>
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<th>Employers are not concerned about suppliers' products</th>
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<td>Originator</td>
<td>Amy Batchu</td>
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<tr>
<td>Contributors</td>
<td>Min Joong Kim</td>
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<tr>
<td></td>
<td>Suat Hoon Pee</td>
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<tr>
<td></td>
<td>Amy Batchu</td>
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</tbody>
</table>

### Design Strategies
- Explain benefits of potential product to users
- Recruit actual target users

### Solution Elements
- Product Education Package
- Recruiting Recognition

### Sources
- Personal observations
- Team deliberations

### Associated Functions
- 92 Provide incentives for employees to maintain a healthy lifestyle
- 93 Promote new products
- 94 Report product information
- 95 Continue informative relationship
- 96 Provide employees with products for pre-market research

### Observation
Suppliers currently are not in touch with the public. There is a disconnect and a lack of trust. The public generally thinks that suppliers cannot be trusted. People blame suppliers for the rise in health care costs. Organizations of employers can become the channel of communication about products for patients/employees.

### Extension
If suppliers team with employers in order to educate employees and patients, then they may create interest with the targeted group. Some thing that they can do is incentivize the public to care about the product and how that product relates to them and their diagnosis. If suppliers provide the additional information that is needed to understand different products when they apply to different users, then they will be effective in creating an interest. In addition to this they must think of products as an entire care cycle and how that can benefit individuals within an organization.
Design Factor

**Project**
Rethinking - Design Thinking - Health Care

**Mode**
Provisions for Employers

**Activity**
Communicating research

**Originator**
Amy Batchu

**Contributors**
Min Joong Kim
Suat Hoon Pee
Amy Batchu

**Observation**
When suppliers conduct pre-market research they attempt to find the best suited sample of patients to run the clinical trials on. However there are many patients that are skeptical of the process of pre-market testing. Suppliers should have products that are recognizable as a breakthrough treatment for a target group.

**Extension**
When suppliers recruit patients for clinical trials they should be aware of who they are recruiting, and specify their efforts towards recruiting a specific group. This group of people would be incentivized in order to participate. These incentives are not necessarily financial, but are rewards that surface naturally from participating. Suppliers should focus on how they need to address the target sample for each research trial. If the proposed product is valuable and the supplier can communicate that then, patients would be willing to participate freely. It is then the job of the recruiters to insure that the right group of patients is sampled.

**Design Strategies**
- Explain benefits of potential product to users
- Recruit actual target users

**Solution Elements**
- **Product Education Package**: M
- **Recruiting Recognition**: M

**Sources**
Personal observations
Team deliberations

**Associated Functions**
95 Continue informative relationship
96 Provide employees with products for pre-market research

**Date**: 14 October 2007
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>The pre-market research could generate some unexpected problems</th>
</tr>
</thead>
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<tr>
<td>Project</td>
<td>Rethinking - Design Thinking - Health Care</td>
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<tr>
<td>Mode</td>
<td>Provisions for Employers</td>
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<td>Activity</td>
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<td>Contributors</td>
<td>Min Joong Kim, Suat Hoon Pee, Amy Batchu</td>
</tr>
<tr>
<td>Observation</td>
<td>A supplier relies on testing products before they hit the market. Usually these studies are conducted as clinical trials. However in other instances there may be pre-market research. This research is based on surveys.</td>
</tr>
<tr>
<td>Extension</td>
<td>When a supplier is researching a potential product they may run clinical trials or usability tests. This is one way of collecting information about the product and its interactions with the users. Another way to obtain information from the users is to directly survey a sample of the users and create a response. However there are many other ways to obtain pre-market information. Some methods are observational research or consumer shadowing.</td>
</tr>
<tr>
<td>Design Strategies</td>
<td>Solution Elements</td>
</tr>
<tr>
<td></td>
<td>- Record potential users and customers</td>
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<tr>
<td></td>
<td>- Perform observational research</td>
</tr>
<tr>
<td></td>
<td>M Participant’s Health Profile</td>
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<td>M Shadow Users</td>
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</table>

Version: 1  Date: 14 October 2007
**Title**: Providers don't have time to evaluate supplier services

**Design Factor**

<table>
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<tbody>
<tr>
<td>Mode</td>
<td>Provisions for Providers</td>
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<tr>
<td>Activity</td>
<td>Supplying services and products to providers</td>
</tr>
<tr>
<td>Originator</td>
<td>Amy Seng</td>
</tr>
<tr>
<td>Contributors</td>
<td>Amy Batchu, Minjoong Kim, Megan Pee</td>
</tr>
<tr>
<td>Observation</td>
<td>Suppliers want feedback on their support services but providers don't have the time to provide it.</td>
</tr>
</tbody>
</table>

**Associated Functions**

- 62 Request service quality evaluations

**Design Strategies**

- Provide multiple channels for providers to offer feedback
- Create easy-to-answer feedback measures
- Ask for specific feedback right when the service occurs
- Allow providers to give feedback when they have free time

**Solution Elements**

- **S** How am I doing?
- **E** Online feedback system
- **E** Quarterly satisfaction evaluation

**Extension**

Suppliers want to develop strong relationships with the providers that purchase their products in order to keep their business and to entice new purchasers. One way of strengthening a supplier-provider relationship is to offer continued post-purchase support. This includes training the providers, keeping them informed of updates, and repairing any broken equipment. Qualitative provider feedback on these services is a valuable resource to improve the services, thereby improving the supplier-provider relationship.

Unfortunately, most providers don’t have the time or the means to offer feedback on support services. They are already overwhelmed with caring for patients, maintaining their facilities, and working with insurance companies.
## Design Factor

### Project
Rethinking - DesignThinking - Health Care

### Mode
Provisions for Providers

### Activity
Supplying services and products to providers

### Originator
Amy Seng

### Contributors
Amy Batchu  
Minjoong Kim  
Megan Pee

### Observation
Providers need to be taught how to use/prescribe products and suppliers are the best people to do this, but the training has to be repeated every time a product is updated or a new purchase is made.

### Extension
Equipment is the most effective when it is used correctly and medications are the most effective when they are prescribed correctly. Sales representatives are trained extensively on how to use medical devices and doctors often rely on them in the operating room (Mahar 2006, 294), but they can't depend on sales representatives to always be there. Suppliers need to have well-developed training programs to teach providers and their staff how to prescribe drugs and use devices.

The problem is that this can become costly when products are updated or new products are sold. Suppliers need to have an efficient way to retrain their own sales representatives as well as providers and technicians every time a new product comes out.

### Design Strategies
- Don’t change usage patterns when updating equipment or drugs
- Use a training method that doesn’t require in-person visits
- Assign sales people to specific providers to create a long term relationship
- Mail out update CDs
- Call providers in for mass training sessions
- Design better equipment in the first place

### Solution Elements
- **E** e-training
- **M** Buddy system
- **M** Training mailing lists
- **S** Training conferences
- **E** Usability testing

### Sources

### Associated Functions
55 Educate providers on product use
## Design Factor

### Title
Training is forgotten

### Project
Rethinking - DesignThinking - Health Care

### Mode
Provisions for Providers

### Activity
Supplying services and products to providers

### Originator
Amy Seng

### Contributors
- Amy Batchu
- Minjoong Kim
- Megan Pee

### Observation
Providers may forget how to use products to deal with rare situations if they occur a long time after their initial training.

### Extension
After using a product for awhile, a provider becomes comfortable with the common tasks associated with the product, but may forget how to deal with rare situations. These details are covered in the initial training, but are easily forgotten since they aren’t needed on a daily basis. The result is that providers either aren’t aware of the product’s capabilities in these situations or they are aware, but don’t remember how to take advantage of them.

### Design Strategies
- Provide quick reference materials for providers
- Include reminders in/on/with the product itself
- Provide digital training materials so that providers can refresh their skills whenever they want to
- Offer refresher training courses

### Solution Elements
Status: E - existing, M - modified, S - speculative

- **M** Cheat Sheets
- **M** Instructions on products
- **M** e-Training
- **M** Annual re-certification

### Associated Functions
- 55 Educate providers on product use
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>Title</th>
<th>Reference materials are lost</th>
<th>Sources</th>
<th>Associated Functions</th>
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<tbody>
<tr>
<td><strong>Project</strong></td>
<td></td>
<td>Rethinking - DesignThinking - Health Care</td>
<td>Medical Device User</td>
<td>56  Provide reference materials to providers</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td></td>
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<td>Manuals: Shifting Toward Computerization. <a href="http://www.devicelink.com/mddi/archive/02/01/003.html">http://www.devicelink.com/mddi/archive/02/01/003.html</a></td>
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<td></td>
<td>Amy Batchu, Minjoong Kim, Megan Pee</td>
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<tr>
<td><strong>Observation</strong></td>
<td></td>
<td>Physical manuals and reference materials for products, services, and medications that come with the product are easily misplaced and unavailable when providers need them.</td>
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</tr>
<tr>
<td><strong>Extension</strong></td>
<td></td>
<td>Physical documentation (e.g. manuals, references, indications, etc.) is rarely kept with the product that it offers guidance for. At best it is kept in a central location where all providers can access it when needed, at worst it is thrown out or into an obscure corner once the product is received. The result is that providers don’t have the information on hand when they need it (e.g. when using the equipment or deciding whether to prescribe a drug).</td>
<td></td>
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<tr>
<td><strong>Design Strategies</strong></td>
<td></td>
<td>• Provide reference materials in/on the product itself</td>
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<td></td>
<td></td>
<td>• Encourage providers to place reference materials in each room where the product may be used</td>
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<tr>
<td></td>
<td></td>
<td>• Provide digital reference materials</td>
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<tr>
<td><strong>Solution Elements</strong></td>
<td></td>
<td>Status: E - existing, M - modified, S - speculative</td>
<td>M Customized instructions on products (dependent on the situation)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>M Duplicate reference materials</td>
<td>M Digital reference materials</td>
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Version: 2  Date: December 10 2007
### Rethinking - DesignThinking - Health Care

#### Title
Difficult to determine where the fault lies when products or services malfunction

#### Sources
- Personal observation.
- Team deliberations.

#### Associated Functions
- 59 Repair broken equipment

#### Design Strategies
- Build self-diagnostic tools into the products or services
- Train providers better so that misuse doesn’t occur

#### Solution Elements
- **M** Self-diagnoser
- See previous training solution elements

#### Mode
Provisions for Providers

#### Activity
Supplying services and products to providers

#### Originator
Amy Seng

#### Contributors
- Amy Batchu
- Minjoong Kim
- Megan Pee

#### Observation
When products or services fail, suppliers want to know the cause so that they can prevent future problems.

#### Extension
Suppliers want to continually re-evaluate and improve their products. When equipment fails, they need to know whether it was due to poor quality, regular wear-and-tear, or provider misuse. This knowledge can help direct their efforts towards improving product quality and/or provider training.
### Design Factor

<table>
<thead>
<tr>
<th>Project</th>
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<td>Amy Batchu, Minjoong Kim, Megan Pee</td>
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</tbody>
</table>

### Design Strategies

- Use standard/universal parts in all equipment
- Charge fees for supporting outdated equipment
- Replace outdated products with new ones
- Train providers to maintain their own products
- Provide digital reference materials

### Solution Elements

- **Toolbox**
  - Supported by: M
- **Legacy Contracts**
  - Status: M - modified
- **Leasing Contracts**
  - Status: M - modified

### Associated Functions

- 59 Repair broken equipment

### Title

**Supporting outdated equipment is costly**

### Sources

- [Provision for Providers](http://www.gehealthcare.com/usen/service/time_material_support/products/partseol.html)
  - Barbara Loeb, MD. Interview by Amy Batchu.

### Extension

Healthcare equipment is always built to the highest quality standards. As such, it will last for years even as new, more advanced products are developed. Supporting the outdated equipment requires that manufacturers continue making replacement parts and stocking them in warehouses. As time passes, the demand for these parts decreases, but manufacturers may have to keep producing them just in case.

Software companies deal with this problem by stopping support of older versions of software after a few years. This is more difficult for healthcare suppliers since the equipment could still be working fine and stopping support services could mean endangering patient lives.

### Observation

Healthcare equipment is made to last for years, even as technology rapidly advances. Supporting older models of equipment becomes more and more costly as time passes.
## Site visits are costly

### Design Factor

**Project**
Rethinking - DesignThinking - Health Care

**Mode**
Provisions for Providers

**Activity**
Supplying services and products to providers

**Originator**
Amy Seng

**Contributors**
Amy Batchu
Minjoong Kim
Megan Pee

### Design Strategies

- Offer virtual repair services
- Remote servicing for software problems
- Optimize service routes
- Optimize service team allocations
- Train providers to maintain their own products

### Sources

Lifepoint Hospital Holdings, Inc. and GE Healthcare Technologies Comprehensive Service Agreement for Diagnostic Imaging and Biomedical Services. [http://www.secinfo.com/dsVsf.z1Se.a.htm](http://www.secinfo.com/dsVsf.z1Se.a.htm)

### Associated Functions

59 Repair broken equipment

### Observation

Providing on-site repairs can be very costly - requiring trained supplier repair teams in every major city and the logistics to manage them all.

### Extension

Providing on-site repairs is a service that many large appliance and equipment manufacturers offer since the products (e.g. refrigerators, TVs, washing machines, etc.) cannot be shipped back for repair. This service requires a repair team to be located in every major city with the infrastructure in place to train, support, and manage them. This is very costly and routine service calls for products not under warranty can easily cost hundreds of dollars per hour.

### Solution Elements

Status: E - existing, M - modified, S - speculative

- Remote Servicing
- Remote Diagnoser
- Service Team Utilizer
- Empowering Warranty

See previous training solution elements
Title: Old products cannot be resold

Sources:
- Barbara Loeb, MD. Interview by Amy Batchu.
- Personal observation

Associated Functions:
- 61 Take back old products

Design Strategies:
- Donate old products to developing countries or clinics
- Resell general supplies (e.g. walkers, blankets, etc.) at steep discounts to low-income neighborhoods
- Recycle products for their raw materials
- Remanufacture products

Extension:
Providers often throw out or donate old, but not broken or expired, products and medications. To prevent this waste, suppliers could take back their products when the providers no longer want them. The problem with this situation is that the suppliers will not be able to resell the products, even though they still work. Providers are pressured to use the most up-to-date equipment and patients are worried that outdated equipment is not as effective as newer equipment.

Currently, some single-use devices are being reprocessed, used advanced equipment is being donated to smaller clinics and developing countries, and used general supplies (e.g. crutches) are being resold by consumers, either online or in thrift stores. A more structured system for recycling and reusing products could save suppliers, providers, and consumers money while benefitting people that cannot afford general health supplies.

Solution Elements:
- Healthcare Goodwill (M)
- Product Life Meter (S)
- The Giving Tree - determines how to reuse the product (S)
Collecting used products is resource intensive

**Design Factor**

**Project**
- Rethinking - Design Thinking - Health Care

**Mode**
- Provisions for Providers

**Activity**
- Supplying services and products to providers

**Originator**
- Amy Seng

**Contributors**
- Amy Batchu
- Minjoong Kim
- Megan Pee

**Observation**
While suppliers do not want providers to throw out their old products and they can actually reuse many of the parts, it takes a lot of resources to collect the products from the providers.

**Sources**

**Extension**
Suppliers can be environmentally conscious while cutting down costs if they think in terms of cradle-to-cradle manufacturing. This also alleviates the burden of retiring medical durable equipment that providers currently face.

Some suppliers already remanufacture their products, but this is not common practice, either within the company or throughout the industry. If remanufacturing was practiced more widely, infrastructure could be set up to facilitate the collection process.

**Design Strategies**
- Arrange "pick-up" days
- Contract with a shipping company
- Make products modular for easy (dis)assembly and shipping
- Reuse delivery trucks for removal

**Solution Elements**

- **Pick-up Truck** (S)
- **Shipping Contracts** (S)
- **Modular, packable products** (M)
- **Shipping Optimizer** (M)
<table>
<thead>
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<th>Design Factor</th>
<th>Title</th>
<th>Used products may not be in working condition</th>
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<tr>
<td><strong>Observation</strong></td>
<td></td>
<td>After taking back used products, suppliers need to figure out how to best use them. Some can be resold or donated, others can be remanufactured, and still others can be broken down to re-use the parts. In the worst case, the products will need to be thrown out.</td>
</tr>
<tr>
<td><strong>Extension</strong></td>
<td></td>
<td>As suppliers of medical equipment, there is an extra responsibility to ensure that products are working well. This becomes especially important if suppliers want to re-sell or re-use products. They must be able to determine whether products, or their component parts, are reusable. If they cannot be re-used, suppliers can still recycle the materials and use them to make new components. Currently there are online retailers that buy and sell used medical equipment (e.g. Scientific Equipment Liquidators <a href="http://medused.com/">http://medused.com/</a>), but there are no government regulations to ensure that the resold products can still provide quality care.</td>
</tr>
</tbody>
</table>

### Design Strategies
- Use standard parts across products
- Use recyclable / "green" materials

### Solution Elements
- **Toolbox**
- **The Giving Tree**
- **Cradle to Cradle Manufacturing**
**Title**  
Training sales and repair teams is resource intensive

**Sources**  

**Associated Functions**  
53 Maintain product sales and repair teams

---

**Project**  
Rethinking - Design Thinking - Health Care

**Mode**  
Provisions for Providers

**Activity**  
Supplying services and products to providers

**Originator**  
Amy Seng

**Contributors**  

Amy Batchu  
Minjoong Kim  
Megan Pee

**Observation**  
Supplier sales and repair teams need to be trained on how to use and repair products as well as what the products are made for. Each time a new product is developed, the sales and repair teams need to be trained again.

**Extension**  
The healthcare industry uses advanced technologies and science to develop their products (e.g. medical equipment, drugs, and therapies). The sales and repair teams for these products need to be thoroughly trained on not just what the products should be used for, but also how they’re made and how they should be maintained. In the operating room, a supplier sales representative is often a doctor’s best reference. (Mahar 2006, 294)

Every time a new product is developed or a new team member is hired, this training needs to be repeated. Refresher courses also need to be offered to ensure that the sales and repair teams don’t forget anything. With sales forces in the thousands, this training can be very resource intensive.

This training is necessary to ensure that products are used correctly and that the emissaries of suppliers can create strong relationships with the providers, but maintaining these teams is costly.

---

**Design Strategies**

- Reduce turnover in sales teams  
- Enable remote training  
- Train providers to maintain their own products  
- Develop fast and effective training methods

**Solution Elements**  
Status: E - existing, M - modified, S - speculative

- M Sales Rep Loyalty Incentives  
- M e-Training  
- M Empowering Warranty  
- M Speed Trainer
<table>
<thead>
<tr>
<th>Design Factor</th>
<th>Title</th>
<th>Sources</th>
<th>Associated Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
<td>Providers don't know how to fix equipment by themselves</td>
<td>Team deliberations.</td>
<td>59 Repair broken equipment</td>
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### Design Strategies
- Train providers to maintain their own products
- Offer virtual repair services
- Design products to be easily fixable

### Solution Elements
- **M** Dual-Training - Train providers both on how to use products and how to maintain them
- **M** Empowering Warranty
- **M** Remote Servicing
- **M** Labelled Parts

### Extension
Many service calls result in minor fixes or re-calibrations of equipment. These are tasks that providers can easily do on their own if they are taught how to. While most hospitals have technicians on staff, smaller providers may not have this benefit. In those cases, aids to help providers fix or service the device could save both time and money.

Providers are busy though, so the responsibility also lies on the suppliers to make their equipment malfunctions easy to diagnose and repair.
## Activity Analysis

### Project
Rethinking - Design Thinking - Health Care

### Mode
Provisions for Providers

### Originator
Amy Seng

### Contributors
Amy Batchu  
Minjoong Kim

Megan Pee

### Users
Suppliers  
Providers  
Patient information

### System Components
IT Solutions  
Indivivialized Formats  
Process to direct information

### Environmental Components
Supplier’s Headquarters  
Hospitals

### System Functions
- Analyze results of clinical trials from all providers
- Analyze results of product usability tests
- Generate base price lists
- Write and update documentation
- Develop and update training/reference materials
- Evaluate quality of products
- Evaluate quality of support services
- Create incentives to use/prescribe products
- Assemble relevant samples

### Associated Design Factors
- Results analyses are biased
- It’s tedious to update documentation
- Documentation deposited in different locations
- Hands-on training is not always possible
- Training materials are developed before actual real-world use
- Can’t simulate real problems for training
- Different metrics are being used to measure product quality
- Different metrics are being used to measure service quality
- Quality evaluations are biased
- Unable to determine appropriate samples

### Activity
Assembling for providers

### Scenario
After collecting the relevant information, Suppliers can analyze and assemble it into useful formats for the Providers.

### Version
2

### Date
October 6 2007
## Activity Analysis

### Project
Rethinking - Design Thinking - Health Care

### Mode
Provisions for Providers

### Originator
Amy Seng

### Contributors
Amy Batchu
Minjoong Kim
Megan Pee

### Users
Suppliers
Providers

### System Components
- Drugs
- Equipment
- IT solutions

### Environmental Components
- Hospitals
- Patient's Home
- Supplier's Headquarters

### System Functions
- Recruit patients for clinical trials
- Access clinical trial results
- Access product usability test results
- Access medical device error reports
- Access product quality evaluations
- Access service quality evaluations
- Access data on drugs and products

### Associated Design Factors
- Patients are reluctant to participate in experimental therapies
- Clinical trials have strict requirements for patient subjects
- Providers do not deliver the results of the clinical trials
- Data is collected from many different Providers
- Data is collected incorrectly
- No way to know when a device fails on the Provider’s end
- Providers don’t complete or return evaluations
- Suppliers can’t find the necessary data
- Data on products is outdated

### Scenario
Providers are the main purchasers and users of the Suppliers’ products. There is a lot of useful information that Suppliers can collect, analyze, assemble, and distribute to Providers to help them with their jobs.

### Collecting for providers

<table>
<thead>
<tr>
<th>Activity</th>
<th>Provisions for Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruit patients for clinical trials</td>
<td>Patients are reluctant to participate in experimental therapies</td>
</tr>
<tr>
<td>Access clinical trial results</td>
<td>Clinical trials have strict requirements for patient subjects</td>
</tr>
<tr>
<td>Access product usability test results</td>
<td>Providers do not deliver the results of the clinical trials</td>
</tr>
<tr>
<td>Access medical device error reports</td>
<td>Data is collected from many different Providers</td>
</tr>
<tr>
<td>Access product quality evaluations</td>
<td>Data is collected incorrectly</td>
</tr>
<tr>
<td>Access service quality evaluations</td>
<td>No way to know when a device fails on the Provider’s end</td>
</tr>
<tr>
<td>Access data on drugs and products</td>
<td>Suppliers can’t find the necessary data</td>
</tr>
</tbody>
</table>

### Contributors
Amy Seng

### Dates
Version: 2
Date: October 6 2007
## Legacy Contracts

### Description
A contract that providers sign with suppliers to ensure that suppliers continue to support outdated devices.

### Mode
Provisions for Providers

### Activity
Supplying equipment and services to providers

### Originator
Amy Seng

### Contributors
Amy Batchu
Minjoong Kim
Megan Pee

### Source
New concept.

### Properties
- A contract between suppliers and providers
- Annual fee that is higher than the standard warranty cost, but still cheaper than purchasing new equipment
- Only available for products that are still effective (i.e. still provide quality care)

### Features
- Allows providers to continue using older models of equipment that are still in working condition
- Offsets supplier’s cost of manufacturing parts for outdated models and training service teams on older models
- Reduces waste from retired equipment

### Associated Function/s
- Repair broken equipment
- Offer multiple service channels
- Maintain product sales and repair teams

### Source Design Factor/s
- Supporting outdated equipment is costly
### Empowering Warranty

**Description**
A cheaper warranty that focuses on training providers to service their own products, turning to the suppliers as a last resort.

**Project**
Rethinking - Design Thinking - Healthcare

**Mode**
Provisions for Providers

**Activity**
Supplying equipment and services to providers

**Originator**
Amy Seng

**Contributors**
Amy Batchu  
Minjoong Kim  
Megan Pee

**Source**
In-House Assist Plans.  
http://www.gehealthcare.com/usen/service/healthcare_services_msolution/index.html

<table>
<thead>
<tr>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A repair and servicing warranty</td>
</tr>
<tr>
<td>• Cheaper than a standard warranty</td>
</tr>
<tr>
<td>• Includes maintenance and repair training</td>
</tr>
<tr>
<td>• Offered in lieu of a standard warranty</td>
</tr>
<tr>
<td>• Includes stipulations that providers stay up-to-date with training</td>
</tr>
</tbody>
</table>

• Periodic checks to make sure that providers are maintaining their products at optimal conditions

<table>
<thead>
<tr>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Empowers providers to service and maintain their own equipment</td>
</tr>
<tr>
<td>• Incentivizes providers with a cheaper annual fee</td>
</tr>
<tr>
<td>• Offers regular training sessions for providers</td>
</tr>
<tr>
<td>• Checks that providers are adhering to the training stipulations</td>
</tr>
<tr>
<td>• Allows suppliers to minimize the number of service calls and the size of their service and maintenance teams</td>
</tr>
</tbody>
</table>

**Associated Function/s**
- Repair broken equipment  
- Offer multiple service channels  
- Maintain product sales and repair teams

**Source Design Factor/s**
- Training sales and repair teams is resource intensive  
- Providers don’t know how to fix equipment by themselves
<table>
<thead>
<tr>
<th>Functions</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Generate base price lists / P</td>
</tr>
<tr>
<td>45</td>
<td>Communicate base price lists / P</td>
</tr>
<tr>
<td>48</td>
<td>Negotiate contracts</td>
</tr>
<tr>
<td>80</td>
<td>Provide initial price lists / HP</td>
</tr>
<tr>
<td>72</td>
<td>Generate base price lists / HP</td>
</tr>
<tr>
<td>81</td>
<td>Create contracts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ends</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Preparing price lists</td>
</tr>
<tr>
<td>102</td>
<td>Preparing contracts</td>
</tr>
<tr>
<td>201</td>
<td>Supporting consumer-centric pricing</td>
</tr>
</tbody>
</table>

Project: Rethinking - Design Thinking - Health Care

Cluster 201

Supporting consumer-centric pricing
### Means/Ends Analysis

**Project:** Rethinking - Design Thinking - Health Care  
**Cluster:** 203

<table>
<thead>
<tr>
<th>Functions</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Recruit patients for clinical trials</td>
</tr>
<tr>
<td>96</td>
<td>Provide employees with products for pre-market research</td>
</tr>
<tr>
<td>39</td>
<td>Develop incentives to use/prescribe products</td>
</tr>
<tr>
<td>46</td>
<td>Promote products</td>
</tr>
<tr>
<td>92</td>
<td>Provide incentives for employees to maintain a healthy lifestyle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ends</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>Locating beta testers</td>
</tr>
<tr>
<td>106</td>
<td>Developing incentives</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ends</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>203</td>
<td>Launching new products</td>
</tr>
</tbody>
</table>

**End**
**Means System Element**

- Customer/Provider database
- Buddy System
- Lead development tool (e.g. referrals system...)
- Two-Phased sales
- Internal communication platform for salespeople
- Management network
- Mi-cycle
- Meet n’ Greet / Share n’ Care
- HBO
- Sharing network

**Ends/Means Synthesis**

**Project:** Rethinking - Design Thinking - Health Care

<table>
<thead>
<tr>
<th>End</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>202</td>
<td>Maintaining communication channels</td>
</tr>
<tr>
<td></td>
<td>Choose channel (direct, online, call center)</td>
</tr>
<tr>
<td></td>
<td>Market product</td>
</tr>
<tr>
<td></td>
<td>Sell Product</td>
</tr>
<tr>
<td></td>
<td>Provide product service</td>
</tr>
<tr>
<td></td>
<td>Educate users</td>
</tr>
<tr>
<td></td>
<td>Consider customer privacy and data security</td>
</tr>
<tr>
<td></td>
<td>Plan for set terms (quantitative, qualitative targets)</td>
</tr>
<tr>
<td></td>
<td>Manage campaign</td>
</tr>
<tr>
<td></td>
<td>Develop leads</td>
</tr>
<tr>
<td></td>
<td>Execute pre-sales process</td>
</tr>
<tr>
<td></td>
<td>Capture key customers</td>
</tr>
<tr>
<td></td>
<td>Monitor sales against initial targets</td>
</tr>
<tr>
<td></td>
<td>Manage opportunities</td>
</tr>
<tr>
<td></td>
<td>Manage activities</td>
</tr>
<tr>
<td></td>
<td>Manage service orders</td>
</tr>
<tr>
<td></td>
<td>Manage service contract orders</td>
</tr>
<tr>
<td></td>
<td>Manage planned services</td>
</tr>
<tr>
<td></td>
<td>Manage warranty</td>
</tr>
<tr>
<td></td>
<td>Plan and schedule resources</td>
</tr>
<tr>
<td></td>
<td>Communicate product information</td>
</tr>
<tr>
<td></td>
<td>Manage service workforce</td>
</tr>
<tr>
<td></td>
<td>Share research results</td>
</tr>
<tr>
<td></td>
<td>Share usability results</td>
</tr>
<tr>
<td></td>
<td>Collaborate to generate new ideas</td>
</tr>
<tr>
<td>End</td>
<td>Means</td>
</tr>
<tr>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>307</td>
<td>Service &amp; Product Evaluations</td>
</tr>
<tr>
<td></td>
<td>Prepare communication method</td>
</tr>
<tr>
<td></td>
<td>Research target user</td>
</tr>
<tr>
<td></td>
<td>Locate product and service users</td>
</tr>
<tr>
<td></td>
<td>Prepare Evaluations</td>
</tr>
<tr>
<td></td>
<td>Collect product information</td>
</tr>
<tr>
<td></td>
<td>Distribute evaluations</td>
</tr>
<tr>
<td></td>
<td>Collect evaluations</td>
</tr>
<tr>
<td></td>
<td>Analyze evaluations</td>
</tr>
<tr>
<td></td>
<td>Communicate evaluation results</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>End</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Determine standardized metrics</td>
</tr>
<tr>
<td></td>
<td>Establish standardized criteria</td>
</tr>
<tr>
<td></td>
<td>Determine goal of evaluation</td>
</tr>
<tr>
<td></td>
<td>Reference customer sales reports</td>
</tr>
<tr>
<td></td>
<td>Locate end users</td>
</tr>
<tr>
<td></td>
<td>Reference support service request</td>
</tr>
<tr>
<td></td>
<td>Collect pertaining product logs</td>
</tr>
<tr>
<td></td>
<td>Determine evaluation cycle</td>
</tr>
<tr>
<td></td>
<td>Determine distribution channel and medium</td>
</tr>
<tr>
<td></td>
<td>Request evaluation response</td>
</tr>
<tr>
<td></td>
<td>Encourage evaluation participation</td>
</tr>
<tr>
<td></td>
<td>Establish initial product expectations</td>
</tr>
<tr>
<td></td>
<td>Determine analysis tools</td>
</tr>
<tr>
<td></td>
<td>Ensure objective analysis</td>
</tr>
<tr>
<td></td>
<td>Provide relevant results to interested parties</td>
</tr>
<tr>
<td></td>
<td>Share results with evaluation participants</td>
</tr>
</tbody>
</table>

**Means System Element**

- Value Metric
- Standard Evaluation
- User 1.0 (Network of initial product and service evaluators)
- E-Z Evaluate (system to capture evaluations, different times, different mediums)
- Sister Suppliers
- Value Net (share and reference product reviews)
<table>
<thead>
<tr>
<th>Functions</th>
<th>Product Center</th>
<th>Official Suppliers Organization</th>
<th>Mi - Cycle</th>
<th>HBO</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Collect results of product quality evaluations (G)</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>66 Gather data on drugs and products (HP)</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>70 Assemble results of usability tests</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>71 Assemble product usage, statistics, and evaluations from providers</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>86 Collect results of product quality evaluations (E)</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
</tr>
<tr>
<td>87 Gather data on drugs and products (E)</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐</td>
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</tr>
</tbody>
</table>

- ☐ Strongly supports fulfillment of the Function
- ☐ Supports fulfillment of the Function
<table>
<thead>
<tr>
<th>System Elements</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Support 2.0</strong></td>
<td>1 2 3 4 5 6 7 8 9 1 2 3 4 1 2 3 4 1 2 3 4</td>
</tr>
<tr>
<td><strong>Information Database</strong></td>
<td>1 2 3 4 1 2 3 4 1 2 3 4</td>
</tr>
<tr>
<td><strong>Buddy System</strong></td>
<td>1 2 3 4 1 2 3 4 1 2 3 4</td>
</tr>
<tr>
<td><strong>Share n' Care</strong></td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functions</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3  Collect results of product quality evaluations (G)</td>
<td>Strongly supports fulfillment of the Function</td>
</tr>
<tr>
<td>66 Gather data on drugs and products (HP)</td>
<td>Supports fulfillment of the Function</td>
</tr>
<tr>
<td>70 Assemble results of usability tests</td>
<td>Strongly supports fulfillment of the Function</td>
</tr>
<tr>
<td>71 Assemble product usage, statistics, and evaluations from providers</td>
<td>Supports fulfillment of the Function</td>
</tr>
<tr>
<td>86 Collect results of product quality evaluations (E)</td>
<td>Supports fulfillment of the Function</td>
</tr>
<tr>
<td>87 Gather data on drugs and products (E)</td>
<td>Supports fulfillment of the Function</td>
</tr>
<tr>
<td>System Element</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Health Support 2.0</strong></td>
<td>Health Support 2.0 links to the product information in the Product Center</td>
</tr>
<tr>
<td><strong>Information Database</strong></td>
<td>Product Center extracts its data from the Information Database.</td>
</tr>
<tr>
<td><strong>Buddy System</strong></td>
<td>A sales rep might refer a provider to the Product Center to learn more about a specific product.</td>
</tr>
<tr>
<td><strong>HBO</strong></td>
<td>HBO showcases new products with links to the product details in the Product Center.</td>
</tr>
<tr>
<td><strong>Product Center</strong></td>
<td>Professional Share n’ Cares are announced through HBO. Both HBO and Share n’ Care are communication tools.</td>
</tr>
<tr>
<td><strong>Official Suppliers Organization</strong></td>
<td>The HBO is a branch of the Official Suppliers Organization dedicated to informing providers about new supplier news.</td>
</tr>
</tbody>
</table>

**Scoring**
- 3 Critical Relationship
- 2 Strong Relationship
- 1 Slight Relationship
- 0 No Relationship

**Project:** Rethinking - Design Thinking - Health Care

**System Elements Pairing:** 14, 5, 10, 20 with 6, 1, 8, 11
### System Element Relationships

<table>
<thead>
<tr>
<th>Project: Rethinking - Design Thinking - Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Elements Pairing 1, 8, 11 with 14, 5, 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Official Suppliers Organization</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
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</tr>
<tr>
<td>8</td>
<td>Share n’ Care</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Health Support 2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Information Database</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Buddy System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Scoring**
- 3 Critical Relationship
- 2 Strong Relationship
- 1 Slight Relationship
- 0 No Relationship

**Mi-Cycle** extracts inventory information from the Information Database.

**Share n’ Care** are physical meeting points to learn about products and services found on Health Support 2.0.

**Buddy System** teams invite providers to the Share n’ Care session. Sales representatives are present at the Share n’ Cares as well.
## Flex Plans

**Originator**
Amy Seng

**Contributors**
Amy Batchu  
Min Joong Kim  
Suat Hoon Pee

**Sources**
- Personal observation  
- Team deliberations

**SuperSet Element(s)**
- None

**SubSet Element(s)**
- Empowering Warranty  
- Legacy Contracts  
- Product Leases

**Related Elements**
- Persona  
- Buddy System  
- Just for You Packages  
- EZ Train

### Description

Flex Plans are a set of purchasing and servicing plans that enable providers to purchase advanced medical equipment that they would otherwise not be able to afford.

### Properties

- Flexible purchasing and support plans for medical equipment and services  
- Multiple plans based on provider needs and cost constraints  
- Manuals, tools, and software to help providers repair their own devices

### Features

- Determines provider needs using Persona and from Buddy System interactions  
- Encourages suppliers to consider ease of repair and reuse when designing new products  
- Allows buyers to compare and choose their own plans  
- Emphasizes repair and reuse over buying new products  
- Allows Buddy System teams to develop their own purchase and maintenance plans based on their specific providers  
- Reduces waste as products are used longer
Fulfilled Functions

29 Gather data on drugs and products
42 Collaborate to generate new product ideas
47 Offer relevant packages
48 Negotiate contracts
58 Recall bad products
60 Loan temporary equipment

Discussion

Since buying and maintaining advanced medical equipment can be very expensive, suppliers need to offer flexible purchasing and servicing plans to providers. **Flex Plans** are one way to do this, especially for those who have limited financial resources.

All **Flex Plans** encourage providers to perform routine checks of their equipment and learn how to do basic repairs. Suppliers enable them by providing the training, manuals, tools, and software they need to maintain their own equipment.

While there can be many types of **Flex Plans**, three variations are **Empowering Warranties**, **Legacy Contracts**, and **Product Leases**.

**Empowering Warranties**

These product warranties are cheaper than regular plans, but require that providers first try to service their own equipment before contacting the supplier support team.

To ensure that the products are still providing quality care, providers are required to attend annual **Brand Certification** classes and suppliers perform random checks either remotely or in person via **Buddy System** teams.

Besides costing less for the providers, Empowering Warranties also save suppliers money by reducing the number of service calls they need to make.

**Legacy Contracts**

Since medical devices are built to a high standard of quality, they continue to function long after they are obsolete. Currently suppliers stop supporting devices after a certain number of years and providers are forced to either replace their equipment or find third-party companies to maintain it.

**Legacy Contracts** are higher-priced than standard warranties, but guarantee that suppliers will continue to manufacture spare parts and offer repair services for obsolete equipment. For providers, this higher warranty fee is still cheaper than purchasing new equipment when what they have is still working fine.

**Legacy Contracts** expire when a product can no longer operate at its maximum effectiveness. At these times, a retirement and upgrade clause take effect, allowing suppliers to take the product back and offering the provider a discount for upgrading to a newer model. The retirement clause allows suppliers to recycle the materials and also encourages them to consider cradle-to-cradle manufacturing when developing products. The upgrade clause incentivizes providers to stay with the same supplier.

**Product Leases**

Many suppliers currently offer leasing programs for their high-priced equipment. This is an effective way to provide quality equipment to providers who may not otherwise be able to afford it.

Leasing also encourages suppliers to think about remanufacturing and recycling products and materials in the design and development phases. This ultimately saves them money and protects the environment by reducing waste.

Associated Design Factors

24 Providers are unable to compare products across suppliers
28 Providers cannot easily verify what sales people tell them
30 Providers are incentivized to purchase/prescribe products
Scenario
A supply chain coordinator, Mike, is looking for a better way to manage the inventory levels at the hospital where he works. He has been doing all of his ordering and purchasing with the assistance of a sales representative from the suppliers’ side and a team of administrative support from the hospital’s side. His responsibilities involve ordering products and services for the hospital along with distributing them to the different departments. Mike also tries to ensure that every hospital employee receives accurate supplies on time and is aware of the correct storing requirements.

Some factors that make Mike's job difficult are the inconsistencies between the information exchange of supply and demand. Because he is doing very little of his calculating and ordering on a computer, his quantity levels are not precise and there is a large amount of stock that remains unused and eventually goes bad. On other occasions he realizes that he does not have adequate inventory to fulfill the demand of the hospital employees. When Mike is able to accurately compose his needed levels he is informed that the supplier, which in this case is a distributor, does not have it available or the price of it has now changed. The anticipated calculations that Mike had planned for now mean very little.

Mike's sales representative, Lisa, has realized his frustrations over time and has decided to introduce Mike to a new web application that is being offered to preferred customers. Lisa introduces Mike to Mi-Cycle. This live exchange of information will now allow Mike to use the computer along with the internet to do all of his purchasing and ordering. This will allow for accurate prediction of his ordering cycle. With this application he can also develop algorithms that will help the hospital understand where and when supplies will be used. By subscribing to Mi-Cycle, Mike is also able to review the levels of inventory on the suppliers side. This form of transparency will allow Mike and his staff anticipate and prepare appropriately for back orders and possible price changes.

Mi-Cycle will link to e-Purchase which is an additional web application provided by the supplier or the distributor. This application is used for smart purchasing. e-Purchase will have access to Product Center, which has all of the product information and list prices. By using Mi-Cycle along with e-Purchase, Mike is able to plan the hospital’s supply chain more efficiently.

Upon receiving the supplies, Mi-Cycle, assists Mike and his staff on how to store the products effectively. While checking-in supplies, this information is displayed as a feature informing the employee of possible expiration dates or specific storing conditions.

Lisa is now able to monitor the patterns of Mike's orders more effectively. This allows for Lisa to track patterns of ordering that may require attention. If Mike’s hospital, along with others in the area have an approaching increase in demand, then Lisa and her company can manufacture just in time.
Mi-Cycle is a web based application used as an information sharing and optimization technique that syncs inventory levels between suppliers which include medical equipment manufacturers and pharmaceutical companies, and providers, which consists of health care professionals and facilities. This application tracks purchasing habits and forecasts future purchases. A feature of Mi-Cycle is to ensure that suppliers are able to forecast the demand of products, while providers are able to view available supply levels from all of their suppliers. Mi-Cycle is linked to e-Purchase, which will allow for purchasing to happen after levels are forecasted.

- Web application
- Live exchange network of inventory information continuously flowing between the providers and the suppliers
- Automatic update of levels that allow for transparency
- Personalized feedback or automation of supply and demand reports when necessary
- Links to e-Purchase for convenience to purchase based on forecasts

- Responds quickly to supply and demand
- Handles unexpected external disruptions
- Recovers promptly from disaster
- Updates changes in supply promptly
- Collaborates with suppliers and providers to personalize process
- Manufactures products based on accurate customer preference
### System Element

<table>
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### Discussion

In the developed healthcare system there is the need for providers to be aware of the flow of information and inventory of pharmaceutical and medical equipment between their suppliers, themselves, and their patients, the general public. The supply chain is often left for others to handle because of the complexity that has been created between multiple players and payments. However, supply chain management is an area of great costs savings. All though, this understanding of inventory levels is not the primary responsibility of providers, just a valuable analysis to keep in mind as they administer supplies, and their inventory levels win and wain. By being aware of changing inventory levels providers are able to utilize products better, minimize error, and predict supply and demand. Mi-Cycle is a web based application that is used to reveal product levels between suppliers and providers. By creating transparency of inventory, providers and suppliers can forge new relationships that use algorithms to anticipate each other.

A great ability of Mi-Cycle is that it helps providers anticipate the necessary storage requirements for incoming supply. Automating inventory management with a point-of-use system such as supply and medication cabinets or scanning systems can assist in the rearranging of space within storage or the preparing of accurate temperature for the incoming products. Mi-Cycle has a smart feature, Physical Conditions, that assists in calculating available storage space in conjunction to incoming supply. The provider is able to input dimensions, floor plans and layouts of existing storage space. This planning tool flags situations when ordering more product is necessary however there is no available storage space. While calculating available storage space this resource takes in consideration the size of shipping and storage packaging, which is known primarily by the supplier. An additional amenity of Mi-cycle is it provides reminders for all necessary storage conditions, referred to as Storage Procedures, base on logical-unit-of-measure. Upon receiving supply the provider will also receive a helpful note about the product. Some products need refrigeration while other products need to be in a controlled area. At this time there is also a human acknowledgement of expiration dates, which is crucial to know before the utilizing phase of product in the patients care cycle.

The Stock Card element of Mi-Cycle houses all of the information on inventory levels. Every product has a Stock Card which can be displayed on the screen. The data on the screen will provide the date that the specific product was received, how many were received and the balance in stock. As this data changes for a particular product, the supplier’s corresponding Stock Card will also update.

On the suppliers side of the situation, it is crucial to have a constant live record of where products are going and at what rate. This allows for the ability for perpetual inventory and efficient par levels, with automated replenishment that links with e-Purchase. The online purchasing system between providers and suppliers. Eventually suppliers will be able to streamline product distribution in conjunction with centralize warehouses or distributor warehouses, resulting in lower labor, inventory and space costs. Just-in-time inventory will then become more feasible.

If after a specific amount of time, a product is not active and the levels have remained stagnant, the suppliers will recall the product and pick it up from the supplier. On the opposite end, if a product is being issued faster than it can be kept in stock, the supplier will track the pattern or rate of consumption. This may provide valuable insight into trends. And in less fortunate situations like natural disaster and epidemic this transparency tool contributes to the preparation of regions effected.
Discussion (continued)

Scenario
A supply chain coordinator, Mike, is looking for a better way to manage the inventory levels at the hospital where he works. He has been doing all of his ordering and purchasing with the assistance of a sales representative from the suppliers’ side and a team of administrative support from the hospital’s side. His responsibilities involve ordering products and services for the hospital along with distributing them to the different departments. Mike also tries to ensure that every hospital employee receives accurate supplies on time and is aware of the correct storing requirements.

Some factors that make Mike's job difficult are the inconsistencies between the information exchange of supply and demand. Because he is doing very little of his calculating and ordering on a computer, his quantity levels are not precise and there is a large amount of stock that remains unused and eventually goes bad. On other occasions he realizes that he does not have adequate inventory to fulfill the demand of the hospital employees. When Mike is able to accurately compose his needed levels he is informed that the supplier, which in this case is a distributor, does not have it available or the price of it has now changed. The anticipated calculations that Mike had planned for now mean very little.

Mike's sales representative, Lisa, has realized his frustrations over time and has decided to introduce Mike to a new web application that is being offered to preferred customers. Lisa introduces Mike to Mi-Cycle. This live exchange of information will now allow Mike to use the computer along with the internet to do all of his purchasing and ordering. This will allow for accurate prediction of his ordering cycle. With this application he can also develop algorithms that will help the hospital understand where and when supplies will be used. By subscribing to Mi-Cycle, Mike is also able to review the levels of inventory on the suppliers side. This form of transparency will allow Mike and his staff anticipate and prepare appropriately for back orders and possible price changes.

Mi-Cycle will link to e-Purchase which is an additional web application provided by the supplier or the distributor. This application is used for smart purchasing. e-Purchase will have access to Product Center, which has all of the product information and list prices. By using Mi-Cycle along with e-Purchase, Mike is able to plan the hospital’s supply chain more efficiently.

Upon receiving the supplies, Mi-Cycle, assists Mike and his staff on how to store the products effectively. While checking-in supplies, this information is displayed as a feature informing the employee of possible expiration dates or specific storing conditions.

Lisa is now able to monitor the patterns of Mike's orders more effectively. This allows for Lisa to track patterns of ordering that may require attention. If Mike's hospital, along with others in the area have an approaching increase in demand, then Lisa and her company can manufacture just in time.