BMS3052

Lecture 1.2

1. Describe the current state of Australian healthcare
2. Demonstrate an understanding of the various levels of healthcare including primary healthcare, secondary healthcare
3. Describe and identify the gaps and challenges in these areas and critically examine potential solutions

ONE, TWO

We need to weight up the health benefits with the economical cost of conducting a survey

A vast country makes it difficult to supply the whole country with equal access.

Definitions:

WHAT IS PRIMARY HEALTHCARE (PHC)? Baseline healthcare→ first point of call.

Primary Healthcare

This includes most services not provided by hospitals:

- Health promotion
- Prevention
- Early intervention
- Treatment of acute conditions
- Management of chronic conditions

Self-determination, brings the community together, intersectoral

Workers:

- Nurses → aged care
- GPs → general practice
- Dentists → dentist clinic
- Health workers
- Local pharmacists
- Allied health professionals → physio/dietetics
- Telecommunication services

Primary healthcare is expensive, but the first barrier to more expensive treatments. It is a preventative measure.

Funding:

- Medicare
- PBS
- Aboriginal/Torres Straight Islanders-specific health services
- State and territory government
    - No jab no pay
    - Slap it on
    - Immunisation

- Fees
- Private health insurance/charities
- Communities health services

Breakdown of health lawmaking:

- Local→state→federal

Primary Healthcare Budget Breakdown

Category	Health care services provided	Percent increase from 2011-12
	**304 million** out-of-hospital Medicare services were claimed, of which 123 million were for non-referred encounters with GPs (DoH 2014).	**19%** from 256 million out-of-hospital services in 2007–08.
	**208 million** prescriptions were subsidised by the PBS and Repatriation Pharmaceutical Benefits Scheme (RPBS) (DHS 2013).	**12%** from 185 million prescriptions in 2007–08.
	**73 million** general treatment (ancillary) services were reimbursed through private health insurance – including 9.5 million physiotherapy services, 9.6 million optical services and 30.7 million dental services (PHIAC 2013).	**23%** from 59 million services in 2007–08.
	**1.6 million** patients were transported to public hospital emergency departments by ambulance services (ambulance, air ambulance, helicopter rescue services) (AIHW 2012b).	**22%** from 1.3 million patients in 2007–08.
	**2.6 million** episodes of care were delivered by Aboriginal and Torres Strait Islander-specific services.	**25%** from 2.1 million episodes of care in 2008–09.
	**273,731** patient contacts were made with the Royal Flying Doctor Service (Royal Flying Doctor Service 2012).	**4.6%** from 261,801 patient contacts in 2007–08.

Aboriginal and Torres Straight Islander origins are most concentrated around the cost and largest in population in Capital cities.

- Melbourne
- Sydney
- Brisbane
- Adelaide
- Perth
- Cairns

- Townsville

Bold = most

Role of GP is changing over-time:
- Identification of metal health issues
- Environmental conditions

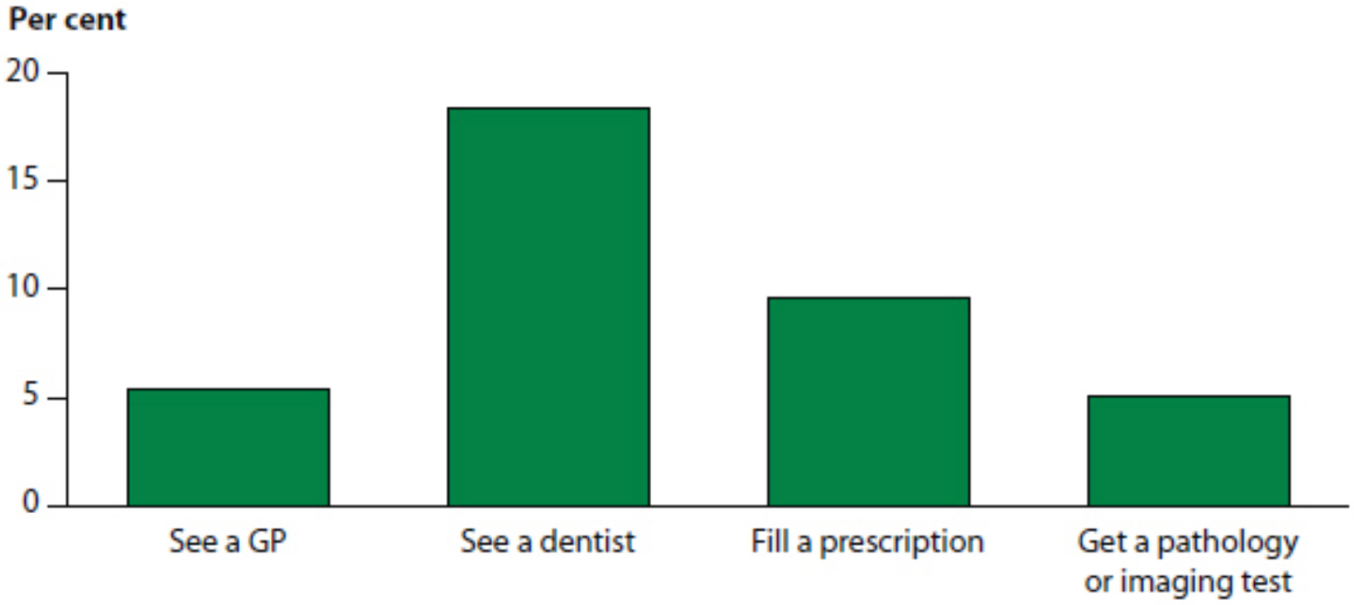
Primary Healthcare Achievements:
- Reduces costs/increased efficacy
- Lower hospitalisation rates
- Reduce health inequities
- Increase patient satisfaction = better outcomes
    - Make discussion around health less daunting
    - Increase general public health education

THREE

Challenges:
- Ageing populations
    - Improving communication
    - Improving access and services
    - Improving QALY
- Rising level of risk factors (obesity)
    - Refers to health of fat to muscle ratio
- Prevalence of chronic disease:
    - Treating second heart attacks (rather than first, as we are quite good at treating the first one)
    - Changing cultural practise
- Disparities in access: have an impact on health incomes
    - Encourage rural practice to close the gap
- Changing in governments change economics
- Climate change
- Research output and evidence
    - Have to search through significant and non-significant research.
    - Have to find which research is applicable
    - Sift through output to fin quality research
- Accessibility
    - Waiting times for GPs
    - Cost
    - Locality/distribution of services
    - Afterhours services
    - Indigenous services
- Effective and co-ordinated care

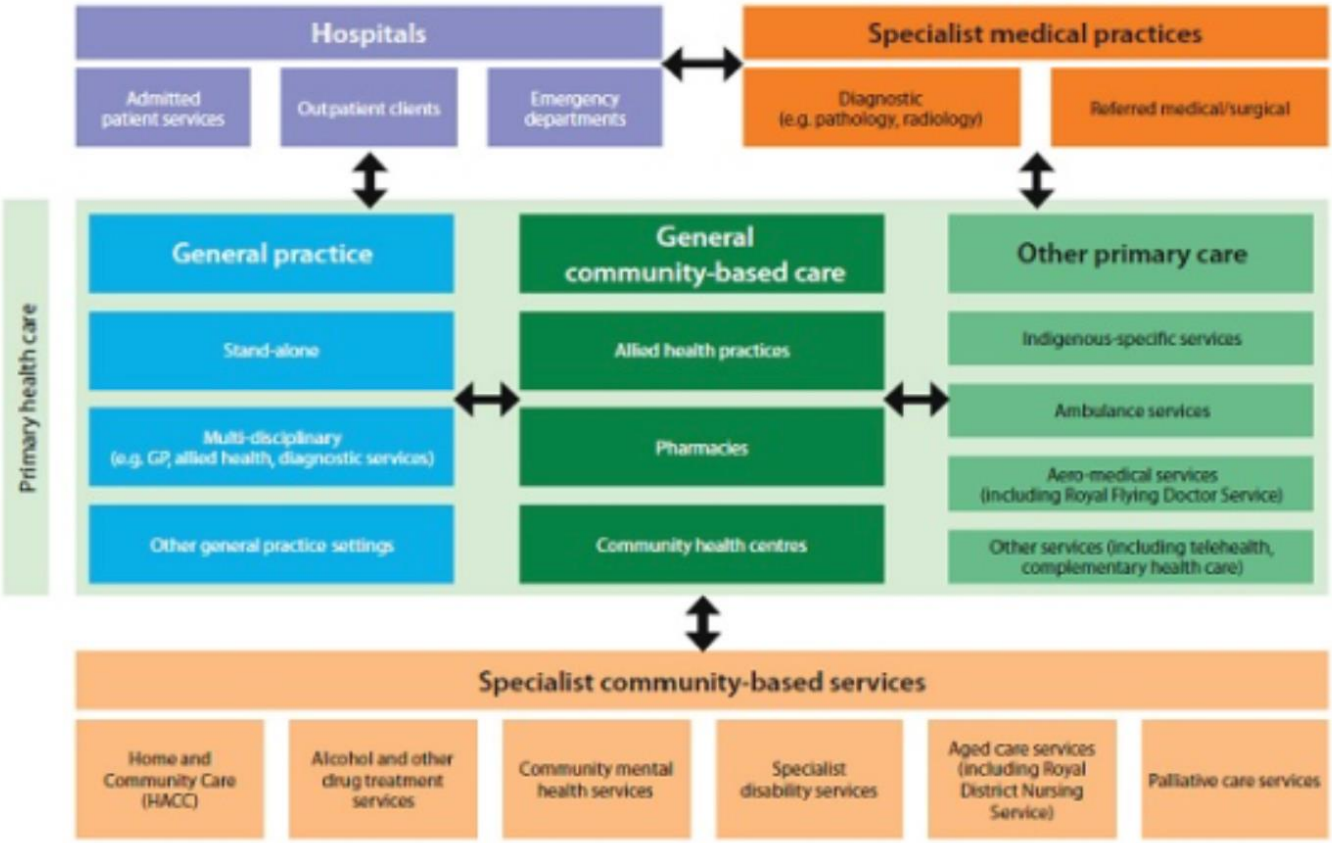
Cost barriers:

Proportion of people who reported cost barriers to accessing primary health care services



Communication is fundamental for better outcomes. Often there is miscommunication between trained health professionals and complementary medicine individuals.

Central role of Primary Healthcare



Secondary Healthcare:

- Specialists and hospital care
    - Acute care
        - Childbirth
        - Sub-acute care

        - Rehabilitation
        - Palliative care
        - Geriatric evaluation and management
        - Psychogeriatric care
    - Non-acute care
        - Support for a patient with impairment, activity limitation or participation restriction due to a health condition

Workers:

- Doctors
- Nurses
- Therapists
- Technicians (radiology/surgical/patient care)
- Janitorial staff
- Admin
- Information technology
- Food services
- Environmental services (electricians, plumbers)
- Pharmacy
- Other (transport/assistants/volunteers)

Hospitals: run by the state

- Private (592)
    - Elective surgeries (2/3)
- Public (753)
    - Long waiting times
    - Greater emergencies occur during the weekend, thus confounding statistics that state you are more likely to die on the weekend
    - Generally provide most emergency departments and outpatient services
- Home services
    - Nursing homes
    - Obstetrics and maternity
- Diversity in services:
    - Large metro hospitals
    - Small regional hospitals
    - Specialised hospitals (psych/rehabilitation)
    - Pathology clinics

3 Major Tertiary Hospitals in Melbourne:

- Alfred
- MMC
- Royal Melbourne Hospital

Most expensive healthcare provision:

- $752,000 for premature births
- Accounts for 7 of the top ten highest costing procedures it paid for

Healthcare provision are not just for length of life, but also include QALY.

Ambulance Services:

- Emergency pre-hospital care
- Transport between hospitals
- Offer transport in response to illness or injury
- Co-ordinate patient services in multi-casualty events

Challenges:

- Increase in responses
  - 4.1 million incidents in 2012-13.
  - Average response time is 22.5 minutes in 90% in Victoria
  - 1 in 4 emergency department admission (1.6 million) arrived by ambulance in 2012-13.
  - Aero-medical services
    - 45 aeroplanes
    - 35 helicopters

Individuals aged 15-24 (females more than males) present the most to public hospital emergency departments. Followed by individuals aged 25-34.

In 2012–13:

- fewer than 1% of presentations were in the *Resuscitation* triage category
- 11% of presentations were in the *Emergency* category
- 35% of presentations were in the *Urgent* category
- 44% of presentations were in the *Semi-urgent* category
- 9% of presentations were in the *Non-urgent* category.

Triage categories:

- Category 1 Resuscitation: immediate (within seconds)
- Category 2 Emergency: within 10 minutes
- Category 3 Urgent: within 30 minutes
- Category 4 Semi-urgent: within 60 minutes
- Category 5 Non-urgent: within 120 minutes

<u>MEDICINES AND HEALTH</u>

Pharmaceutical Benefits Scheme (PBS) & the Repatriation Pharmaceutical Benefits Scheme (RPBS) subsidise the cost a variety of medicines.

- General patient out of pocket cost = $36.10 approx
- Concessional patient out of pocket cost = $5.90 approx
  - Healthcare card holders
  - Students

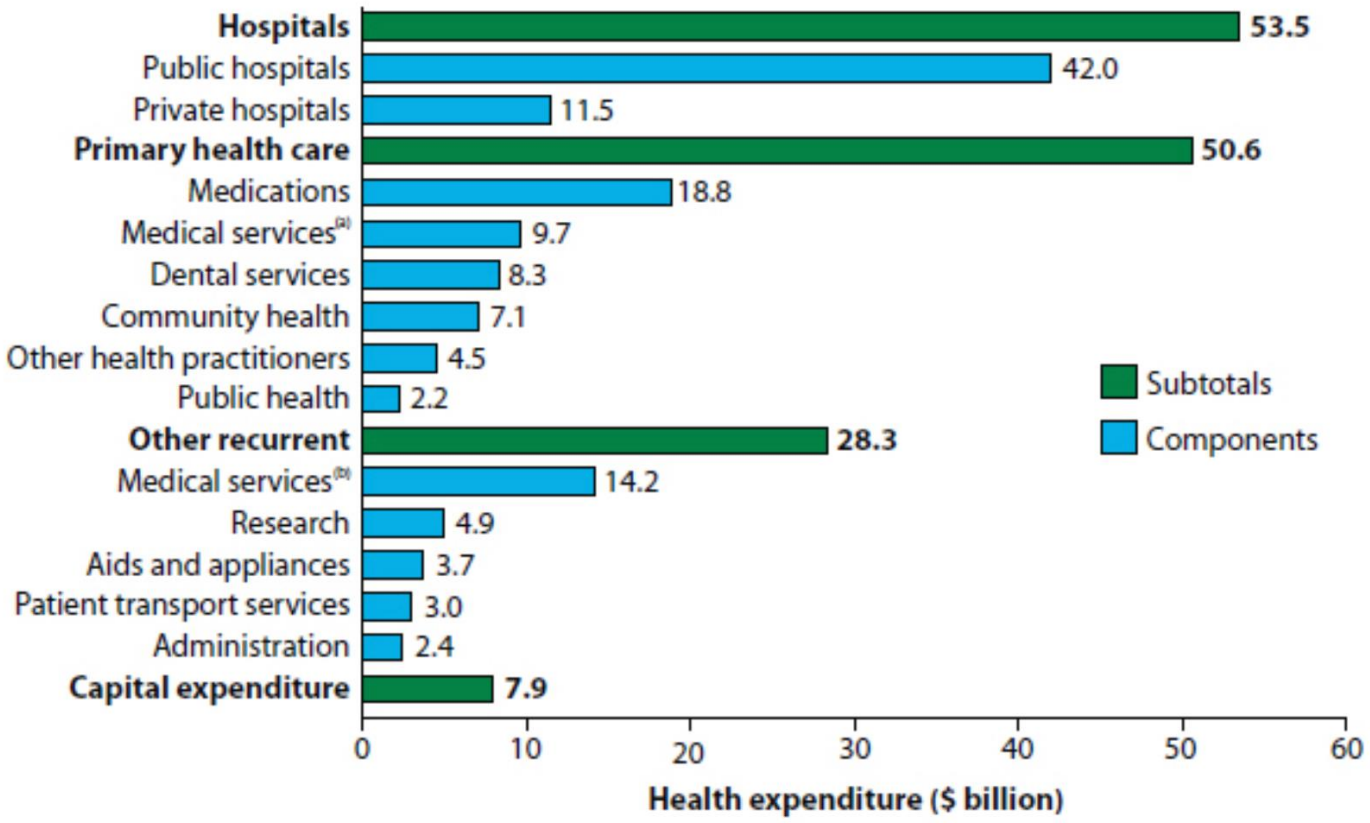
In 2011-12 medication spending:

- Subsidies totalled: $10.1 billion
- 207 million pharmacy services were subsidised
- 80% to concessional patients
- 50% of medications are for cardiovascular (33.9%) or nervous system (20.6%) medications

Challenges:

- Over prescription: antibiotics
- Most frequently prescribed medicine: statins
- GPs are required for transcriptions, but their services are limited
- Lack of national data collection
    - What medication was taken
    - What was the outcome

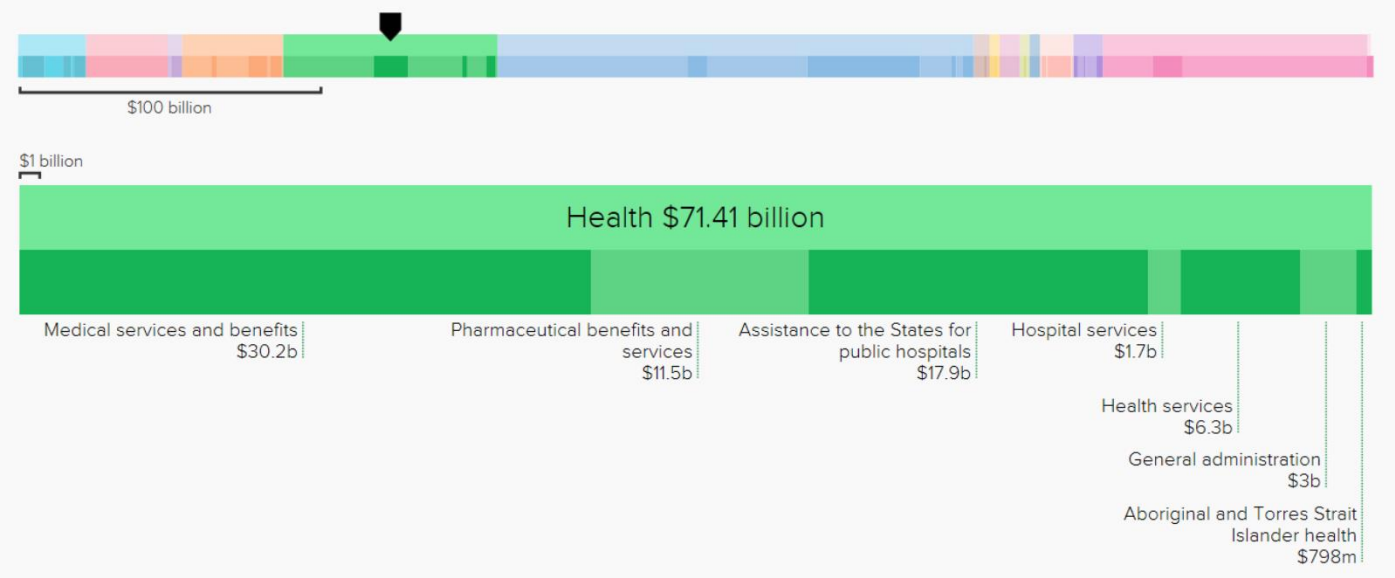
Spending:



Budget: (from greatest to lowest cost)

1. Social security and welfare (prevention)
2. Other purposes (interest payments/salaries)
3. Health

Health breakdown:



Prevention has been removed from the budget, but it has been incorporated into other areas e.g. education/services etc.

An update:

- Has our spending increased in health in recent years? **Yes, we allocated 9.5% of GDP to health**
  - By how much in the last 20 years? **Up from 7.1%**
  - How does this compare to OECD countries? **Average 9.3% other OECD countries**

Good news!

- We are living longer – 82 years on average

Lecture 1.3

1. Outline the major challenges for biomedical research
2. Explain why it takes so long from bench to bedside
3. Justify why it is important to publish negative data
4. Identify strategic plan for biomedical research

ONE

Major challenges for biomedical research:

1. Government
2. Slow pace from bench to bedside
3. Escalating costs
4. Publishing negative data
5. Strategic planning

Australia has world leading expertise in health and medical research. Governments and companies have poor funding, but we have a very good output for government investment. For every $1 spent, $2.17 is generated in IP.

The value of research:

- Improving health
    - Research has improved cancers, infectious diseases and heart failure
- Training following generations
- Increasing knowledge
    - Nobel prize winners
- Strengthening economy
    - Creating new industry
- Developing new technologies, products and industries

Public attitude: politicians pay attention to the consensus of the general public. If the government is not convinced that a research project is important, it is difficult to convince the government.

Large discrepancies exist globally. 46% of Americans and opposed to 74% of Australians agree that biomedical research can lead to a reduction in health costs. Research also offers hope for people who are terminally ill and have no other treatments to turn to.

Government Control:

Legislation: used to maintain privacy

- Public Health Act
- Information Privacy Act

Guidelines: required to confirm voluntary consent

- Australian Code for the Responsible Conduct of Research
- Code for the Practice for the care/use of animals
- National Statement on the Ethical Conduct in Human Research

Funding:

$5.9 billion is spent on health and medical research (H&MR) in Australia each year

18% of all Australian Research and Development (R&D) is spent on H&MR (Total R&D is around $33 billion)

8% of all spending on health is spent on H&MR (Total health expenditure in 2013-14 was $154.6 billion)

More than half of all Australian H&MR is undertaken in the higher education sector

H&MR accounts for **one third of all R&D expenditure in higher education institutions**

19% of all H&MR expenditure is in the private sector (mostly on pharmaceutical R&D)

At Monash University, the faculty of Medicine brings in approximately 60% of funds for all research money across all faculties.

NHMRC Funding	**$850 million**
ARC Funding contribution to HMR (10%)	**$85 million**
Infrastructure Block Grants contribution to HMR (34%)	**$340 million**
Total	**$1.275 billion**

NHMRC funding for disease is declining, NHMRC funds science, not disease specific research.

Despite America spending the most money on healthcare, they have the lowest life-expectancy. The opposite is true for Australia and Japan (spend lowest amount of money on healthcare, but 2nd highest and highest life-expectancy respectively).

TWO

Escalating Costs:

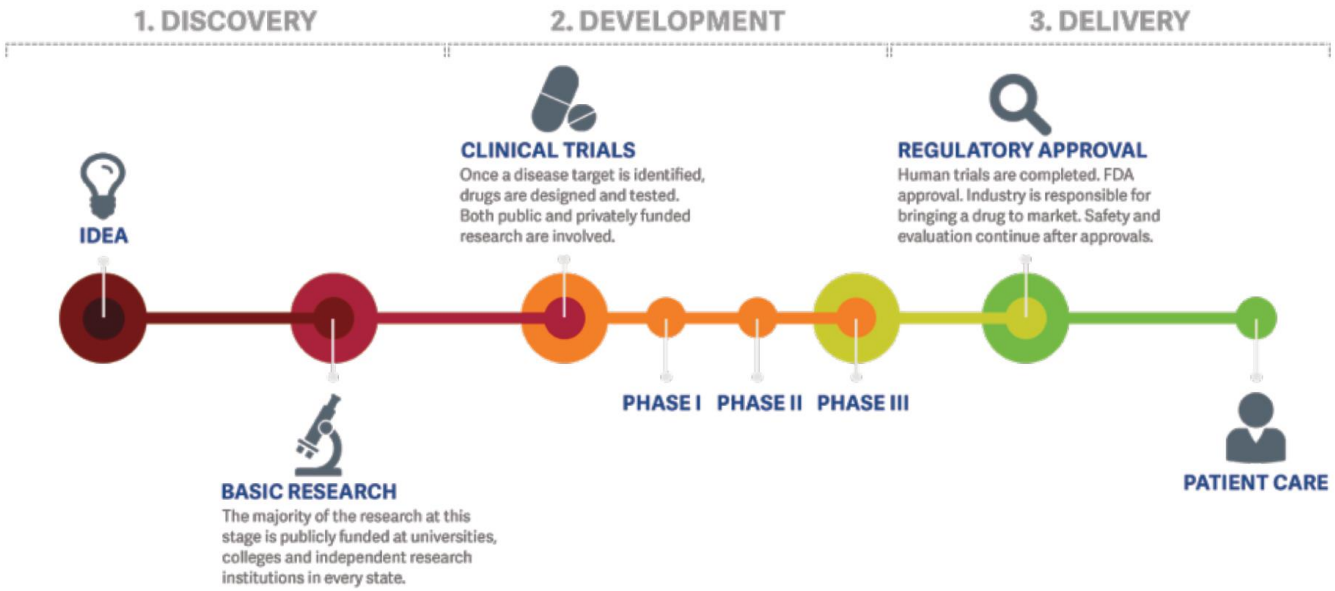
- Australia's health system is facing sharply rising costs and a growing number of demands

- The ageing of Australia's population, chronic diseases, consumer expectations and new health technologies were factors in the growing expense of health and hospital services.

However, it is predicated that Australia's sending on healthcare will continue to increase over the next 40 years (almost double). This is largely because of the aging population.

Why does it take so long from bench to bedside?

- Long time-line



Basic research: takes approximately in 7 years.

- Failure to work in humans, though it is successful in animal models
- Lack of negative trial publications
- Lack of funding
- Spend a lot of time on disease mechanisms

Clinical Trails:

- Many researchers get caught up in the mechanisms of action. Identification of these takes time.
- This contrasts to journal criteria which mandates mechanisms of action understanding
- High cost of trials
- Cost increases as the Phase number increases. FDA review phase (between Phase III and Phase IV) is least expensive

Return on Investment:

- Australia funds more than 700 clinical trials and invests more than $1 billion annually in research and development.

- Of the 795 medicines approved for use in Australia over the last 10 years, 224 were a breakthrough using a newly discovered molecule.

- **These 224 breakthroughs:**
  - were an average of 15 years in the making – requiring testing of 10,000 new molecules
  - were a $1.4 billion investment in research and development.
  - have changed the way 52 diseases are treated.

THREE

Publishing negative data:

- Since researchers are engaged in competition for positions and funding, many are choosing not to publish their non-significant findings that have:
  - less scientific interest
  - fewer citations
  - can generally only be published in lesser impact journals.
- The amount of non-significant data reported is progressively declining
- Negative findings are a valuable component of the scientific literature because
  - they force us to critically evaluate and validate our current thinking, and fundamentally move us towards unabridged science.

Publishing in big-impact journals give you a good track record (higher impact = more applicable) and gives media exposure = more funding. Publishing low impact information can decrease the researchers reputation.

Solutions:

- Private organisations and government has created negative-results journals where only negative-results trails can be published and it does not impact the researcher's reputation.

FOUR

Solutions:

- Reduce the amount of time spend on identifying mechanisms of action
- Address slow and ineffective methods used throughout the drug development process (research trials etc.)
  - Remove the red-tape
  - Open interactions and shared information: bad in Australia because funding is to scares, the researchers all become competitors and do not wish to share information
- Increase resources
- Increase collaborative work amongst researchers

Strategic Imperatives: designed to empower the community and reduce the health burden (economically and socially)-

Strategic Imperatives:

1. A Healthy & enpowered community
2. Encourage giving
3. Research active health services deliver higher quality care
4. Developing implementation science – turning evidence into action
5. Collaborating for success
6. World class research needs world class researchers
7. Funding research
8. Encourage commercial investment in R&D
9. A strategic national approach
10. Reduce red tape

These are preventative measures.

- We are bad at donations and charities (we have a lot, but not enough funding for each charity)
- We lose a lot of our researchers because they travel overseas
- We lack big pharma and lack collaborations with commercialisation organisations
- NHMR is focused on Alzheimer's
- Reducing the red tape = reducing time

It is thought that these strategic imperatives can increase knowledge and understanding:

- Meet ageing population challenges
- Meet increased challenges associated with increased chronic disease
- Boost wellbeing and productivity
- Create new jobs and prosperity

Lecture 1.4

1. Outline the importance of research integrity
2. Explain the challenges of animal ethics
3. Justify why using stem cells is so important to medical research
4. Explain why non-human primate research can be ethical

ONE

<u>Research integrity</u>

Ethics: moral principles that govern a person's behaviour/conducting of an activity

Integrity is guided by the Australian Code for the Responsible Conduct of Research. This dictates both institutions and researcher activity and underpins the values of "good research practice". It provides a framework for resolution of unethical practices.

Breaches:

- Plagiarism
- Falsifying/fabricating data
    - Photoshopping data

    - It is permissible to change the colour of images (this is because people that are colour blind cannot discriminate between green and red)
- Duplicating results
    - Cannot even submit your own work twice (if you want to reuse your work, you have to reference the journal it was published in, because the journal now owns the information)
- Inappropriate finance management
- Concealing conflicts of interest
- Stealing other peoples research

These breaches can impact the entirety of your career if caught.

Fessing up to Fraud:

- These is a large amount of discrepancy between people doing fraud, and people admitting to fraud.
- If you see another individual committing fraud whose name will be published on the same paper as you, this will also impact your career, despite you doing nothing wrong

Journals own the information, despite you having to pay the journal to publish your work. They own all the data and IP. The PhD student earns the next most and the supervisor often earns the least.

Scientific misconduct is unacceptable and includes plagiarism, collusion and cheating:

- Plagiarism involves the use of another person's work without full and clear referencing and acknowledgement
- Self plagiarism occurs where an author republishes their own previously written work and presents it as new findings without referencing the earlier work
- Cheating involves presenting another Researcher's work as your own
- Collusion involves presenting work as independent work when it has been produced in whole or part in collusion with other people.

Retractions of papers: black mark against the researcher's name. Publication retractions have increased over the years and have increased significantly in the last century. This is likely because we now have more sophisticated technology to catch people involved in misconduct. Increases from most to least:

1. Fraud
2. Duplication
3. Error
4. Plagiarism

TWO

Challenges of animal ethics: there has been a huge decrease in public opinion regarding using animals for biomedical research. This is likely because ethics used to be very bad and animals were being used inhumanely and inappropriately. Now, trying to get permission for animal use from ethics committees is very difficult, especially at Monash. Public opinion has begun to slowly increase in past 5 years.

Inappropriate use includes:

- Cosmetics
- Cruel living conditions

Animals ethics committees only consider the animal, not the effect on humans. More people believe that animal research is essential in USA than in UK. Despite similar societies, opinions vary greatly.

The Monash Committee: School or Faculty Animal Ethics Committees (AECs)

- The AECs are the legal committees in Victoria and must approve each application to use animals in research and teaching, before the project may commence.
- Monash adheres to the Victorian Prevention of Cruelty to Animals Act and Regulations 1986 (the law), and the NHMRC Australian Code for the Care and Use of Animals for Scientific Purposes (8th edition, 2013).

People on the committee (at least one member from each category):

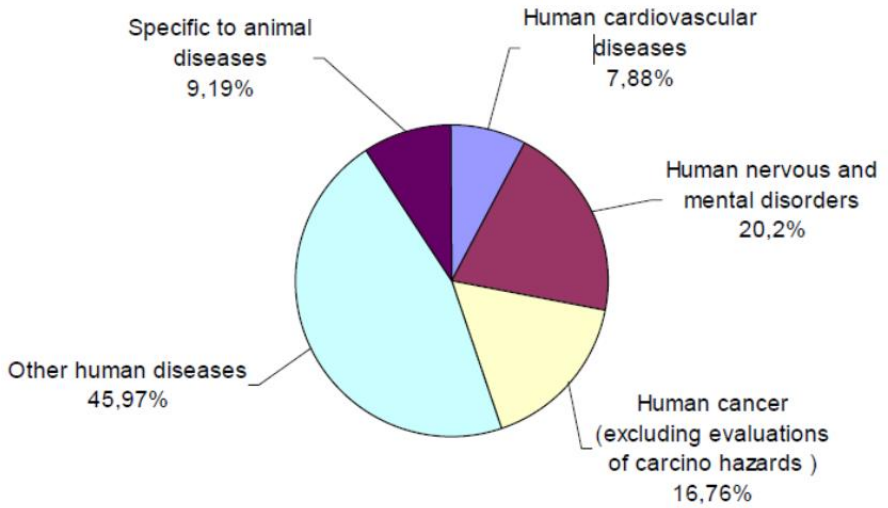
- A veterinarian (Category A)
- An animal researcher (Category B)
- A welfare member (Category C)
- An independent lay person (Category D)- has not used animals for research or teaching purposes
- Animal Facility Manager or an animal technician as a member
- Animal Ethics Officer or Animal Welfare Officer in attendance.

The C and D members are not employed by the institution.

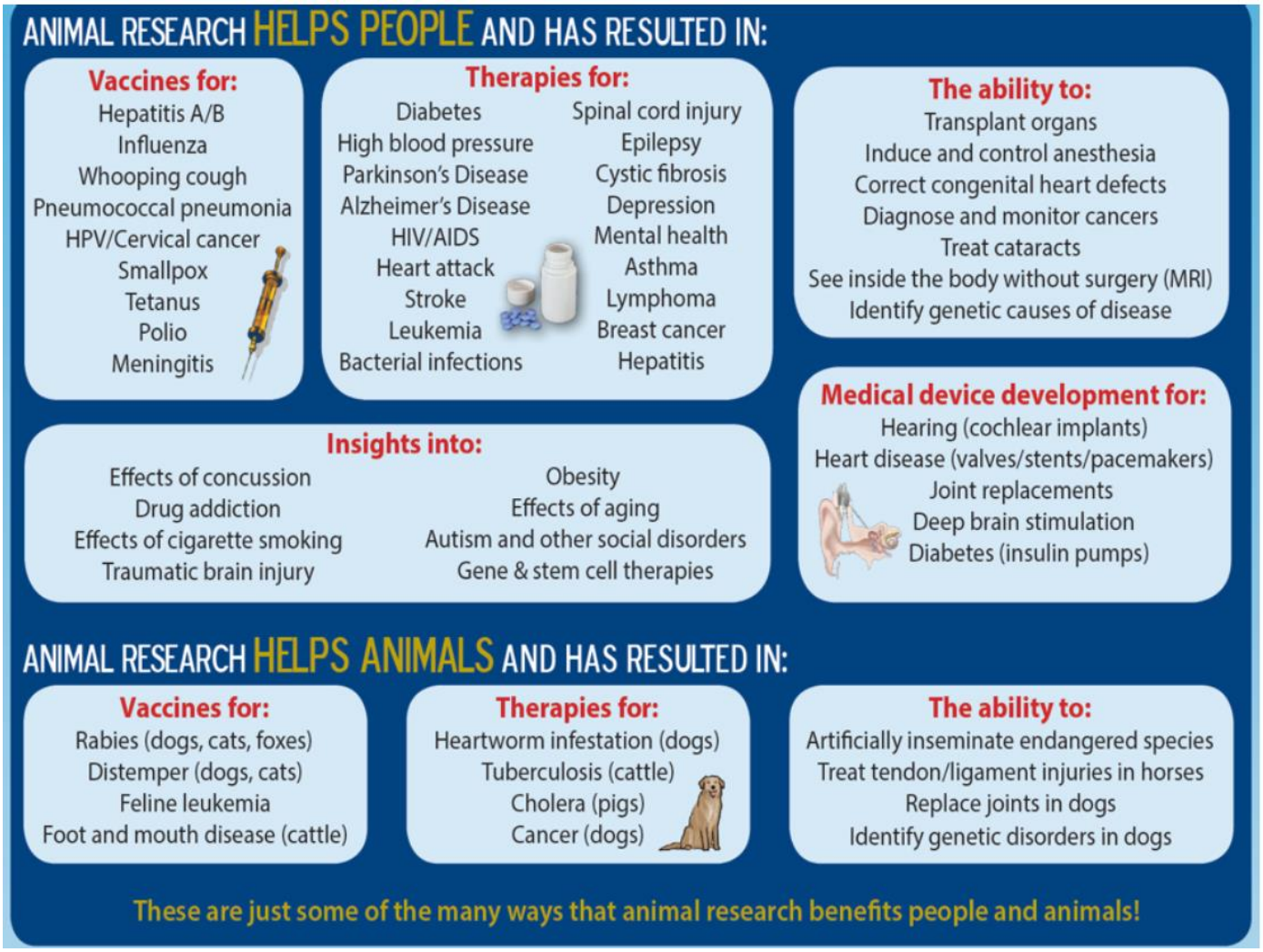
Justification:

- Reduction:
    - Share the animal parts around a number of labs
- Refinement:
    - Reduce pain
    - Complications arise when looking at the immune system because analgesics alter the immune system, but need to be used to reduce animal suffering
- Replacement:
    - Computer modelling
    - Using lesser organisms
    - Cell culturing/stem cells
- Must be able to justify the research
- Must explain the likely outcome on the animal

Proportion of animals used for studies of diseases



Benefits:



THREE

In Australia, researchers must obtain an NHMRC license to use excess human IVF embryos for research.

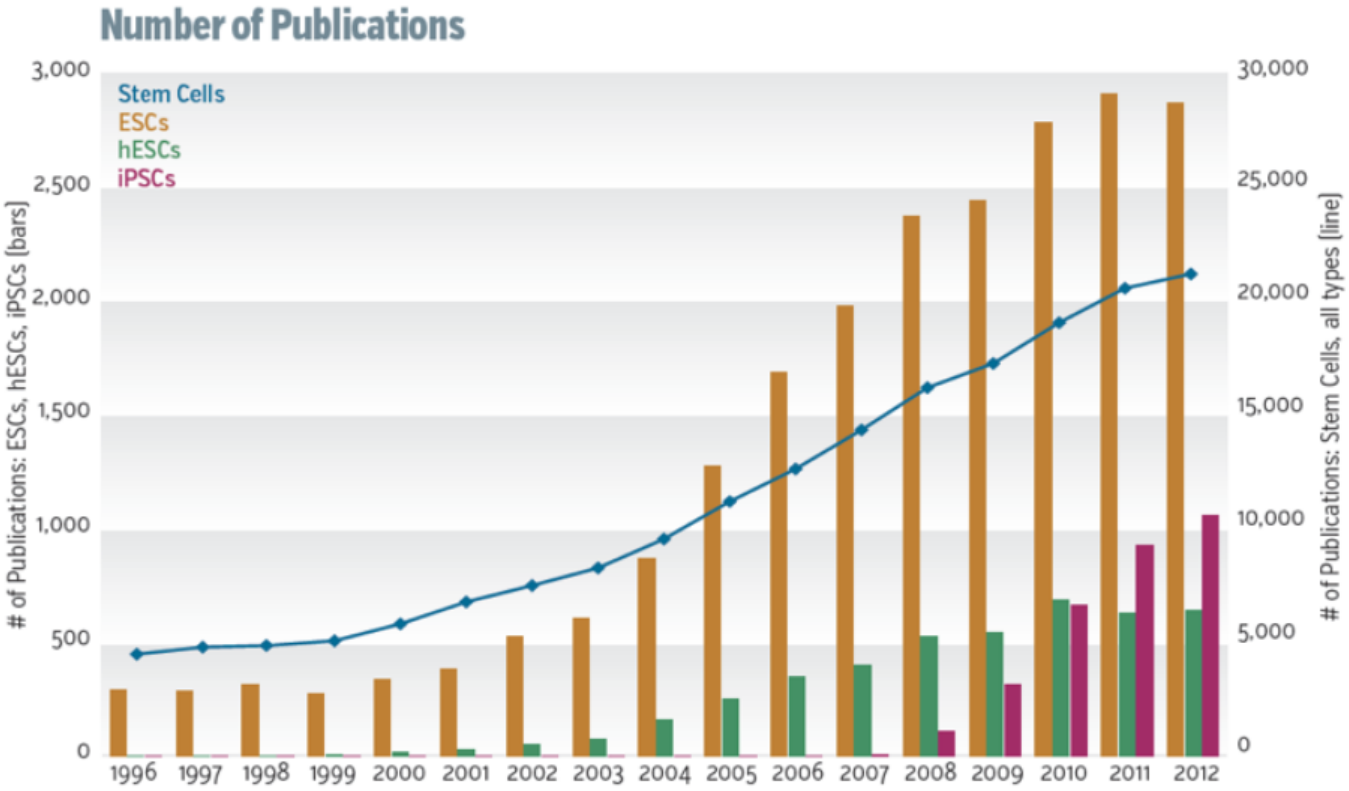
Two views:

- Some people regard research on human embryos created by any means, and at any age, as unethical, believing that human life begins when a human egg gains the ability to form an embryo.
- Conversely, there are others with the strongly held view that embryonic stem cells hold the promise of sufficient benefit to human health to justify the use of humanembryos for research purposes.

An ethical way of collecting stem cells is to use placental stem cells what would have otherwise been thrown away. These cells do not proliferate and therefore cannot form tumours. Other stem cells include:

- Embryonic stem cells (less accepted)
- Adult stem cells
- Induced pluripotent stem cells

All come from donated human tissue and should be subject to the highest level of scrutiny. Use has greatly increased over the years.



FOUR

Non-human primate research can be ethical because they have created the following cures:

- Polio vaccine
- Insulin for diabetes
- Coronary bypass surgery
- Hip replacements
- Kidney dialysis and transplants
- Organ transplants
- Organ rejection medications
- Medications for
    - bipolar disorder
    - depression
- Blood transfusions
- Chemotherapy
- Hepatitis B vaccine
- HIV/AIDS medications
- Child lung transplants for cystic fibrosis
- Anthrax
- Parkinson's disease treatments
- Prostrate cancer treatments

Ebola:

- Since the 2014 outbreak, there have been 28,000 affected and 11,000 deaths. A huge amount of money and resources were pooled to develop an Ebola whole-virus vaccine that is 100% protective in non-human primates.

Lecture 1.5

1. Identify the major funding bodies of Health & Medical Research in Australia
2. Outline the NHMRC Grant funding Schemes
3. Outline the NHMRC Fellowship funding Schemes
4. Explain how to cost a research project

ONE

Major funding bodies in Australia:

- NHMRC (National Health and Medical Research Council)
- ARC (Australian Research Council)
- Industry
- Not for profit organisations (a large amount of money comes from this area)
- Philanthropic

NHMRC:

- Supporting health and medical research
- Developing health advice for the Australian community, health professionals and governments
- Providing advice on ethical behaviour in health care and in the conduct of health and medical research.

Priority Areas:

NATIONAL HEALTH PRIORITY AREAS	2012 $M	2013 $M	2014 $M	2015 $M	2016 $M
Aboriginal and Torres Strait Islander Health	$46.6	$41.5	$49.1	$55.8	$51.8
Arthritis and Osteoporosis	$26.4	$23.2	$21.7	$23.0	$17.6
Asthma	$20.7	$21.5	$23.5	$22.6	$15.3
Cancer	$192.3	$179.3	$188.0	$191.4	$170.1
Cardiovascular Disease	$121.6	$112.4	$122.7	$120.9	$106.0
Dementia	$27.6	$27.1	$33.5	$34.6	$46.4
Diabetes	$74.9	$65.1	$69.6	$69.4	$64.1
Injury	$51.8	$46.1	$58.9	$61.9	$46.7
Mental Health	$70.4	$73.3	$83.8	$86.2	$71.7
Obesity	$40.5	$41.7	$40.5	$38.3	$27.2

Marketing team for cancer is very good, because it is not number on the 'cause of deaths', but has the most funding. This could be because the public perception is that cancer is so terrible and the governments want to appeal to the public, regardless of what the statistics say. Furthermore, cancer affects more young people than old people (who suffer more from CVD related events), which may be another reason cancer treatments are more favoured.

Leading cause of death:

1. Ischaemic heart disease
2. Dementia, Alzheimer's
3. Cerebrovascular disease
4. Trachea/respiratory cancers
5. Chronic lower respiratory diseases
6. Diabetes
7. Colon, gut cancers
8. Blood/lymphoid cancer
9. Heart failure
10. Diseases

The government wants to make a return on their research investments. Stroke does not have a high return, so despite it being a leading disease, it is not highly invested in.

TWO

Funding schemes:

CALENDAR YR	INFRASTRUCTURE SUPPORT	PEOPLE SUPPORT	RESEARCH SUPPORT	YEARLY TOTAL
2000	$2,200,438	$14,439,256	$151,161,467	$167,801,160
2010	$45,884,994	$144,332,643	$537,423,416	$727,641,053
2011	$50,588,427	$155,500,891	$572,291,667	$778,380,985
2012	$58,753,505	$162,017,026	$605,666,500	$826,437,031
2013	$47,177,894	$144,027,700	$583,977,391	$775,182,985
2014	$42,381,138	$157,095,560	$644,799,842	$844,276,540
2015	$40,085,518	$168,037,208	$681,792,268	$889,914,995
2016	$35,806,764	$155,475,972	$626,328,574	$817,611,309

Research only funding: do not get an income from grants, must find fellowships for living cost support. Family are a disadvantage because full-time workers are favoured over individuals spending more time with their families.

THREE

Fellowship Funding Schemes: huge number

- Many research fellowships are available for early career development, but as you become a more senior researcher, the fellowships dry up.

PEOPLE SUPPORT	Career Development Fellowships	$24,908,760
	Early Career Fellowships (Australia)	$24,866,296
	Early Career Fellowships (Overseas)	$12,723,309
	International Exchange Early Career Fellowships	$373,206
	Postgraduate Scholarships	$8,306,547
	Practitioner Fellowships	$7,288,787
	Research Fellowships	$63,041,725
	Targeted Calls for People	$11,831,253
	Translating Research into Practice Fellowships	$2,136,088
	People Support Total	**$155,475,972**
RESEARCH SUPPORT	Block Funding	
	Capacity Building Grants	
	Centres of Research Excellence	$44,361,722
	Development Grants	$14,490,890
	International Collaborations	$8,878,130
	Partnerships	$21,183,404
	Program Grants	$107,671,713
	Project Grants	$409,658,426
	Targeted Calls for Research	$20,084,288
	Research Support Total	**$626,328,574**

Research Fellowships: most of the cost goes to associate professors. Despite the value being similar to early career development fellowships, there are less associate professors and thus their wage is much higher.

Half of the NHMRC funding goes towards Project Grant→ this is where most of the research support goes.

Less than 1/5 people get funding (17% success rate) with approximately 3,800 applicants. Program grants have a much higher success rate of 45%, however it is much harder to put these strong teams together, hence the low applicant number (24 applications).

The higher you go in your career, the lower the grant success rate.

CALENDAR YR	BASIC SCIENCE	CLINICAL MEDICINE AND SCIENCE	HEALTH SERVICES RESEARCH	PUBLIC HEALTH
2000	$85,195,407	$35,419,944	$2,454,052	$16,465,240
2010	$331,922,105	$231,181,680	$32,355,127	$97,110,148
2011	$346,297,600	$252,728,597	$35,418,969	$105,036,095
2012	$361,778,641	$262,862,559	$37,173,789	$112,335,132
2013	**$332,227,847**	**$254,656,527**	$37,417,172	**$108,434,734**
2014	$357,458,332	$281,060,909	$48,067,011	$118,900,248
2015	$372,187,220	$300,712,041	$57,590,915	$120,395,230
2016	**$331,469,163**	**$288,470,826**	**$49,170,956**	**$112,937,246**

The bulk of funding goes to basic science, followed by clinical medicine and lastly public health. There has been more money put into public health in the last few years.

FOUR

An application for a research project requires:

- Preliminary data
- Research plan

This usually takes about 6-9 months to write, with 9 pages to apply for. They are submitted early March and assessed by 1-2 external assessors and 2 panel members (*primary and secondary*).

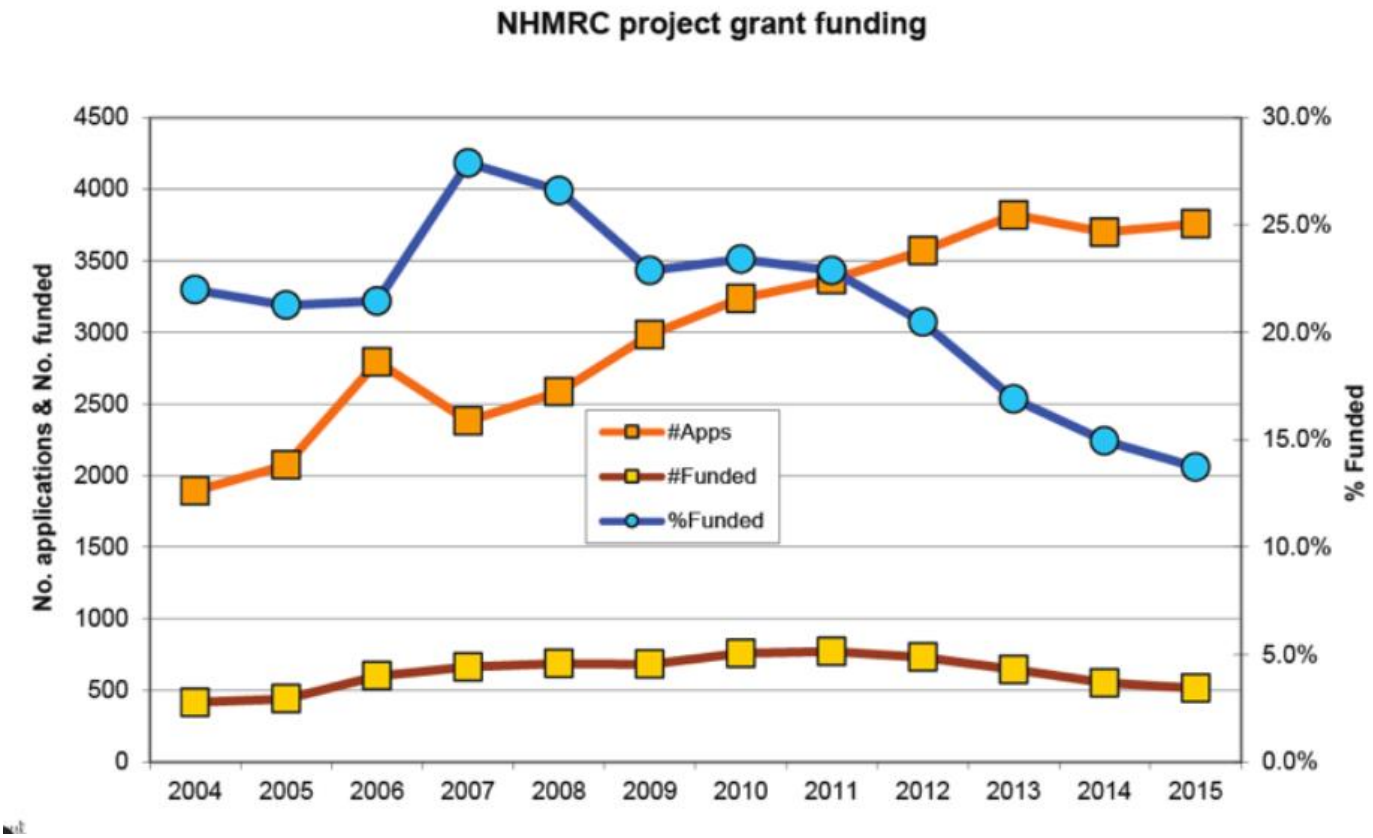
Assessed on:

- Scientific Quality (50%)
- Significance & Innovation (25%)
- Track Record, Team Quality & Capability (25%)
    - In the last 5 years→ disadvantage to younger researchers

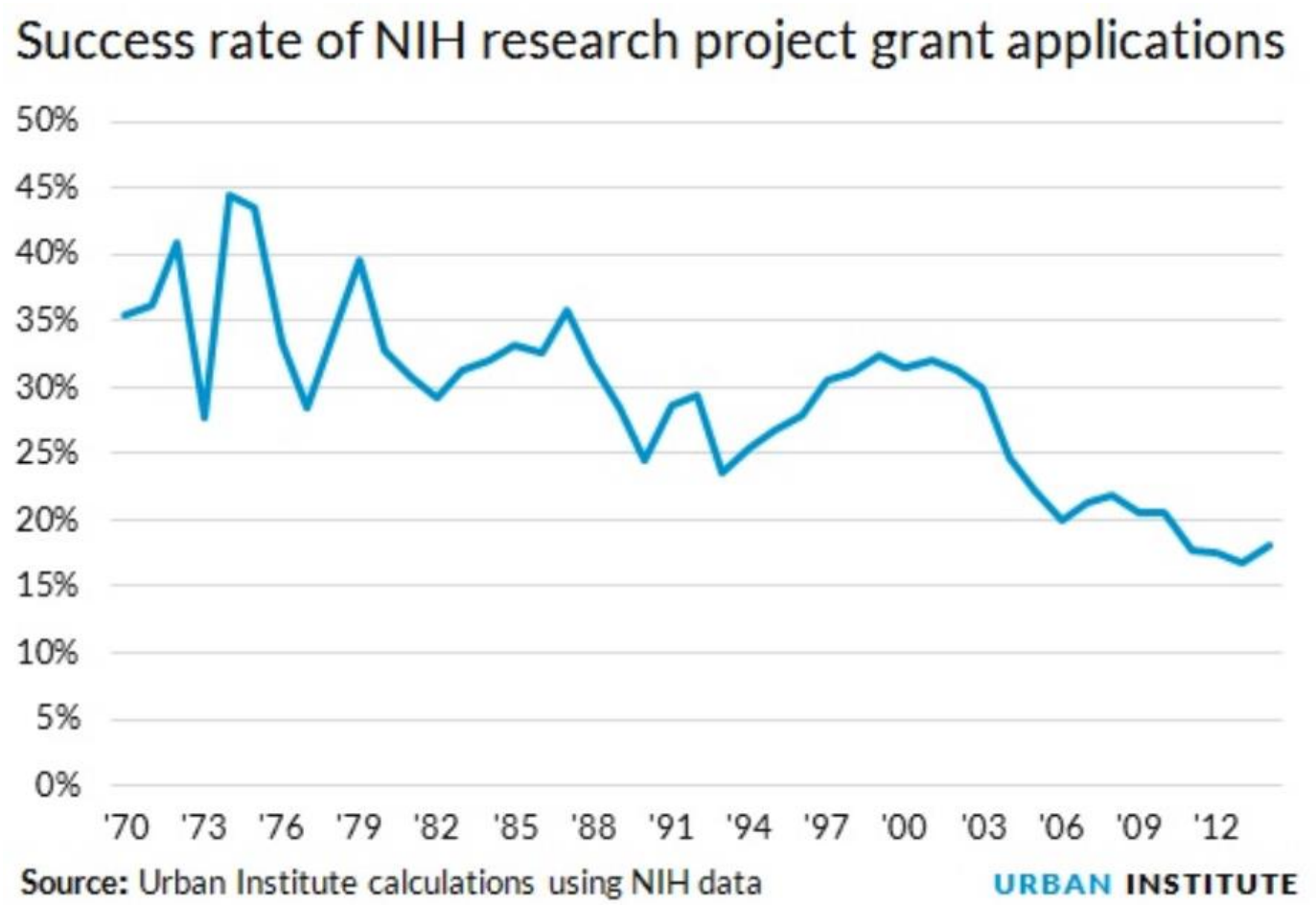
Each section is scored out of 7 and you receive assessor comments in July

- Have up to 10 days to submit rebuttal of 2 pages
- Panel meet in August to decide final scores
- 37 grant review panels (each panel assess ~ 90 grants)
    - People who sit on panels are experts because they have to review a huge number of grants within a very short time period (1 week). Thus they have to be familiar with a large body of literature so they do not waste time researching

Success Rate of NHMRC Project Grants



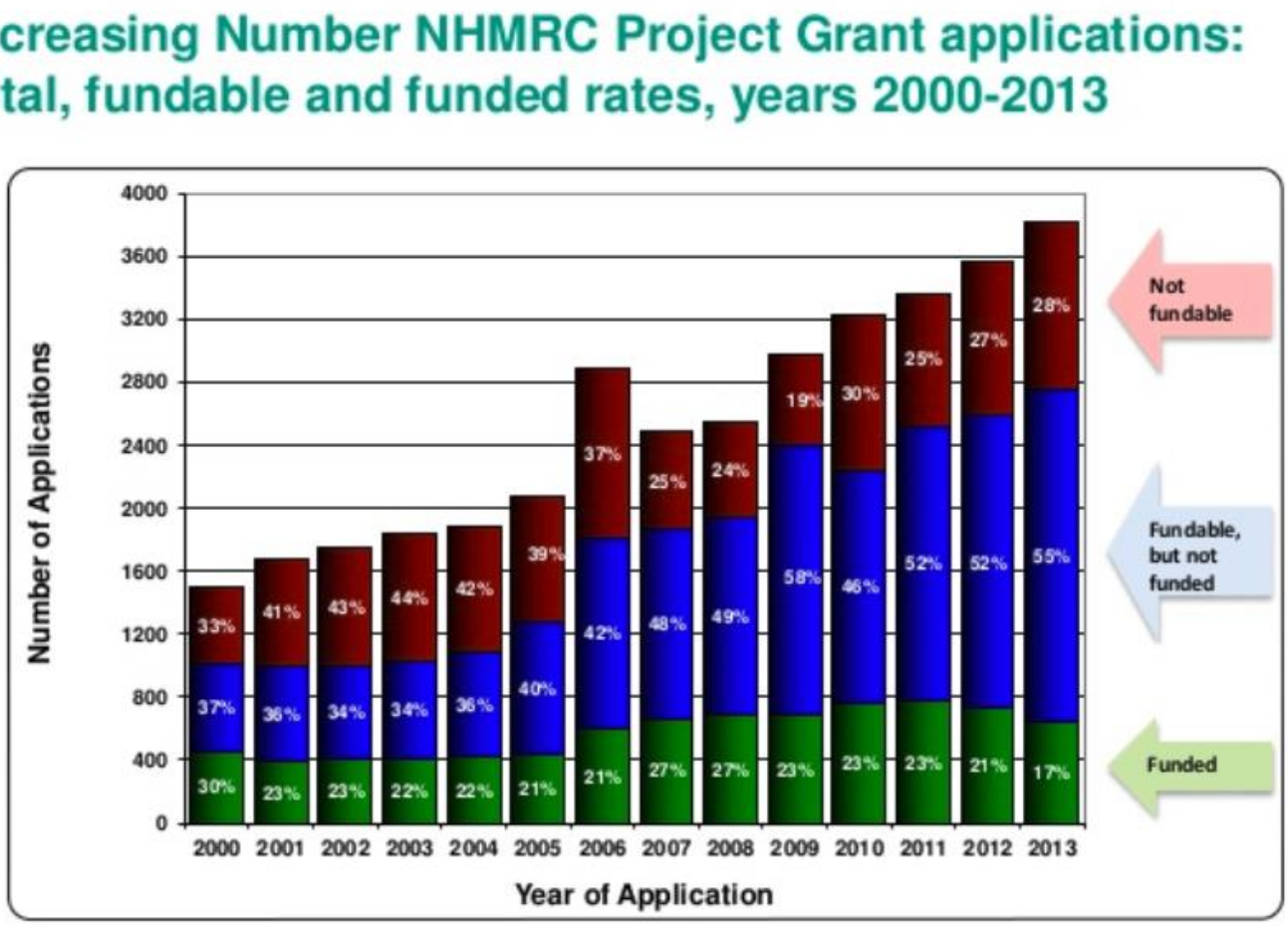
Peaked at 28%. We are now at 13%. Soon we will bottom, and it is expected that funding will increase with new medical funding. Because funding has halved over the last 10 years, there are probably ½ as many people within the industry. Indicating that 50% of people have lost their jobs. Another thing that drives funding is the number of applications. The more the applications, the lower the success rate.

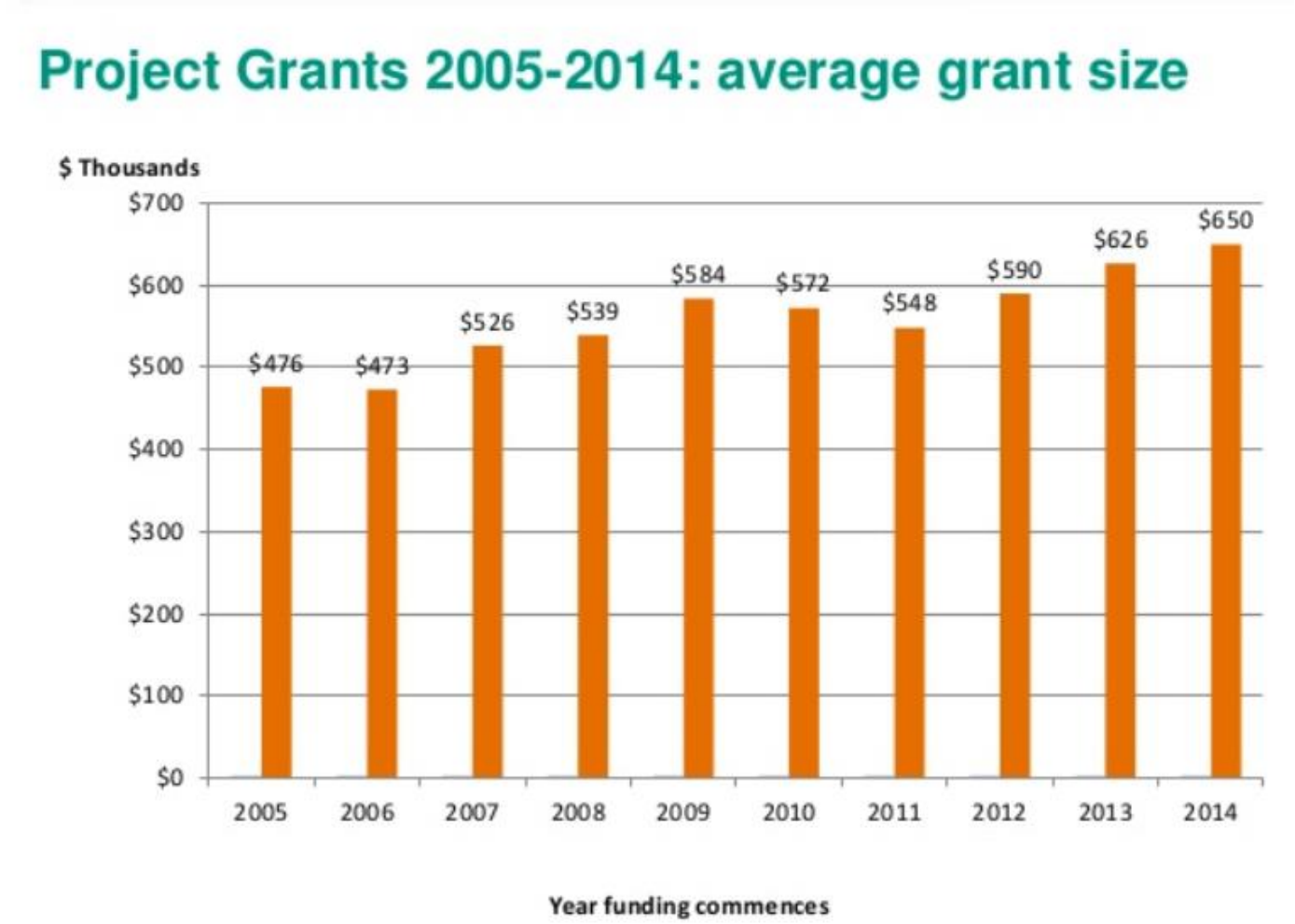


Despite the low numbers, a huge amount of money is still put into this.

- NIH= National Institute of Health

Fundable, but not funded→ Your application is scored. Those who get a 7 are fundable. The top 25 quartile of those who score a 4 or above are then funded. The rest are not, though they also scored well.





CIA= Chief Investigator, where most of the money goes to.

- Most CIA's are male
- Number of funded grants increases, the higher up the alphabet you go

Level B/C = academics (B is lecturers, C is senior lecturers)

Level D = associate professors (similar funding to B/C level)

Level E positions = Profs (x2 more likely to be awarded a project grant)

- Level E males are x4 more likely to receive project grant funding than females
- Monash is quite good, they have almost equal male to female ratio

It is predicated that funding with double in the next 40 years. Medical research funding will increase by $1 billion in 2022-23.

Chief Investigator needs to:

- Ensure all appropriate ethics are obtained
- Submit an annual budget
- Provide annual report on research findings
    - This includes publications

NHMRC Fellowship Breakdown:

Grant applications include:

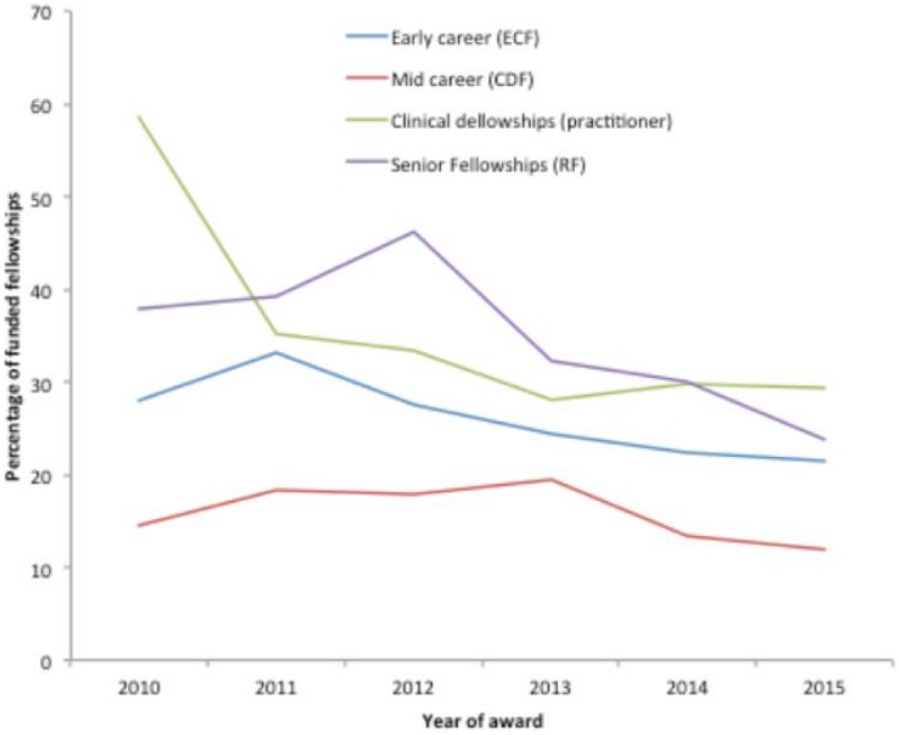
- Research project description
    - *Background (includes preliminary data)*
    - *Research Plan*

Assessed by:

- 5-6 Panel members (*primary and secondary*)
- Research Output (50%)
- Research Proposal and Environment (30%)
    - Universities with better infrastructure and an international reputation have a huge advantage over universities without these resources
- Professional contribution (20%)

- Each section is scored out of 7

* Fellowships do not fully cover researchers salary = the university or research group often covers the rest of the cost.



How to cost a research project:

- All the important costs are included so as to be able to conduct the research to the highest quality
- Only acceptable costs have to be met by the University (animal use)
- The included costs are justified by the work content

The advantages and disadvantages of doing the project must be considered and balanced:

- How it fits in with the research portfolio of the School/University Opportunities for exploitation
- Publicity, enhancement of reputation, strategic importance

The time involved in preparing the bid and the likelihood of success should be considered. Some researchers can spend up to 70% of their time applying for grants. This statistic is generally only for large labs, where the senior lab head has people working under then and thus, has time to commit to writing research grants.

Breakdown:

- Staff – directly working on the project (over and above standard allocations for permanent staff)
- Equipment – usually over a defined cost limit, rules about allocated cost may apply, may be upper cost limit
- Consumables – materials directly used on the project
- Travel – meetings, conferences, visits directly related to the project work or to disseminate the results
    - Less accepted by the NHMRC now, often travel is self-funded or funded *in kind*.
- Animal costs – Animal care/maintenance, breeding costs, genetic manipulation
- Other costs – insurance, auditing, student fees etc.