

Prepared for Charles Sturt University
Murray Darling Medical School

Economic Impact Analysis

Report dated 13 April 2017

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Defined terms

Abbreviation	Definition
AMA	Australian Medical Association
CSP	Commonwealth Supported Place
Doctors	Summative term for all medical practitioners, including GPs and specialists
GP	General Practitioner
MDMS	Murray Darling Medical School

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A. Executive Summary

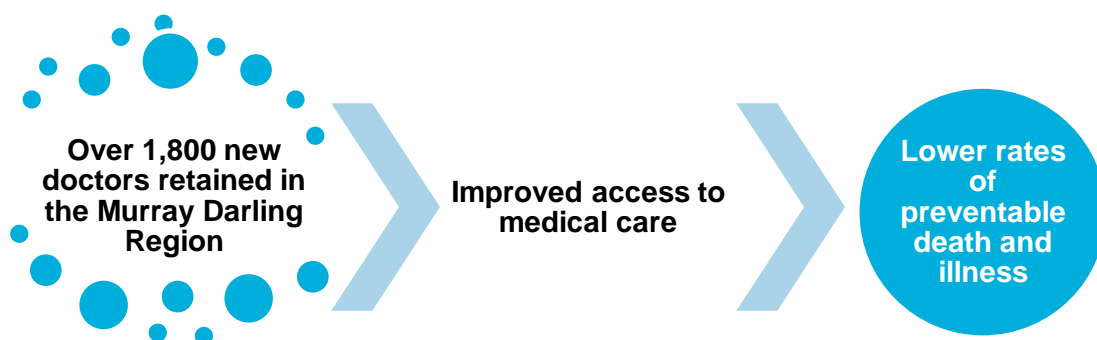
Purpose

1. The purpose of the following report is to:
 - provide a summary of the proposed features and design of the Murray Darling Medical School (MDMS)
 - assess the health and policy context for the MDMS
 - describe, analyse and quantify the economic impact of the MDMS on the Murray-Darling region, including the transmission mechanisms by which this impact is expected to occur.

Social, Health and Other Non-Quantified Impacts

2. Geographical shortages of medical services are currently concentrated in non-metropolitan areas of Australia. Existing and historical policy settings have not been successful in bridging the significant gap in the availability of medical services between rural and metropolitan areas. The MDMS proposal has been developed specifically to address these shortages and generate flow-on benefits for the whole community.
3. The MDMS proposal is based on the finding that where people study affects where they subsequently choose to live and work. Based on the experience of James Cook University, a significantly higher portion of doctors (50% plus) trained in the Murray-Darling region are expected to reside and work in the region post-graduation compared to those students studying at metropolitan-based medical schools.¹ A range of social and economic and impacts can therefore be expected from the MDMS proposal.
4. One of the main social impacts expected is improved health and well-being outcomes across the wider Murray Darling community. For example, our mid-case estimates that around 1,889 new doctors will be practising in the region by 2050. Studies linking doctor/population ratios and avoidable death rates estimate the increased number of doctors in the region will reduce the number of avoidable deaths in the region.
5. A better regional health workforce and associated services is also expected to increase the attractiveness of the region for non-residents and may help to drive increased population growth. In general, vibrant and diverse rural and regional communities are likely to benefit all Australians.

Figure 1: Social and Health Impacts of the Murray Darling Medical School

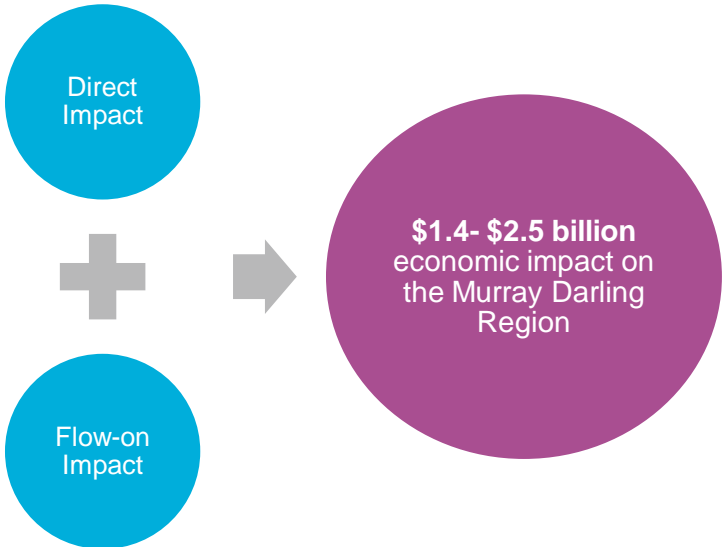


¹ See generally, Sen Gupta T et al, 'Positive Impacts on Rural and Regional Workforce from the First Seven Cohorts of James Cook University Graduates' (2014) *Rural and Remote Health* 14:2657

Economic Impacts

- 6. The forecast regional economic impact of the proposed MDMS is in the range of \$1.43 billion to \$2.54 billion (net present value) over the period 2017 to 2050. The forecast most likely (mid case) impact is approximately \$2 billion.
- 7. The forecast economic impact is comprised of the following elements:
 - An initial \$124 million direct investment into the Murray Darling Basin, comprising capital expenditure, building maintenance and ongoing non-staff operating expenditure.
 - The initial direct investment is expected to generate further regional economic flow-on impacts of between \$1.3 billion and \$2.4 billion. This includes impacts from the direct employment of staff at the MDMS and local expenditure from the medical students who will reside in the region.
 - Other forecast impacts include a further 'attraction dividend' or 'halo effect' resulting from anticipated growth in student numbers studying allied medical disciplines; as well as regional investment derived from increased numbers of doctors graduating and working in the region.
 - Larger, more sustainable regional university campuses. Regional universities have high potential for growth. Over and above the 'halo' effect, the MDMS provides a catalyst for potential growth in other disciplines as students are attracted to the medical school and other allied health offerings. In turn, this may create further diversity in study offerings for regional students. It would also likely make the regional universities more viable and vibrant.
 - Several studies also suggest there are material flow-on effects associated with regional investment. Many regional economies, including the Murray Darling, have unemployed and under-employed resources and are not operating at capacity. Regional investments such as the MDMS will attract population and economic activity, providing an opportunity to utilise such resources without pushing up prices or crowding out other economic activity.
- 8. The estimated economic impacts of the MDMS are dispersed across the Murray Darling region. Course delivery will occur at the three regional centres of Wagga, Orange and Bendigo, but also at a further 16 clinical training sites that will be allocated across the region, including numerous remote areas.

Figure 2: Economic Impact of the Murray Darling Medical School



Government Funding Impacts

- 9. In relation to the policy goal of increasing the number of doctors in regional Australia, the MDMS is likely to be more cost effective than current approaches. Specifically, relying on the 'sticky' effect of regional medical education is more cost-effective than conducting medical education in the cities and then subsidising or otherwise encouraging doctors to move to the regions.
- 10. Using the mid-case as an example the MDMS anticipates it will be able to achieve a post-graduate doctor regional retention rate of 50%, out of an annual cohort of 180. Metropolitan universities would typically be required to train 692 doctors to achieve the same annual number of regionally retained doctors. The difference in CSP funding to achieve the same annual number of graduated regionally based doctors is \$144 million in net present value terms over the 2017 – 2050 period of this analysis.
- 11. MDMS is therefore potentially three times more cost efficient (in terms of CSP expenditure) than metropolitan universities in training doctors who will work in regional or rural Australia.

Figure 3: Government efficiency gains from the MDMS



B. Background and context

Key Points

- Charles Sturt University and La Trobe University are requesting allocation of Commonwealth Supported Places to establish a regionally located medical school offering an undergraduate program to predominantly regional, rural, remote and indigenous students. The MDMS will also include a research component.
- Many of the features of the MDMS, including the curriculum, have been modelled on the medical program of James Cook University, which has proven to be successful in rural recruitment and retention.

Purpose

12. The purpose of this section is to provide an overview of the proposed features and design of the MDMS proposal.

Overview of the Murray Darling Medical School proposal

13. Charles Sturt University and La Trobe University have requested approval from the Commonwealth Government to establish and operate a rural medical program in the Murray-Darling region of Victoria and New South Wales. They have requested an initial allocation of 120 commencing Commonwealth Supported Places in medicine per annum from 2018, rising to 180 commencing places by 2020.
14. The MDMS proposal has been developed based on advice from Government, consultation with local health networks, primary health networks, local government and regional development bodies and expert advice. Many of the key characteristics of the proposal were chosen to ensure that the outcomes are in line with government policy and are focused on the local community in the Murray-Darling Basin.
15. The following is a summary of the key features of the MDMS proposal:



6-year undergraduate Bachelor of Medicine/Bachelor of Surgery program



Three regional campus locations: Bendigo, Orange and Wagga Wagga and a further 16 clinical training locations throughout the Murray Darling region



> 80% of medical student places reserved for students from regional, rural, remote and indigenous backgrounds



Dedicated pathway program for indigenous students



Curriculum designed in collaboration with local medical practitioners and health services



Strong focus on regional and rural medical practice with opportunity to participate in clinical training in regional settings



Graduates encouraged to practise in rural and regional areas

16. Many of these features, including the curriculum, have been modelled on the medical program of James Cook University, which has proven to be successful in rural recruitment and retention. James Cook University will be retained to mentor the MDMS over the first six years of the program. This will assist in ensuring accreditation, the design of program elements (such as recruitment policies) and the adaptation of the curriculum to the local environment.
17. The MDMS will also develop a research agenda based on the challenges facing the local community and which builds on the existing strengths of the universities in medical and health sciences, as well as related fields such as veterinary science and behavioural science.
18. The proposed structure for the MDMS is a joint venture company limited by guarantee. Each member university has a 50% membership. The corporate entity will have responsibility for financial and administrative matters subject to corporate governance and reporting obligations to the two member universities, which will remain responsible for academic standards and governance.

C. Under-representation of doctors in regional and rural areas

Key points

- The increase in doctor numbers nationally has not occurred evenly across geographies or amongst doctor types, even taking into account international medical graduates, who comprise a significant part of the regional and rural medical practitioner workforce.
- Access to doctors is particularly important in regional and rural communities due to the geographic spread, demographic characteristics and health status of these communities.
- Demand for medical practitioners is likely to increase in these communities with increases in population and the proportion of elderly people, and the ageing of the existing medical workforce.
- Efforts to address the maldistribution of medical services will need to focus on specific areas and regions – such as the Murray Darling Basin – where the maldistribution of doctors is greatest.
- The maldistribution has an adverse impact on health outcomes for regional and remote communities, including increasing the number of preventable hospitalisations and premature deaths.

Purpose

19. The purpose of this section is to outline the problem the MDMS proposal is seeking to address, namely the underrepresentation of doctors in Australia’s regional and rural areas, and the impact of this on regional and rural communities.

The problem to be addressed

20. There is a quantifiable underrepresentation of doctors in Australia’s regional and rural areas.

21. Over the last 20 years there has been:
- a doubling of medical graduates
 - expansion of medical schools
 - an increase in medical training places

leading to an increase in doctor numbers nationally. This increase, however, has not occurred evenly across geography or amongst types of doctors.

22. The number of employed full-time equivalent doctors per 100,000 of the population in major cities is significantly greater than in regional and remote areas as shown in Table 1 below.

Table 1: Number of doctors per 100,000 people²

	2011	2012	2013	2014	2015
FTE rate of Major cities	431.0	417.2	425.8	429.7	441.6
FTE rate of Inner regional areas	269.5	275.2	282.8	289.1	297.5
FTE rate of Outer regional areas	253.0	262.8	258.0	270.4	278.7
FTE rate of Remote/Very remote areas	258.1	256.3	256.8	264.0	262.8

² Australian Institute of Health and Welfare, *National Health Workforce Data Set* (2011 to 2015)

23. Further, the extent of maldistribution is somewhat masked by the heavy reliance on international medical graduates, which comprise 40% of the doctor workforce in regional and rural areas.³
24. This geographic maldistribution parallels a growing professional disparity. There has been an increasing sub-specialisation trend amongst local graduates, resulting in a smaller pool of local generalist graduates from which to attract doctors to practice in regional and rural communities.⁴ This is problematic due to rural and regional communities' reliance on primary care services, which in turn is due to the distance of these communities from hospitals.
25. The geographic spread, together with the demographic characteristics and poor health status of regional and rural communities, increases the impact of the maldistribution of medical services.
26. At the same time, demand for health and medical services and qualified medical practitioners is likely to further grow due to increases in the population in regional and remote areas (in absolute terms).⁵ The proportion of the population aged 65 years and over is also forecast to grow, noting that this cohort is a dominant user of health care resources, comprising 40% of all hospital admissions across Australia.⁶ In line with this broader trend, the medical practitioner workforce in these areas is also ageing, with the average age of rural doctors in Australia nearing 55 years.⁷
27. State and Commonwealth governments have committed to ensuring adequate access to medical care in regional and rural Australia and increasing medical graduate numbers to address workforce shortages filled by overseas doctors. In order to achieve this by 2025, Rural Health Workforce Australia has forecast the geographic distribution of doctors would need to improve by 100% on 2012 levels.⁸
28. To be efficient and effective, efforts will need to focus on specific regional and rural areas where the maldistribution is greatest.
29. The Murray Darling Basin has been identified as a specific area of need. Currently, the average number of medical practitioners per 100,000 people employed in subsections of this region in 2014 is significantly below the Melbourne Inner East rate of 428.5 and Sydney Eastern Suburbs rate of 895.9.

Table 2: Number of medical practitioners per 100,000 employed in SA4 subsections of the Murray Darling region⁹

Region (SA4)	No. per 100,000
Ballarat	315.3
Bendigo	305.9
Far West and Orana	277.5
Riverina	274.6
Shepparton	272.4
Central West	247.2
Latrobe - Gippsland	242.9
Murray	227.9
New England and North West	227.4

³ Australian Medical Association, *Position Statement: International Medical Graduates 2015* (2015) <<https://ama.com.au/position-statement/international-medical-graduates-2015>>

⁴ McGrail M et al, *Solving Australia's rural medical workforce shortage* (2017) Policy Brief, Centre for Research Excellence in Medical Workforce Dynamics, Issue 3

⁵ Australian Bureau of Statistics, *3218: Regional Population Growth Australia, Population Estimates by Remoteness Area, 2006-16* (30 March 2017)

⁶ Australian Institute of Health and Welfare, *Australian hospital statistics 2009-10* (2011), Health services series no. 40. cat. no. HSE 107, Canberra

⁷ Australian Medical Association, *Media Release: Plan for Better Health Care for Regional, Rural and Remote Australia* (26 May 2016) <<https://ama.com.au/media/time-better-health-deal-rural-australians>>

⁸ Rural Health Workforce Australia, *International Medical Graduates* (2015) <http://www.rhwa.org.au/client_images/1676279.pdf>

⁹ Australian Institute of Health and Welfare, *National Health Workforce Data Set* (2011 to 2015)

Hume	207.7
North West	207.0
Capital Region	179.8

30. Further, the growth in the resident general practitioner and specialist numbers in this region has significantly lagged behind the national rate.

Table 3: Changes in General Practitioners and Specialists 2001-11¹⁰

	National 2001-11		Murray Darling Basin 2001-11	
	Outer regional	Remote/Very Remote	Outer regional	Remote/Very Remote
Resident General Practitioners	46.3%	52.1%	17.8%	14.7%
Resident Specialists	52.1%	66.7%	-5.1%	0%

Impact

31. The maldistribution of medical services has an adverse impact on health outcomes for regional and remote communities. These communities have a higher proportion of elderly and Indigenous people, as well as people with low socioeconomic status and poorer health status. In rural and regional communities there is also a higher incidence of chronic disease, preventable hospitalisation and premature deaths.
32. A report by the National Rural Health Alliance found
- poor access to health services
 - rural doctor shortages
- were factors in lower rates of utilisation of primary health care services and higher rates of unnecessary hospitalisations among rural and regional populations.¹¹
33. In addition, population health studies indicate healthcare services can disrupt the association between low socioeconomic status and high levels of avoidable mortality. One study found that an increase of one doctor per 10,000 people is associated with a reduction in the mortality rate of 14.1 deaths per 100,000.¹² The authors also concluded that areas with high inequality benefit more from the increased presence of primary care resources than those with low inequality.
34. Fewer doctors available in regional and remote areas also results in an increase in travel distance and wait times to access care, and in some cases, individuals must relocate. For example, almost a quarter (23%) of people living in outer regional and remote areas felt they waited longer than was acceptable for an appointment with a GP, compared with 16% of those living in major cities.¹³ People living in outer regional and remote areas were also four and a half times as likely as those living in major cities to travel over one hour to see a GP.¹⁴
35. The number of medical practitioners in regional areas also has an indirect impact on advocacy and leadership on health issues and provision of health information to the community.
36. Finally, the maldistribution affects doctors who practice in the region, compounding many of the perceived challenges of working in a region such as:
- the higher workloads and on-call hours, limited peer and professional support and training and professional development opportunities, limited social and economic opportunities for

¹⁰ Australian Bureau of Statistics, *Australian Social Trends* (2011)

¹¹ National Rural Health Alliance, *Measuring the Metropolitan-Rural Inequality* (2010)

¹² Shi L, Macinko J et al, *Primary care, race, and mortality in US states* (2005) *Social Science & Medicine* 61: 65-75

¹³ Australian Bureau of Statistics, *Australian Social Trends* (2011)

¹⁴ Ibid

spouses and children, inadequate housing and childcare, and inadequate remuneration and recognition

- the need for doctors to have a broad scope of practice
- the need for doctors or their patients to travel long distances due to dispersal regional and remote communities.

For example, in 2012, GPs in Australia's major cities worked 38 hours per week on average, while those in inner regional areas worked 41 hours, and those in remote/very remote areas worked 46 hours.¹⁵

¹⁵ National Rural Health Alliance, *The little book of rural health numbers: Health Workforce* (2012)
<<http://ruralhealth.org.au/book/health-workforce-0>>

D. Current Policy and Funding Arrangements

Key points

- The Commonwealth and State governments have established various policy and funding arrangements to support the education and training of medical doctors in Australia, with a focus on ensuring more effective and equitable access to medical practitioners and their services.
- The Commonwealth funds a capped number of medical places available at Australian universities. State and territory governments guarantee these students an internship following their degree.
- Commonwealth Supported Places comprise the majority of medical places available to commencing medical students. Of these places, 28.5% are expected to be bonded places, whereby the student is required to work in a 'district of workforce shortage' for at least 12 months after completing their medical degree.
- The Commonwealth also provides funding to universities under the Rural Clinical Training Support program to establish and promote medical student training in rural areas, as well as supporting 17 rural clinical schools across Australia.
- There are a range of internship and training programs that are further intended to encourage graduates into rural and regional settings.

Purpose

37. The purpose of this section is to provide an overview of:
- the types of government and non-government supported medical school places available at Australian universities
 - government funded training incentives to encourage greater professional participation in regional and remote areas
 - post-graduate training requirements.

Types of places available

38. There are three main types of medical places available at Australian universities:
- Commonwealth supported places
 - bonded places
 - full fee-paying places.
39. In 2015 there were 3,777 commencing medical students.
40. The table below shows the number and types of places available to Australian medical students commencing in 2015. Over three quarters (78.2%) of all university places available to commencing students were Commonwealth supported.

Table 4: Commencing Medical Students by Type, Place and University 2015

University	Location	CSP	Fee-paying		Other (b)	Total
			Domestic	International (a)		
Adelaide	Major City	120	1	28	0	149
ANU	Major City	86	0	1	0	87
Bond	Major City	0	100	0	0	100
Deakin	Major City	134	0	3	0	137
Flinders	Major City	126	0	17	28	171
Griffith	Major City	150	0	5	0	155
James Cook	Outer Regional	170	0	30	0	200
Melbourne MD (c)	Major City	255	55	52	0	362
Monash PG	Major City	80	0	10	0	90
Monash UG	Major City	247	0	63	0	310
Newcastle/UNE	Major City/Inner Regional	173	0	27	0	200
Notre Dame Sydney	Major City	60	62	0	0	122
Notre Dame Fremantle	Major City	101	9	0	0	110
Queensland (c)	Major City	327	0	92	0	419
Sydney	Major City	244	1	76	0	321
Tasmania	Inner Regional	97	0	22	0	119
UNSW	Major City	187	1	84	0	272
UWA MD (c)	Major City	211	0	31	0	242
UWS	Major City	108	1	20	0	129
Wollongong	Major City	76	0	6	0	82
Total		2,952	230	567	28	3,777

UG – undergraduate

PG – postgraduate

MD – Doctor of Medicine

(a) Excludes all offshore programs, including UQ Ochsner and Monash Malaysia.

(b) Includes medical students on state health department bonded medical scholarships.

(c) University of Melbourne, University of Queensland and University of Western Australia now only admit students to their MD programs.

Commonwealth supported places

41. Each year the Commonwealth government funds an agreed number of student places, which is capped to ensure there is not an oversupply of graduate doctors entering the workforce.
42. Commonwealth supported places are subsidised substantially by the Commonwealth government. In 2017, medical students are required to pay \$10,596 a year for the degree component of their studies, with the Commonwealth contributing a further \$22,809.¹⁶
43. These places are only available to Australian citizens, New Zealand citizens and permanent residents. Australian citizens and permanent residents may also defer paying their student contribution by taking out a HECS-HELP loan.

¹⁶ Department of Education, *Total Resourcing for a Commonwealth Supported Place by Discipline – 2017* (2017) Australian Government <<http://www.news.com.au/finance/work/careers/nation-of-dropouts-university-completion-rates-drop-to-a-new-low/news-story/1265f4d9872db263694aaa74f815c432>>

44. However, to encourage greater medical workforce participation in rural and regional areas, over one quarter of the Commonwealth Supported Places offered by a university must be allocated under the Bonded Medical Place Scheme. The scheme requires students to meet certain obligations once they complete their medical training under a so-called 'return of service obligation'.¹⁷

Bonded places

45. As of the 2016 academic year, 28.5% of all first-year Commonwealth supported medical school places are expected to be offered through the Bonded Medical Place Scheme. Students applying for a bonded place must meet the same entry requirements as other medical school applicants. They do not receive any financial assistance, scholarships or other incentives and must pay their HECS-HELP debts in full.¹⁸
46. When accepting a bonded place, a student commits to working in a 'district of workforce shortage' for at least 12 months after completing a medical degree or within 5 years of finishing specialist training. A district of workforce shortage generally encompasses outer-metropolitan, regional and rural areas, as well as indigenous medical services.¹⁹
47. This obligation is governed by the terms and conditions of a legally binding contract between the student and Commonwealth. Significant penalties apply if a student breaks the contract, including the student being liable to repay the government's entire contribution plus interest.²⁰
48. Students who are ineligible or unable to gain a Commonwealth Supported Place may be able to apply for a full fee paying place.

Full fee paying places

49. Public universities may offer full fee paying undergraduate and graduate positions to international students. However, public universities are generally restricted from offering full fee paying places to Australian students, except for when the Doctor of Medicine is made available as a postgraduate degree. Private universities, on the other hand, may offer full fee paying places to Australian undergraduate students.
50. The government does not contribute to full fee paying student places and as such a full fee paying student must pay tuition fees for each subject up front and in full. On average, the annual standard full-time study costs for a medical degree can be over \$60,000 for domestic students and \$70,000 for international students.²¹
51. The number of full fee paying places is not capped by Government in the same way as Commonwealth Supported Places, but is determined by universities based on market demand.

Government funded training incentives

52. Until 2015, the Commonwealth Government offered Medical Rural Bonded Scholarships to Commonwealth Supported Place students who committed to work for six continuous years in a rural or remote area of Australia after finishing their medical training as a specialist. However, that program is no longer offered to commencing medicine students; only those students who are currently on the scholarship continue to receive support under the scheme.

¹⁷ Department of Health, Bonded Medical Places Scheme Student Information Booklet for 2017 (2017) Australian Government, 5 <[http://www.health.gov.au/internet/main/publishing.nsf/Content/09699C23B61BBE3DCA257EF80079B8F6/\\$File/BMP-Information-Booklet-2017.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/09699C23B61BBE3DCA257EF80079B8F6/$File/BMP-Information-Booklet-2017.pdf)>

¹⁸ Ibid 6-8

¹⁹ Ibid

²⁰ Department of Health, *Deed of Agreement – Medical School Place Under the Australian Government's Bonded Medical Places Scheme* (September 2016) Australian Government, cl 4 <[http://www.health.gov.au/internet/main/publishing.nsf/Content/6B5C46289ECA3D51CA257EF9000CFE8D/\\$File/2017-Deed-of-Agreement.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/6B5C46289ECA3D51CA257EF9000CFE8D/$File/2017-Deed-of-Agreement.pdf)>

²¹ Australian Medical Association, *Becoming a Doctor* (2016) AMA Career Advice Hub <<https://ama.com.au/careers/becoming-a-doctor>>

53. Several other Commonwealth programs and grants aimed at encouraging doctors to practice in regional and rural areas were ceased in 2015.²² The main Commonwealth support to encourage professional exposure to rural and remote settings is now provided through the Rural Clinical Training Support program, which is a component of the Rural Health Multidisciplinary Training framework. This program provides participating universities with funding to establish and promote medical student training in rural areas, as well as supporting 17 rural clinical schools across Australia.
54. Participating medical schools are required to meet several objectives set out in the program's parameters, including:
 - providing all medical students with at least 4 weeks rural training
 - having at least 25% of their medical students undertake a minimum of one-year clinical training in a rural area
 - having at least 25% intake of students from a rural origin
 - maintaining or increasing the number of Aboriginal and Torres Strait Islander medical graduates
 - facilitating an increase in rural and workforce research
 - raising awareness of rural and remote medical issues.²³

Post-graduate medical training

55. On completing a medical degree, a medical graduate receives provisional registration and enters the workforce either as an intern or a postgraduate year 1 (PGY1) doctor. Internships last for 12 months (47 weeks) and are generally undertaken in a public hospital. Interns undertake a series of work rotations to expose them to a range of clinical situations and environments.²⁴
56. All Commonwealth Supported students are guaranteed an internship position by State and Territory governments upon graduation.²⁵ Under the National Health Reform Agreement, the Commonwealth, States and Territories are jointly responsible for funding medical teaching, training and research.
57. International students are not provided with any guarantee of securing an internship following graduation from medical school and may be required to continue their training overseas.²⁶ That said, there is a Commonwealth Medical Internship initiative designed to increase the nation's capacity to train medical interns in alternative settings, such as private hospitals, and in rural and regional Australia, where there are traditionally fewer options for internship training. Intern places under this initiative are only available to international full fee paying students from onshore Australian medical schools, who have completed all their medical degree in Australia (with the exception of university approved rotations offshore).
58. After completing their internship, the majority of medical graduates undertake specialist medical training. In order to do so, they must complete a recognised medical training program. There are only a fixed number of places available. The Commonwealth funds a Specialist Training Program to support specialist medical training in settings beyond the traditional public teaching hospitals.²⁷

²² See, Department of Health, *Health Workforce Programmes* (22 September 2016) Australian Government <<http://www.health.gov.au/internet/main/publishing.nsf/Content/work-prog>>

²³ See Department of Health, *Rural Health Multidisciplinary Training (RHMT) 2016-2018 – Programme Framework* (21 March 2016) Australian Government <<http://www.health.gov.au/internet/main/publishing.nsf/Content/rural-health-multidisciplinary-training-programme-framework>>

²⁴ Ibid

²⁵ See, Department of Health, *Postgraduate Year 1* (9 April 2014) Australian Government <<http://www.health.gov.au/internet/publications/publishing.nsf/Content/work-pubs-mtrp-17-toc-work-pubs-mtrp-17-chapter-3-work-pubs-mtrp-17-chapter-3-postgraduate-year-1>>

²⁶ AMA, above n 21.

²⁷ See generally, Department of Health, *Specialist Training Program* (1 December 2016) Australian Government <<http://www.health.gov.au/internet/main/publishing.nsf/Content/work-spec>>

E. Effectiveness of Current Policy Arrangements

Key points

- Where a medical student comes from affects his or her likelihood of practising in a regional or remote community. However, there are challenges in recruiting rural origin students in sufficient numbers to address the under-representation of rural and regional medical services.
- The location of a medical school can also affect the likelihood of its graduates practising in a rural, regional or remote area. However, most medical schools and Commonwealth Supported Places are in the major cities.
- Rural exposure programs have had variable success in influencing doctors' intention to practice in a regional and rural areas. Overall, those programs have not been successful in increasing regional and rural practitioner numbers to such an extent as to address the under-representation problem.
- A multifactorial approach – based many of these elements that affect doctor location decisions – has proven to be more effective.

Purpose

59. The purpose of this section is to analyse briefly the effectiveness of current policy and funding arrangements.

Medical Training

60. Students' access to and experience of medical education and training has a significant impact on the desire to practice in regional and remote areas. That finding has informed government policy and funding arrangements. However, despite the range of existing and historical initiatives implemented by governments, the percentage of graduates expressing an intention to practice in a regional or rural area – and the percentage who actually do practise – remains low.
61. A study by the Medical Deans of Australia and New Zealand found only 11.8% of graduating medical students nationally expressed an interest in medical practice in a regional centre or large town and 6% in a small rural town or remote.²⁸

Table 5: Career intention regarding region for students preferring to practise in Australia

Preference	2010		2011		2012		2013		2014		2015	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Urban	1,594	86.5	2,004	84.3	2,127	82.3	2,246	81.8	2,045	84.4	1,632	82.1
Regional city of large town	176	9.5	269	11.3	314	12.2	335	12.2	266	11	235	11.8
Small town/community	73	4.0	105	4.4	143	5.5	165	6	111	4.6	120	6
Total	1,843		2,378		2,584		2,746		2,422		1,987	

62. Further, the same study found that the proportion of graduating medical students that reported living in a rural or regional area fluctuated between a high of 22.4% in 2012 and a low of 16.3% in 2014.²⁹

²⁸ Medical Deans ANZ, *Medical Schools Outcomes Database National Data Report (2015 and 2016)* pp. 8 and 11 <<http://www.medicaldeans.org.au/wp-content/uploads/Medical-Students-Workforce-Survey-Report-FINAL-14102015.pdf>> and <<http://www.medicaldeans.org.au/wp-content/uploads/MSOD-National-Data-Report-2016-FINAL.pdf>>

²⁹ Ibid pp. 5 and 7

Table 6: Residency area for graduating domestic students

Main location rurality	2010		2011		2012		2013		2014		2015	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Capital city	757	67.2	1,351	70.8	1,481	69.6	1,582	70.0	1,847	75.8	1,391	68.9
Major urban centre	130	11.5	186	9.7	171	8.0	197	8.7	194	8.0	233	11.5
Regional city or large town	115	10.2	145	7.6	213	10.0	189	8.4	161	6.6	157	7.8
Smaller town	58	5.2	111	5.8	108	5.1	114	5.0	107	4.4	85	4.2
Small community	66	5.9	116	6.1	156	7.3	179	7.9	128	5.3	152	7.5
Total	1,126		1,909		2,129		2,261		2,437		2,018	

Origin of medical student

63. A review of relevant research showed that **a medical graduate of rural origin is 2.5 times more likely to practice in a rural or remote location after completion of their training than graduates from metropolitan areas.**³⁰
64. As noted above, the Commonwealth Government has imposed a 25% rural origin recruitment requirement on universities participating in the Rural Clinical Training Support program.
65. However, most medical students continue to have a metropolitan background.

Table 7: Location of residency of domestic commencing medical students 2006-12

	2006	2007	2008	2009	2010	2011	2012	Average
Urban	78.0%	77.7%	77.1%	77.6%	78.4%	76.8%	76.7%	77.5%
Regional City or Large Town	8.9%	10.4%	9.1%	9.1%	8.8%	10.1%	9.4%	9.4%
Small Town or Centre	13.1%	12.0%	13.8%	13.3%	12.8%	13.1%	13.9%	13.1%

66. This is likely to reflect the relatively higher socio-economic and educational attainment and performance of metropolitan based students.³¹ It may also reflect a bias in admission processes or failure to standardise for rural and regional experience, such as where regional students may have had fewer opportunities to participate in academic and enrichment programs or national level activities.³²

Location of medical school

67. The physical location of a medical school in a rural area can help reduce financial and geographic barriers to rural student participation. It can also bring medical students into closer proximity with rural communities where they have opportunities to meet rural friends and life partners.
68. Nonetheless, the majority of medical schools are concentrated in major cities, including most of the new schools established since 2000.

³⁰ Laven G, Wilkinson D, *Rural doctors and rural backgrounds: how strong is the evidence? A systematic review* (2003) Australian Journal of Rural Health 11(6): 277-284

³¹ Cardak B et al, *Regional Student Participation and Migration* (2017) National Centre for Student Equity in Higher Education, Curtin University <<https://www.ncsehe.edu.au/wp-content/uploads/2017/02/Regional-Student-Participation-and-Migration-20170227-Final.pdf>>; Rourke J, *Strategies to increase the enrolment of students of rural origin in medical school: recommendations from the Society of Rural Physicians of Canada* (2005) Canadian Medical Association Journal, vol 172 no 1 <<http://www.cmaj.ca/content/172/1/62.full>>

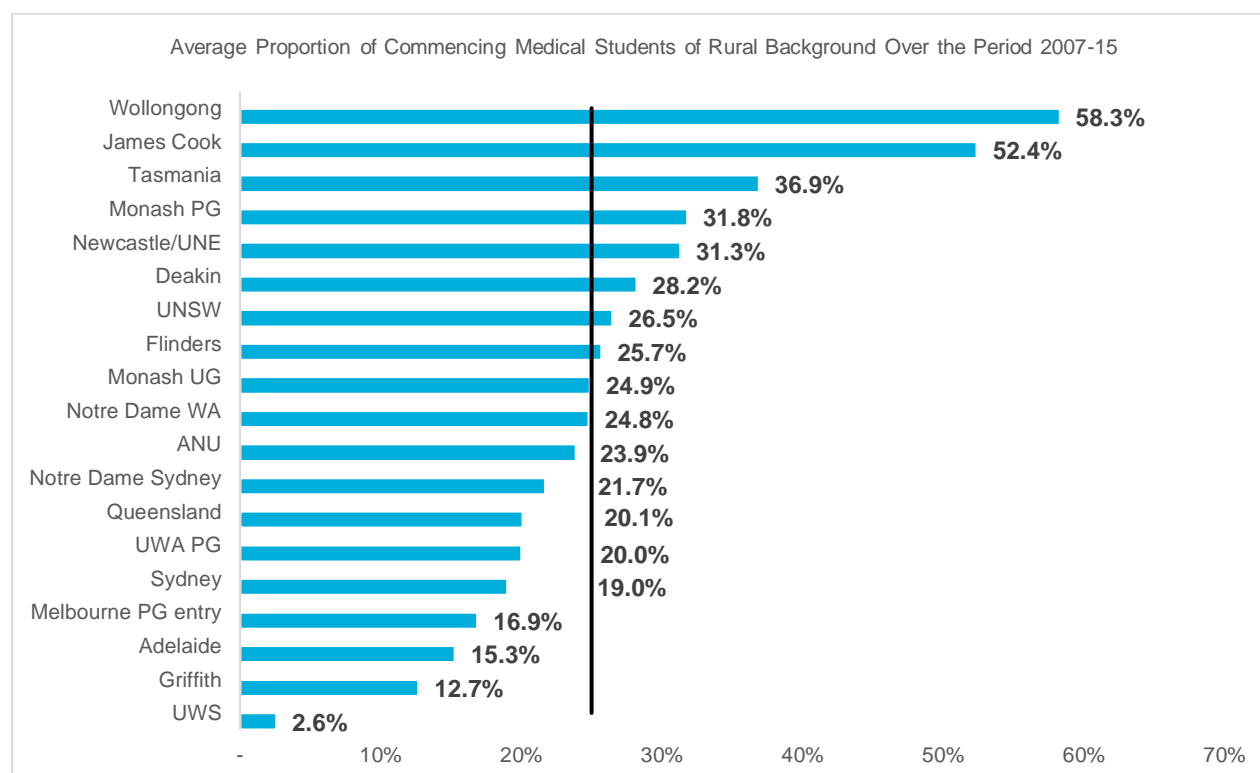
³² Rourke J (2005)

Table 8: Medical schools approved in Australia after 2000

University	Year approved	Location	ASGC Classification
Curtin University	2015	Perth	Major city
Deakin University	2008	Geelong	Major city
University of Notre Dame	2008	Sydney	Major city
University of Newcastle Joint Medical Program	2008	Armidale	Inner regional
Western Sydney University	2007	Campbell town	Major city
University of Wollongong	2007	Wollongong	Major city
University of Notre Dame WA	2005	Freemantle	Major city
Bond University	2005	Brisbane	Major city
Griffith University	2004	Brisbane	Major city
Australian National University	2004	Canberra	Major city
James Cook University	2000	Townsville	Outer regional

69. Further, only 12% of the 16,959 Commonwealth Supported Places are allocated to medical schools located in regional and remote areas.
70. There is considerable variation in the performance of metropolitan and regionally located medical schools in relation to rural recruitment and retention.
71. Despite the requirement that rural origin medical students comprise 25% of commencing load, **nine metropolitan schools failed to reach this target**, even with the broad definition of rural origin used until 2016 which enabled students who had five years of cumulative residency in a rural area after preschool to be counted.

Table 9: Commencing Undergraduate Regional and Remote Student Enrolments³³



³³ Higher Education Statistics Collection (2014)

72. In addition, some studies suggest that fewer than 10% of domestic medical graduates from metropolitan medical schools locate to rural practice.³⁴

Rural exposure

73. There is evidence that clinical or vocational training in a rural setting is associated with subsequent rural practice that is sustained for more than 5 years.³⁵ This effect is independent of, but strengthened by, doctors' rural origin – rural origin medical graduates who spend at least 50% of their time in rural areas during training are 4 times more likely to work in rural practice.³⁶
74. To this end, the Commonwealth Government requires universities participating in the Rural Clinical Training Support program to provide all their medical students with at least 4 weeks of rural training and at least 25% of their students with a minimum of 12 months of clinical training in a rural area. However, rural exposure programs have had variable success.

Rural Clinical Schools

75. There is limited research on the effectiveness of Rural Clinical Schools. However, there is research to demonstrate that Rural Clinical Schools improve the student experience and increase positive intention towards rural practice.³⁷
76. The research in relation to the correlation between Rural Clinical Schools and rural and regional practice is less compelling. A study by the University of Sydney found that 5.25% of Rural Clinical School students (rural and non-rural origin) went on to a rural internship, compared to 4.4% of those that did not attend the Rural Clinical School.³⁸
77. A study of University of Western Australia medical graduates found that 42 of 258 graduates (16.3%) who participated in the Rural Clinical School were working rurally compared to 36 of 759 (4.7%) in the control group.³⁹
78. Whilst both studies indicate a greater proportion of Rural Clinical School graduates practice in regional and rural areas, these results should be read in the context of the limited scale at which Rural Clinical Schools operate.

Bonded Medical Places

79. There is also evidence indicating that the bonded scheme may not be meeting its objectives and may in fact be counterproductive, stigmatising rural practice.⁴⁰ Some participants in the scheme appear to be using the scheme to secure a Commonwealth Supported Place, with the intent of buying out their obligations at 75% of the total cost of a full fee place.
80. Further, there is some suggestion that there is limited capacity to enforce bonds due to legal or constitutional limitations.⁴¹

³⁴ Senate Inquiry, *The factors affecting the supply of health services and medical professionals in rural areas* (2012) p 85 <http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/Completed_inquiries/2010-13/rurhlth/report/index>

³⁵ McGrail MR, Russell D, Campbell D, *Vocational training of general practitioners in rural locations is critical for Australia rural workforce supply* (2016) *Medical Journal of Australia* 205(5): 216-21

³⁶ Laven G, Wilkinson D, *Rural doctors and rural backgrounds: how strong is the evidence? A systematic review* (2003) *Australian Journal of Rural Health* 11(6): 277-284

³⁷ Urbis, *Review of University Departments of Rural Health and Rural Clinical School Program* (2008); Mason J, *Review of Australian Government Health Workforce Programs* (2013) <[https://www.health.gov.au/internet/main/publishing.nsf/Content/D26858F4B68834EACA257BF0001A8DDC/\\$File/Review%20of%20Health%20Workforce%20programs.pdf](https://www.health.gov.au/internet/main/publishing.nsf/Content/D26858F4B68834EACA257BF0001A8DDC/$File/Review%20of%20Health%20Workforce%20programs.pdf)>

³⁸ Clark T et al, *Medical graduates becoming rural doctors: rural background versus extended rural placement* (2013) *Medical Journal of Australia* 199 (11) p 779-782

³⁹ Sen Gupta T, Murray R, Hays R, Woolley T, *James Cook University MBBS graduate intentions and intern destinations: a comparative study with other Queensland and Australian medical schools* (2013) *Rural and Remote Health*, 13: 2313 <<http://www.rrh.org.au/articlaes/subviewnew.asp?ArticleID=2313>>

⁴⁰ Mason J pp.19, 158, 244

⁴¹ Ibid p.251

Other factors

81. The Rural Medical Education Guide argues that rural recruitment and retention is multifactorial and relies on the interplay of a range of factors such as:
- commencing recruitment program in rural high schools, prior to entry to medical school.
 - locating medical schools in rural and regional areas to attract local students and retain local health professionals in those areas of need.
 - using affirmative selection policies that quarantine medical school places for rural students linked to the values and purpose of the institution.
 - using selection committees with local community members to reduce inadvertent discrimination by urban-based admissions committees and empowers local communities to select medical students with values they see as important.
 - locating educational facilities in the proximity of the underserved regions to reduce the financial burden on rural students.
 - delivering rural-oriented curricula to influence students to practice rurally.⁴²
82. James Cook University has adopted many of these characteristics and as mentioned above, has had above average success in rural recruitment and retention including:
- at graduation, 88% of JCU medical students intended to practise outside Australian capital cities compared with 31% of graduates from other medical schools.
 - more JCU medical graduates than others planned to work in rural towns or regional centres with a population of less than 100 000 (46% compared with 16% for the rest of Australia).
 - 67% of JCU graduates undertook their internship outside a metropolitan centre compared with 17% of others.
 - 47% of JCU graduates undertook their internship in outer regional centres compared with 5% of others.
 - medical graduates from JCU are more likely to prefer general practice as a career, particularly rural medicine.
 - interest in 'working in a rural area' increased over the course duration.⁴³
83. The effectiveness of policy and funding arrangements is therefore likely to be enhanced if a combination of these factors is applied in a targeted way to areas in which the maldistribution of doctors is greatest.

⁴² Stagg P, *Medical School Admissions Policies Targeting Rural Students* (2014) Rural Medical Education Guide <<http://www.globalfamilydoctor.com/groups/WorkingParties/RuralPractice/ruralguidebook.aspx>>

⁴³ Sen Gupta T, Murray R, Hays R, Woolley T, *James Cook University MBBS graduate intentions and intern destinations: a comparative study with other Queensland and Australian medical schools* (2013) Rural and Remote Health 13: 2313 <<http://www.rrh.org.au>>

F. Social, Health and Other Non-Quantified Impacts

Key findings:

- MDMS proposal is expected to educate a total student cohort of 1,044 medical students each year in the Murray Darling region. Increases are also expected in the number of higher degree research students and non-medical health students choosing to study in the Murray Darling Region.
- The increase in students studying in the Murray Darling Region will likely lead to a more vibrant and diverse regional community.
- In addition to attracting students to the region, the MDMS is expected to result in between 1,430 to 2,348 new doctors potentially practising in the Murray Darling region over the next 33 years.
- The increase in new doctors in the region is expected to significantly improve health outcomes for local residents and increase the attractiveness and quality of life in the region.

Purpose

84. The purpose of this section is to provide an overview of likely:
- the social impacts from an improved higher education offering in the region
 - potential public health and wellbeing impacts of increasing the number of doctors in the region through the MDMS program

Social impacts of higher education

85. Regional university campuses play an important role in the social and economic fabric of local communities. As identified in 2009-10 Ministerial Statement on Education, Employment and Workplace Relations a 'sustainable higher education provision that is responsive to the specific needs of regional Australia is essential to Australia's social and economic prosperity.'⁴⁴
86. Importantly from an ongoing sustainability perspective, students who study in a regional area are more likely to stay in the region post-graduation, providing much needed skills and expertise region.⁴⁵
87. As detailed more fully in Section G below, the establishment of the MDMS would likely strengthen and enhance the depth, breadth and viability of various course offerings within the region. It would also attract higher research funding and provide access for local higher degree research students.
88. Given the well-established disadvantages experienced by regional and remote communities in obtaining access to higher education, over time, the MDMS proposal provides a potential vehicle to bridge some of these disadvantages through greater scale and breadth of course offering.

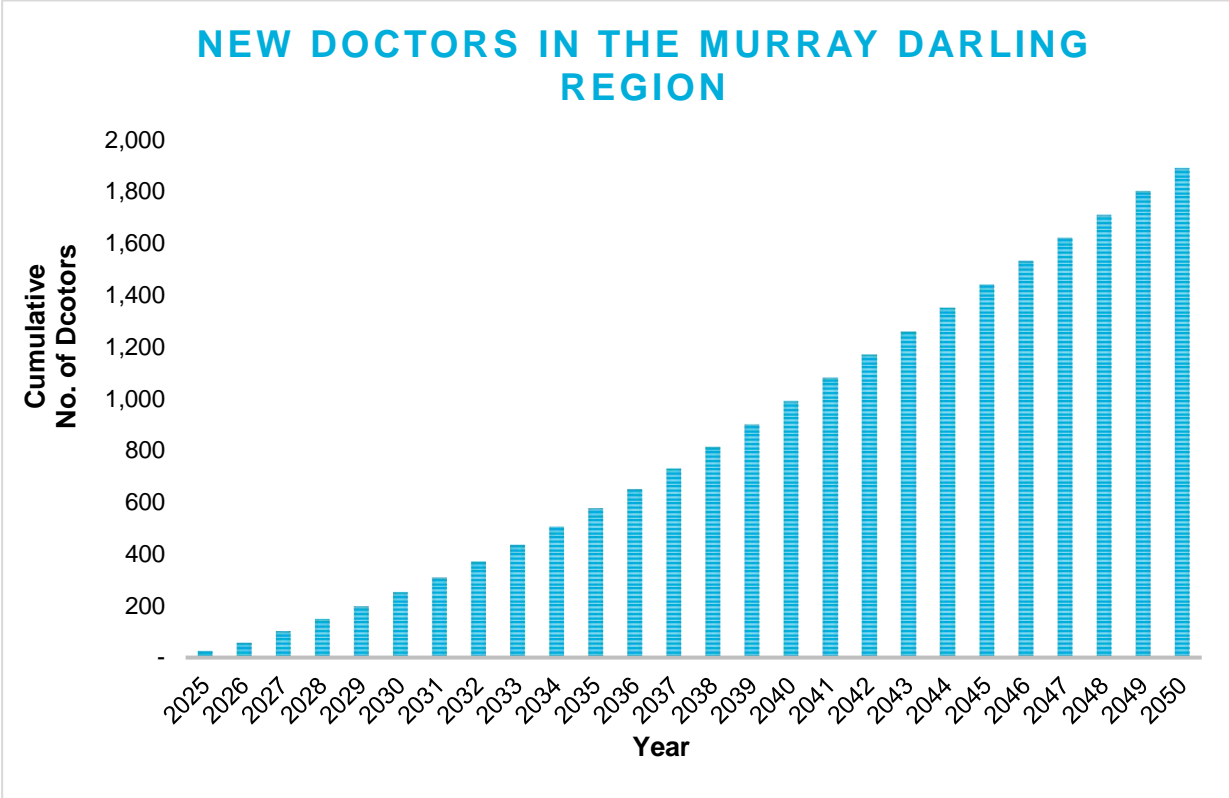
Public health and wellbeing impacts

89. In addition, the MDMS has the potential to significantly improve community access to healthcare.
90. Based on an estimated retention rate of 50% from MDMS's annual graduating cohort, it is possible that around 1,889 additional doctors would be practising in the region by 2050. The forecast growth in the number of doctor practising in the Murray Darling Region as a direct result of establishing the MDMS is depicted below at Figure 4.

⁴⁴ Gillard J, Budget 2009-10 Ministerial statement on education, employment and workplace relations, jobs, productivity and fairness – a foundation for recovery, Canberra, p 64 < http://www.budget.gov.au/2009-10/content/ministerial_statements/deewr/download/ms_deewr.pdf > (2009)

⁴⁵ Ibid

Figure 4: New Regional Doctors Graduating from the MDMS



- 91. As result of an increased number of doctors practising in the region, improved health and well-being outcomes are expected in the wider Murray Darling community. For instance, there are several studies linking doctor/population ratios and avoidable death rates.
- 92. One study suggests that an increase in one doctor per a population of 10,000 is associated with a reduction in the mortality rate of 14.4 for every 100,000 individuals.
- 93. In addition to generating a likely reduction in avoidable death rates in the Murray Darling region, improved depth and scale of the health workforce would also be associated with a variety of positive impacts for the community in terms of improved health outcomes. These would include benefits such as:
 - (a) reduced morbidity
 - (b) shorter wait times for access to medical care
 - (c) reduced travel times for certain medical procedures
 - (d) less stress and mental health benefits for local residents, and
 - (e) a locally embedded higher education research community with a focus on studying and addressing specific health issues of issue to local residents.
- 94. Attracting new community investment to provide for jobs and economic development can also be difficult without quality medical services. Hence improving rural and regional medical outcomes is likely to be an important driver for ensuring sustainable population growth and investment in the Murray Darling region.

G.Economic Impacts

Key findings:

- The MDMS is expected to have a regional economic impact of between \$1.4 billion and \$2.5 billion in net present value terms.
- The direct economic impact of the capital and operating expenditure by the MDMS in net present terms is c. \$124 million.
- All other economic impacts will stem from staff and student expenditure, as well as the expenditure of new doctors retained in the Murray Darling Region.
- As medical graduates are more likely to stay in the same region as where they study, the MDMS is potentially 3 times more cost efficient (in terms of CSP expenditure) than metropolitan universities in training doctors who will work in regional or rural Australia.

Purpose

95. This section:

- describes the methodology used to quantify the economic impacts of the MDMS proposal
- presents the results of the analysis.

Background and methodology

96. In measuring expected economic impact, the following principles were applied:

- being transparent about all inputs and assumptions
- quantifying impacts where possible
- avoiding double counting of impacts
- analysing impacts over an appropriate time period
- using robust analytical methods such as net present value analysis (not using 'input-output multipliers').

97. The inputs and assumptions are detailed in the appendices and an underlying financial model.

98. To measure the potential economic impact of the MDMS on the Murray Darling regional economy, the following key steps were undertaken:

- a) **Map out the investment logic.** In conjunction with MDMS management, we reviewed the key features of the MDMS business case and mapped the likely areas of potential impact and related pathways or transmission mechanisms. In broad terms, the critical investment logic underpinning the economic impact modelling is set out below:
 - a. Geographical shortages of medical services are currently concentrated in regional areas of Australia, including the Murray Darling region.
 - b. Addressing these shortages could create significant value for the Murray Darling region and Australia community in a number of ways, including:
 - i. improved health and wellbeing, and
 - ii. a more vibrant and diverse rural and regional community.
 - c. Where people study affects where they choose to live and work. A model of education study that locates and embeds medical students within regional and rural communities during the entirety of their study has the potential to deliver a significantly higher number of graduates who will stay and work within rural communities, compared with metropolitan-based and alternative delivery models.

- d. Using the 'sticky' effect of regional medical education is potentially more cost-effective than conducting medical education in the cities and then subsidising doctors to move to the regions.
 - e. Regional universities have high potential for growth, as do the economies of regional areas more generally.
 - f. The funding of medical places at regional universities can have a measurable 'halo' effect on the size, course offering, viability and performance of campuses.
 - g. Greater investment in regional universities and regional communities can enhance overall economic activity, potentially benefiting all Australians.
- b) **Understand and quantify the proposed initial investment.** The nature and scope of the investment is described earlier in this report.
- c) **Identify and quantify likely flow-on economic impacts.** Given the well-known challenges with multiplier-based economic impact assessments, only those impacts that could reliably be tied to expenditure within the Murray Darling region were included in the analysis. This step involved evaluating the MDMS business case; assessing the outcomes of comparable projects, such as graduate outcomes from the James Cook University Medical School; and analysing student and health data from various sources including, government, industry and academic reports. The steps undertaken were then integrated into a financial model.
- d) The analysis had three principal components:
- a. Direct investment: Capital investments and on-going (non-labour) operating expenditure by the MDMS.
 - b. Flow-on impacts: These include investment associated with the employment of staff at the MDMS and local expenditure from medical students who will reside in the region. Other forecast impacts included the 'attraction dividend' or 'halo-effect' resulting from anticipated growth in student numbers studying allied medical disciplines; as well as regional investment derived from increased numbers of doctors graduating and working in the region.
 - c. In addition, the analysis also considered government funding impacts through an assessment of the difference in CSP funding to achieve the same annual number of regionally based doctors based on whether a student is educated and trained at the MDMS or a metropolitan university. This analysis considered the effectiveness of funding in relation to the policy objective of addressing the maldistribution of doctors and medical services.
99. **Document other, non-quantifiable impacts.** There are also a range of other potentially material unquantified economic impacts associated with the MDMS. These impacts are examined in the further flow-on impact section below.
100. **Understand the timing of likely impacts.** The impacts will take some years to be achieved. The impacts were estimated out to the year 2050 and converted to a present value using a discount rate endorsed by IPART for regional investments.
101. **Understand the geographical locations of the likely impacts.** The expected impacts fall primarily in the Murray Darling region. Other impacts are discussed below.
102. Table 10 summarises the approach.

Table 10: Modelling elements

Summary of analytical and modelling elements
<p>Map out the investment logic, including:</p> <ul style="list-style-type: none">• changes to doctors' location decisions• impacts from greater university investment and enrolment• government savings impacts <p>Understanding and quantify the proposed initial investment: The initial investment was calculated based on the assumptions in the MDMS business case and consisted of the MDMS's capital expenditure and ongoing operating expenditure.</p> <p>Identify and quantify likely flow-on economic impacts: The identified flow-on impacts included, the increase of staff and student expenditure in the Murray Darling Region, as well as expenditure by medical graduates who stay on and practise as doctors in the region post-graduation. Additional 'halo effects' from the establishment of the medical school on the overall attractiveness of the universities for students and attraction of research funding were also modelled.</p> <p>Document other, non-quantifiable impacts: The uplift of investment in the region and the availability of improved health services is likely to stimulate additional economic activity, increasing regional retail demand and employment opportunities, as well as improving health and wellbeing.</p> <p>Understand the timing of likely impacts: Consideration was given to when the investments and cashflows associated with the MDMS are likely to impact the region and a conservative discount rate was applied to calculate the total economic impact associated with the MDMS in net present value terms.</p> <p>Understand the geographical locations of the likely impacts: Examining each financial flow/economic impact to understand which impact would result in quantifiable expenditure within the regional economy, and what proportion. Only those impacts resulting in expenditure within the Murray Darling economy were included.</p> <p>Summary conclusion: The forecast regional economic impact of the proposed MDMS is in the range of \$1.4 billion to \$2.5 billion over the period 2017 to 2050. The forecast economic impact of the MDMS consists of the following key elements:</p> <ul style="list-style-type: none">• Direct capital and operational investment• Flow-on staff, student and medical industry expenditure.

Direct Investment

103. The MDMS will provide direct investment of approximately \$124 million into the Murray Darling region, comprising capital expenditure and ongoing non-staff operating expenditure.
104. Over the period 2017 to 2050, it is expected that \$47 million will be spent on campus works, equipment and clinical training centres. This capital expenditure will be used to establish the MDMS program and fund the six regional medical training centres in larger towns, and ten rural medical training centres in smaller rural communities and remote centres.
105. The analysis recognises some establishment expenditure will 'leak' from the Murray Darling economy to suppliers and contractors engaged from outside the local region. Notwithstanding this, a large portion (80%) of the MDMS's capital works expenditure will be spent in the local area, stimulating employment and economic activity in the region.

106. Recurrent non-labour operational expenditure by the MDMS is also likely to have a considerable impact on the Murray Darling economy. Between 2017 to 2050, total expenditure in net present value terms is expected to be in the vicinity of \$77 million. This expenditure will be spent on a range of services and operations, including the provision of student services, student recruitment, information technology, and general equipment.

Table 11: Direct Investment

Impact Driver	
Capital Investment	\$47,026
Operating Expenditure (Excluding Staff Investment)	\$76,942
Total Direct Investment Impact	\$123,968

Flow-on Impacts

107. Other major economic impacts of the MDMS include an increase in university staff and students living in the region, as well as a flow-on increase in economic activity stemming from a rise in expenditure on goods and services. Staff and students of the medical school expenditure are expected to spend between \$550 million and \$652 million in the region over the 33 years to 2050.
108. These are conservative figures. They assume a portion of the student population will come from the local region and will continue to live at home, meaning they are likely to spend considerably less than those students in independent living arrangements (\$9,220 as opposed to \$24,300).
109. In addition to the expenditure by medical school staff and students, the MDMS is likely to stimulate a 'halo-effect'. The 'halo-effect' refers to an overall increase in general enrolment, and particularly in allied disciplines, as a result of universities offering courses of a perceived high standing, such as medicine, veterinary science and dental science.
110. Medicine is viewed as a top-tier discipline in terms of academic achievement and future graduate employment prospects. Given its reputational standing, students, particularly those the health-science disciplines, tend to link whether a university has a medical school with the quality of education it provides. This is a measurably strong driver of perceptions of universities. Students who are unable to gain a place in an initial round of medical enrolments intakes are also likely to accept a place in a related course at the same institutions, to place themselves in a position to secure a place in medicine in the future. This in turn means that the MDMS is likely to improve the reputation and the overall number of health students seeking to enrol at La Trobe University's and Charles Sturt University's regional campuses in Bendigo, Orange and Wagga Wagga.
111. The relationship between introducing a course of perceived high standing and increased student enrolments was evident during the 5-year period after Charles Sturt University introduced veterinary and dental science programs. The Bachelor of Clinical Sciences, a feeder program for the Bachelor of Dental Science program in Orange, increased by 7% in the 5 years following the commencement of the dental program at Charles Sturt University. Similarly, enrolments in the Bachelor of Equine Science and the Bachelor of Applied Science (Equine Studies), both associated courses of the Bachelor of Veterinary Science/Veterinary Surgery in Wagga Wagga, increased by 45% in the five-year period following the commencement of the veterinary program at Charles Sturt University.
112. The number of students commencing a course can also be influenced by factors outside of student load demand. For instance, a university may not be able to increase student numbers, despite increased interest and student demand, owing to staffing, infrastructure or resourcing constraints. On the other hand, a university may be able increase load in response to student demand through leveraging external funding or the allocation of additional internal resources to meet a strategic priority.
113. For this reason, a conservative 5-year ramp up in health-related student enrolments to a maximum range of between 5% to 15% has been factored into the economic impact calculations stemming from the establishment of the MDMS. This would in turn lead to annual increase of around 257 to 772 non-medicine health students on an annual basis across the Bendigo, Orange and Wagga Wagga campuses based on these students undertaking a 3-year degree.

114. The assumed increase in student enrolments resulting from the 'halo effect' will have a commensurate impact on economic activity and employment creation in the Murray Darling region, owing to the resultant increase in staff and student expenditure. Between 2019 and 2050, this expenditure is likely to have a direct economic impact of between \$86 million and \$330 million. A modest uplift in research investment and expenditure by higher degree students is also expected in the range of \$106 million and \$118 million.
115. Furthermore, it is anticipated that the MDMS will achieve a post-graduate doctor regional retention rate of 50%, out of an initial annual graduating cohort of 120 and an eventual graduate cohort of 180. This will lead to a substantial increase in medical practitioners in the region, spending in excess of between \$552 million to \$1.3 billion from 2024 to 2050 in net present value terms. To 2050 the MDMS is expected to result in around 1,430 to 2,438 new doctors practising in the Murray Darling region.

Table 12: Flow-on Impact

Impact Driver	High	Medium	Low
Medical Schools Impacts			
Staff Expenditure	\$296,727	\$265,493	\$234,258
Student Expenditure	\$355,569	\$335,815	\$316,061
High Research Degree Impacts			
Research Funding Expenditure	\$6,212	\$6,212	\$6,212
Student Expenditure	\$111,861	\$105,646	\$99,432
Halo Effect Impacts			
Direct Expenditure (Staff Investment and Facility Operations)	\$104,129	\$60,637	\$24,799
Indirect Expenditure (Central Administration Investment)	\$20,745	\$13,502	\$6,258
Student Expenditure	\$205,571	\$126,467	\$55,326
Subsidiary Medical Employment			
Expenditure by Regional Doctors	\$1,312,005	\$905,576	\$562,284
Total Flow-on Impacts	\$2,412,819	\$1,819,347	\$1,304,630

Increased Regional Economic Activity

116. When the medical school, and its students and staff, as well as medical practitioners, spend in the local economy, this also has flow-on impacts through all sectors of that economy.
117. Specifically, regional investments such as the MDMS will increase regional demand and economic activity. Moreover, because the region is not at full employment, we consider that the increase in demand and economic activity would occur without pushing up prices or wages, and without crowding out other economic activity. In other words, the investment is expected to generate an increase in economic activity that is additional in net terms.
118. It is also acknowledged that when goods and services are purchased from locations outside the local region, there will also be an economic impact in those locations. In the case of the MDMS, impacts are expected in Melbourne, Sydney and the wider Australian economy as a whole. We concluded that, while the expected economic impacts within the Murray Darling Region are substantial, impacts outside the region are expected to be modest in proportional terms.

Government Funding Impacts

119. In relation to the policy goal of increasing the number of doctors in regional Australia, the MDMS is likely to be more cost effective than current approaches.

120. Based on a 2016 survey by the Medical Deans Australia and New Zealand around graduate work preferences,⁴⁶ metropolitan universities may need to train between 400 to 1,350 doctors per annum to achieve the same number of doctors subsequently graduating and working in regional or rural locations as expected under the MDMS model.
121. Viewed in relation to the policy goal of addressing under-representation of doctors in rural and regional Australia, the MDMS would generate savings for the Australian Government. The estimated difference in CSP funding to achieve the same annual number of graduated regionally based doctors is between \$45 million and \$366 million in net present value terms over the period 2017-2050.
122. Using the mid case as an example, the MDMS is potentially therefore three times more cost efficient (in terms of CSP expenditure) than metropolitan universities in training doctors who will work in regional or rural Australia.

Table 13: Government Funding Impacts

CSP cost to train doctor cohort	High	Medium	Low
Metropolitan University*	\$435,880	\$214,329	\$115,862
Murray Darling Medical School	\$70,076	\$70,076	\$70,076
Notional cost differential MDMS vs metro university	\$365,804	\$144,253	\$45,786

**Annual CSP cost to graduate sufficient students to deliver the same number of rural practising doctors as anticipated under the MDMS model.*

Concluding remarks

123. Overall the MDMS is expected to deliver a significant quantifiable economic impact on the Murray Darling region, in the order of \$1.4 billion to \$2.5 billion over the period 2017 to 2050.
124. The total economic impact will comprise additional economic activity, arising from the initial investment and flow-in investments, as well as associated effects on rural and regional wellbeing.

⁴⁶ Medical Deans of Australia and New Zealand, Medical Schools Outcomes Database National Data Report (2016), 11 <<http://www.medicaldeans.org.au/wp-content/uploads/MSOD-National-Data-Report-2016-FINAL.pdf>>

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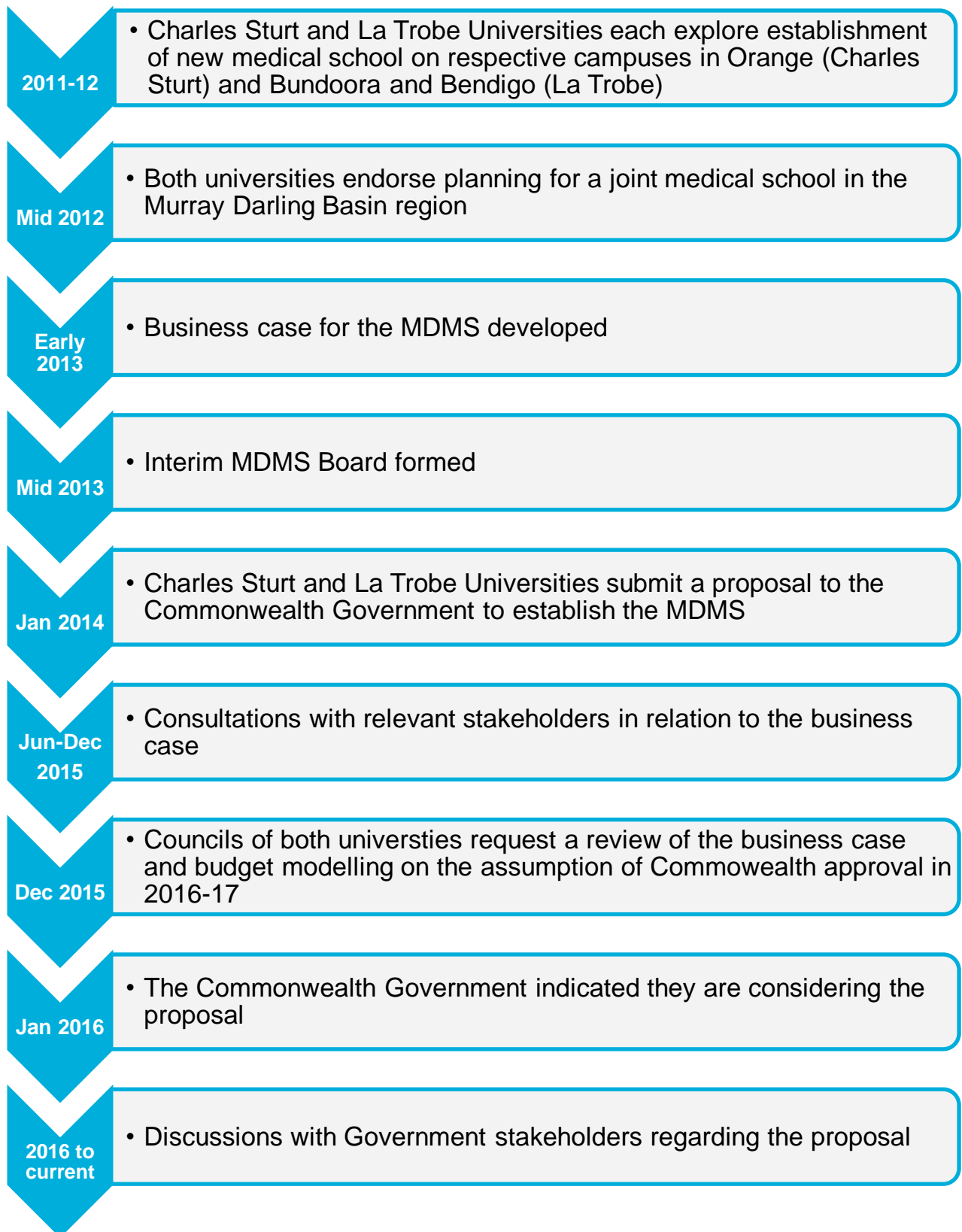
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Appendix A – Engagement Letter

Appendix B – Timeline of Events

The following timeline sets out the background of the MDMS proposal



Appendix C – Consultees

PPB Advisory consulted with a range of MDMS stakeholders to explore their view on the inputs and assumptions underpinning the economic impact modelling.

These stakeholders included:

- Prof Andrew Vann, Vice-Chancellor, Charles Sturt University
- Mr Gary Seach, Chief Financial Officer, LaTrobe University
- Mr Leon Morris, Chief of Staff, Office of the Vice-Chancellor, LaTrobe University
- Mr Mark Burdack, Managing Director, Murray Darling Medical School
- Mr Peter Fraser, Director of Government and Community Relations, Charles Sturt University.

Stakeholders provided guidance on internal funding and student numbers. However, all assumptions remain independent and based on external research.

Appendix D – Assumptions

A range of assumptions were used in quantifying the economic impact of the MDMS. The main assumptions underpinning the findings in the analysis are outlined below.

Key inputs and ranges

For the purposes of the analysis three ranges were used to provide an estimate of the major economic impacts:

- **High** - A more optimistic but defensible estimate
- **Medium** - A moderate/best estimate, but still conservative.
- **Low** - The most conservative estimate

A 5% discount rate was assumed based on guidance provided by IPART for modelling local development contributions.

Indexation of the MDMS revenue and expenditure was forecast consistent with the assumptions in the business case. For all other assumed expenditure inflation was adjusted based on the midpoint for the Reserve Bank of Australia's long-run inflation target (2.5% per annum).

Direct Investment

University Expenditure was calculated by adding together the upfront capital costs, subsequent maintenance costs and the ongoing operating expenditure of the MDMS.

CapEx

Based on estimates provided by the CFO, LaTrobe University, 80% of capital expenditure was assumed to be spent in the Murray Darling Region.

OpEx

Based on historic analysis undertaken by the CFO of LaTrobe University, a percentage of operating expenditure (excluding staff costs) was assumed to be expended centrally rather at the regional campuses. Only expenditure incurred directly by the campuses in the Murray Darling Region was included for the purposes of the analysis. The assumed percentages are outlined below.

Table 14: Operating Expenditure in the Murray Darling Region

Expenditure Type	% Central Operating Expenses	% Expenses MD Campuses
University Service Fees	73%	27%
Student Recruitment	75%	25%
Systems & IT	55%	45%
Equipment, Stores & Provisions	76%	24%
Other Expenses	60%	40%

Flow-on Impacts

Staff Expenditure

An assumption was made around the percentage of total income that staff members are likely to spend in the region.

Based on economic modelling for James Cook University, staff were estimated to spend c. 95% of their income in the regional economy. This estimate was adopted as the high case, with more conservative estimates for the Medium and Low cases.

Table 15: Percentage of Staff Wages Spent in the Murray Darling Region

High	Medium	Low
95%	85%	75%

Higher Research Degree Students

Research Funding

It was assumed that research funding would be split based on the staffing supervision between LaTrobe University and Charles Sturt.

Based on advice from the MDMS team, two-thirds of the MDMS funding was assumed to be generated by LaTrobe University academics and the other other third to Charles Sturt University.

It was conservatively assumed that all LaTrobe University's research funding would be spent in the metropolitan region, as the university's research capacity is primarily focused on cancer and agri-science located at its Melbourne and Bundoora campuses. The other one-third of research funding assumed to be spent at Charles Sturt University's research facilities within in the Murray Darling Region.

Based on the business case, the MDMS expects to conservatively build up to c. \$1.1 million of annual funding. This estimate excludes Australian Research Council and other funding for health and medical research programs. Funding is expected to commence in 2019 when the MDMS is anticipated to start operating. To be conservative research funding was assumed to ramp up at a rate of \$100,000 a year until the MDMS reaches its full research student load in 2027.

Higher Research Student Load

The MDMS is likely to attract research graduates to regional campuses to further their education. Academic and research staff are focussed primarily on curriculum development, clinical relationships and development over first 5 years of the program.

Active recruitment of higher research degree students is unlikely to occur until Year 6 of the program (Year 4 of enrolments). Supervision capacity scales up over next 4 years and reach a peak in 5 years.

Therefore, it was assumed that LaTrobe University academics will be responsible for supervising two-thirds of the MDMS's higher degree students, who will be based at its Bendigo campus. The other one-third of high degree research students will be based at Charles Sturt University's campuses in Orange and Wagga Wagga. A higher research load was allocated to LaTrobe University, as it has a more established medical research program than Charles Sturt University. The total allocation of higher research degree students is outlined below.

Table 16: Total number of Higher Degree Research Students

Year	LTU Students	CSU Students	Total
2017	-	-	0
2018	-	-	0
2019	-	-	0
2020	-	-	0
2021	-	-	0
2022	-	-	0
2023	167	31	198
2024	167	31	198
2025	218	41	259
2026	218	52	270
2027	269	62	331
2028	269	62	331
2029	269	62	331
2030	269	62	331
2031	269	62	331
2032	269	62	331
2033	269	62	331
2034	269	62	331
2035	269	62	331
2036	269	62	331
2037	269	62	331
2038	269	62	331
2039	269	62	331
2040	269	62	331
2041	269	62	331
2042	269	62	331
2043	269	62	331
2044	269	62	331
2045	269	62	331
2046	269	62	331
2047	269	62	331
2048	269	62	331
2049	269	62	331
2050	269	62	331

Halo Effect

It is expected that the establishment of the medical school will also attract non-medicine students to the regional university campuses in the Murray Darling region. This assumption was based on the fact that the establishment of a medical school should make the regional university campuses in the Murray Darling region more attractive to prospective students, particularly for those intending to study health-related courses.

The 'halo effect' was estimated as a percentage of how many additional students will be attracted to study health-related (non-medicine) courses at Charles Sturt and LaTrobe University's regional campuses as a result of the MDMS being established. Only undergraduate courses offered in the Murray Darling Region were considered (online and postgraduate courses were excluded from the assessment). It was assumed that the 'halo effect' will increase in a staggered ramp-up.

Student Expenditure

The increase the student population will consequently lead to higher student expenditure in the Murray Darling Region as students travel and relocate to the 3 delivery campuses. The number of students who will relocate to the 3 delivery campuses was based on review of historic ATAR scores at the 3 campus locations.

It was assumed that due to the ATAR scores required to study medicine, a lower portion of medical students as compared to student studying generic health courses will come from the local area and will continue to live at home while studying. For this reason, estimates were provided for the cost of living expense incurred by local students living at home, as well as for non-local students and those who have moved out of home for both medical students and students studying other health-related courses in line with figures below.

Table 17: Student Expenditure

	Local Resident Living at home	Non-resident or students not living at home	
Accommodation	\$150	\$0	\$7,800
Energy and Utilities	\$30	\$0	\$1,560
Household Items	\$0	\$700	\$700
Personal Computer	\$0	\$1,000	\$1,000
Food	\$100	\$0	\$5,200
Personal care and entertainment	\$60	\$3,120	\$3,120
Travel	\$50	\$2,600	\$2,600
Books and Stationery	\$0	\$800	\$800
Miscellaneous	\$0	\$1,000	\$1,000
Total living expenses		\$9,220	\$23,780

Increase in Doctors

Based on empirical evidence from the establishment of the James Cook University medical school, there is a high likelihood that a majority of graduates from the MDMS will remain the region.

But it can be challenging to set up specialist practices in rural and regional areas owing to the overall lack of demand for these services. This is evidenced by the experience at James Cook University medical school where 48% of the cohort committed to general practise, which was significantly higher than the 26% of the first cohort who intended to become GP at graduation. As the focus of the MDMS is to increase the GP population, it has was assumed that a majority of MDMS graduates will go on to become GPs rather than specialists or surgeons.

Table 18: Graduate Practice Streams

Graduates Practise Streams	Percentages
General Practitioners	60%
Specialists/Surgeons	40%

It was assumed that graduates will commence as interns for 2 year before becoming registrars in local hospitals for a further two years. After completing their registry it was assumed the graduate doctors will spend a further 5 years working towards fellowship before becoming fully qualified. The first cohort of interns was assumed to begin following graduating in 2024.

Doctor expenditure in the Murray Darling Region was assumed to be consistent with the expenditure of the MDMS staff members.

Government Funding Impact

The analysis compared the anticipated cost to deliver rural practicing doctors under the MDMS model versus the results obtained in metropolitan universities, the key difference being the higher forecast retention rates under the MDMS model.

Future costings were based on an indexed Commonwealth Government CSP Contribution. For simplicity, no rural loadings or other funding were factored in.

To establish the maximum range, the high case of the MDMS was compared against the low case for metropolitan universities, while the low case for MDMS was compared against the high case for metropolitan universities. The relevant ranges are outlined below.

Table 19: Graduate Retention Rates

Institute	High	Medium	Low
Murray Darling Medical School (2028 onwards)	60%	50%	40%
Metropolitan University (2019 onwards)	18%	13%	8%

The assumptions for the MDMS in this respect were based primarily on graduate outcomes at the JCU medical school.

The metropolitan figures were based on graduate survey data in the Medical Schools Outcomes Database National Report 2016.