

Clinical Nutrition: An Update on Market Environment, Research and Development, and New Product in a Global Context

临床营养的发展, 市场环境, 研发和新产品的全球新概况

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Presentation Outline 内容纲要

- A. History and Milestones 发展历程
- B. Market Dynamics and Industry Profile 市场动向和行业概况
 - i. Key growth drivers 增长驱动力
 - ii. Size and value 行业规模和产值
 - iii. Players and market share 公司和市场占有
 - iv. Products (enteral nutrition) 产品概述(肠内营养)
- C. R&D and New Product 研发和新产品
- D. Wellgenex Brief Introduction 公司简介
- E. Q & A 问答

A. History and Milestones 发展历程

□ Nutrition Vs. Clinical Nutrition

■ Nutrition

- The process of providing or obtaining the **food** necessary for health and growth - *Oxford Dictionaries*.
- The intake of food, considered in relation to the body's dietary needs - WHO.

■ Clinical Nutrition

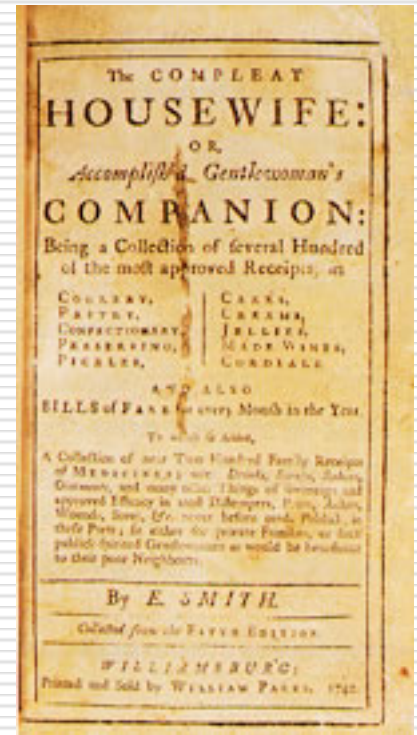
- Nutrition of **patients** in health care - *Wikipedia*.
 - Infant Nutrition
 - **Enteral Nutrition**
 - Parenteral Nutrition



"I find that I can cut back on calories if I use only one chopstick."

A. History and Milestones 发展历程

- Since 1700s*
 - *The Compleat Housewife* by Eliza Smith originally published in **1727**.
 - The first cookbook ever published in America.
 - A collection of over 600 of the most approved receipts in cookery, pastry, confectionary, preserving, pickles, cakes, creams, jellies, etc.
 - A collection of above 300 family recipes of medicines - drinks, syrups, salves, ointments etc.



* Bonnel M. The growth of clinical nutrition. *J Am Diet Assoc*
1974;64:624-629

A. History and Milestones 发展历程 - Discovering Vitamins 发现维生素

□ 1700s – Lavoisier and Metabolism

■ Antoine-Laurent Lavoisier (1743-1794)

- A French chemist, the father of modern chemistry.
- Pioneer work on metabolism and respiration, the first step toward science of nutrition.
 - ice calorimeter guinea pig experiment
 - respiration is a form of slow combustion
 - role of food in the human body



A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

- 1700s - Lind, Scurvy, and the British Navy
 - James Lind (1716-1794)
 - A British naval surgeon first discovered the cure for scurvy, a disease of Vitamin C deficiency.
 - Scurvy, found in people with limited access to fresh fruits and vegetables, once thought to be caused by exposure to "bad air," putrefaction, and dampness.
 - In 1747 Lind conducted the 1st controlled trial on 12 sailors with scurvy. The pair given citrus fruit became well within 6 days. Results published in "*Treatise on the Scurvy*" in 1753.
 - Over 40 years later, Gilbert Blane, a British navel surgeon put the cure to practice after reading Lind's treatise.



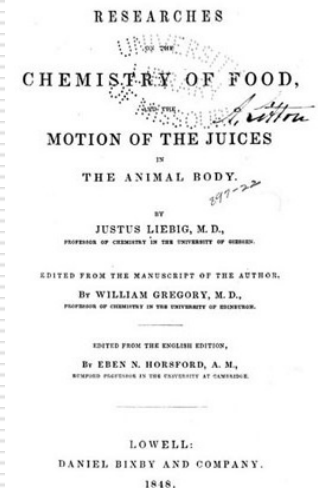
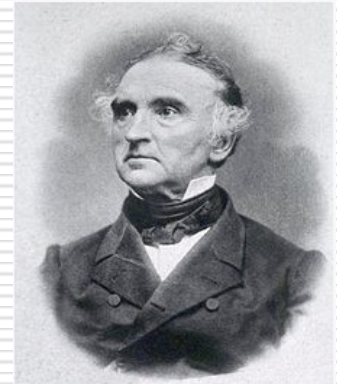
James Lind ©

A
T R E A T I S E
O N T H E
S C U R V Y .
I N T H R E E P A R T S .
C O N T A I N I N G
An Inquiry into the Nature, Causes,
and Cure, of that Disease.
Together with
A Critical and Chronological View of what
has been published on the Subject.
By J A M E S L I N D, M. D.
Physician to his Majesty's Royal Hospital at Heston
near Portsmouth, and Fellow of the Royal
College of Physicians in Edinburgh.
The THIRD EDITION, enlarged and improved.
L O N D O N :
Printed for S. CROWE, D. WILKIN and G.
NICHOLS, T. CADDIS, T. BERRY and Co.
G. FRANK, and W. WOODFALL.
M D C C C X X I I .

A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

- 1800s - Liebig' s Dietetic Trinity
 - Justus Liebig (1803-1873)
 - A German chemist studied chemistry and physiology.
 - Published in 1848 “*Researches on the chemistry of food, and the motion of the juices in the animal body.*”
 - Famously asserted that proteins, carbohydrates (CHO), and fats (i.e. Dietetic Trinity) provided **all** the nutrition needed by the human body.

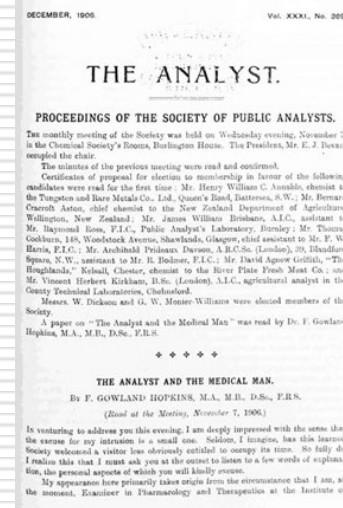
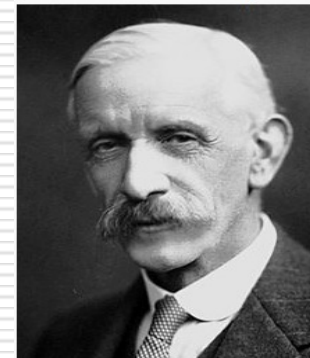
Justus von Liebig



A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

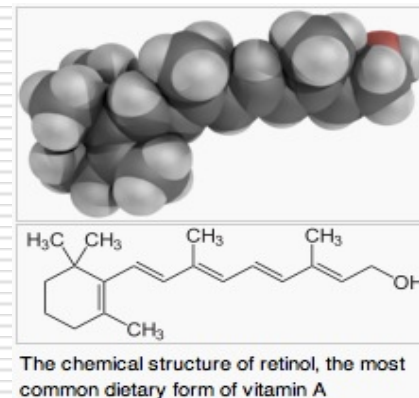
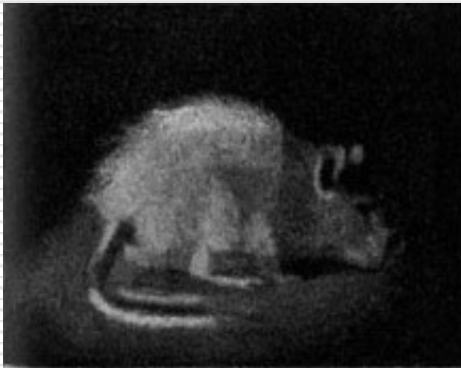
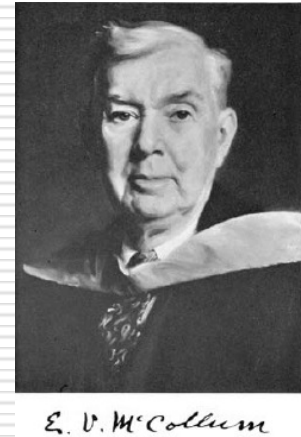
- 1900s - Accessory Factors
 - Frederick Gowland Hopkins (1861-1947)
 - A English biochemist first to elucidate the “accessory food factor” that later defined as **vitamins**.
 - Discovered tryptophan in 1901.
 - Accessory factors, the idea that food contains trace amounts of substances essential for nutrition, published in 1906 “The Analyst and the Medical Man.” *The Analyst*.
 - 1929 Nobel Prize in Medicine or Physiology for discovery of the growth stimulating vitamins.

Frederick Gowland Hopkins



A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

- 1900s – Rats and fats
 - Elmer McCollum (1879-1967)
 - An American biochemist researched fats and health.
 - Contributed to the discovery of “Fat-soluble A” , the first known vitamin (**Vitamin A**).



A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

Yr of discovery	Vitamin	Deficiency disease
1913	Vitamin A	Night-blindness
1910	Vitamin B1	Beriberi
1920	Vitamin C	Scurvy
	Vitamin D	Rickets
	Vitamin B2	Ariboflavinosis
1922	Vitamin E	Mild hemolytic anemia in infants (very rare)
1926	Vitamin B12	Megaloblastic anemia
1929	Vitamin K1	Bleeding diathesis
1931	Vitamin B5	Paresthesia
	Vitamin B7	Dermatitis, enteritis
1934	Vitamin B6	Anemia, Peripheral neuropathy
1936	Vitamin B3	Pellagra
1941	Vitamin B9	Birth defects such as neural tube defects

A. History and Milestones 发展历程 – Discovering Vitamins 发现维生素

Nobel Laureates and Their Work with Vitamins		
1928	Vitamin D	Adolf Windaus
1929	Vitamin B1	Christiaan Eijkman
	Growth Stimulating Vitamins (accessory food factors)	Frederick Gowland Hopkins
1934	Vitamin B12	George Hoyt Whipple, George Richards Minot and William Parry Murphy
1937	Vitamin C	Albert Szent-Györgyi, Walter Norman Haworth
	Vitamin E, A, B	Paul Karrer
1938	Vitamin B2, B6	Richard Kuhn
1943	Vitamin K	Henrik Dam, Edward A. Doisy
1957	Vitamin B12	Lord Todd
1964	Vitamin B12	Dorothy Crowfoot Hodgkin
1965	Vitamin B12	Robert B. Woodward

A. History and Milestones 发展历程 – RDA to DRI 膳食营养素推荐供给量到参考摄入量

- Since 1941, Recommended Dietary Allowances (RDA) has been used and regularly updated.
 - RDA was defined as the average daily dietary intake level that is sufficient to meet the nutrient requirements of nearly all (approximately 98 percent) healthy individuals.
- In 1997, Dietary Reference Intakes (DRI) was created to address increasing link between nutrition and disease.
 - DRI defines the the amount of each nutrient needed on a daily basis for healthy individuals.
 - RDA
 - AI (Adequate Intake)
 - Upper Intake Level (UL)
 - Estimated Average Requirement (EAR)

A. History and Milestones 发展历程 – RDA to DRI

膳食营养素推荐供给量到参考摄入量

Vitamins: Historical Comparison of RDIs, RDAs and DRIs, 1968 to Present						
VITAMIN	RDI*	1968 RDA**	1974 RDA**	1980 RDA**	1989 RDA**	DRIs***
Vitamin A	5000 IU	5000 IU	1000 RE (5000 IU)	1000 RE	1000 RE	900 mcg (3000 IU)
Vitamin C	60 mg	60 mg	45 mg	60 mg	60 mg	90 mg
Vitamin D	400 IU (10 mcg)	400 IU (10 mcg)	400 IU (10 mcg)	10 mcg (400 IU)	10 mcg (400 IU)	15 mcg (600 IU)
Vitamin E	30 IU (20 mg)	30 IU (20 mg)	15 IU (10 mg)	10 mg (15 IU)	10 mg (15 IU)	15 mg #
Vitamin K	80 mcg	--	--	70-140 mcg	80 mcg	120 mcg
Thiamin	1.5 mg	1.5 mg	1.5 mg	1.5 mg	1.5 mg	1.2 mg
Riboflavin	1.7 mg	1.7 mg	1.8 mg	1.7 mg	1.8 mg	1.3 mg
Niacin	20 mg	20 mg	20 mg	19 mg	20 mg	16 mg
Vitamin B-6	2 mg	2 mg	2 mg	2.2 mg	2 mg	1.7 mg
Folate	0.4 mg (400 mcg)	400 mcg	400 mcg	400 mcg	200 mcg	400 mcg food, 200 mcg synthetic ##
Vitamin B-12	6 mcg	6 mcg	3 mcg	3 mcg	2 mcg	2.4 mcg ###
Biotin	(300 mcg)	150-300 mcg	100-300 mcg	100-200 mcg	30-100 mcg	30 mcg
Pantothenic	10 mg	5-10 mg	5-10 mg	4-7 mg	4-7 mg	5 mg
Choline	--	--	--	--	--	550 mg

* The Reference Daily Intake (RDI) is the value established by the Food and Drug Administration (FDA) for use in nutrition labeling. It was based initially on the highest 1968 Recommended Dietary Allowance (RDA) for each nutrient, to assure that needs were met for all age groups.

** The RDAs were established and periodically revised by the Food and Nutrition Board. Value shown is the highest RDA for each nutrient, in the year indicated for each revision.

*** The Dietary Reference Intakes (DRI) are the most recent set of dietary recommendations established by the Food and Nutrition Board of the Institute of Medicine, 1997-2001. They replace previous RDAs, and may be the basis for eventually updating the RDIs. The value shown here is the highest DRI for each nutrient.

Historical vitamin E conversion factors were amended in the DRI report, so that 15 mg is defined as the equivalent of 22 IU of natural vitamin E or 33 IU of synthetic vitamin E.

It is recommended that women of childbearing age obtain 400 mcg of synthetic folic acid from fortified breakfast cereals or dietary supplements, in addition to dietary folate.

It is recommended that people over 50 meet the B-12 recommendation through fortified foods or supplements, to improve bioavailability.

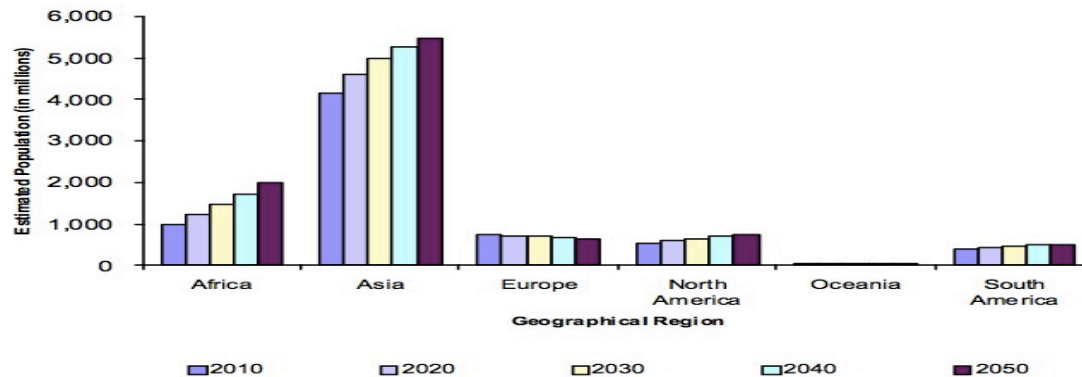
Source: Council for Responsible Nutrition

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers 增长驱动力

□ Growing and aging population

World Population by Selected Geographical Region, 2010 - 2050

Year	Population by Region (in millions)						World
	Africa	Asia	Europe	North America	Oceania	South America	
2010	995.8	4,142.2	728.8	538.6	34.7	392.8	6,832.9
2020	1,217.8	4,600.4	720.0	592.3	38.3	431.8	7,600.5
2030	1,458.0	4,977.2	702.4	643.7	41.4	463.2	8,285.9
2040	1,717.5	5,270.7	678.6	690.9	43.6	484.0	8,885.3
2050	1,992.9	5,478.9	648.9	732.7	45.2	494.2	9,392.8



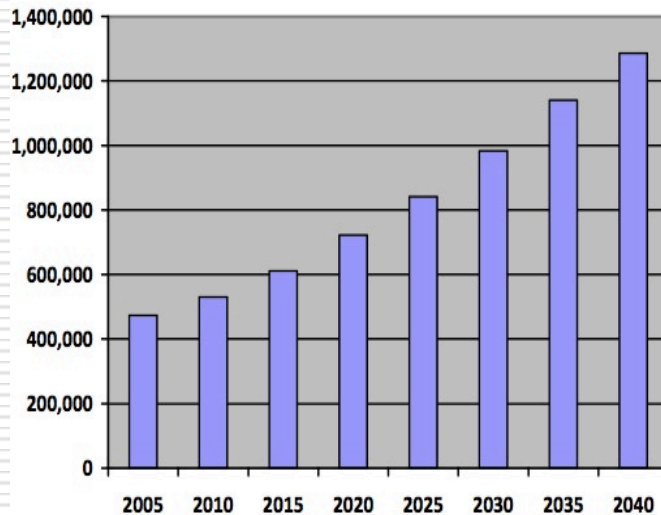
Source: WHO, US Census Bureau, Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

□ Growing and aging population (cont' d)

International Population Trend Age 65+

(Thousands)



Percent Population Over 65 by Year and Region, 2010-2050

Year	Africa	Asia	Europe	North America	Oceania	South America	World
2010	3.4%	6.9%	16.3%	10.8%	11.2%	7.0%	7.8%
2020	3.8%	9.1%	19.3%	13.4%	13.8%	9.2%	9.6%
2030	4.5%	12.0%	23.5%	16.6%	16.5%	12.5%	12.1%
2040	5.4%	15.8%	26.6%	18.3%	18.8%	16.0%	14.8%
2050	6.7%	18.5%	28.7%	19.5%	19.9%	19.6%	16.8%

Source: WHO, US Census Bureau, Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

□ Growing and aging population (cont' d)

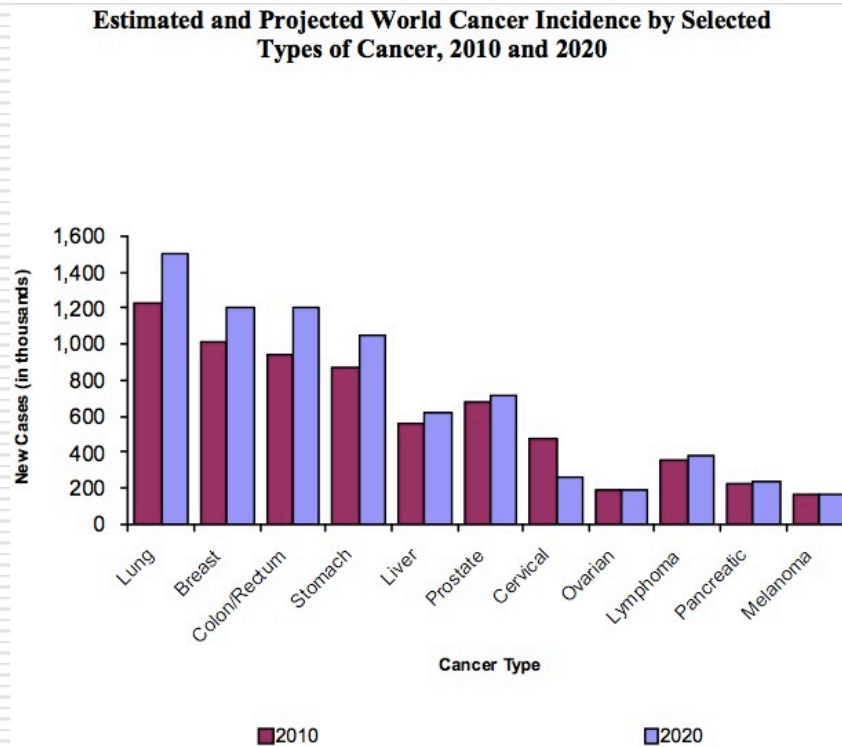
Ageing Population, Percent of Total Population, and Annual Growth by Country*, 2010

Country	Over 65 Population (in thousands)	As a Percent of Total Population	Annual Over 65 Population Growth
Japan	28,665	22.6%	2.6%
Germany	16,803	20.6	1.5
France	10,692	16.5	1.0
United Kingdom	10,157	16.3	1.2
Canada	5,231	15.5	2.8
Australia	2,957	13.7	2.7
United States	40,229	13.0	1.9
Ireland	524	11.3	2.6
China	115,001	8.6	2.8
Brazil	13,198	6.6	3.5
Mexico	7,199	6.4	3.8
Indonesia	14,725	6.1	3.5
South Africa	2,711	5.5	2.8
India	62,620	5.3	3.5
Malaysia	1,368	4.8	4.1
Pakistan	7,720	4.2	2.5
Mali	408	3.0	2.6
Niger	372	2.3	3.8
World	532,625	7.8%	2.3%

Source: US Census Bureau, Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Increasing incidence of chronic diseases - e.g. cancer



Source: WHO, National Cancer Institute, Kalorama Information ■

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Increasing incidence of chronic diseases - e.g. cancer (cont' d)

Total Cancer Incidence by Sex and Country, 2010 Estimates

Year	Cancer Incidence (in thousands)		
	Total	Male	Female
Canada	174	90	84
China	2,300	1,400	900
France	280	160	120
Germany	410	215	195
India	900	440	460
Italy	285	155	130
Brazil	288	145	143
Russia	390	200	190
Japan	580	350	230
Spain	180	108	72
United Kingdom	294	148	146
United States	1,530	790	740

Source: WHO, National Cancer Institute, Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Growing awareness/knowledge on nutrition and disease
 - Cancer and nutrition

Summary of Strength of Evidence on Lifestyle Factors and Risk of Developing Cancer

Evidence	Decreased risk	Increased risk
Convincing^a	Physical activity (colon)	Overweight and obesity (oesophagus, colorectum, breast in postmenopausal women, endometrium, kidney) Alcohol (oral cavity, pharynx, larynx, oesophagus, liver, breast) Aflatoxin (liver) Chinese-style salted fish (nasopharynx)
Probable^a	Fruits and vegetables (oral cavity, oesophagus, stomach, colorectum ^b) Physical activity (breast)	Preserved meat (colorectum) Salt-preserved foods and salt (stomach) Very hot (thermally) drinks and food (oral cavity, pharynx, oesophagus)
Possible/insufficient	Fibre Soya Fish n-3 Fatty acids Carotenoids Vitamins B ₂ , B ₆ , folate, B ₁₂ , C, D, E Calcium, zinc and selenium Non-nutrient plant constituents (e.g. allium compounds, flavonoids, isoflavones, lignans)	Animal fats Heterocyclic amines Polycyclic aromatic hydrocarbons Nitrosamines

^a The "convincing" and "probable" categories in this report correspond to the "sufficient" category of the IARC report on weight control and physical activity (4) in terms of the public health and policy implications.

^b For colorectal cancer, a protective effect of fruit and vegetable intake has been suggested by many case-control studies but this has not been supported by results of several large prospective studies, suggesting that if a benefit does exist it is likely to be modest.

Source: WHO/FAO

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Growing awareness/knowledge on nutrition and disease
 - Obesity and nutrition

Summary of Strength of Evidence on Lifestyle Factors and Risk of Developing Obesity

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Regular physical activity		Sedentary lifestyles
	High dietary intake of NSP (dietary fibre) ^b		High intake of energy-dense micronutrient-poor foods ^c
Probable	Home and school environments that support healthy food choices for children ^d		Heavy marketing of energy-dense foods ^d and fast-food outlets ^d
	Breastfeeding		High intake of sugars-sweetened soft drinks and fruit juices
Possible	Low glycaemic index foods	Protein content of the diet	Adverse socioeconomic conditions ^d (in developed countries, especially for women)
			Large portion sizes
			High proportion of food prepared outside the home (developed countries)
Insufficient	Increased eating frequency		"Rigid restraint/periodic disinhibition" eating patterns
			Alcohol

^a Strength of evidence: the totality of the evidence was taken into account. The World Cancer Research Fund schema was taken as the starting point but was modified in the following manner: randomized controlled trials were given prominence as the highest ranking study design (randomized controlled trials were not a major source of cancer evidence); associated evidence and expert opinion was also taken into account in relation to environmental determinants (direct trials were usually not available).

^b Specific amounts will depend on the analytical methodologies used to measure fibre.

^c Energy-dense and micronutrient-poor foods tend to be processed foods that are high in fat and/or sugars. Low energy-dense (or energy-dilute) foods, such as fruit, legumes, vegetables and whole grain cereals, are high in dietary fibre and water.

^d Associated evidence and expert opinion included.

Source: WHO/FAO

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Growing awareness/knowledge on nutrition and disease
 - Cardiovascular disease and nutrition

Summary of Strength of Evidence on Lifestyle Factors and Risk of Developing Cardiovascular Disease

Evidence	Decreased risk	No relationship	Increased risk
Convincing	Regular physical activity	Vitamin E supplements	Myristic and palmitic acids
	Linoleic acid		Trans fatty acids
	Fish and fish oils (EHA and DHA)		High sodium intake
	Vegetables and fruits (including berries)		Overweight
	Potassium		High alcohol intake (for stroke)
	Low to moderate alcohol intake (for coronary heart disease)		
Probable	α-Linolenic acid	Stearic acid	Dietary cholesterol
	Oleic acid		Unfiltered boiled coffee
	NSP		
	Wholegrain cereals Nuts (unsalted) Plant sterols/stanols Folate		
Possible	Flavonoids		Fats rich in lauric acid
	Soy products		Impaired fetal nutrition
Inufficient	Calcium		Beta-carotene supplements
	Magnesium		Carbohydrates
	Vitamin C		Iron

EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; NSP, non-starch polysaccharides.

Source: WHO/FAO

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Growing awareness/knowledge on nutrition and disease
 - Diabetes and nutrition

Summary of Strength of Evidence on Lifestyle Factors and Risk of Developing Type 2 Diabetes

Evidence	Decreased risk	No relationship	Increased risk	
Convincing	Voluntary weight loss in overweight and obese people		Overweight and obesity	
	Physical activity		Abdominal obesity	
Probable	NSP		Physical inactivity	
			Maternal diabetes ^a	
Possible	n-3 fatty acids		Saturated fats	
	Low glycaemic index foods		Intrauterine growth retardation	
	Exclusive breastfeeding ^b		Total fat intake	
Insufficient	Vitamin E			Trans fatty acids
	Chromium			Excess alcohol
	Magnesium			
	Moderate alcohol			

NSP, non-starch polysaccharides.

^a Includes gestational diabetes.

^b As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health (59).

Source: WHO/FAO

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Healthcare settings for clinical nutrition - hospitals

Registered Hospitals and Acute Care Centers by Country

Country	Number
United States	5,800
Canada	2,200
Japan	9,000
Australia	1,300
Germany	1,500
France	1,100
United Kingdom	1,100
China	12,000

Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

- Healthcare settings for clinical nutrition – nursing homes (non-hospital care centre)

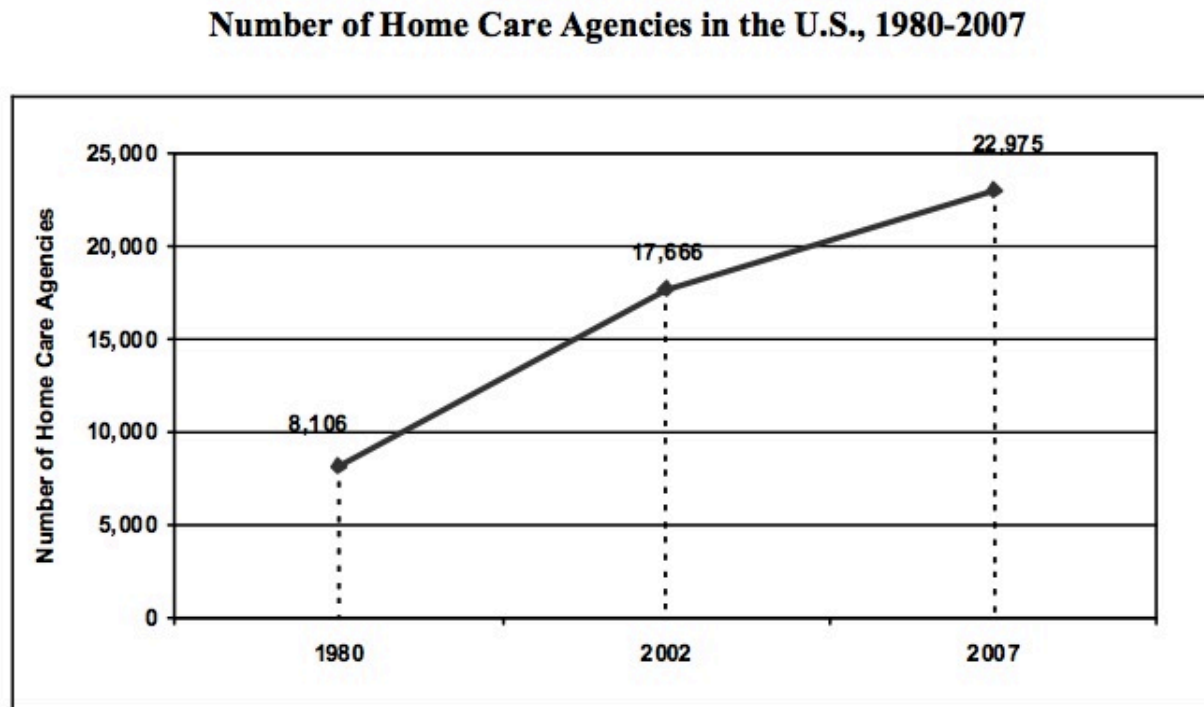
Estimated Nursing Service Establishments and Care Centers by Country

Country	Number
Canada	1,500
Japan	15,000
Germany	10,000
France	8,000
United Kingdom	4,500
China	40,000

Source: Kalorama Information

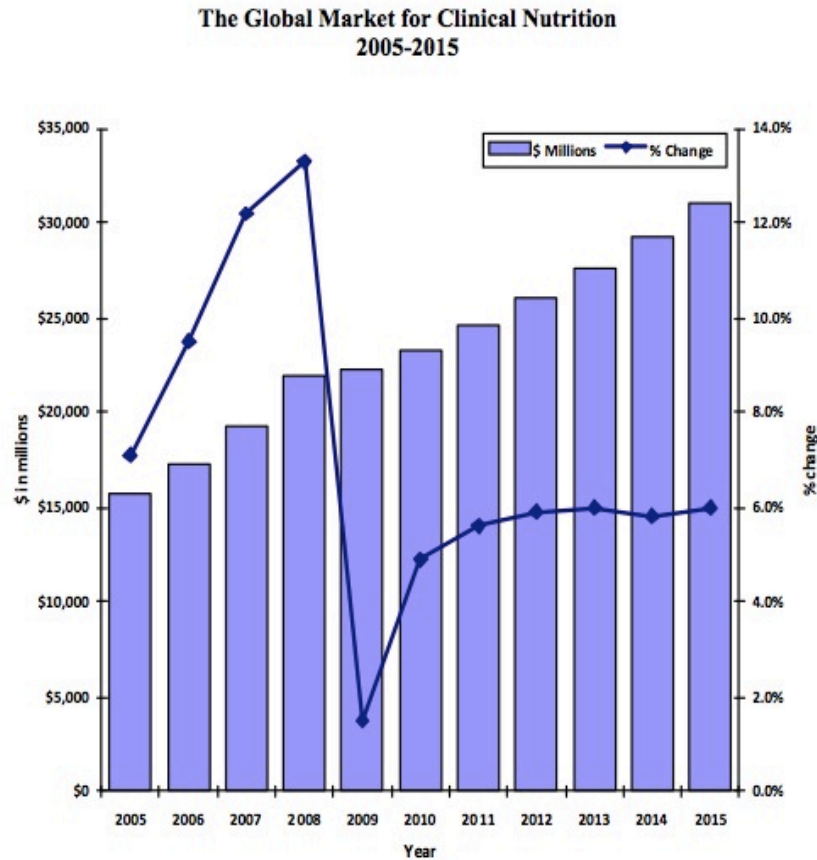
B. Market Dynamics and Industry Profile 市场动向和行业概况 – Key Growth Drivers (cont'd) 增长驱动力

□ Healthcare settings for clinical nutrition – home care



Source: US Census Bureau

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Size and Value 规模和产值



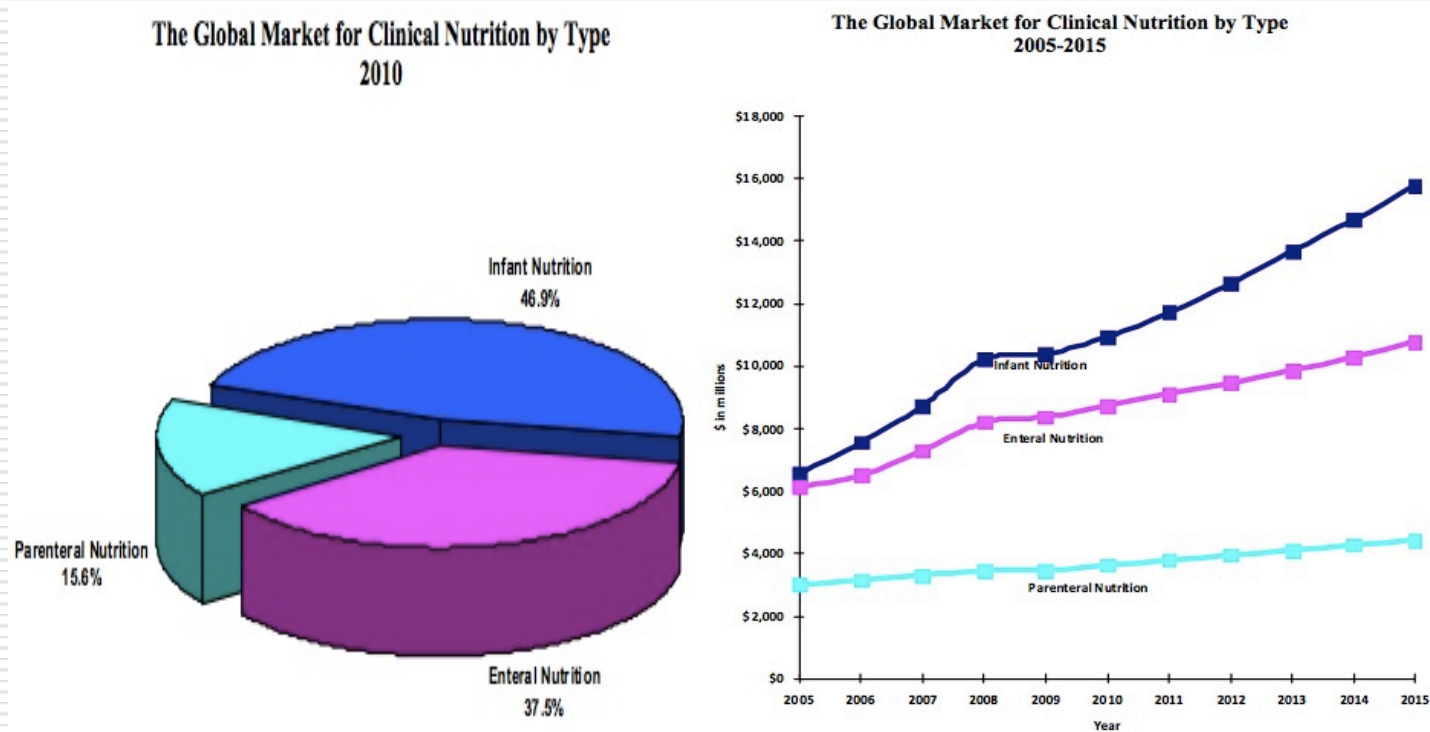
Year	Revenues (in millions)	Percent Change
2005	\$15,726	—
2006	17,226	9.5%
2007	19,321	12.2%
2008	21,890	13.3%
2009	22,227	1.5%
2010	23,320	4.9%
2011	24,623	5.6%
2012	26,084	5.9%
2013	27,662	6.0%
2014	29,265	5.8%
2015	31,008	6.0%

Compound Annual Growth Rate

Period	CAGR
2005-2010	8.2%
2010-2015	5.9%
2005-2015	7.0%

Source: Kalorama Information

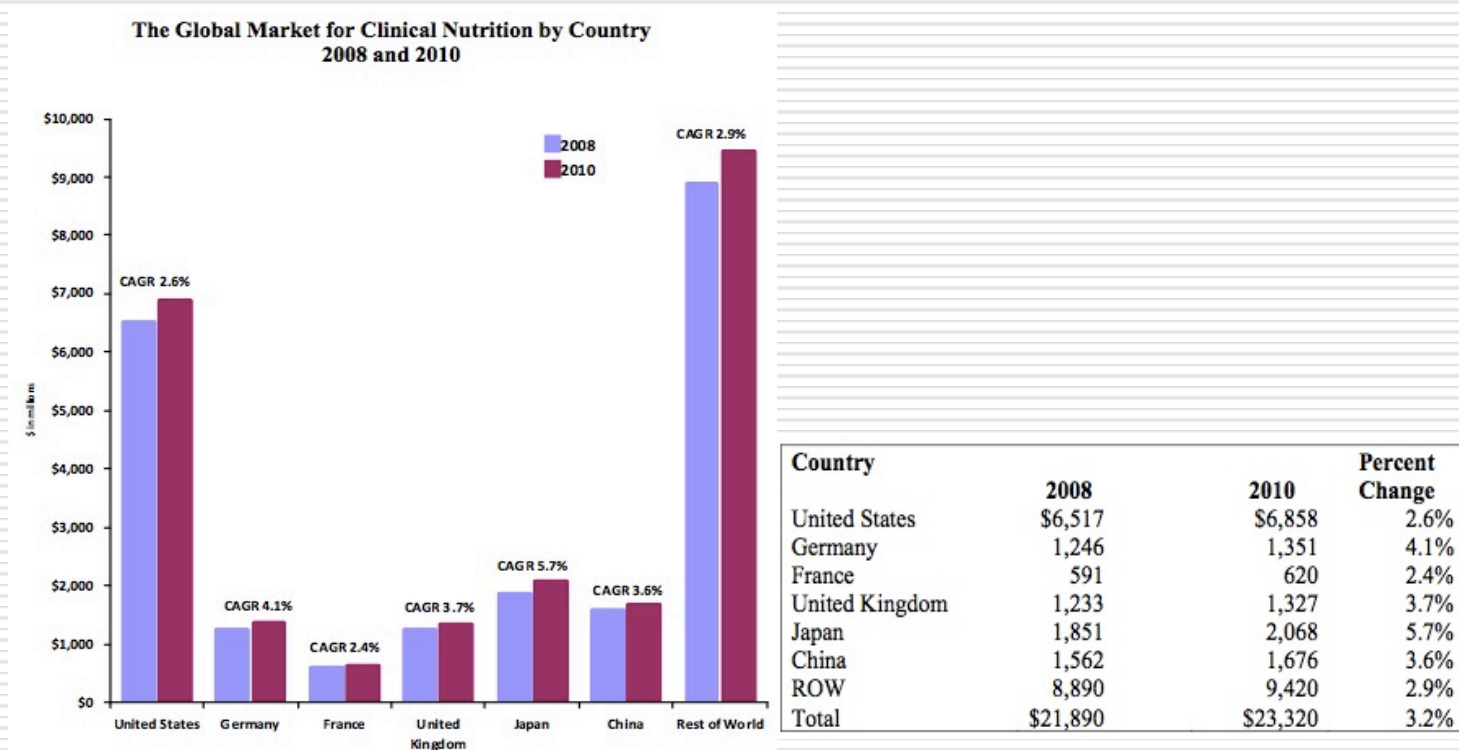
B. Market Dynamics and Industry Profile 市场动向和行业概况 – Size and Value (cont'd) 规模和产值



Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Size and Value (cont'd) 规模和产值

- The US has the largest market at 29%, followed by Japan at 9% and China at 7%.

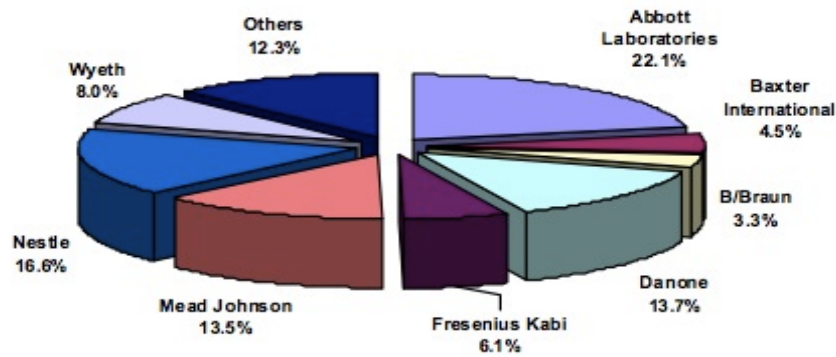


Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Players and Market Share 公司和市场占有率

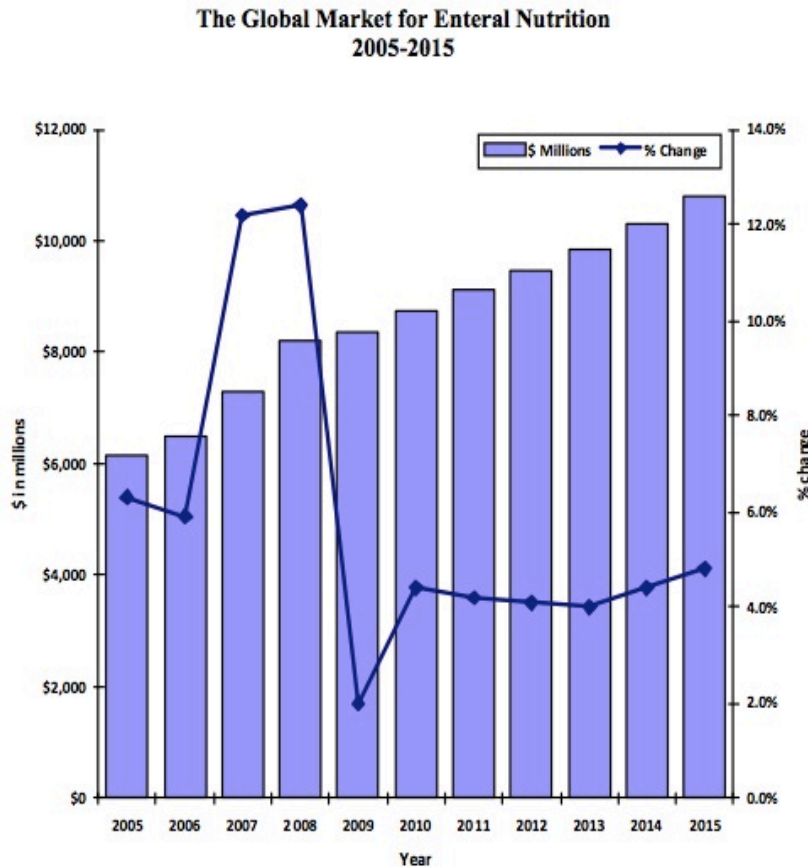
Leading Suppliers Clinical Nutrition Revenues and Significant Segments of Participation, 2010

Supplier	Segments of Major Participation			Estimated Market Share
	Infant Nutrition	Enteral Nutrition	Parenteral Nutrition	
Abbott Laboratories	•	•		22.1%
Baxter			•	4.5%
B/Braun		•	•	3.3%
Danone	•	•		13.7%
Fresenius Kabi		•	•	6.1%
Mead Johnson	•	•		13.5%
Nestle	•	•		16.6%
Pfizer	•	•		8.0%



Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Size and Value 肠内营养规模和产值



Year	Revenues (in millions)	Percent Change
2005	\$6,145	—
2006	6,506	5.9%
2007	7,301	12.2%
2008	8,209	12.4%
2009	8,374	2.0%
2010	8,743	4.4%
2011	9,109	4.2%
2012	9,480	4.1%
2013	9,860	4.0%
2014	10,290	4.4%
2015	10,780	4.8%

Compound Annual Growth Rate

Period	CAGR
2005-2010	7.3%
2010-2015	4.3%
2005-2015	5.8%

Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Size and Value (cont' d) 肠内营养规模和产值

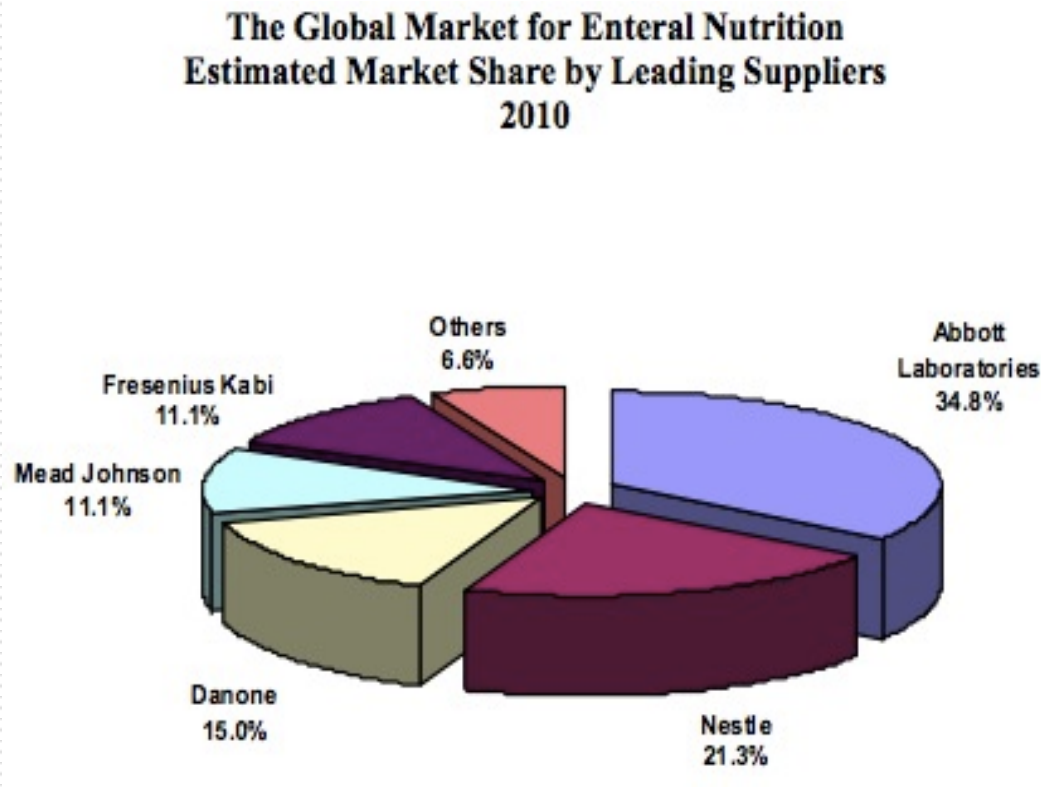
- The US has the largest market at 29%, followed by Japan at 8% and China at 6%.

**The Global Market for Enteral Nutrition
Estimated Products Sales by Select Geographic Region, 2010**

Region	Revenues Estimates (in millions)	Share of Total Market
United States	\$2,509	28.7%
Europe	2,623	30.0%
Germany	550	6.3%
United Kingdom	435	5.0%
France	185	2.1%
Japan	708	8.1%
Rest of World	2,903	33.2%
China	517	6.0%
Brazil	86	1.0%
Total	\$8,743	100%

Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Players and Market Share 肠内营养规模和产值



Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Players and Market Share (cont' d) 肠内营养规模和产值

Sales and Market Share of Leading Enteral Nutrition Companies in the World 2010

Company	Sales (millions)	Market Share			Key Market Region
		Total	USA	Outside USA	
Abbott Laboratories	\$3,043	34.8%	62.5%	23.7%	US
Nestle	\$1,862	21.3%	26.0%	19.4%	US, Western Europe
Danone	\$1,312	15.0%		21.1%	Europe
Mead Johnson	\$974	11.1%	4.0%	14.0%	US, China, Hong Kong, Brazil, Russia, India, Middle East
Fresenius Kabi	\$973	11.1%		15.6%	Europe, Latin America, Asia
Others	\$579	6.6%	7.5%	6.2%	
Total		100%		100%	

Source: Kalorama Information

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Category 产品类别 (肠内营养)

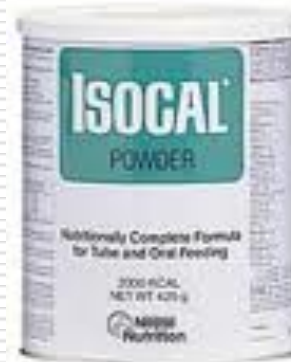
- Standard and Fiber-containing Formulas
 - Polymeric
 - Fiber-supplemented
- Elemental/Semi-elemental Formulas
 - Oligomeric
 - Monomeric
- Specialized Formulas
 - Modular
 - Diabetic
 - Pulmonary
 - Renal
 - Hepatic
 - Immunomodulating

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Standard Formulas 标准配方

- Standard and Fiber-containing Formulas
 - Provide complete nutrient profiles that mimic a typical diet
 - Whole protein as nitrogen source.
 - Usually lactose-free and isotonic (caloric density 1 to 2 kcal/ml).
 - Require some digestion and absorption. Suitable for patients with normal or near normal GI function.
 - Products include blenderized food, standard, high calorie, high protein, fiber-supplemented formulas.
 - Blenderized: *Compleat*
 - Standard: *Ensure, Jevity 1.2, Osmolite, Boost, Isocal, Nutren 1.0*
 - High calorie: *Twocal HN, Novasource 2.0, Nutren 2.0, Deliver 2.0*
 - High protein: *Ensure Plus, Osmolite 1.2 Cal, Promote, Boost, Isosource HN, Isocal HN, Replete*
 - Fiber-supplemented: *Ensure with Fiber, Jevity, Fibersource HN*

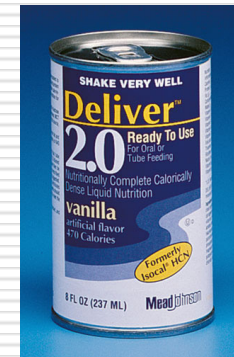
B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Standard Formulas (cont' d) 标准配方

□ Blenderized / Standard



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Standard Formulas (cont' d) 标准配方

□ High Calorie



□ High Protein



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Standard Formulas (cont' d) 标准配方

□ Fiber-supplemented



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Elemental/Semi-elemental Formulas 初形/半初形配方

□ Elemental/Semi-elemental Formulas

- Predigested nutrients with short peptides and/or free amino acids as nitrogen source.
- Lactose and fiber-free.
- Unpleasant palatability (taste) due to amino acids.
- Moderately to highly osmotic due to multiple small particles.
- Require minimal digestion for absorption. Indicated for patients with impaired GI digestive and absorptive functions.
- Products include *Perative, Vital HN, Criticare HN, Peptamen, Subdue, Tolerex, Vivonex TEN*, etc.

B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Elemental/Semi-elemental Formulas (cont' d) 初形/半初形配方

□ Elemental/Semi-elemental Formulas



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas 特殊配方

- Specialized Formulas – Modular 模组
 - Provide protein, fats or CHO as single nutrients or modular mixtures to allow adjustment of macronutrient mix.
 - Used individually to treat a specific deficiency or to be added to food and other formulas.
 - Products include *Polydose*, *Benprotein*, *Benecalorie*, *Microlipid*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas (cont' d) 特殊配方

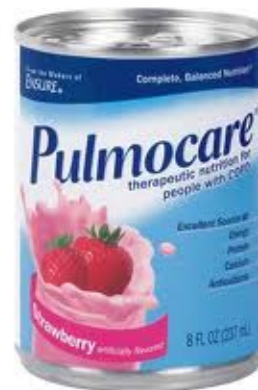
- Specialized Formulas – Diabetic 糖尿病
 - Contain low CHO and increased fat content, soluble and insoluble fibers.
 - Efficacy study results are mixed. May be beneficial in short-term outcomes rather than long-term.
 - Products include *Glucerna*, *Choice DM*, *Diabetisource*, *Glytrol*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas (cont' d) 特殊配方

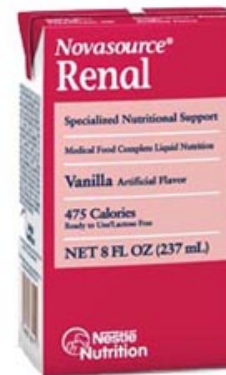
□ Specialized Formulas – Pulmonary 肺病

- Contain low CHO (to reduce CO₂ load), high fat and no fiber, may be added with omega-3 fatty acids and antioxidants.
- Aim to reduce CO₂ produced by CHO and assist with weaning mechanical ventilation. But efficacy study results inconclusive.
- High fat gastric feeding may cause delayed emptying in seriously ill patients.
- Products include *Oxepa*, *Pulmocare*, *Nutrivent*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas (cont' d) 特殊配方

- Specialized Formulas – Renal 肾病
- Contain high calorie (2.0 kcal/ml) with intact protein level and modified electrolytes.
- Used in renal failure patients. Efficacy trial results are not clearly better than standard formulas.
- May be used as supplement or calorie source for patients with impaired renal function.
- Products include *Magnacal Renal*, *Nepro*, *Novasource*, *Suplenat*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas (cont' d) 特殊配方

- Specialized Formulas – Hepatic 肝病
- Provide increased amounts of branched chain amino acids (BCAA) and reduced aromatic amino acids (AAA).
- BCAA inhibit the uptake of AAA at the blood brain barrier to act as false neurotransmitters therefore help to improve neurological symptoms from hepatic encephalopathy. But efficacy trial results are not conclusive.
- Products include *NutriHep*, *Hepatic-Aid II*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Specialized Formulas (cont' d) 特殊配方

□ Specialized Formulas – Immunomodulating

- Enriched with “immunomodulating” nutrients (arginine, glutamine, omega-3 fatty acids).
- Intend to support immune system, improve anti-inflammatory response and protect enterocytes.
- Clinical research results, although mixed, suggest to be most beneficial in surgical patients (reduced ICU infection and mortality, shorten hospitalization time).
- Products include *Alitraq*, *Crucial*, *Impact*, etc.



B. Market Dynamics and Industry Profile 市场动向和行业概况 – Enteral Nutrition – Products – Leskon 立适康

肠内营养系列



立适康营养流食(粉剂)

本品适用于有胃肠道功能或部分胃肠道功能,但存在营养摄入障碍的患者;手术前后;

[详细]



立适康营养流食(输液瓶)

均衡、整蛋白型基本配方,适用于代谢正常或中轻度增高的患者;含中链甘油三酯(MCT),能直接被小肠粘膜吸收,更快的供能,特别适用

[详细]



立适康480g普通型匀浆膳

本品适用于胃肠道功能较好的患者;康复期患者以及家庭肠内营养患者的饮食替代或营养补充。

[详细]



立适康(乳清蛋白粉)

乳清蛋白是世界上最顶级的蛋白质。立适康乳清蛋白粉100%选用优质浓缩乳清蛋白,富含人体需要的所有必需氨基酸,不仅容易消化,

[详细]



立适康低蛋白型

适用于急慢性肾功能衰竭、维持性血液透析、持续性腹膜透析、糖尿病肾病患者。

[详细]



立适康(短肽型)

适用于胰腺炎、炎症肠道疾病、放射性肠炎、肠瘘、短肠综合征、各种危重患者、空肠造瘘等。各种危重

[详细]



立适康纤维多糖

本品源自多种天然膳食纤维的组合(魔芋精粉、双歧因子、燕麦纤维、瓜尔豆胶),经过特殊的工艺将水溶性与非水溶性膳食纤维合理配比,保

[详细]



立适康480g纤维型匀浆膳

适用于糖尿病、应激性高血糖患者及需要高膳食纤维饮食的人群。成分明确,配制方便,经济安全。

[详细]

C. Research and New Product Development 研发与新产品

□ Current research activity focus

■ Gastrointestinal disorders

- Crohn' s Disease
- Short Bowel Syndrome
- Pancreatitis.

■ Neuromuscular disorders

- Muscular dystrophy
- Spinal cord defects
- Cerebral palsy

■ Cardiopulmonary disorders

■ Failure to thrive

■ Premature infants

C. Research and New Product Development (cont' d)

研发与新产品

□ *Gattex*

- A novel, recombinant analog of human glucagon-like peptide 2 (GLP-2) (teduglutide 替度鲁肽) for the treatment of adults with short bowel syndrome.
- Designed to boost the ability of the intestine to absorb nutrients.
- Approved in Europe on August, 2012 and marketed as *Revestive*.
- FDA advisory committee unanimously recommends approval of Gattex on October 16, 2012.
- Developed by NPS Pharmaceuticals. Estimated peak sales at around \$350 million in the US.

C. Research and New Product Development (cont'd)

研发与新产品

□ *Souvenaid*

- A product developed by Prof Richard Wurtman at MIT and manufactured by Danone for Alzheimer's disease (AD).
- Contains Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA), Omega-3 fatty acids, phospholipids, choline, uridine monophosphate, Vit. E, selenium, Vit. B12, Vit. B6, folic acid.
- Two recent clinical trials showed memory improvement benefits in patients with AD.
- Product is to be launched on 4 select markets Germany, Belgium, the Netherlands and Brazil in October 2012.



C. Research and New Product Development (cont'd)

研发与新产品

□ Ingredients in new development

■ Omega-3 fatty acids

- Combine higher Omega-3 fatty acids with medium chain TG (MCT) to produce better bowel tolerance as MCT are Omega-6 fat with smaller chains that are more easily absorbed.
- Omega-3 fatty acids for use as modular to add to formulas with Omega-6 to achieve a more balanced balanced Omega-6 to Omega-3 ratio (the ideal 1:3 vs 20:1 in typical North American diets).
- Omega-3 fatty acids owing to the anti-inflammatory properties are beneficial for patients with trauma and chronic wounds.

■ Citrulline 瓜胺酸

C. Research and New Product Development (cont'd)

研发与新产品

□ Ingredients in new development

■ Citrulline (CIT) 瓜氨酸

- An amino acid gets released through small intestine and passed over the kidneys to get metabolized to arginine (ARG).
- ARG releases nitrous oxide that is beneficial for healing.
- Animal studies showed CIT supplementation in malnourished elderly rats with short bowel syndrome led to marked increase of ARG, restored nitrogen balance and maintained protein homeostasis.
- Human clinical trials on CIT-added specialized enteral nutrition formulas are being conducted on malnourished patients with impaired intestinal functions.

D. Wellgenex 公司简介

□ Corporate highlight:

- A Canadian professional firm focusing on medical, nutrition and natural health in North America and Asia Pacific
- Experts with extensive expertise in academia, industry and agencies bridging the gap between science and business

□ Area of specialty:

- New market entry, due diligence, strategic alliance
- R&D, product development and commercialization
- Scientific & regulatory affairs

- Wellgenex是一家专注于生命科学包括天然药物和营养健康品的加拿大专业服务公司
- 新市场拓展与开发, 评估, 战略伙伴建立
- 产品研发, 临床试验及商业化
- 科学法规事务, 认证与注册

Helping you create product excellence and connect to market success

E. Q & A 问答

谢谢!

