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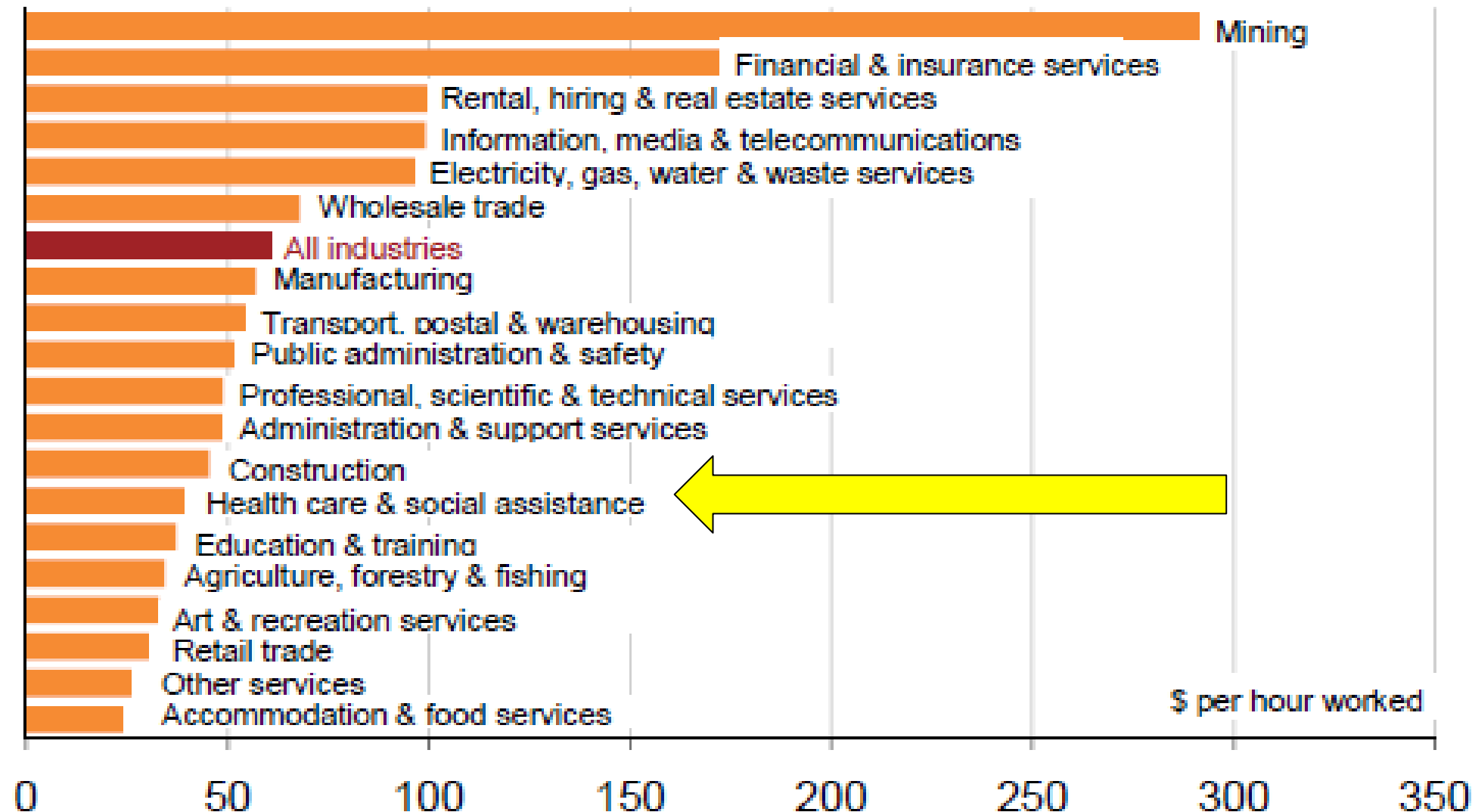
A National Broadband Network for Australian eHealth

Dr Darrell Williamson
Deputy Director, CSIRO ICT Centre



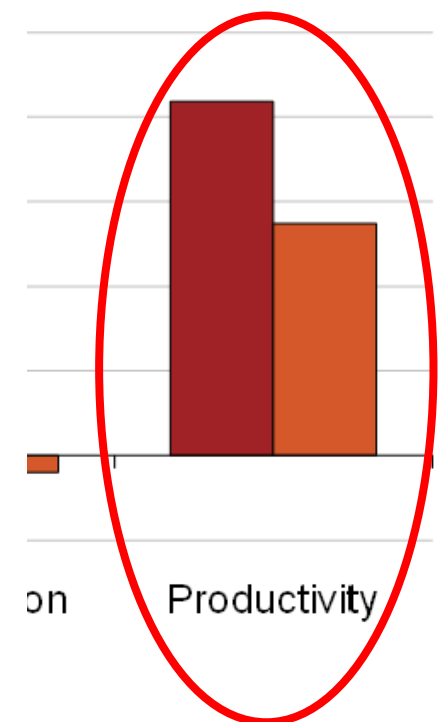
Australia: Decrease in Productivity

Gross value added per hour worked



GDP, 1990-2010

10-01 to 2009-10



Sources: ABS and Grattan Institute calculations.

Australia's real GDP growth rate averaged 3.4% per annum during the 1990s. Population growth accounted for 1.4 %; and labour productivity growth 2.1%

The Health Care Challenge

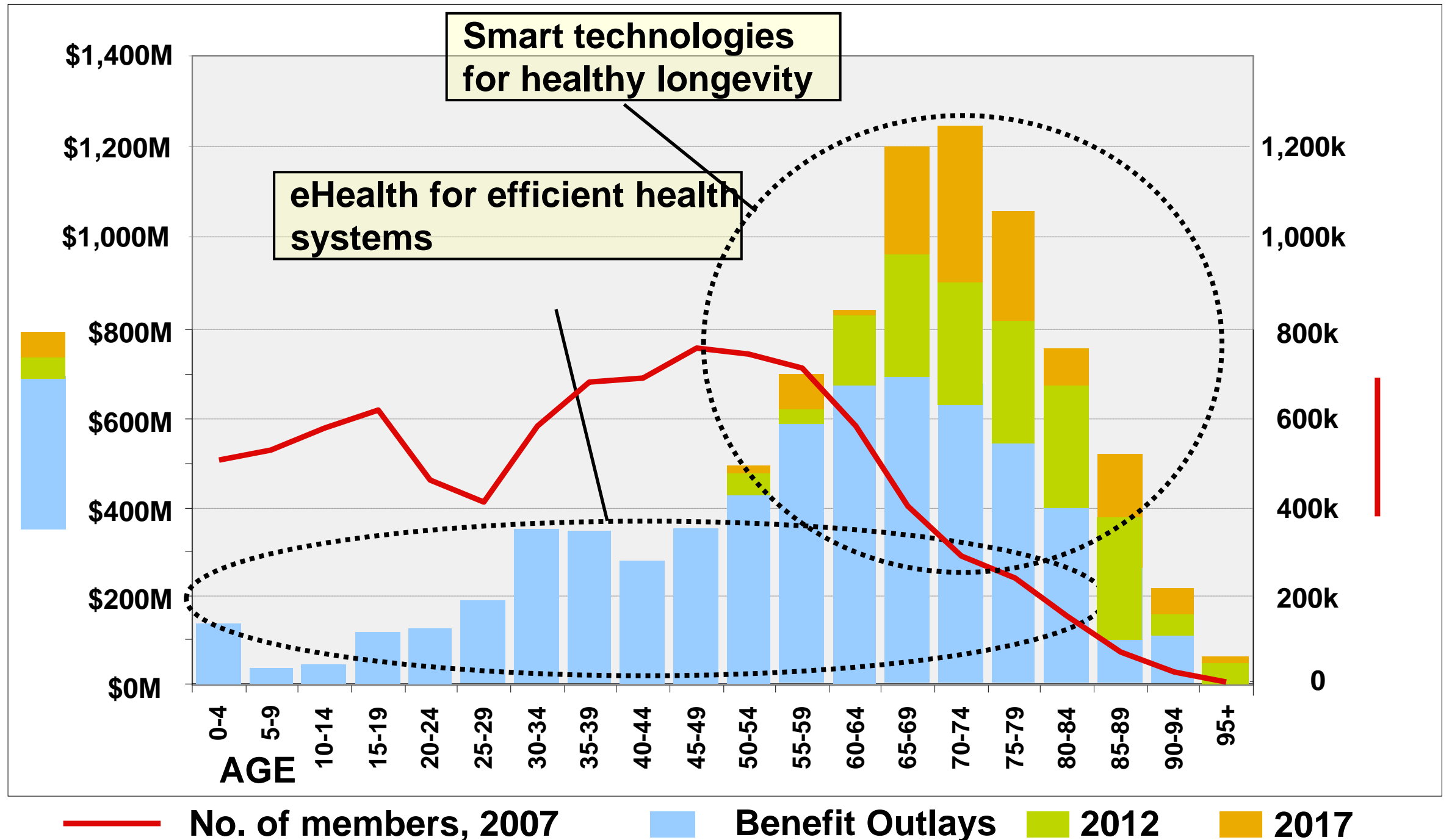


Health expenditure in excess of **\$110 billion**, accounts for over **9%** of Australia's GDP

New cost-effective services must be developed to meet the needs of the health system, the hospital, and the doctor

A healthy life, a sustainable health care system

Source PHIAC, Medibank analysis 2006/07



Why an NBN is a game changer

- **Bandwidth***

- Metro, optical fibre, 100 Mbps ↑↓
- Rural/Regional, wireless, 12 Mbps↓, 1 Mbps ↑
- Remote, Satellite, 12 Mbps↓, 1 Mbps ↑

(* Peak rates, subject to busy hour contention and RSP service offering.)

- **Ubiquity**

- Everyone will have it !

- **Reliability**

- Essential service, similar to electricity

- **Latency**

- An issue for two way communication / control
- Optical fibre, direct path. 200km ~ 2ms travel time
- Satellite, 36,000km altitude ~ 500ms travel time

It's not just the NBN !

- Other vital pieces are also falling into place
 - Australian eHealth Architecture, and patient controlled electronic health records (PCEHR)

"The right information,
at the right place,
at the right time,
for the right person"

- Telemedicine & Telecare advances
 - Community & individual models
 - Devices & interfaces



Question

What does eHealth mean to you?

eHealth @ CSIRO



Acute Operations

- Improving patient outcomes & operational efficiency
- Data used in:
 - Bed planning
 - Ambulance arrival



Health Delivery

- Improving health service across Australia
- New service models
 - Mobile phones & uHealth
 - Broadband equipment for community health
 - Video consultation
 - Haptic simulations for training



Informed Treatment

- Enhancing treatment through use of data & image analysis
- Decisions from data in:
 - Quantitative analysis of medical images
 - Integrating imaging & treatment
 - Real time analysis and prediction of adverse events



Health Records

- Enabling electronic health records
- Translation paths:
 - Getting from existing record systems to SNOMED-CT
 - Tools for mapping, searching and browsing tools

Bandwidth and Service Factors

Service	Location	Bandwidth	Latency
Video medical appointments	Home - Consulting Rooms	HD: 2.5Mb/s ↑↓ SD: 300kb/s ↑↓	~100ms
Ambulance arrivals	Ambulance - hospitals	Data: kb/s ↑↓	~sec
Specialist assistance	Hospital - hospital	HD+image: 2.5Mb/s ↑↓	~100ms
Home monitoring	Home - base	Data: bits/s ↑↓ Video: 300kb/s ↑↓	~sec
Remote surgical training	Hospital - hospital	Data: bits/s ↑↓ Video: 300kb/s ↑↓	Few ms

Health Services

Some broadband history...

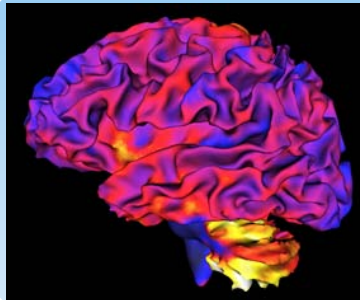


Virtual Critical Care Unit (ViCCU) Video from 2005

Health Services: A lifecycle view

Diagnosis

MRI / CAT
Other tools



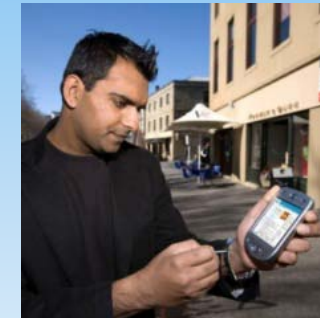
Hospital Services

SnoRocket
Snapper



Post Operative Care

Cardiac Tool
Remote
consultation
and
patient
monitoring



Admission

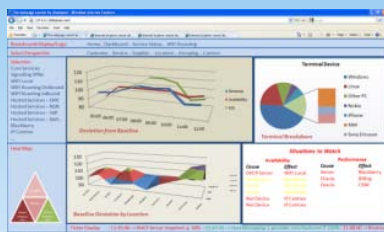
PAPT
SnoRocket
Snapper



Commonwealth and State
Services



Remote Diagnosis



CEO View, CFO View, CIO View

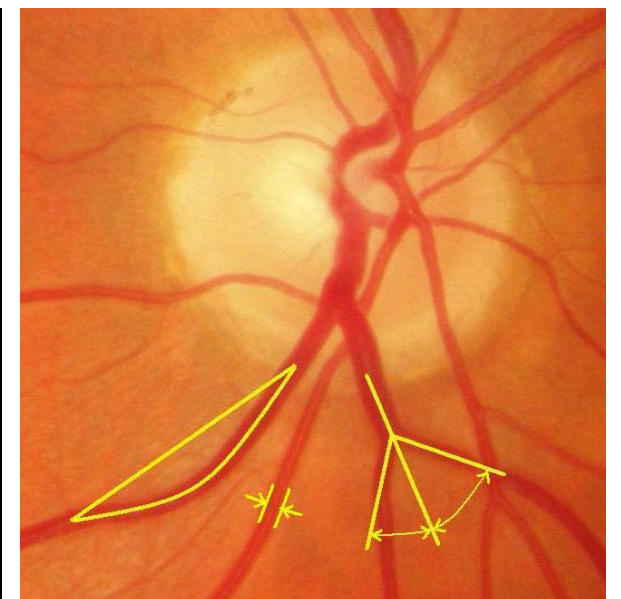
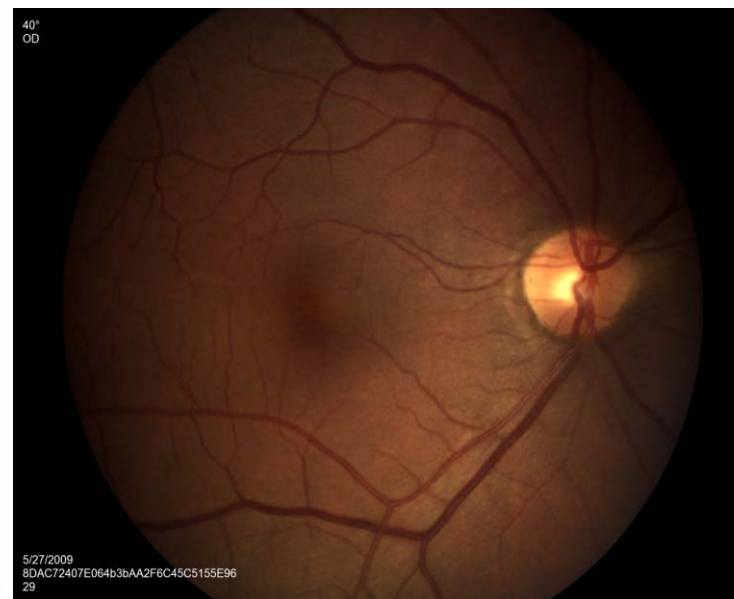
Telehealth: Non-invasive remote diagnostics (Dr Yogi Kanagasingam, Floreat. WA)

Use the eye as the window to the body

- Low cost camera
- On-site analysis software
- Images transmitted for remote expert consultation

Ability to detect changes related to a range of conditions

- Prevent needless blindness
- Screening and early detection of diabetic retinopathy, glaucoma and other eye disease
- Screening and early detection of systemic disease: Alzheimer's disease, cardiovascular disease, stroke and CMV-Retinitis



Access for all Australians

Leveraging a National Communications Infrastructure

A national broadband network will transform the national economy, enabling new services to be developed and delivered from cities and towns across the country, to all Australian enterprises and citizens

**Customer
Centric
Services**

Delivers
appropriate
services
targeted to
needs and
circumstances of
each customer

**(Symmetric)
Broadband
Communication
Infrastructure**

Makes delivery
of services
possible to All
Australian
Enterprises and
Citizens



What is the CSIRO ICT Centre doing?

Broadband Innovation

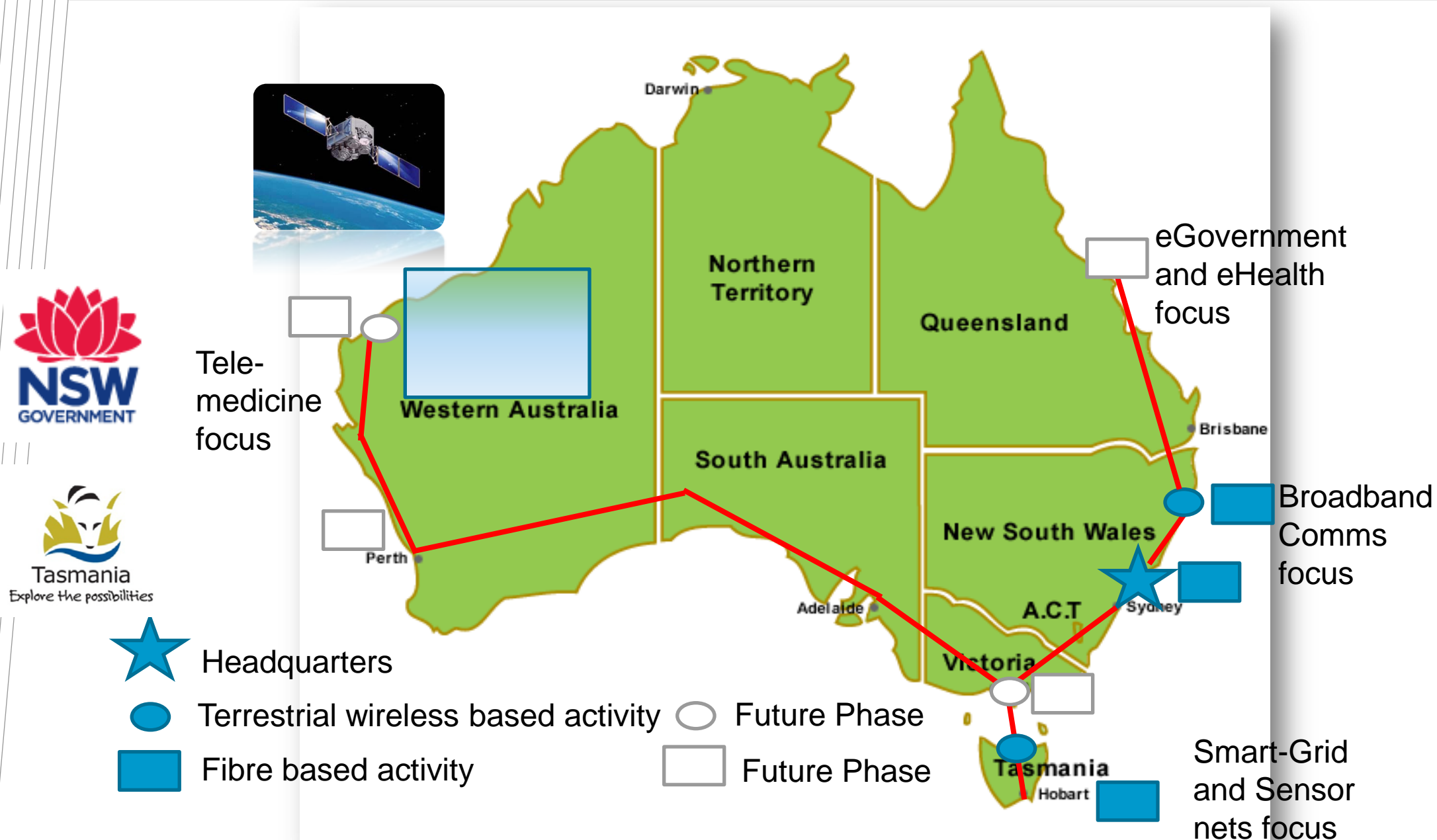


The true potential of the NBN is in providing access to high speed, reliable communications to all Australians

Symmetric data rates means users can contribute to content creation

Australian Centre for Broadband Innovation

National Impact Developed through State and National Partnerships



Initial Partners



Australian Centre for Broadband Innovation

Smarter, safer homes for the aged

1.8% of Australian are aged 85yrs+
- that's over double that of 1990

- In 2010 there were 398,200 Australians aged 85 years and over
- Life expectancy is increasing
- The demand for infrastructure and staff to care for the elderly will grow
- Residential aged care costs approximately \$33,000 p.a.
- Many move to residential care after a bad fall at home or through the risks associated with living alone



Australian Centre for Broadband Innovation

Project example: Smarter, safer homes for the aged

Project overview and deliverables

- 2 year project with major deliverables in first year
- 20 homes equipped and connected to the NBN – 3 months
- Data collection and analysis – 6 months, 12 months, 18 months, 2 years
- Value proposition for the NBN in home based aged care
- Transfer of lessons and technology to aged care industry and industry



Australian Centre for Broadband Innovation

Smarter, safer homes for the aged

Home based NBN enabled technologies to keep senior Australians in their own homes longer including

- Sensor and imaging technologies to prevent
 - Physical risks – burns, scalds
 - Falls
 - Indoor and outdoor wandering of the demented
- Medication mentoring and monitoring
- Psychological wellbeing through High Definition videoconferencing health care and service provision

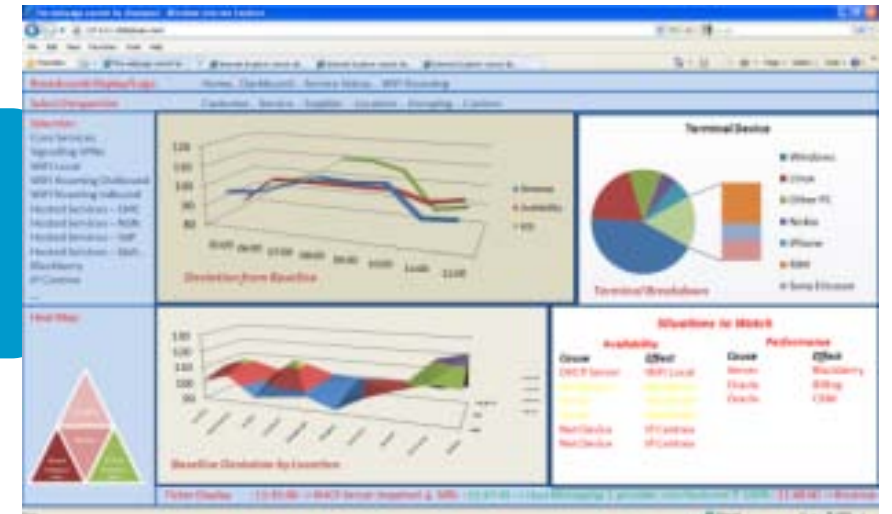


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Smarter, safer homes for the aged

Project metrics

- Quality of life (QoL validated measure)
- Emotional wellbeing
- Physical wellbeing
- Communication ability
- Frequency and duration of communication episodes
- Quality of the communication exchanges
- Community engagement
- Social network



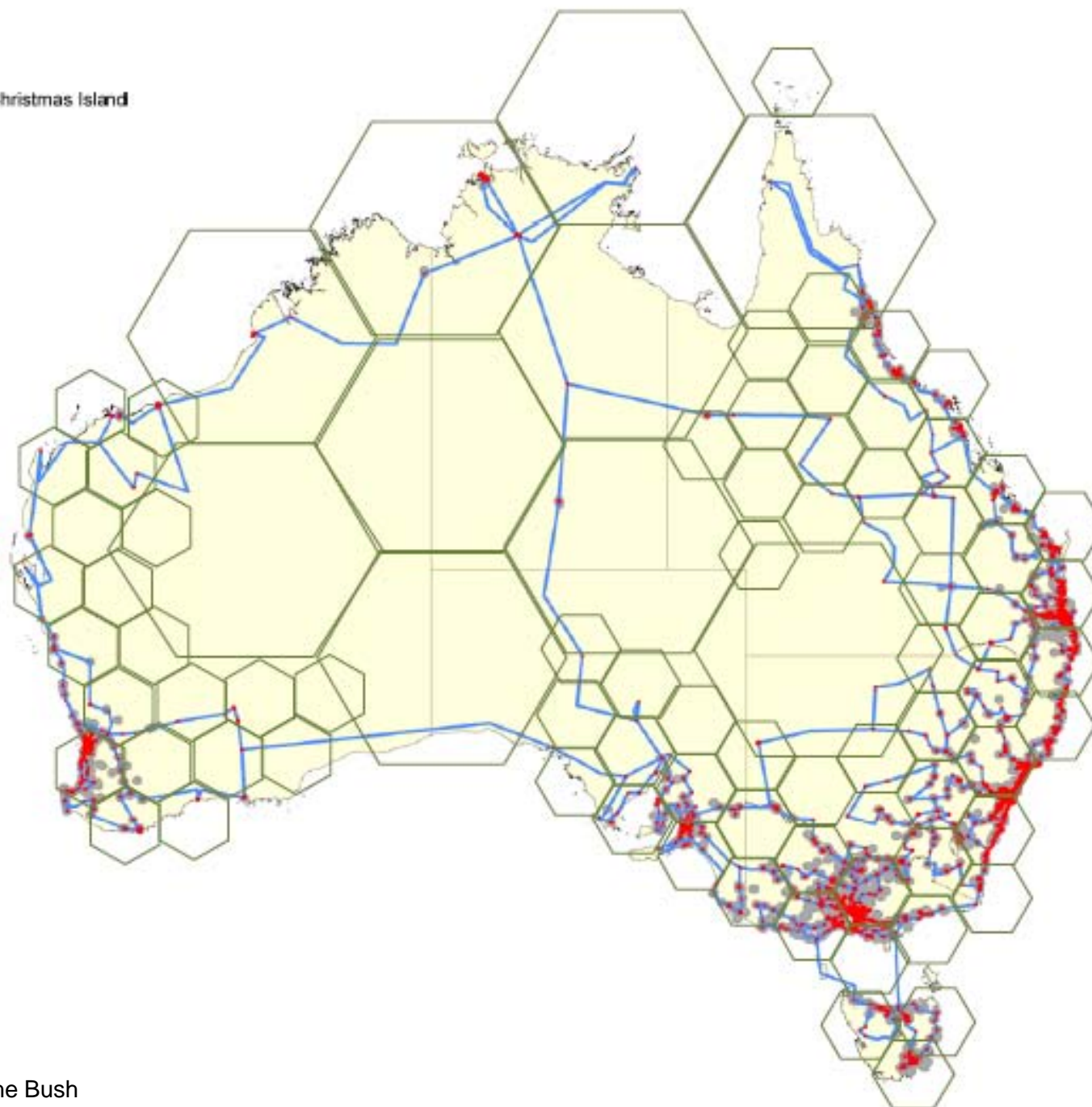
6. Wireless / Satellite: Access for the “Last 7%”

93% Fibre + 4% Wireless + 3% Satellite



Christmas Island

Cocos Island



Norfolk Island



Lord Howe Island

Satellite remains the answer for some: Spectrum and higher fixed wireless data rates will help others

"NBN Co has significant interest in higher data rates in fixed wireless. If we can go to 5Mbps uplink and 25Mbps downlink, or 10Mbps uplink and 25Mbps downlink, which is in line with our GPON offerings, we would have huge interest," Mr Mike Quigley, NBN Co CEO, May 2011.

CSIRO is working towards achieving **50 Mbps uplink and 50 Mbps downlink fixed wireless** services possible in the near future, supplying up to 12 concurrent users in a non-urban environment whilst using **28 MHz** of digital dividend spectrum.

With the potential to utilise greater than 28 MHz of spectrum in non-urban areas, CSIRO's technology has the **potential to close the gap** in meeting NBN Co's stated interest in higher fixed wireless data rates.

Conclusions

The power of the NBN is providing access to reliable, high-speed, symmetric communications for all Australians

“...the entire eHealth agenda is underpinned by high quality, high-speed broadband networks”

Dr Mukesh Haikerwal, NEHTA Committee Hansard
Sydney, 5 August 2009, p. 28.

Delivery models for services become feasible when EVERYONE has access to high speed, reliable, symmetric communications

CSIRO can help

For further information:

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Thank you

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