Toshiba Healthcare Business
- Introduction-

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Director, Representative Executive Officer, President & CEO
February 20, 2014
Forward-looking Statements

- This presentation contains forward-looking statements concerning Toshiba Group’s future plans, strategies and performance.

- These forward-looking statements are not historical facts, rather they represent assumptions and beliefs based on economic, financial and competitive data currently available.

- As a global entity, operating a wide range of businesses in countries and regions with widely different market environments, Toshiba wishes to caution that actual results may differ materially from our expectations due to risks and uncertainties that, without limitation, relate to economic conditions, worldwide mega-competition in the electronics business, customer demand, foreign currency exchange rates, tax rules, regulations and other factors.

- Toshiba’s fiscal year runs from April 1 to March 31.
Creating New Approaches to Healthcare by combining wide-ranging technologies
Toshiba’s Vision of the Future

Three major pillars that will support Smart Communities

- **Energy**
  - Renewable Energy
  - Power Supply
- **Social Infrastructure**
- **Transportation**
- **Homes**
- **Smart Grid, Energy Management**
- **ICT/Cloud Storage**
- **Materials and Devices**
  - Data Centers
  - Servers
  - Storage Arrays
  - HDD/SSD/NAND
- **Home Appliances**
- **Medical Services**
- **Healthcare IT**
- **Distribution & Retailing**
- **TVs, PCs**

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Toshiba’s Vision for Healthcare

Megatrends

Population growth and aging
Information society
Natural resource & energy problems
Protection of global environmental

People’s Values

More comfortable, safer and happier

Evolving to become a society where people can lead healthier and happier lives
Evolving to become a society where people can lead healthier and happier lives

‘Creating a virtuous healthcare cycle’

I’m happy.

My family is happy.

All children are happy.

Aware individuals are more healthy and happier

Families stay healthy and live comfortable lives

My community is happy.

Individual, families and the community bringing healthier future

In a secure environment, individual people can live in comfort, safety and happiness.
Evolving to become a society where people can lead healthier and happier lives

Healthcare
- Diagnosis & Treatment
  - Early detection & stress-free diagnosis & treatment
- Prevention
  - Reduce disease risks
- Prognosis & Nursing Care
  - Services that help people live in peace

Health Promotion
- Living a happy life & staying mentally and physically healthy

Healthcare Components
- Air
- Food
- Water

Combining wide-ranging technologies

NCI
New Concept Innovation
Prevention

Keeping track of and predicting individuals’ health conditions to reduce disease risks

Environmental factors
Lifestyle factors

Security Cloud
Bioinformatics
Genome Analysis

Genetic factors

Viewing PHRs
Daily sensed data
Lifelong Data Management
Easy health monitoring for everyone, everywhere

Biosensors that provide “easy sensing”

Semiconductors
Lifestyle Sensing
Sensed Information Analysis

Big Data Analysis

NCI
Clinic
Lifestyle advice and preventive assistance from doctors and health concierges

NCI
Research Institute
Predict health conditions by analyzing healthcare big data

NCI

Available Upcoming Under R&D NCI New Concept Innovation

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Diagnosis & Treatment

Diagnosis and treatment for early detection and stress-free, patient-friendly therapy

Full line-ups of high-image-quality, low-radiation diagnostic imaging systems

320-row detector
Noncontrast MRA
Medical naked-eye display

MRI System
CT System
Ultrasonic Diagnostic System
FlyThru

Enhanced visualization
Stenosis analysis

Quick, easy examination free of physical stress

Food safety
Air pollutants
Measurement of trace gas concentrations in exhaled breath

Breath sensor
NCI

Food poisoning
Infectious diseases
Animal healthcare

Quick and accurate DNA testing using semiconductor technology

NCI
DNA tester

Effective for deep, refractory cancers

Patient-friendly non-surgical cancer treatment

Heavy-ion cancer therapy system

High-temperature superconductor Accelerator

Radio biometry
Reporter DNA
Nanopore

NCI

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Prognosis & Nursing Care

Offering services for reducing burdens on families and other caregivers to help patients continue living at home

- Home care after recovery
- Keeping track of status from a remote location
- Connecting families, friends and communities, thereby assisting the elderly with healthcare and other aspects of their lives

Wide-ranging services from home care to nursing facilities and hospital care

- Nursing care
- Reducing the burden on caregivers
- Motion assist robots for nursing care
- Voice-activated SNS
- Information sharing that changes medical practices
- Speech recognition & communication

User-friendly operation like home appliances
Interactive UI
Clear and easy to follow
Speech clarification
At-home services for the elderly
Elderly household
Lifestyle sensing
HEMS
Cloud
Nursery
NCI
NCI
NCI
NCI
NCI

TOSIBA
Leading Innovation

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Health Promotion

Offering a safe living environment and assisting in mental and physical health to help people continue to live happy lives.

**Health Promotion**

**Air**
- Safe & comfortable living environment
- Deodorization
- Antimicrobial & antivirus
- Advanced medical care using sensors and diagnostic imaging systems
- Animal medical care
- Services for pets

**Water**
- Safe drinking water
- Small water purifier
- Ultraviolet irradiation efficiency

**Food**
- Safe foodstuffs
- Plant factory
- CO₂ generation
- Plant irradiation
- Safe, chemical-free food
- Efficient nutrition intake
- Nutrient protection

**Sensing**
- Social participation
- Injury prevention using sensors
- Sports

**Happy daily life**
- RENECAT
- Safe drinking water
- Air conditioner with PM2.5 filter
- Pollen and PM2.5 filtering with home appliances
- Ultraviolet irradiation efficiency

**BIOTY**
- Ultraviolet irradiation efficiency
- Plant factory
- Temperature/humidity control
- Efficient nutrition intake
- Nutrient protection
Business Domains Underpinning Healthcare

Knowledge utilization
Stenosis analysis

Cloud
Bioinformatics

Nanopore
Reporter DNA
Genome analysis
Sensed info analysis
Semiconductors

Sensing
Electronic circuits
User interface

4K resolution
Air purification & deodorization
Antimicrobial & antivirus

Healthcare

Prevention

Health Promotion

Diagnosis & Treatment

Prognosis, Nursing Care

High-temp. superconductivity
Optical wave guiding

Animal healthcare
Enhanced visualization
Radio biometry
Speech recognition / communication
Care assist
Speech clarification
Security
HEMS

Temp/humidity control
Plant irradiation
Accelerator

Air

Water

Food

Healthcare

Electronic circuits

Sensing

4K resolution

Air purification & deodorization
Antimicrobial & antivirus
Ultraviolet irradiation efficiency

FY2015 Target Sales: 600 billion yen
Committed to People
Committed to the Future. TOSHIBA

Realizing ‘Growth Through Creativity and Innovation’
Initiatives toward
Creating New Approaches
to Healthcare
by combining wide-ranging technologies
Prevention

Keeping track of and predicting individuals’ health conditions to reduce disease risks

Environmental factors

Lifestyle factors

Wearable device

Biosensor

Thermometer

Biosensors that provide “easy sensing”

Security Cloud

Viewing PHRs

Daily sensed data

Lifelong Data Management

Easy health monitoring for everyone, everywhere

Bioinformatics

Genome Analysis

Research Institute

Predict health conditions by analyzing healthcare big data

Big Data Analysis

Clinic

Lifestyle advice and preventive assistance from doctors and health concierges

Knowledge Utilization

UI

Semiconductors

Lifestyle Sensing

Sensed Information Analysis

TOSHIBA

Leading Innovation

Available

Upcoming

Under R&D

NCI

New Concept Innovation

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Prevention - Toshiba’s Vision of Preventive medicine

Why do people get sick?
Effective disease prevention requires that we identify disease-causing factors. To take diabetes as an example…

- **Likely to develop diabetes**
  - Obesity, lack of exercise
  - Under stress
  - Incipient
  - Become diabetic

- **Managed lifestyle**
  - Under stress
  - Incipient
  - Managed lifestyle
  - Under stress
  - Incipient
  - Lifestyle Factors
  - Obesity, lack of exercise
  - Stress free
  - Healthy

- **Genetic Factors (Congenital Factors)**
  - Under stress
  - Incipient
  - Unlikely to develop diabetes

- **Managed lifestyle**
  - Under stress
  - Incipient
  - Stress free
  - Healthy

Environmental Factors (Acquired Factors)

Toshiba will combine all of its expertise to create disease prevention programs tailored to individual needs.
Prevention - Realizing Toshiba’s Vision of Preventive Medicine

Genetic

① Array chips for Japanese genome analysis

Lifestyle

② “Easy sensing” in daily life
③ Wearable, secure sensing

Environmental

Current health conditions

Medical records

Daily medical & health information

① Array chips for Japanese genome analysis
② “Easy sensing” in daily life
③ Wearable, secure sensing
④ Health data analysis
⑤ PHRs, data trust banks

Prediction of future health conditions

Advice Feedback

Diagnosis & Treatment
Prognosis & Nursing care
Health Promotion
Extending a cohort study from Tohoku to the world

**Toshiba** to enter the business using the COI STREAM outline

Global Scale

- Environmental factors
- Lifestyle factors

- Genetic factors

Biosensors that provide easy sensing

- Wearable device
- Thermometer
- Biosensor

Clinic

- Assistance from doctors and health concierges

- PHR

COI STREAM (Tohoku Uni., Toshiba, Nihon Kohden)

Demonstration

- Genetic factors
- Environmental factors
- Lifestyle factors

Tohoku Medical Megabank Organization (ToMMo)

150 thousand people in Tohoku

Total Data Base

- Genetic record
- Medical History

Big Data Analysis

- Predict future health condition based on big healthcare data analysis

- Calculate future health risks including lifestyle diseases

**Biosensors**

- PHR

- Medical records
- Maternity record book
- Physical checkups

**Clinic**

- Assistance from doctors and health concierges

**Biosensor**

- Thermometer
- Wearable device
- Biosensor

**Lifestyle changes**

**Environmental factors**

**Lifestyle factors**

**Genetic factors**
**Prevention** ①“Array Chips” for Japanese Genome Analysis

Unraveling genetic factors by examining the genome of many people at a reasonable cost

* Tie-up with the University of Tohoku (MEXT/JST COI)

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**Array Chip for Japanese**
(Under development)

Issues: Expensive, long analysis time, enormous data storage

↓

Develop array chips to reduce data volume to 1/3000th, time and cost.

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**Extract information inherent in Japanese**

Tohoku Medical Megabank Organization whole genome sequencing of 1,000 people

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**Future** (Practical use in FY2016)

“Easy genome test for all people”

Disease-specific custom arrays
1/100 data volume, shorter test time, lower cost

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Extract info particular to patients

Healthy Person

Patient

Arrays for the Japanese

Sequential Global Expansion
Prevention

② Unobtrusive Sensing in Daily Life

Using easy sensing to measure lifestyle factors during daily life

Silmee
(Scheduled for release in FY2014)

- Senses various factors in daily life
- Measures ECG, pulse rate, temperature, body motion, sound and SPO2 simultaneously
- Sleep analysis and other applications

* Tie-up with the University of Tohoku (MEXT/JST COI)

Future (FY2016)
Easy sensing during all kinds of activities

- Develop ultra-small biocompatible sensor devices
- Develop MEMS sensors, reduce their size
- Develop magnetic sensor materials and biometric systems using ultrasonic devices

Latest small health sensors

Ingested sensor

Ultra-small biocompatible sensor

Patch Sensor

Ultra-small biocompatible sensor

Two-hour charging /day

in motion

Record heartbeat change

at work

Check body condition and stress

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sleeping

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Prevention

Wearable & Secure Sensing

Developed wearable devices that can be worn throughout the day by leveraging semiconductor and other interdisciplinary expertise.

**Move Band (TM)** (Released in Jan. 2014)

- Tracks body data (number of steps, distance travelled, calories consumed, etc.)

**Future (FY2016)**

- **Highly flexible design**
- **Sensing in more situations**
- **Ultra-small Volume: 1/10**
- **Robust info security**
- **Security technology**
- **100% connectivity**
- **Charge-free**
- **Ultra-low-power technology**
  - Continuous use: 1 week ➔ Few months

**Ultra-low-power, continuous wireless communication technology (BLE/WiFi)**

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Prevention ④ Health Data Analysis

Analyze health using data from various sensors in order to prevent worsening of diseases and to provide lifestyle advice.

Full-range health monitoring services
(Practical use: FY2014)

- Combine health-related data owned by insurers
- Efficiently and accurately identify patients with lifestyle-related diseases at high risk of worsening
- Recommends high-risk patients to seek medical and lifestyle advice to prevent aggravation

Data A  Data B  ····  Data X

Integrated Health DB

Identifying high-risk patients

Future (FY2016)

- Reduce medical costs and improve individual quality of life (QOL).
- Global expansion with a focus on Europe, Taiwan and other Asian countries and regions

Specific medical check-ups and statements of medical expenses (Local government)

Tie-up

Physicians
Nurses

Consultation

Analysis

Identify high-risk patients

Lifestyle advice

Recommend seeing a doctor

Lifestyle advice

Exercise advice

Dietary advice
Prevention  Positive Healthcare Room

Healthcare room in the Toshiba Smart Community Center in Kawasaki helps employees to improve their health, strengthening the company’s overall activities.

**Now (Installed in FY2013)**

- Employee Health Data
- Cafeteria
- Diet Record
- Health Portal Site

- Health measurement
- Health evaluation, advice & viewing

- Blood pressure
- Stress
- Body composition
- Vascular age
- Eyesight
- Skin age

**Future (FY2016)**

- Extensive continuous sensing
- Expanding applications to external facilities
  - Fitness & sports clubs
  - Local restaurants

Employee Health Data

TOSIBA
Leading Innovation

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Prevention ⑥ Creating PHRs and Data Trust Banks

Managing individuals’ lifelong health data
(Equivalent to having a thorough physical check-up every day)

PHR/Healthcare Cloud
(Practical use: 2014)

- Individuals’ lifelong personal health records (PHRs)
  - Exams, medication, treatment and other medical records
  - Data from various sensors
  - Maternity record, various physical checkups
- Secure management on a healthcare cloud
- “Health self-check services” Easy and safe services for everyone, everywhere

Future (2016)

- Increased disease coverage
  - Mental disorders, heart disease
- Data utilization
- Third-party use of data

Data Trust Bank

- PHR entry
- Permission for third-party use
- Anonymity

Manufacturers, distributors, retailers

Security Pharmacy Food Cosmetics, etc.

* Tie-up with the University of Tohoku (MEXT/JST COI)
Diagnosis & Treatment

Diagnosis and treatment for early detection and stress-free, patient-friendly therapy

Full line-up of high-image-quality, low-dose diagnostic imaging systems

320-row detector
Noncontrast MRA
Medical glassless display

Enhanced visualization
CT System

Stenosis analysis
Ultrasonic Diagnostic System

Quick, easy examination, free of physical strain

Food safety
Air pollutants
Detected trace gases in breath
Breath test

Food poisoning Infectious diseases
Animal healthcare

Quick and accurate DNA test using semiconductor technology
DNA tester

Patient-friendly non-surgical cancer treatment

Effective for deep, refractory cancers
Heavy-ion cancer therapy system

Radio biometry
Reporter DNA
Nanopore

High-temperature superconductor

Molecular imaging
FlyThru
Ultra-high-speed scan

Molecular imaging
FlyThru
Ultra-high-speed scan

320-row detector
Noncontrast MRA
Medical glassless display

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High-temperature superconductor

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Full line-up of diagnostic imaging and medical IT systems

- X-ray TV system
- Circulatory organ X-ray diagnosis system
- CT System
- MRI System
- Hospital information system
- Picture archiving and communication system
- Ultrasound diagnostic system
- Nuclear medical diagnostic system
- Radiation therapy system
- Automated chemical analysis system

Shares: 3rd globally and 2nd in Japan
Shares: 4th globally and 1st in Japan
Shares: 4th globally and 4th in Japan
Now (FY2013)

- All models incorporate reduced radiation exposure technology (AIDR 3D). (Up to 75% reduction in radiation dose)

- Various applications in many fields
  - Myocardial CT perfusion
  - Coronary artery CT angiography

Future (FY2016)

- IGT (Image Guided Treatment)
- Molecular Imaging
- PET/CT (Under development)

Expanding business with angiographic CT and PET/CT.
Diagnosis & Treatment

CT System
Global No.1 share
(Target FY2013)

Diagnostic Imaging System
Global No.3 share
(Target FY2017)

Now (FY2012 global share)

Future

Worldwide CT Market
390 B Yen

Toshiba 23%
A 28%
B 29%
Others 3%

Worldwide Diagnostic Imaging System Market
2,200 B Yen

Toshiba 12%
C 19%
B 22%
A 26%
Others 11%

CT System
390 B Yen

Toshiba 23%
A 28%
B 29%
Others 3%

Diagnostic Imaging System
2,200 B Yen

Toshiba 12%
C 19%
B 22%
A 26%
Others 11%
Diagnosis & Treatment

State-of-the-art technologies that only Toshiba can provide. Deploy in Japan, the U.S. and Europe

CT

320-row detector
- Scans brain, heart and other organs with a single gantry revolution (0.275 seconds*)

X-ray

Dose Tracking System
- Visualizes incident skin dose for each patient

Ultrasound

FlyThru
- Creates 3D views of lumina and blood vessels from 4D data

CT

Non-contrast MRA
- Allows evaluation of blood flow without using a contrast medium

X-ray

Medical glasses-less display
- Displays 3D structures of blood vessels, bones, organs and affected areas at high resolution

Ultrasound

Electronic health records

TOSMEC Aventy (pen UI)
- Allows handwritten input

MRI

Non-contrast FBI image

Screen example

Lumen display mode

*Aquilion One/ViSION Edition

Using a contrast medium

Non-contrast FBI image

Screen example

Detecting main unit

Screen example
Multi-center study using Aquilion One

Conventional Method

- X-ray angiography
- SPECT

Cardiac test using Aquilion ONE

- Coronary artery CT angiography
- Myocardial CT perfusion

Provides single-scan test, significantly reduces radiation and shortens exam time.

Uses catheters & radioactive chemicals.

Participation of 16 organizations in 8 countries

USA
- Johns Hopkins University
- Harvard University
- National Institute of Health

Canada
- University of Toronto

Japan
- Iwate Medical University
- Mie University
- Keio University
- St Luke’s International Hospital

Singapore
- Mount Elizabeth National Heart Center

Brazil
- University of Sao Paulo (INCOR)
- Albert Einstein Israeliite Hospital

Europe
- Humboldt University (Charite)
- Leiden University Medical Center
- Copenhagen University Hospital (Rigshospitalet)

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Diagnosis & Treatment

Accelerate global expansion with a focus on emerging economies

Expand global sales and service networks

10 subsidiaries and 78 agents outside Japan

Expand sales channels through M&A

- Mar. 2013 Founded subsidiary in Turkey
- Apr. 2013 Founded subsidiary in South Korea

Medical systems sales and service in over 135 countries worldwide

Strategic products targeting emerging economies

Releasing feature-rich, compact and cost-effective Products in emerging economies

CT (Alexion)  Ultrasound (Xario Series)  MR (Vantage Elan)
Diagnosis & Treatment

Diffusion of patient-friendly heavy-ion radiotherapy

Now (FY2013)
High-precision irradiation provides high quality of life (QOL).

Future (FY2016)

- Outside Japan: Pursue projects in each country
- In Japan: Conduct extensive promotion activities to win contracts

Toshiba’s Vision of Healthcare

Installed: 1
(National Institute of Radiological Sciences)

Contract awarded: 1
(Kanagawa Cancer Center)

Planned: 4
(2 in Japan, 2 outside of Japan)

Respiration-gated irradiation
High-speed spot scanning irradiation

Low-dose radiotherapy due to high-speed scanning
High-precision positioning using a robot treatment bed

Linkage to medical info
Respiration-gated irradiation

Toshiba Corporation
Initiatives for a new in-vitro diagnosis (IVD) business

**Now (FY2013)**

- Realize early diagnosis using highly sensitive measuring instruments and sensors
- Detect influenza virus at early stage of infection when virus load is low.
- Achieve treatment before symptoms emerge

**Future (FY2016)**

(Increasing test coverage)
The following tests will be supported by IVD, in stages:

- Infectious diseases
- Heart diseases
- Thyroid disorders
- Cancer markers

IVD will also be applied to other tests that rely on antigen-antibody reactions.

(Customer expansion)
IVD is likely to find widespread use not only in medical institutions but also in schools and public facilities.

* Preparing for pharmaceutical application
Genelyzer
- Detects HPV, the virus that causes cervical cancer
- Monitors microorganisms in experimental animals

Bio Bulwark
- Detects biological agents

Features
- Quick: Allows 20 to 30 tests to be conducted on four samples in two hours.
- Easy: A DNA sample is injected on to a card and inserted into the detection system

Detection of bacteria causing food poisoning
- Simultaneous detection of 15 strains

Identification of rice varieties
- Simultaneous identification of 304 varieties

Healthcare (Human infections, etc.)

Animal infections
- Comprehensive field testing

Now (FY2013)

Future (FY2016)
- Wide-ranging applications, from food reliability and safety to infectious diseases in humans and animals
- Overseas business expansion (mainly the U.S. and Europe)
Diagnosis & Treatment  Breath Test

New test technologies that reduce physical stress on patients

**Now (FY2013)**
(Under development for practical use in 2015)

- Desktop models that detect trace gases with a precision equivalent to fixed models
- Gas analysis technology that uses laser absorption spectroscopy improved for industrial applications
- Semiconductor laser capable of emitting middle infrared rays, in the monocular fingerprint region

**Future (FY2016)**

- Apply to disease diagnosis and health condition monitoring

<table>
<thead>
<tr>
<th>Gas</th>
<th>Physiological Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaldehyde</td>
<td>Alcohol metabolism (hangover)</td>
</tr>
<tr>
<td>Acetone</td>
<td>Fatty acid metabolism (obesity, diabetes)</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>Heme catabolism (smoking)</td>
</tr>
<tr>
<td>Methane</td>
<td>Intestinal bacteria metabolism (intestinal environment)</td>
</tr>
<tr>
<td>Nitrogen monoxide</td>
<td>Vasodilatation, etc. (Asthma)</td>
</tr>
<tr>
<td>$^{13}$C carbon dioxide</td>
<td>$^{13}$C labeling reagent metabolism (H. pylori)</td>
</tr>
</tbody>
</table>

Biochemical gases identified as related to diseases

- Expand applications to indoor air and atmospheric analysis

Comparison of Gas Analysis Methods

- **Laser absorption spectroscopy**
  - Trace gas detection × Semiconductor technology
  - Sensitivity: High
  - Portability: Small
  - Gas Chromatography
  - Chemiluminescence
  - Semiconductor Gas Sensor
  - Gas sensitivity: 0.1ppm
Now (FY2013)

Differentiators
- Delivers full 360° images of capsule circumference with 360° panoramic view (Does not shoot the same area multiple times.)
- Does not require an external receiver since data is stored in the capsule, and is therefore less costly
- 3D software is being developed to help medical professionals cut review time (under development with CapsoVision)

- Toshiba provides semiconductor devices, such as NAND Flash memory, CMOS sensors and LEDs, to help improve capsule performance.
- Toshiba plans to acquire exclusive distributorship in Japan.
- CE mark (Europe)
- FDA approval pending (USA)
- Preparing for pharmaceutical applications in Japan

Future (FY2016)

- There is a strong possibility of market expansion if capsule endoscopes are used for primary screening in corporate physical checkups and thorough physical exams.
- Possible that Toshiba and CapsoVision will together develop capsule endoscopes, taking advantage of Toshiba’s semiconductor technologies to further reduce size and cost.
- Applications can be further expanded if capsules can be guided exogenously.
Prognosis & Nursing Care

Offering services to reduce burdens on family and other caregivers and to help patients continue to live at home

Connecting families, friends and communities, thereby assisting the elderly with healthcare and other aspects of their lives

Wide-ranging services from home care to nursing facilities and hospital care

Reducing the burden on caregivers

Motion assist robots for nursing care

Voice-activated SNS Information sharing that changes medical practices

Speech recognition & communication

HEMS

NCI

Home care after recovery

Keeping track of situations from a remote location

Cloud

NCI

NCI

User-friendly operation like home appliances

Interactive UI

Clear and easy to follow

Speech clarification At-home services for the elderly

Elderly household

Lifestyle sensing

NCI

Caring family household

NCI
**Now (FY2013)**
(Launched in Dec. 2013)
Connects healthy seniors to their families, with a focus on four areas: security, health, convenience and fun

- Monitors daily health conditions from remote locations
- Records vital data (blood pressure, weight, pedometer count) and checks physical condition

**Future (FY2016)**
- Expand services to cover all the family, even pets, assisting in their social connections
- Overseas deployment (Europe, South-eastern Asia)

Service designed for...
- for mother and child
- for family
- for senior home care
- for women
- for pet
- for child

Toshiba cloud infrastructure offers great flexibility for service expansion

Support vital senior lives with a focus on social connections
Now (FY2013)
(Demonstration tests are now being conducted. Scheduled for practical use within FY2014)

- Allows users to enter text by talking to a device
- Allows specific groups to share information in real time
- Visualizes information from numerous voice messages to show changes in a patient’s condition
- Allows safe access to SNS with a smartphone

Future (FY2016)

Speech recognition technology available in various use environments, from home care to nursing homes and hospitals

Application examples:

- Speech interface for surgeons to create records of operations, catheterizations, etc.
- Speech-based communication & recording systems for nursing homes & hospitals
Health Promotion

Offering a safe living environment and providing mental and physical health support that helps people to continue to enjoy happy lives.

Water

- Safe drinking water
- Small water purifier
- Ultraviolet irradiation efficiency

Air

- Deodorization
- RENECAT Air conditioner with PM2.5 filter
- Pollen and PM2.5 filtering with home appliances

- Antimicrobial & antivirus
- Advanced medical care using sensors and diagnostic imaging systems
- Animal medical care
- Services for pets

Food

- Safe foodstuff
- Plant factory
- CO₂ generation
- Safe, chemical-free food
- Temp. & humidity control
- Plant irradiation
- Efficient nutrition intake
- Nutrient protection

Happy daily life

- Social participation
- Injury prevention using sensors
- Sports
- Sensing
Health Promotion  Plant Factories

Delivering a healthy life with safe, fresh vegetables, all over the world

Now (FY2013)
(Under development; scheduled for release within 2014)

Offering sterile, pesticide-free safe vegetables

ICT
Production management

Energy generation
PV, windmills, Biomass power

Air
Temp. & humidity control
Heat pumps
CO₂ generation

Light
Lighting for growing plants
(Wavelengths ideal for photosynthesis)

Specialty Vegetables

Water
Sterilization
High-efficiency electrolytic functional water

Future (FY2016)

Social healthcare built on dietary habits
Adding value to increase profits

Services for linking food-related appliances together

Offering plant factory solutions
Contributing to a safe-food industry

Global expansion: Exports to China and cold, arid regions

Offering sterile, pesticide-free safe vegetables

Now (FY2013)
(Under development; scheduled for release within 2014)

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Global expansion: Exports to China and cold, arid regions
Inner beauty, a concept for creating beauty from inside the body

**Now (FY2013)**

(1st step) BIOTY Juice Squeezer
- Rich in nutrients
- Ingredients do not separate easily with time.

**Future (FY2016)**

Health & beauty in life, starting with good food

Expanding the offerings of concept products

E.g., Beauty monitor

- chlorogenic acid contained in apple juice
- reduced vitamin contained in mango juice
- vitamin A contained in Komatsuna juice

Potential health-related market 3 trillion Yen in 2014

Market of food good for health or beauty 2 trillion yen in 2014

Beauty salon, body care & reflexology 350 billion Yen in 2014
**Health Promotion**

**Deodorizing, antimicrobial and antivirus effects with indoor light**

### Now (FY2013)

- **Light**
  - Resolve the components of bacteria, virus and odor
  - Photocatalytic particle

#### Existing Products
- Spray
- Deodorant Device
- Fridge
- Construction
- Filter
- Fiber

#### Future products

#### Material

#### 30 times in decomposition performance of conventional photo catalysis (compared to our Toshiba products)

#### Suppresses various microorganisms and viruses under visible light

### Future (FY2016)

- **Reduce infections in kindergartens and hospitals, cut household odors**
- **Prevent hospital infections**
- **Livestock and poultry facilities**

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**Deodorization with indoor light**

**Antivirus performance evaluations**

- **Deodorant efficiency with indoor light**
  - acetaldehyde concentration (ppm)

- **Bird flu (H5N9)**
  - infectivity titer
  - irradiation time [h]

- **feline calicivirus**
  - infectivity titer
  - irradiation time [h]

- **Test organizations**
  - Kitasato Research Center of Environmental Sciences (KRCES)
  - Avian influenza: Obihiro University of Agriculture and Veterinary Medicine

- **Test method**
  - JISR 1702, film adhesion
  - Light source: 6000 lx fluorescent light (UV filtered)

- **Infectiousness**
  - Cell infection ability of a virus, measured experimentally

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Health Promotion Animal Healthcare

Initiatives for medical and health care of pets and other animals

**Now (FY2013)**

Medical Field (Diagnostic Imaging Systems)

There are approx. 10 thousand veterinary hospitals in Japan. Toshiba had a 27% market share in Japan for diagnostic imaging systems in FY2012.

![Graph showing population of children and pet animals.]

**Future (FY2016)**

- Market share target in Japan for diagnostic imaging systems → 50% in FY2015
- *Life care services for pets*
  - Location & behavior monitoring, search for lost pets, identification of individual pets, health management, e-commerce for fashion goods, pet owner SNS, etc.
- *Services that regard pets as a member of the owners’ family*
- *Animal infection testing (DNA chip test)*

※ペットフード協会 犬猫飼育率全国調査、総務省統計局統計より抜粋
Creating New Technologies

Combine technologies from across Toshiba Group to create new healthcare applications

Air purification & sterilization
- PM2.5 filtering air conditioner
- UV sterilization

Health
- Nursing care robots
  - Nursing care assistants
    - High-output arm control
    - NUI
    - High-precision sensing

Air
- Smart refrigerators
  - Spectral sensing
  -Links to recipes
  -Smart receipts

Tablets for inpatients
- Voice commands
-Remote inquiries
-Records of vital signs

Prognosis & Nursing Care
- Voice interaction
-Teleconference

Health
- Nursing care robots
- High-output arm control
- NUI
- High-precision sensing

Food
- Smart refrigerators
- Visualize contents of compartments
- Visualize food freshness
- Links to receipts

Prognosis & Nursing Care
- Voice commands
- Remote inquiries
- Records of vital signs

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- Nursing care robots
- High-output arm control
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Business Domains That Underpin Healthcare

**Healthcare**

- **Prevention**
  - Knowledge utilization
  - Stenosis analysis
  - Cloud
  - Bioinformatics
  - Nanopore
  - Genome analysis
  - Sensed info analysis
  - Semiconductors
  - Sensing
  - User interface
  - 4K resolution

- **Health Promotion**
  - Electronic circuits
  - Air
  - Water
  - Food

- **Diagnosis & Treatment**
  - High-temp. superconductivity
  - Optical wave guiding
  - Enhanced visualization
  - Animal healthcare
  - Radio biometry
  - Speech recognition / communication
  - Care assist
  - Speech clarification
  - Security

- **Prognosis, Nursing Care**
  - Genome analysis
  - Sense info analysis
  - Transistor
  - Reporter DNA
  - Stenosis analysis
  - High temp. superconductivity
  - Enhanced visualization
  - Animal healthcare
  - Radio biometry
  - Speech recognition / communication
  - Care assist
  - Speech clarification
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**Business Domains That Underpin Healthcare**

- **Diagnosis & Treatment**
  - Stenosis analysis
  - High-temp. superconductivity
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- **Health Promotion**
  - Electronic circuits
  - Air
  - Water
  - Food

- **Prevention**
  - Knowledge utilization
  - Sensed info analysis
  - Semiconductors
  - Sensing
  - User interface
  - 4K resolution

**FY2015 Target Sales: 600 billion yen**
Global Healthcare Market

Increase global market share for diagnostic imaging systems from 12%. Expand IVD business areas; start new disease prevention, prognosis and health promotion businesses.

**Key Targets & Market Scales (2012)**

- **Diagnosis & Treatment**
  - Diagnostic Imaging Systems
    - Toshiba's Share 12%
    - 3 trillion yen
  - Medical Info Systems & Services
    - Medical monitor
      - 3 trillion yen
  - Treatment Systems
    - 300 billion yen
    - Endoscopes
      - 250 billion yen (except rigid types)
    - Business Expansion
  - In-vitro diagnosis (IVD)
    - 4 trillion yen
  - Biomedicine (excluding drug development)
    - 300 billion yen

- **Prevention**
  - (including physical medical check-ups)
    - 1 trillion yen

- **Health Promotion**
  - 10 trillion yen

- **New Business**
  - Prognosis & Nursing Care
    - 10 trillion yen (except labor costs)

*Market scales: Toshiba estimates.*
Leveraging Toshiba’s technologies to contribute to the development of the healthcare industry

Toshiba’s technologies

- Bioinformatics
- High-temp. superconductors
- Stenosis analysis
- Knowledge utilization
- 4K resolution
- Enhanced visualization
- Radio biometry
- Nursing care assist
- Temp./humidity control
- HEMS
- Nutrient protection
- CO₂ generation
- Plant lighting

At-Home & Nursing Care Services

- Diagnostic Imaging
  - 3D glasses-less systems
- Treatment Systems
  - Endoscopes
- Medical Monitor
  - Silmee

Health Promotion, Safety and Security

- In-Vitro Diagnosis (IVD)
  - Breath sensors
  - DNA testing
- Nursing care robots
- Voice-activated SNS
- At-home services for the elderly

Prevention

- PHR creation

- PHR creation
- Smart refrigerators
- RENECAT

- Antibacterial & antivirus
- Air purification & deodorization
- High-efficiency UV irradiation
- Big data
- Security

Speech recognition & communication

Speech clarification

Sensing

Sensed info analysis

Genome analysis

Nanopore

Semiconductor

Accelerators

Electronic circuits

Animal healthcare

Reporter DNA

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Business Goals

Initiatives for achieving goals

- Diagnosis & treatment: Enter new diagnostic fields and promote operations in emerging markets
- Prevention, prognosis, nursing care and health: Create new businesses and cross-business synergies in Toshiba Group
Target of Overseas Operations

Initiatives to achieve targets

- Expand diagnostic imaging systems business in developed countries, centering Japan, the U.S. and Europe

- Overseas deployment in prevention and prognosis

Diagnosis & Treatment (FY2015)

Sales outside Japan: approx. 58%

Others (FY2015)

Sales outside Japan: approx. 48%
Global R&D Operations

R&D workforce
Japan: Approx. 1,450
Overseas: Approx. 1,550
Total: Approx. 3,000

Annual R&D expenditures
Approx. 40 billion yen/a year
Approx. 10% of revenues
FY2013 Forecast
Global Strategy

Healthcare business sales networks
Diagnosis/Treatment (main customers: medical organizations)
- Strengthen sales channels of Toshiba Medical Systems

Prevention & Prognosis/Nursing & Health promotion
(Insurance and pharmaceutical companies, national and local governments, etc.)
- Reorganize and utilize Toshiba’s social infrastructure business channels
- Building bases focusing to life support business
New Organization (under consideration)

**Present**

Healthcare Systems & Services Group

- Healthcare Business Development Division
- Toshiba Medical Systems Corp.

**April, 2014**

Healthcare Systems & Services Group

- New healthcare organization

- Establish an organization within Toshiba Corp. dedicated to the healthcare business
- Amalgamate Toshiba Group’s healthcare-related businesses

Develop the comprehensive power of the healthcare business into a third pillar of business
Creating New Approaches to Healthcare by combining wide-ranging technologies