Australian Government

Commonwealth Grants Commission

Report on
GST Revenue Sharing Relativities

2020 Review

SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION FOR THE DRAFT REPORT

1 This document provides additional analysis and other supporting material for the attachments to the draft report. It contains information for the following assessments:

- Schools — specification of the schools funding model regression, along with responses to State arguments for the inclusion of certain variables
- Health — data and method supporting the substitutability levels for each component of the Health category and choice of indicators for non-State sector activity, as well as responses to State views on these issues
- Justice – specification of the police funding model regression, including responding to State concerns with the specification of the model, and details of the regression used to calculate regional costs and service delivery scale in prisons
- Roads — additional responses to State comments on the proposed algorithm for estimating rural road lengths, and information about the approach to estimating the length of connections to national parks and other points of significance
- Investment — the indicative effects of specific method changes to the assessment, and a technical and algebraic explanation of the assessment approach
- National capital — further details responding to the ACT's arguments in relation to national capital influences not accepted by the Commission
- Native title and land rights — information on the scope of eligible expenses.

SCHOOLS

2 This section provides supplementary details on the regression model used in the Schools assessment, along with responses to the inclusion of variables requested by States. It should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 10 — Schools.

Regression model

3 As part of the 2020 Review the funding model for Schools has been redeveloped and the regression analysis respecified. Table 1 shows the results.

Table 1 Regression predicting State funding per student for government schools, 2016

	Estimate	Standard Error	Significance
	$	$	
Intercept	7 639	51	< 0.1%
Outer regional	958	102	< 0.1%
All remote	4 238	224	< 0.1%
SES ICSEA Q1	5 073	171	< 0.1%
Indigenous student proportion	4 126	370	< 0.1%
Inverse school size	192 901	6 297	< 0.1%

Note: Adjusted R^2 = 0.4778.
Source: Commission calculation.

4 The following sections explain the variables considered and the issues surrounding their specification.

Regional costs

5 The proposed model (see Table 1) has only two remoteness classification variables, outer regional and remote Australia (remote and very remote combined).

6 While not specifically in relation to the schools model, Western Australia and the Northern Territory have expressed views that there should be further disaggregation of remoteness, in particular remote areas. Table 2 shows the results of a model with more detailed remoteness areas. While there remains a substantial increase in the costs of delivering school services in remote areas (consistent with the service delivery approaches described by States during State visits), very remote has a coefficient only marginally higher than that of remote. The similarity of these coefficients in Table 2 to the coefficient for all remote areas in Table 1 indicates that there is no significant difference between remote and very remote students in explaining student cost.

7 Separately including inner regional (with costs only slightly below those of major cities, as shown in Table 2) was considered to add complexity but little explanatory value, and so inner regional areas were combined with major cities in the preferred model.

Table 2 Standard model with all remoteness areas included, 2016

	Estimate	Standard error	Significance
	$	$	
Intercept	7 644	54	< 0.1%
Inner regional	-84	77	
Outer regional	932	106	< 0.1%
Remote	4 155	253	< 0.1%
Very remote	4 287	362	< 0.1%
SES ICSEA Q1	5 114	175	< 0.1%
Indigenous student proportion	4 131	387	< 0.1%
Inverse schools size	193 774	6 367	< 0.1%

Note: Adjusted $R^2 = 0.4778$.
Source: Commission calculation.

Indigenous status

8 The recommended model in Table 1 includes a variable for Indigenous students.

9 Western Australia funds Indigenous students in schools with high concentrations of Indigenous students at higher levels than Indigenous students in predominantly non-Indigenous schools. The Northern Territory also suggested that such a model (regarding Indigenous student concentration) would capture Indigenous disadvantage, given that Indigenous Relative Socio-economic Outcomes (IRSEO) is no longer available to do so.

10 Table 3 shows that including separate Indigenous student variables, one for Indigenous students in schools with less than 80% Indigenous, and one for students with more than 80% Indigenous, produces results counter to the stated funding formulas noted above. Having different thresholds changes these results only slightly. Schools with high concentrations of Indigenous students consistently have lower funding for Indigenous students than schools with lower concentrations.

Table 3 Standard model with Indigenous student concentration included

	Estimate	Standard error	Significance
	$	$	
Intercept	7 622	51	< 0.1%
Outer regional	828	104	< 0.1%
All remote	4 390	224	< 0.1%
SES ICSEA Q1	4 852	175	< 0.1%
Indigenous student proportion low (a)	5 709	448	< 0.1%
Indigenous student proportion high (b)	2 476	445	< 0.1%
Inverse school size	194 056	6 281	< 0.1%

Note: Adjusted $R^2 = 0.4810$.
(a) Indigenous students in schools where 80% of students or less are Indigenous.
(b) Indigenous students in schools where more than 80% of students are Indigenous.
Source: Commission calculation.

11 During the State visits, the Commission was told that in most instances there was a single loading for Indigeneity, which was not further inflated by any low SES loadings. While Western Australia does have a more complex funding model, the national average funding formula appears best described by a single loading for Indigenous students.

Service delivery scale

12 The regression includes a variable for inverse school size, which is calculated as one divided by the number of full time equivalent (FTE) students in the school. The effect of this, in a regression explaining per student costs, is to assume the relationship between school size and cost is a simple fixed/variable cost relationship, with the coefficient for inverse school size representing the fixed cost of operating a school. This fixed cost estimate, when combined with average school sizes for each remoteness area, provides a service delivery scale (SDS) gradient.

13 Victoria considered the Commission's approach to measuring service delivery scale over-estimates its effect, and that a better approach would be to include whether a school was in a SDS area in the regression.

14 Victoria was concerned that the SDS assessment involves measuring the effect of variation in school size on cost regardless of whether that variation was policy driven (small urban schools) or driven by being in a small community.

15 To examine the Victorian contention, Table 4 shows two models. The first model adds a variable for whether a school is in a defined SDS area. While this variable captures some geographic influences of higher costs in these regions, it does not capture the effect of differences in school sizes, because actual school size is, by definition, a better measure of school size than whether a school is in a SDS area. All variation in

cost attributable to school size, both within regions and between SDS and non-SDS areas, is attributed to the school size variable.

16 Table 4 also shows a second model, with SDS area variables replacing school size variables. The coefficients for most variables change, as the effect of variation in school size is now attributed to all the variables it is somewhat correlated with. For example, the remote and Indigenous coefficients have increased, reflecting that these areas tend to have smaller schools, and attributing the higher costs of small schools to these variables.

17 The chosen approach to SDS was considered to appropriately capture the effect of small schools being more expensive than larger schools on a per student basis. States are assessed to have higher costs to the extent that States have smaller schools for reasons attributable to their geographic distribution.

Table 4 Standard model with SDS areas included, 2016

	Model 1 Estimate	Significance	Model 2 Estimate	Significance
Intercept	8 073	< 0.1%	8 425	< 0.1%
Outer regional	685	< 0.1%	843	< 0.1%
All remote	3 631	< 0.1%	3 918	< 0.1%
SES ICSEA Q1	4 297	< 0.1%	4 589	< 0.1%
Indigenous student proportion	4 454	< 0.1%	4 701	< 0.1%
SDS dummy	1 393	< 0.1%	2 316	< 0.1%
Inverse school size	198 410	< 0.1%	NA	NA

Note: Model 1 Adjusted R^2 = 0.4298.
Model 2 Adjusted R^2 = 0.3439.
These models were run with DET data incorporated, contributing to marginally different coefficient values for the other variables.
Source: Commission calculation.

State funding of non-government schools

18 A similar model to that for the State funding of government schools has been used for the State funding of non-government schools. A regression has been developed that reflects the national average funding formula. Table 5 shows the results of the regression analysis.

Table 5 State funding of non-government schools, 2016

	Estimate	Standard error	Significance
	$	$	
Intercept	1 874	26	< 0.1%
Outer regional	162	68	< 5%
All remote	134	171	
SES ICSEA Q1	3 146	150	< 0.1%
Inverse schools size	53 001	6 795	< 0.1%

Note: Adjusted R^2 = 0.2114.
Source: Commission calculation.

19 Initially, the same model as for State spending on government schools was tested. However, as Table 6 shows, the weight for Indigenous students produced using this approach (a negative cost weight in all years tested) appeared unreliable, and so this variable was removed from the model. Across the different years tested the outer regional coefficient was sometimes smaller than the remote coefficient (2014-15 and 2015-16), while in other years it was not (2016-17). On this basis, both outer regional and remote variables were retained.

Table 6 Standard model predicting State funding of non-government schools, 2016

	Estimate	Standard error	Significance
	$	$	
Intercept	1 873	26	< 0.1%
Outer regional	163	71	< 5%
All remote	140	191	
SES ICSEA Q1	3 152	169	< 0.1%
Indigenous student proportion	-23	324	
Inverse schools size	53 035	6 813	< 0.1%

Note: Adjusted R^2 = 0.2111.
Source: Commission calculation.

HEALTH

20 The draft report outlines the Commission's approach to the health assessment and summarises its decisions on substitutability levels and indicators for recognising the influence of the non-State sector on States health expenses. The following section describes the data and method supporting the substitutability levels for each component of the Health category and choice of indicators for non-State sector activity, and responds to State views on these issues. It should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 12 — Health.

Background

21 State governments are not the sole providers of health services. Health services are also provided by the non-State (largely private) sector. The Health assessment recognises the impact of non-State sector services on the demand for State services.

22 The influence of the non-State sector is recognised in two ways.

- The calculation of the socio-demographic composition (SDC) disability reflects the fact that there are lower levels of private health services as remoteness increases, which leads to an increased use of similar State services in more remote areas. This increased use can be observed in the national use and cost data for each component.
- The calculation of a non-State sector adjustment reflects the different levels of private provision in similar regions between States. The scale of this adjustment is based on the proportion of State spending on services that are also provided by the non-State sector. Non-State sector services are referred to as 'substitutable services', and the proportion is referred to as the 'substitutability level'.

23 The SDC assessment captures most of the effect of the non-State sector on State spending, particularly in more remote areas, while the non-State sector adjustment captures the marginal differences in the level of private provision in similar regions between States (Table 1).

Table 7 Comparison of SDC assessment and non-State sector adjustment, Health category, 2017-18

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc
SDC assessments	2 498	2 367	2 689	2 570	2 788	3 400	1 892	4 939	2 563
Non-State sector adjustments	-28	15	-25	74	-1	23	193	-114	0

Source: Commission calculation.

Proposed 2020 Review approach

24 The substitutability level and the indicator for measuring non-State services for each component proposed for the 2020 Review are summarised in Table 8. The following sections set out the approach for determining substitutability levels and indicators for each component.

Table 8 Proposed substitutability levels and indicators for the 2020 Review

	Substitutability R2015	Substitutability R2020	Indicator R2015	Indicator R2020
Admitted patients	15%	15%	Private patient separations	Private patient separations
Emergency departments	15%	15%	Bulk-billed GP services	Bulk-billed GP services
Non admitted patients	40%	35%	Bulk-billed specialist and diagnostic services	Bulk-billed operations and specialist services
Community health	70%	60%	Bulk-billed GP services	Bulk-billed GP services

Source: Commission decision.

Substitutability levels for the Health category

Admitted patients

25 There is a strong conceptual case that some admitted patient (AP) services provided in the non-State sector influence the number of similar services that States need to provide. For example, the availability of private childbirth services would affect the level of State service provision. However, many admitted patient services would not be regarded as substitutable, including most emergency procedures and expensive surgical procedures for uninsured patients.

26 In the 2015 Review, a substitutability level of 15% was adopted for admitted patients. This reflected the proportion of non-emergency[1] public hospital patients with private health insurance that could have attended a private hospital.

[1] This is not a reference to emergency department patients. It distinguishes between emergency and non-emergency admitted patient procedures.

Substitutability level

27 The main factors influencing the level of substitutability are differences in the type of admitted patient activity in each sector and the level of privately insured patients with hospital coverage.

28 Based on these two factors, the potential substitutability for admitted patient services is estimated at between 23% and 28%.

- Both public and private hospitals provide non-emergency admitted patient services, but private hospitals provide only limited emergency-type admitted services. Therefore, non-emergency admitted services and a small portion of emergency-type admitted patient services, which is about 50-60% of total public admitted patient separations, are regarded as potentially substitutable.[2]
- At the national level, the proportion of people with private health insurance hospital cover is around 46%.[3] A person without private health insurance will rarely attend a private hospital, regardless of the availability of private health services in their State.
- Therefore, the approximate upper level of potential substitutability would be 50-60% * 46% = 23-28%.

29 This range would be an upper bound because not all privately insured patients choose to utilise their private health insurance due to policy excesses and gaps charged by specialists.[4]

30 Western Australia said that differences between States in the availability of Commonwealth funded residential aged care places and home care packages affects what States need to spend on health care. It said that Western Australia has the lowest rate of operational aged care places, approximately 16% below the national average in 2016-17. During State visits, other States noted the high costs associated with proving sub-acute care for older patients due to a shortage of residential aged care places. Further work is required to determine the effects of differences in Commonwealth funding levels on State expenses. This will involve:

- calculating the proportion of sub-acute hospital services for older patients from Independent Hospital Pricing Authority (IHPA) data
- identifying data on Commonwealth residential aged care services that could be used to measure national service use by different SDC groups

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2 AIHW, 2017, *Admitted Patient Care 2016-17: Australian Hospital Statistics*. Staff calculation using Table 4.4. About 50% public hospital admitted patient services are non-emergency type services.

3 APRA, Private Health Insurance Statistical Trends (https://www.apra.gov.au/publications/private-health-insurance-statistical-trends), [accessed November 2018]. The average quarterly proportion from June 2016 to June 2018 is 46%.

4 For further discussion of policy and non-policy factors affecting the level of substitutability, see Volume 2 of the *2015 Review Report*, pp 185-186.

- investigating the influence of recent State policies on the availability of residential aged care places.

31 At this stage, in the absence of any further evidence suggesting changes in substitutability, the Commission considers that the 2015 Review level of 15% for admitted patients remains appropriate.

Non-State sector indicator

32 All States except Western Australia agreed that the assessment should continue to use data from the Australian Institute of Health and Welfare (AIHW) and the Australian Prudential Regulation Authority (APRA) to calculate the non-State sector adjustment for admitted patients. Western Australia did not comment.

33 The requirement to use data from two sources relates to differences in the level of disaggregation and coverage of each data source. The assessment uses disaggregated AIHW data to measure national use of private patient services by different SDC groups, and aggregate APRA data by State to measure actual usage. The Commission intends to continue using AIHW and APRA hospital separations data to calculate the non-State sector adjustment for admitted patients.

34 During consultation, all States except Western Australia agreed with the proposed substitutability level of 15%. Western Australia said there might be a flaw in the calculation. It asked for clarification of the logic underlying the substitutable proportion for admitted patients.

35 The mathematical expression developed by Western Australia does not correctly conceptualise the logic underlying the calculation of the Commission's substitutability level.[5] The current proportion (15%) assumes that the upper bound of public hospital patients with private health insurance is 47%. No assumption about the proportion of private hospital patients is necessary because the aim is to determine the proportion of State-admitted patient services that could potentially be provided in private hospitals.

Emergency departments

36 Similar to admitted patients, the non-State sector can provide some emergency department (ED) services.

37 General Practitioner (GP) clinics and nurse walk-in centres can treat many of the less severe ED presentations. Most States have policies to limit the use of ED services by promoting the use of alternative services including local GPs, and by adopting policies to increase the availability of GP services. Therefore, there is a strong conceptual case

[5] See Western Australia's Supplementary Submission to the CGC's 2020 Methodology Review, March 2019, pages 4-6.

that the availability of GP services, especially bulk-billed GP services, influences the level of State-provided ED services.

38 Some private hospitals provide ED services. However, private ED patients incur an attendance fee, which is not claimable under Medicare or private health insurance. Based on the relatively low level of private ED services and high attendance fees, the level of substitutability between public and private ED services would be low.

Substitutability level

39 In the 2015 Review, the substitutability level of 15% for ED services was determined based on less severe and less complex ED presentations that could have been managed by a GP.

40 During the 2015 Review, one of the consultants engaged to review the substitutability levels for the health assessment advised that clinically derived methodologies, especially when they yield consistent results, should be preferred over the administrative approaches (for example, AIHW method, see Box 1) or surveys based on patient perception (for example, the ABS patient experiences survey).

Box 1 Summary of methods used to calculate the number of General Practitioner-type presentations[6]

ACEM method: Any self-referred, non-ambulance patient with a medical consultation time less than one hour. This method was developed by the Australasian College for Emergency Medicine (ACEM).

AIHW method: Any Australian Triage System (ATS) category 4 or 5 patient who does not arrive by ambulance, police, community health service vehicle or correctional vehicle, is not admitted to hospital, is not referred to another hospital and does not die. This method was developed by the AIHW.

Diagnosis method: ATS category 4 or 5 patients who self-refer, arrive by private transport, are not admitted and meet one of the listed diagnoses. This method was developed by Kevin Ratcliffe at the Tasmanian Department of Health and Human Services.

Sprivulis method: The difference between the discharge rate of GP-referred and self-referred patients, derived from the product of the difference in the discharge rates and the total number of self-referrals. This method was developed by Peter Sprivulis.[7]

41 There are a number of clinical studies from Australia that have looked at the proportion of ED presentations that could have been managed by a GP (termed GP-type patients or low acuity patients), and provide an indication of the substitutability level. Table 9 summarises this.

6 Allen et al., *Low acuity and general practice-type presentations to emergency departments: A rural perspective*, Emergency Medicine Australasia, April 2015.

7 Sprivulis P, *Estimation of the general practice workload of a metropolitan teaching hospital emergency department*, Emergency Medicine, February 2003.

Table 9 Summary of studies on GP-type presentations

				Percentage of GP-type presentations (%)			
Study	State	Remoteness	Study year	ACEM	AIHW	Diagnosis	Sprivulis
Nagree et al.	WA	Major cities	2009-11	11-12	25-26	11	9-10
Allen et al.	Tasmania	Outer regional	2009-13	35	56	69	15
Stephens et al.	NSW	Major cities	2013-14	19	38	-	7
Stephens et al.	NSW	Inner regional	2013-14	31	51	-	12
Stephens et al.	NSW	Outer regional/ Remote/ Very remote	2013-14	34	54	-	11

Sources: Nagree et al., Quantifying the proportion of general practice and low-acuity patients in the emergency department, The Medical Journal of Australia, June 2013.
Allen et al., *Low acuity and general practice-type presentations to emergency departments: A rural perspective*, Emergency Medicine Australasia, April 2015.
Stephens et al., *Patterns of low acuity patient presentations to emergency departments in New South Wales, Australia,* Emergency Medicine Australasia 29(3), June 2017.

42 All of the studies reported that the percentage of GP-type presentations increased with increasing remoteness, regardless of the method used. This is likely to be due to the limited availability of GP services in more remote areas. The studies also indicated that, compared to other methods, the ACEM method was preferred for estimating GP-type presentations.

43 Using the proportions of GP-type presentations estimated by the ACEM method, weighted by the number of ED presentations by remoteness, the overall proportion of ED presentations that are GP-type presentations is estimated at 23% (Table 10).

Table 10 Estimation of percentage of GP-type emergency department presentations

	Total emergency department presentations	% of general practitioner type presentations	Number of general practitioner-type presentations
Major cities	4 972 141	18	873 203
Inner regional	1 845 781	31	568 501
Outer regional/remote/very remote	1 378 851	35	477 038
Total	8 196 773	23	1 918 742

Source: Commission calculation based on Table 9 and IHPA 2016-17 ED data.

44 It is also evident that GP-type presentations are less costly than more complex and severe ED presentations, mainly due to shorter treatment time. Independent Health Pricing Authority (IHPA) data (2016-17) indicates ED triage 4 and 5 presentations (that is, less severe and complex ED presentations) make up 52% of total ED presentations, but only account for 34% of the cost,[8] resulting in a cost to activity ratio of 0.34/0.52=0.65. Applying this ratio to the activity level of 23%, the proportion of ED expenditure on GP-type presentations would be around 15%.

[8] It refers to efficient cost.

45 New South Wales argued that substitutability would be close to zero during non-business hours as there are few substitutable services, forcing GP-type patients to present to EDs. However, the availability of after-hours GP services has been increasing and more than 80% of patients report that they are able to see an after-hours GP when needed.[9] In addition, the studies cited in Table 9 did not find a big difference for the proportion of GP-type presentations between business and non-business hours. Therefore, no further adjustment of the kind suggested by New South Wales is needed.

46 The approach for calculating the 15% substitutability level is consistent with the 2015 Review consultants' advice and uses most recent evidence. There would be little value in seeking further independent advice on this issue, as suggested by the ACT.

Non-State sector indicator

47 The Commission considers that the current indicator of non-State sector activity (benefits paid for bulk-billed GPs) remains appropriate. Bulk-billed benefits enable those with income constraints to seek low or no cost healthcare.

48 States generally supported this proposal. Western Australia did not comment.

Non-admitted patients

49 State-provided non-admitted patient (NAP) services include a wide range of pre-hospital, post-hospital and clinical treatments. The majority, if not all, of these services are also provided by the non-State sector. The potential substitutability is high for these services, although the actual level is lower reflecting a number of factors.

- There are usually some patients' out-of-pocket costs for services provided in the non-State sector. Medicare provides subsidies to reduce the cost burden on patients but does not regulate the fees charged by private specialists. Out-of-pocket costs for some private specialist services are high.
- Most State provided NAP services (for example, most allied health services) are directly linked to admitted patient services, which are less likely to be affected by similar services provided by the non-State sector.

50 The staff discussion paper *CGC 2018-05-S* proposed using the 2015 Review approach to calculate the substitutability level, but suggested some refinements using more comprehensive data. Compared to the 40% substitutability level adopted in the 2015 Review, the level proposed would be lower at 20-25%.

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[9] ABS, 2018, Cat. No. 4839.0 *Patient Experiences in Australia: Summary of Findings, 2017-18* (Table 7).

Level of substitutability

51 In the 2015 Review, the substitutability level for NAP services was estimated using an approach where NAP services were disaggregated into broad groups. For each group of services, the level of substitutability (using bulk-billing rates as the indicator) and the level of State spending were estimated. The total substitutability level for NAP services was the sum of expense-weighted substitutability levels for each group of services.

52 For the 2020 Review, this approach will be slightly modified. Previously, it applied bulk-billing rates to those services considered substitutable. Since the aim is to determine the proportion of State NAP services that the non-State sector could provide, the mere presence of an equivalent bulk-billed service and value of bulk-billing benefits are relevant factors. However, it is unnecessary to apply the bulk-billing rate to each service area. This small change aligns the NAP method with the method used for the other components. See Box 2 for a further explanation.

Box 2 Assessing the substitutability level for NAP and community health services

The bottom up approach to assessing substitutability involves the following steps.

- Step 1: Identifying and assessing the level of substitutability for each area of service by evaluating:
  - the range of services provided by the State and non-State sectors
  - the availability and cost of services provided by the State and non-State sectors.
- Step 2: Estimate the expense weight for each area of service.
- Step 3: Combine substitutability (from step 1) and expense weights (from step 2) for each area of service and sum the expenditure-weighted substitutability to obtain an estimate of the proportion of State services affected by non-State services.

53 ***Step 1.*** The classification of non-admitted patient services (that is, the Tier 2 classification) uses information about the type of clinic and clinician to classify services. There are four clinic types for non-admitted patient services.[10]

- Procedures clinics, where surgeons or other medical specialists are the main service providers. Some private surgeons and medical specialists offer bulk-billed services, so there is a non-State sector alternative.[11] The relevant Medical Benefits Scheme (MBS) services are operations and assistance at

[10] AIHW, 2018, *Non-admitted Patient Care 2016–17: Australian Hospital Statistics*, page 15; IHPA, 2018, *National Hospital Cost Data Collection Cost report: Round 20 Financial Year 2015-16*, Table 20.

[11] See Department of Health, *Annual Medicare Statistics, 2016-17,* Table 1.1.

operations. The bulk-billing rate for these services is 42% and the average out-of-pocket cost is about $80 per service.

- Medical consultation clinics, where general physicians or medical specialists are the main service providers. Some private specialists offer bulk-billed services, so there is a potential non-State sector alternative. The relevant Medical Benefits Scheme (MBS) services are specialist attendances. The bulk-billing rate for these services is 30% and the average out-of-pocket cost is about $70 per service.[12]
- Diagnostic clinics, which States advise are generally bundled with the requesting specialist. In the calculation that follows, diagnostic services are bundled with medical consultation clinics.
- Allied health clinics, where allied health professionals or clinical nurse specialists are the main service providers. Although all State-provided allied health services are also available in the private sector, most are linked to an earlier admitted patient episode. In addition, only a very limited number of patients who meet specific eligibility requirements (for example, those with a chronic medical condition or with an assessed mental disorder) are eligible for Medicare allied health items. State-provided allied health services are generally not substitutable.

54 ***Step 2.*** The average State expenditure on each type of clinic varies, ranging from $207 for services provided in allied health clinics to $591 for those provided in procedure clinics.

55 Using data on activity levels and average expenditure, Table 11 estimates the proportions of State expenditure for each group of NAP services.

[12] Department of Health, op. cit.

Table 11 Estimation of State expenditure for each group of NAP services

Group of services	Share of activity	Average expenditure	Estimated share of expenditure (a)	Substitutable service available	Expenditure-weighted substitutability level
	%	$	%		%
Procedure clinics	6	591	12	Yes	12
Medical consultation clinics (b)	48	355	57	Yes	57
Allied health clinics	46	207	32	No	0
Total			100		≈69

(a) For each group of services, the share of expenditure is estimated as:

$$\frac{\text{Proportion of activity x average expenditure}}{\Sigma \text{ Proportion of activity x average expenditure}}$$

(b) This also includes services from diagnostic clinics.

Source: Commission calculation based on data from AIHW (2017) *Non-admitted patient care 2015-16*, Table 2.3, and IHPA (2018) *National Hospital Cost Data Collection Cost report: Round 20 Financial Year 2015-16*, Table 20.

56 ***Step 3.*** Based on information from Step 1 and 2, the estimated substitutability level is about 70% (Table 11).

57 Under activity based funding (ABF) arrangements, only NAP services linked to a previous hospital admission are eligible for Commonwealth funding. Therefore, although an alternative non-State sector service may be available (that is, bulk-billed services), it is unlikely that all patients would choose to move to the non-State sector after they had commenced treatment in a public hospital. The percentage calculated in Table 11 would be an upper bound for the proportion of NAP services in public hospitals that the non-State sector could have provided. Since most NAP services are linked to a previous hospital attendance, only 50% of potentially substitutable services are assumed to be actually substitutable. This suggests a substitutability level of 35% (50% * 70% = 35%). Accordingly, the Commission proposes to reduce the substitutability level from 40% to 35%.

58 The proposal put to States in Discussion paper *CGC 2018-05-S*[13] was different (20%) to the current proposal. It multiplied bulk-billing rates by the estimated share of expenditure. The current proposal does not. Although the presence of bulk-billed services is a requirement for potential substitutability, the calculation of the substitutable proportion does not employ bulk-billing rates. This aligns the approach for NAP to the approach taken in other components.

59 Tasmania did not agree with the assumption that allied health services are not substitutable. It said that the substitutability level for admitted patients of 15% should apply to allied health services due to the link between admitted and non-admitted patient services. The strong link between admitted patient services and

[13] Staff proposals and State submissions are available on the Commission website, (https://cgc.gov.au).

NAP provides the rationale to assume a zero level of substitutability for allied health services.

60 The Northern Territory suggested that the substitutability for procedure/medical consultation services would be lower due to their linkage to admitted patient episodes. News South Wales expressed a similar view. The substitutability level assumes that about half of NAP services relate to a previous hospital admission. In the absence of further evidence about this proportion, 50% of potentially substitutable services are assumed to be actually substitutable.

61 The ACT did not object to the estimated level but suggested seeking independent clinical opinion. State service providers (State health departments) are able to provide such clinical opinion.

Non-State sector indicator

62 Similar to EDs, basing the non-State sector adjustment on bulk-billed benefits paid for NAP-equivalent services provided in the private sector enable those with income constraints to avail of low or no cost healthcare.

63 Bulk-billed private surgeons and specialist services are the most appropriate indicator of non-State activity. This is different to the indicator used in the 2015 Review, which included bulk-billed pathology and imaging services. As mentioned in paragraph 53, pathology and imaging services are bundled with specialist consultations. States generally supported this proposal.

64 The Northern Territory expressed concerns about the choice of indicator for substitutable non-State service usage for NAP, as well as for community health. It questioned the rationale of using bulk-billed private services as the indicator, and the assumption that services which incur a fee have no effect on the level of State-provided services.

65 Services with low out-of-pocket costs could be substitutable. However, for most private specialist services, there are considerable out-of-pocket costs, which prevent patients with income constraints from using these services. Since there is no practical way to identify low fee private services, the Commission considers that bulk-billed private services are the most appropriate broad indicator.

Community and public health services

66 States provide a wide range of community health services, along with public health services, many of which GPs or other private clinicians also provide. There is strong evidence of substitutability between State-provided community and public health services and GP or other private clinician services.

67 However, due to the heterogeneous nature of community health services, it has been challenging to determine to what extent non-State services influence the level of services provided by the State sector. In the 2015 Review, a substitutability level of 70% was adopted for this component.

68 During the 2015 Review, one of the consultants suggested investigating the level of substitutability for each area of community and public health services separately to obtain a more accurate estimate. As outlined in discussion paper *CGC 2018-05-S*, applying this bottom up approach yields a substitutability level in the range of 60-70%.

Level of substitutability

69 Limited data are available for community health services, but a number of recent studies (for example, the BEACH[14] study) provide some information to assess the extent of substitutability for each main area of service.

70 Box 2 outlines the approach used to estimate the substitutability level.

- ***Step 1.*** The assessed substitutability level for each area of service is summarised in Attachment B to *CGC 2018-05-S*. The level of substitutability has been classified variously as very low (0-20%), low (21-40%), medium (41-60%), high (61-80%) or very high (81-100%). If the State and non-State sectors provide similar services, and accessibility and out-of-pocket costs are comparable, the potential substitutability would be high or very high. On the other hand, if State and non-State sectors provide different services, with different accessibility and/or costs, the potential substitutability would be lower.
- ***Steps 2 and 3.*** Table 12 summarises the substitutability levels and expense weights for each group of services. The substitutability levels are presented in ranges and the midpoints are used to calculate the overall level.

71 The substitutability level for community health and public health services is estimated at about 63%, with a range of 54%-72%, which encompasses the level adopted in the 2015 Review (70%). New South Wales and Victoria said that the population targeted by States is consistent with a slightly lower substitutability level. States tend to target highly disadvantaged groups for which there are limited private alternatives. The Commission proposes a substitutability level of 60% for the community and public health component in the 2020 Review.

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[14] Bettering the Evaluation and Care of Health (BEACH) is a University of Sydney program that analysed data collected by General Practitioners (GPs) and reported information about GP-patient encounters from clinical practices across Australia. (http://sydney.edu.au/medicine/fmrc/beach/), [accessed 06/2019].

Table 12 Estimation of substitutability level for community health services

Group of services	Substitutability range	Share of expenditure (a)	Expenditure-weighted substitutability
	%	%	%
Community health services			
Public dental services	Low (21-40)	4.6	≈1.4
Alcohol and other drug services	Medium (41-60)	3.9	≈2.0
Community mental health services	Low (21-40)	18.8	≈5.6
Other community health services	Very high (81-100)	53.7	≈48.3
Public health services			
Cancer screening	Medium (41-60)	3.1	≈1.6
Organised immunisation	High (61-80)	4.2	≈2.9
Health promotion	Very low (0-20)	4.9	≈0.5
Communicable disease control	Nil	3.2	≈0
Environmental health	Nil	1.3	≈0
Other public health services	Very low (0-20)	2.3	≈0.2
Total		100.0	≈62.5

(a) The average proportion for 2014-15 and 2015-16.

Source: Commission calculation using unpublished AIHW expenditure data.

72 New South Wales disputed the substitutability estimation and said there was a lack of supporting evidence, misalignment with how States fund activity and potential calculation issues. However, this appears to relate to a different understanding of the distinction between NAP and community health services, which share a common classification (Tier 2).[15]

73 Other States were generally comfortable with the estimated range and some provided comments. These included:

- Victoria suggested that the substitutability level for 'other community health services' should be lower due to income constraints faced by vulnerable and disadvantaged populations. The lower level proposed in this review reflects these circumstances.
- Queensland argued that the proposed level was appropriate for less remote areas but too high in regional and remote areas. It proposed a lower overall substitutability level. Queensland said that its community health services were widely utilised in regional and remote areas where non-State health services were less prevalent or non-existent. The estimated substitutability ranges are an average level of substitutability and already account for regional differences of State service provision, through the SDC assessment. As mentioned in paragraph 22, the non-State sector adjustment mainly reflects the differences in non-State provision in similar regions between States, while the SDC assessment captures the higher use of State services as remoteness increases.

[15] This issue was discussed with States during a multilateral meeting in December 2018.

- The ACT agreed with the level, but contending the need to seek independent opinion. As noted previously, State service providers (State health departments) are able to provide this advice.
- The Northern Territory expressed the upper bound was likely to be the appropriate level. The mid-point is the recommended level.

Non-State sector indicator

74 GPs provide many community health services, so it remains appropriate to base the assessment on bulk-billed benefits paid for GP services. Most States supported retaining bulk-billed GP services as the indicator of non-State sector services. The 2015 Review indicator is proposed to be maintained.

75 The Northern Territory said the bulk-billed GP data should not include services eligible for the *Section 19(2) Exemption Initiative*.[16] It indicated that although these services are partially subsidised by Medicare, States provide most of the funding. By including these bulk-billed services in the Medicare data (and treating these in the same way as privately provided GP services), non-State influences will be overstated.

76 Section 19(2) services are included in the MBS data. State spending on these services contributes to average State spending.[17] The SDC assessment assumes that States with remote populations spend the average amount on services provided under Section 19(2). By including Section 19(2) benefits in the bulk-billed GP data, the assessment recognises that States that access the Section 19(2) initiative need to spend less on remote services, compared to States that utilise this initiative to a lesser extent.

77 ***Discount.*** In the 2015 Review, a 25% discount was applied to the data used to calculate the non-State sector adjustment because it was unclear if the profile of clients using bulk-billed GP services was representative of people using other substitutable services.

78 The ACT said that the discount should be removed given the more detailed approach in this Review and conservative assumptions already applied to the estimate. Since bulk-billed GP services are the main substitutable service for State community and public health services, the Commission proposes to discontinue the 25% discount.

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16 The COAG s19(2) Exemptions Initiative provides exemptions to enable Medicare rebates to be claimed for State remunerated primary health care services in some rural and remote areas.

17 The Commission notes that the Section 19(2) payments from the Commonwealth are not recorded in GFS as user charges, therefore these are not netted off State expenses.

JUSTICE

79 This section should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 16 — Justice.

Police regression

Data

80 States provided police expenses and number of offenders for police districts. Different States have different names for this geographical concept, but all State police forces, with the exception of the ACT, have a regional organisational structure. Centralised costs were distributed amongst the districts in proportion to their individual reported costs. Final costs were scaled to match ABS Government Finance Statistics (GFS) figures for each State. Table 13 shows the number of cost regions used for each State.

Table 13 Number of police cost regions by State

State	Number of regions
New South Wales	58
Victoria	21
Queensland	15
Western Australia	11
South Australia	13
Tasmania	11
Australian Capital Territory	1
Northern Territory	9

Source: State provided data.

Use of actual offenders within regression

81 The regression uses actual offender numbers as this is the factor that determines the resourcing requirement. This is different from the final assessment that uses assessed offenders based on socio-demographic characteristics. Assessed offenders are used in the final assessment to address issues of policy influence and allocate expenses based on the socio-demographics of crime. In contrast, the regression is attempting to find the relationship between the actual level of offending and police resourcing.

82 For example, Kings Cross, in inner Sydney, has a socio-demographic profile which suggests relatively low levels of crime. However the actual level of offending is amongst the highest in Sydney, and the level of policing reflects this. Using actual

offender numbers will ensure the effect of offending on police costs are more accurately reflected through the regression.

Regression results

83 Table 14 shows the regression estimates for the police task model.

Table 14 Standard regression estimates

	Estimate	Std. Error	t value	Pr(>|t|)	Significance (a)
(Intercept)	228	19	11.8	0.000	***
Inner regional	120	36	3.4	0.001	***
Outer regional	133	51	2.6	0.011	*
Remote	491	187	2.6	0.009	**
Very remote	1 950	230	8.5	0.000	***
Offences per capita	4 681	526	8.9	0.000	***

Note: $R^2 = 0.728$. Adjusted $R^2 = 0.718$.
(a) Significance codes: *** 0.001, ** 0.01, * 0.05.
Source: Commission calculation.

84 ACT was concerned with heteroscedasticity in the model and asked for diagnostics addressing this risk. A Breusch-Pagan test gave a value of 60.668, which indicates negligible levels of heteroscedasticity. White-Huber robust standard errors are only slightly higher than the traditional standard errors, again indicating no basis for concerns (Table 15).

Table 15 Standard regression estimates with robust standard errors

	Estimate	Std. Error (a)	t value	Pr(>|t|)	Significance (b)
Inner regional	120	37	3.2	0.002	**
Outer regional	133	66	2.0	0.045	*
Remote	491	219	2.2	0.026	*
Very remote	1 950	242	8.0	0.000	***
Offences per capita	4 681	605	7.7	0.000	***

(a) White-Huber standard errors.
(b) Significance codes: *** 0.001, ** 0.01, * 0.05.
Source: Commission calculation.

Offender regional cost gradient

85 As noted in paragraph 88 of the draft report Attachment 16 — Justice, New South Wales considers that remoteness should, conceptually, affect both the offender based policing task as well as the population based policing task. It asked the Commission to test a model reflecting this conceptual basis. The results from such a model are shown in Table 16.

86 There is no conceptual basis to the pattern of the coefficients for offenders in different regions shown in Table 16.

Table 16 Alternative formulation of policing task regression model

Regression variables	Coefficient	Regression variables	Coefficient
Intercept (Major city)	212	Actual offenders per capita	5 515
Inner regional dummy	171	Actual offenders in inner regional areas	4 808
Outer regional dummy	281	Actual offenders in outer regional areas	1 679
Remote dummy	769	Actual offenders in remote areas	1 932
Very remote dummy	2 183	Actual offenders in very remote areas	2 101

Note: R^2 =0.7476 Adjusted R^2 = 0.7299.
Source: Commission calculation using State data.

Prison regional costs regression

Prison regional costs and service delivery scale

87 To calculate regional costs and service delivery scale in prisons, the Commission undertook regression analysis using State provided data (covering 79 prisons) to predict cost per prisoner. The results are shown in Table 17.

Table 17 Standard regression estimates

	Estimate	Std. Error	t value	Pr(>|t|)	Significance (a)
(Intercept)	74 723	6 335	11.80	0.000	***
Maximum security	61 581	16 182	3.81	0.000	***
Remote	16 347	32 774	0.50	0.619	
Inverse size	1 479 940	860 993	1.72	0.090	.

Note: Remote refers to remote and very remote areas.
R^2 = 0.1776. Adjusted R^2 = 0.1451.
(a) Significance codes, *** 0.001, ** 0.01, * 0.05, . 0.1.
Source: Commission calculation.

88 With 21% of prisoners being in maximum security, the assumed cost of an average prisoner, before regional costs or service delivery scale, is $87 610 (0.21 * $61 581 + $74 723).

89 The service delivery scale and regional costs assessments take account of the fact that there were 1 331 prisoners in remote prisons, but 3 601 assessed prisoners with a remote usual address.

90 Service delivery scale is calculated so the fixed costs of running 11 prisons in remote areas is allocated between the assessed prisoners originating from remote areas:

$$\frac{\$1\,479\,940 * 11}{3\,601} = \$4\,521\ per\ prisoner.$$

91 The comparable calculation in non-remote areas is:

$$\frac{\$1\ 479\ 940 * 70}{38\ 491} = \$2\ 691\ per\ prisoner.$$

92 When added to the $87 610 base cost of a prisoner, remote prisons are 2% more expensive than non-remote prisons due to service delivery scale.

93 Regional costs are similarly calculated so that the additional remoteness-related costs of prisoners housed in remote prisons are allocated among the assessed prisoner population who originate from remote areas:

$$\frac{1\ 331 * \$16\ 347}{3\ 601} = \$6\ 042\ per\ prisoner.$$

94 This represents 7% of the base cost per prisoner.

95 These two disabilities represent additive adjustments, so prisoners usually resident in remote areas are assumed to be 9% more expensive than prisoners usually resident in non-remote areas.

ROADS

Background

96 This section details the Commission's intended assessment method for each of the Roads components. It should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 17 — Roads.

97 The Roads attachment addressed most State views on the Commission's proposed measure of rural road length. The following sections respond to the remaining State comments.

Road length comparisons

98 In redeveloping the approach to rural road length assessment for the 2020 Review, staff began by replicating the 2015 Review method using data collected for the 2020 Review. Table 18 shows the results.

Table 18 Comparison of 2015 Review assessed rural road length and replicated method using more recent data

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	km	km	km	km	km	km	km	km	km
2015 Review	26 566	15 714	28 805	20 880	11 554	2 683	6	10 724	116 932
Replicated method	35 831	20 049	31 060	26 309	12 990	3 824	83	13 600	143 746
Difference	9 265	4 335	2 255	5 429	1436	1 141	77	2 876	26 814

Source: Commission calculation.

99 The replicated rural road length measure was substantially higher for all States than that from the 2015 Review. Some States asked for the reasons for these differences. The increase in road length is likely due to the use of updated data. The original data used in the 2008 consultancy are not accessible and, therefore, it is not possible to provide a definitive explanation. However, staff can confirm that, to the extent possible given the information and software available, both calculations followed the same method.

100 Some adjustments to the RouteFinder Links dataset speed-profile were required. Staff found that the methods used in developing the speed profile in the RouteFinder Links dataset were not consistent across the whole network, resulting in lower level roads often being allocated the same speed as highways and arterial roads. As such, in calculating road length for the 2020 Review, staff adjusted the speed profile for all roads classified as sub-arterial and below to have a maximum speed limit of 80km per hour. This means that the algorithm is less likely to select local type roads. This adjustment was not applied to the dataset used in calculating the replicated method figures.

101 The 2020 Review measurement of rural road lengths are higher than actual lengths for Western Australia and South Australia. States' actual rural road lengths are not comparable because States do not use a common road functional classification. In addition, the allocation of responsibility for maintaining State-type roads differs between States. For example, Western Australia has a policy of allocating responsibility for some State-type roads to local governments. Consequently, its actual road length is less than estimates based on average policy.

Connections to national parks

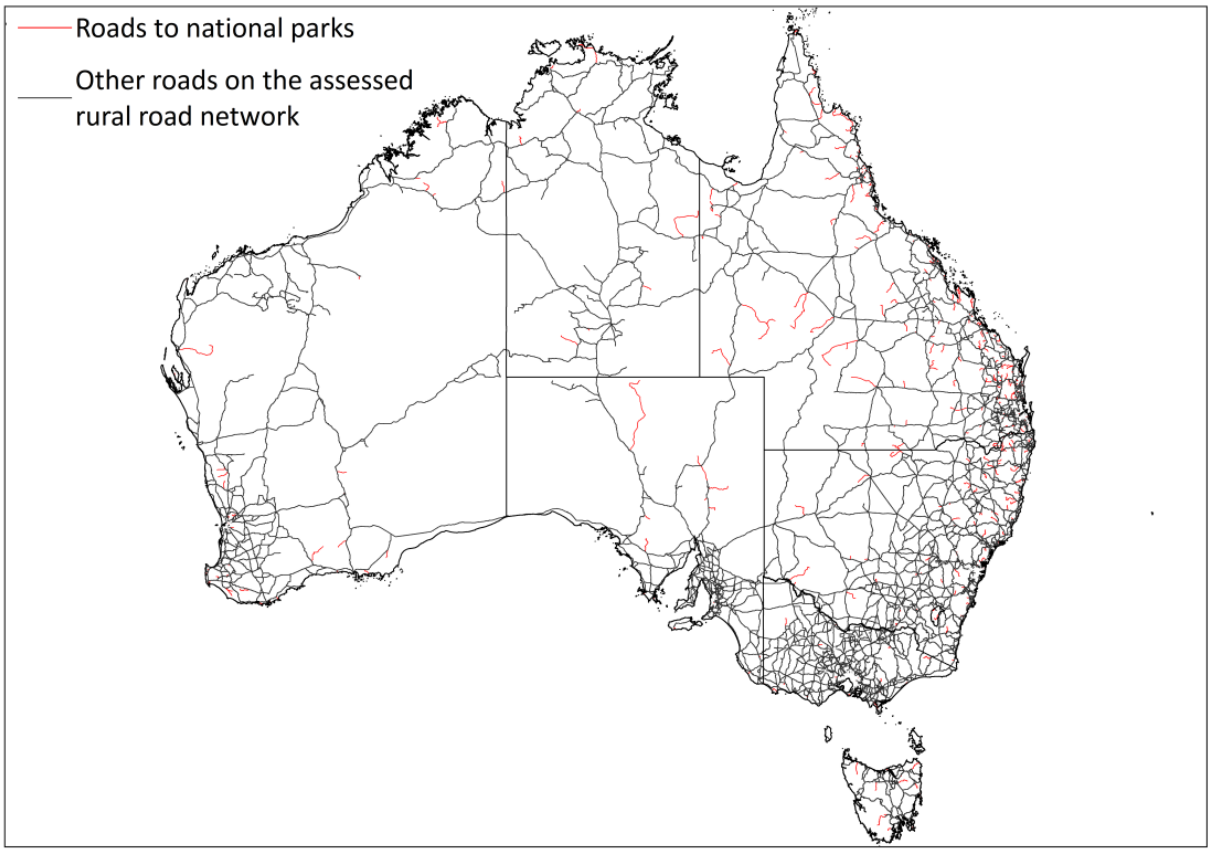
102 Some States requested the list of national parks to which road connections are included. The PitneyBowes StreetPro dataset was used to identify National Parks. This dataset incorporates PSMA Australia data including that relating to National Parks. A separate Excel workbook accompanying this document provides a list of these parks.

103 In developing the rural road length estimates for the draft report, national parks have been connected to their nearest road intersection rather than their nearest ABS Urban centre/locality (UCL). This approach gives preference to routes already on the network.

104 Following this approach, Queensland has by far the greatest length of roads connecting national parks to the network. This result was tested further and we have concluded that the measure is appropriate, as on average, national parks in Queensland tend to be farther from the arterial road network than those of other States.

105 The roads selected by the algorithm are only counted once regardless of how many times they may contribute to different routes (for example, between two different towns as well as to national parks). The software used to develop these connections does not readily allow the measurement of the individual contribution of each national park connection. However, Figure 1 shows a visual differentiation between the additional roads due to connections to national parks and all other roads.

Figure 1 Map of the assessed rural road network



Source: Commission calculation using PitneyBowes RouteFinder Links and StreetPro dataset.

Connections to other areas of significance

106 Some States asked why mines were connected to ports rather than the nearest town and whether there is potential for double-counting if there is already a road from the port to the nearest UCL. The majority of mining production is assumed to be exported, and as such, connections have been added to ports rather than UCLs. As noted above, any road included by the routing algorithm is included in total road measurements only once. There is no double-counting if, for example, a road from the port to the nearest UCL also falls along the route taken to travel from a mine to a port.

107 States also suggested that the location of a mine should be the mine gate rather than some area within the mine, as States' responsibilities for roads would end at the mine gate while roads within the mine are the responsibility of the mine operator. This has been done where possible. Roads classified as private or restricted access were precluded from being selected by the routing algorithm. However, staff are not aware of data that would allow us to determine gate locations (or mine perimeters) directly.

108 To identify the location of mines, information from Geoscience Australia mining and ports datasets were used.[18] These data relate to mines that were operating in 2015 (connections have only been included to mines with a significance score of 1 or 2), and ports that were operating in 2009. These are the best available data of which staff are aware.

109 Spatial information relating to wind farms[19] and hydro stations[20] have also been identified.

110 To date, reliable and comparable national datasets relating to grain bins and areas of mining exploration have not been identified. States are invited to provide information relating to such datasets and on more up to date national datasets pertaining to national parks, ports, mines, hydro power stations and wind farms.

Lane-kilometres

111 The number of lanes and their length were derived from actual State roads information collected from States. The final measure reflects the number and length of lanes currently provided in each State.

112 Staff assumed a minimum of two lanes for all roads on the estimated network. The length of lanes of any roads on this network that were in addition to the minimum two were included. An investigation of State spatial data shows that the algorithm identifies all roads with more than two lanes in rural areas, and these roads tend to be on highways and freeways.

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18 Geoscience Australia, Australian atlas of minerals resources, mines and processing centres, (http://www.australianminesatlas.gov.au/mapping/downloads.html), [accessed 06/2019].[18]

19 National Wind Farm Commissioner, Wind farms, (https://www.nwfc.gov.au/wind-farms), [accessed 06/2019].

20 Geoscience Australia, Australian Energy Resource Assessment, (https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/70142), [accessed 06/2019].

INVESTMENT

113 The following section presents supplementary information related to the Investment and Net borrowing assessments. It should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 21 — Investment, and Attachment 22 — Net borrowing.

Effects of changes on redistribution

114 States have asked to see the redistributive effects of proposed changes to the Investment assessment. The results, for the 2017-18 assessment year, are presented in Table 19. As some of the changes require a previous change be made, a step by step approach is presented.

115 It is important to note that the changes shown in Table 19 represent the differences between the 2015 Review approach and the proposed approach for one particular assessment year. Similar tables in most recurrent expense or revenue categories are often assumed to be representative of future assessment years, but such an assumption is not possible in Investment. Most of the changes represent a change in the volatility of the assessment, not a structural change. Therefore, analysis in this paper should be treated cautiously, as illustrative of the potential magnitude of proposed changes but not necessarily as indicative of whether individual States will be better or worse off in the 2020-21 application year or subsequent updates.

Table 19 Effect of changes on redistribution, 2017-18

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Redist
	$m	$m	$m	$m	$m	$m	$m	$m	$m
2019 Update (a)	9 885	8 532	5 930	3 049	1 766	501	462	503	30 629
2020 Draft Report	10 040	8 195	6 051	3 048	1 765	510	403	616	30 629
Changes									
Functionalisation	-115	106	-181	98	65	-18	42	4	315
Gross investment	0	-19	-2	12	6	1	-3	5	24
Remove averaging	-66	83	-21	-4	-23	-12	3	39	125
Factor changes	336	-506	325	-107	-49	37	-101	65	763
Total change	155	-337	120	-1	-1	9	-59	113	397
	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc
2019 Update (a)	1 248	1 336	1 195	1 180	1 022	955	1 109	2 040	1 237
2020 Draft Report	1 267	1 283	1 219	1 180	1 021	971	968	2 498	1 237
Changes									
Functionalisation	- 15	17	- 37	38	38	-34	101	16	13
Gross investment	0	- 3	0	5	3	2	-6	19	1
Remove averaging	-8	13	-4	-2	-13	-22	8	157	5
Factor changes	42	-79	65	-41	-28	71	-243	265	31
Total change	20	-53	24	0	0	16	-141	457	16

Note: Single assessment year change in redistribution.
(a) 2019 Update methods using 2020 Draft Report total budget data. Administrative scale influences have been removed from 2019 Update factors for consistency.
Source: Commission calculation.

116 ***Functionalisation.*** Moving to a functionalised assessment would have redistributed $315 million between States. This change is due to the use of actual investment data, rather than using stock data as a proxy, in each category. A functionalised assessment not only changes the relative weight of each component, but it also removes the effect of asset revaluations.[21] The magnitude of this effect can vary significantly from year to year, especially as revaluations can be a significant source of volatility in the assessment.

117 ***Gross assessment.*** Moving to a gross assessment would have redistributed $24 million between States in 2017-18, lowering assessed needs in faster growing States as depreciation is now assessed using opening populations rather than closing populations.

118 ***Three year averaging.*** Removing three year averaging of stock factors would have been material for the Northern Territory in 2017-18. The change is predominantly

[21] The effect of revaluations is due to the assumption in the 2015 Review method that investment for each category is in proportion to stock holdings. As this is done separately for opening and closing stocks, a revaluation in the asset stocks for a category was implicitly assumed to represent investment (positive or negative) in that category.

due to the realignment of the population data used in the growth measure (total population) and the stock factor. As such, it represents a material improvement in the assessment. Table 20 shows the change in redistribution by category of removing averaging using 2019 Update factors in a functionalised gross assessment. The large change in redistribution from removing averaging for Rural roads and Schools largely reflects the disconnect between the offsetting mechanisms, and that this change reflects a material improvement in the reliability of the assessment.

Table 20 Effect of removing averaging on redistribution, 2017-18

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc
Schools	3	5	-7	-3	-12	-16	3	51	3
Post-secondary	0	1	0	0	-1	-1	5	-7	0
Health	-4	-1	2	8	3	1	6	2	2
Housing	0	1	0	0	0	-1	0	-12	0
Welfare	0	0	0	0	0	0	0	-2	0
Services to communities	0	1	0	-1	-1	-2	1	-6	0
Justice	0	1	0	-1	0	0	0	-2	0
Roads - Urban	-2	2	3	-4	-1	2	-2	-6	1
Roads - Rural	-5	5	-1	-5	-3	-6	0	147	3
Transport – Non-urban	0	0	0	0	0	0	0	2	0
Transport – Urban	0	0	0	0	0	0	0	0	0
Services to industry	-1	0	1	4	1	0	-3	-10	1
Other Expenses	0	0	0	0	0	0	-2	0	0
Total	-8	13	-4	-2	-13	-22	8	157	5

Note: Single assessment year change in redistribution.
Source: Commission calculation.

119 ***Stock factors.*** The changes to category stock factors would have redistributed $780 million between States in 2017-18. Table 21 shows the effect on redistribution by category. The material differences caused by changes in stock factors applied in the 2020 Review draft report and those used in the 2019 Update are as follows.

- For Services to communities and Non-urban transport,[22] an equal per capita (EPC) factor will be applied for the 2020 Review while recurrent disabilities were applied to stock in 2019 Update.
- For Rural roads, no distinction will be made between sealed and unsealed roads for the 2020 Review, whereas unsealed roads were assumed to have lower capital costs per kilometre in the 2019 Update.
- For Urban transport, the change in redistribution reflects the overall change in assessment methods.

[22] Commission staff are investigating the level of investment in non-urban transport for 2017-18.

Table 21 Effect of new capital stock factors on redistribution, 2017-18

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc	$pc
Schools	0	-1	0	-6	5	11	-7	17	1
Post-secondary	1	0	0	0	0	0	-2	-1	0
Health	-2	-7	6	3	10	23	-26	20	3
Housing	0	0	1	-1	0	7	-5	0	0
Welfare	0	-1	0	1	-1	-1	0	8	0
Services to communities	-2	-1	1	3	1	2	-2	38	1
Justice	-1	-2	0	1	1	9	-5	31	1
Roads - Urban	-2	-5	8	-2	0	4	3	33	2
Roads - Rural	-2	-18	21	-2	-10	26	0	143	6
Transport – Non-urban	10	-23	41	-35	-29	62	-93	33	13
Transport - Urban	41	-22	-15	-2	-2	-76	-109	-68	13
Services to industry	0	1	1	-1	-4	3	1	11	1
Other Expenses	0	0	0	0	0	0	0	0	0
Total	42	-79	65	-41	-28	71	-243	265	31

Note: Single assessment year change in redistribution.
Source: Commission calculation.

Algebraic expression of the investment assessment

120 The box below shows the algebraic expression for an assessment of Investment in each component.

Box 3 Algebraic expression of the investment assessment

The Investment formula, from the 2015 Review, remains unchanged as

$$\left[\left(\frac{K_1}{P_1} P_{i1} \delta_{i1}\right) - \left(\frac{K_0}{P_0} P_{i0} \delta_{i0}\right)\right] \delta_i^c$$

Where:

P_{i0} and P_{i1} are the populations in State i at the start and end of the year

P_0 and P_1 are the national populations at the start and end of the year

δ_{i0} and δ_{i1} are the relative levels of stock per capita required in State i at the start and end of the year.

δ_i^c is the relative cost of building capital for State i across the year

K_1 is the national total value of infrastructure stocks at the end of the year,

K_0 is calculated as K_1 minus gross investment. While it can, for practical purposes, be thought of as the stock of assets at the start of the year, it more accurately represents the stock of those assets that will not be consumed during the year that were held at the start of the year. ($K_0 = K_1$ – Gross investment; or $K_0 = K_1$ – Net Investment + Depreciation).

A State's disability, or relative stock per capita required, is calculated as its share of user population divided by its share of total population. So where, U = national user population:

$$\delta_i = \frac{U_i}{U} \div \frac{P_i}{P}$$

The investment formula can be expanded to

$$\left(\frac{K_1}{P_1}\frac{P_{i1}}{1}\frac{U_{i1}}{U_1}\frac{P_1}{P_{i1}} - \frac{K_0}{P_0}\frac{P_{i0}}{1}\frac{U_{i0}}{U_0}\frac{P_0}{P_{i0}}\right) \delta_i^c$$

and simplified to

$$\left(K_1 \frac{U_{i1}}{U_1} - K_0 \frac{U_{i0}}{U_0}\right) \delta_i^c$$

121 This assessment would be applied separately to assess investment for each expense category. Using a slightly simplified[23] schools assessment as an example, under the 2015 Review model:

- P_i represents the population in State *i*
- δ_i represents the student:population ratio in State *i* relative to the student to population ratio nationally
- K_1 would represent stocks of produced school assets and K_0 would be calculated as K_1 less investment.

122 In the 2015 approach, the narrative would be that, at the start of a year, each State is assumed to have the national average assets per **capita**, adjusted for its student to population ratio. Its assessed investment gives it the capacity to end the year in the

[23] The investment in schools component also incorporates that the capital required in schools with 25% or more Indigenous students is higher than for other schools. This adjustment has been ignored in this description.

same situation. This captures changes in population, relative student population ratios, and changes in the national average capital per capita.

123 The algebraically equivalent, but simpler, 2020 Review approach merely observes that the changes in population and relative student population ratios could be discussed together as change in the number of students. That is, at the start of a year, each State is assumed to have the national average assets per **student**. It is assessed to invest so that it ends the year in the same situation. This captures changes in student numbers and changes in national average capital per student.

Algebraic expression of the Net borrowing assessment

124 The box below shows the algebraic expression for the assessment of financial assets. It is unchanged from the 2015 Review approach.

Box 4 Algebraic expression of the Net borrowing assessment

Assessed Net lending $= \left[\left(\frac{K_1}{P_1}\right) p_{i,1} - \left(\frac{K_0}{P_0}\right) p_{i,0}\right]$

Assessed Net borrowing $= -$ (Assessed Net lending)

Where:

$p_{i,1}$ and $p_{i,0}$ are the populations of State i at the end and the start of the year.

P_1 and P_0 are the Australian populations at the end and the start of the year.

K_1 and K_0 are the Australian total value of financial asset stocks at the end and start of the year, K_0 is calculated as K_1 minus net lending.

NATIONAL CAPITAL

Background

125 This section provides supplementary information on the issues relating to the national capital assessment. It should be read in conjunction with *Report on GST Revenue Sharing Relativities, 2020 Review Draft Report*, Attachment 26 — Other disabilities.

126 National capital allowances recognise the unavoidable extra costs incurred by the ACT, due to Canberra's status as the national capital or legacies inherited from the Commonwealth at self-government, that continue to affect its costs of service delivery. Those allowances can be broadly divided into those relating to planning and urban form, to policing and emergency services, and to roads. Planning and Police allowances are covered in Attachment 26 — Other disabilities and are not further discussed here.

Roads allowance

127 In the 2004 Review, the Commission decided to assess a roads allowance to reflect the additional costs the ACT incurred because, at self-government, it inherited main avenues and arterial roads that were wider than Australian standards. The allowance formed part of the ACT's 'special fiscal needs'.[24] It was intended to run for a further 15 years (assessed for the last time in the 2019 Update), after which sufficient time should have elapsed to allow the ACT to rebuild or restructure the wider roads it inherited.

128 The ACT argued that the roads allowance should be continued. It said the practical reality was that the prominence and importance of those roads meant their maintenance was ongoing. In its view, the argument that the roads in question must, by now, have come to the end of their useful life was a false assumption. It said that, to the extent the roads did ever come to their end-of-life, it would be faced with additional costs to rebuild them.

129 The ACT further argued that National Capital Authority (NCA) restrictions prevented it from being able to restructure the road network. Such a restructure would require an agreement between the ACT and the NCA. It spends $8 million per year in maintaining those roads. Based on the 2004 Review method, the ACT sought a roads allowance at $2.75 million.

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[24] It was brought into the national capital assessment in the 2010 Review.

130 The ACT has not provided strong evidence that it is unable to restructure its road network after three decades since self-government. In relation to NCA restrictions, the ACT is able to seek the necessary agreement with the NCA. The circumstances which led the Commission to phase out the roads allowance remain and it considers that there is no case for its continuation.

Suspicious packages

131 The ACT sought a new allowance for emergency services it provides to the Commonwealth, specifically in relation to suspicious packages. It presented evidence that, in 2014, it had to respond to incidents involving suspicious packages at 22 times the average per capita rate, due to the location of many high profile Commonwealth assets within their jurisdiction. It argued that the relative size of the Commonwealth in the ACT meant that the provision of emergency services required more than marginal additional effort and resources.

132 All States provide a range of emergency services to the Commonwealth, with funding provided via a memorandum of understanding (MOU) between the Commonwealth and the States. The ACT receives 26.1% of this funding based on the relationship between unimproved land values on which Commonwealth assets are situated and the value of associated buildings in each jurisdiction.

133 The ACT argued that it has been underfunded since the Commonwealth changed the funding formula in 2012-13. It sought an allowance of $1.5 million, which represented the difference between the actual Commonwealth funding it received for responding to suspicious packages and its estimated cost of providing the services. The ACT argued such an allowance would be similar to the counter-terrorist allowance that was discontinued in the 2010 Review. That allowance was $0.451 million when it was assessed for 2005-06 and was discontinued because the Commission said all States faced counter-terrorism related costs.

134 The ACT's claim relates to its level of funding via a multilateral MOU and, as such, is an issue outside the scope of the national capital assessment.

NATIVE TITLE AND LAND RIGHTS

Background

135 The native title and land rights assessment requires annual State expense data. These expenses will be assessed actual per capita (APC), as discussed in Attachment 26 — Other disabilities.

136 The scope of eligible expenses is set out below.

Native title

137 Native title expenses include the following.

- Administrative expenses:
  - costs due to administrative processes that need to be followed each time a State acquires land in which native title may exist because there is no clear evidence that it has been extinguished. Such land is usually part of unalienated Crown land or part of State forests
  - work undertaken by States to coordinate native title claims and 'future act' work
  - legal advice and consultants
  - preparation and attendance at mediations, non-court meetings or hearings
  - survey and land management and pastoral land management
  - amendments to legislation
  - negotiation and administration of Indigenous Land Use Agreements.
- Compensation (and compensation type) expenses:
  - direct financial compensation
  - provision of training and employment (including payments for additional rangers)
  - provision of land and services (including rental payments)
  - provision of fencing, level crossings, bores, water and roads
  - replacement housing
  - railway impact study assessment
  - contribution to land council costs
  - development of management plans for reserves and management of reserves
  - construction of buildings and infrastructure

- revegetation, investment in nursery and training in Landcare
- heritage surveys.

Land rights

138 Land rights expenses include:

- costs due to time spent by the Minister and their staff on legislation and policies relating to Aboriginal and Torres Strait Islander land rights and related matters
- costs under land claims resolution; these are costs associated with provision of support and advice to relevant government agencies regarding land claim hearings/settlement and co-ordination of comments from other instrumentalities regarding land claims and attendance at land claims hearings
- mapping, land survey and land tenure reports regarding land rights costs
- costs due to joint management of land rights land
- liaison with industry regarding land rights costs
- costs associated with the Aboriginal and Torres Strait Islander lands governance bodies
- review of proceedings and review of judgements on land rights costs
- briefing to and from council on land rights costs.

Revenue

139 Any revenue States receive in relation to native title and land rights will offset the expenses.

140 Revenue may include, among other things, reimbursements from third parties in relation to native title compensation cases.