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Bariatric Retrievals in Aeromedicine:
A Matter of Dignity and Safety

Royal Flying Doctor Service
WESTERN AUSTRALIA

Acknowledgement of Country

Artwork by Kevin Bynder

The Royal Flying Doctor Service in Western Australia acknowledges the Original and Traditional Custodians of the land on which we meet today, the Muwinina people. We recognise their enduring connection to nipaluna (Hobart) and the surrounding lands and waters.

We honour the continuing custodianship of all Tasmanian Aboriginal communities and pay our respects to their Elders past and present.

RFDSWO Bariatric Transfer System project

- Clinical Audit - Bariatric Retrievals
- Literature Review
- Document Analysis
- Focus Groups
- Bariatric System Assessment

What does the literature tell us?

Australian obesity prevalence reflects global trends

1 in 8 people worldwide are obese
(WHO, 2024)

Global forecasts predict by 2050 Australian adult (25yrs+) obesity rates will be 76.4% for females and 83% for males

(Ng et al., 2025)

Australian Institute of Health & Welfare (AIHW) reports:

- 31% of adults aged 18yrs or more are obese
- 12% of adults are severely obese (BMI ≥35)
- Obesity prevalence peaks in men from 45-54 yrs and from 55-64 yrs for women
- 8.2% of children and youth (2–17 yrs) are obese
  (AIHW, 2023)

Obesity is not experienced equally

Two-thirds of Australian adults are overweight/obese with waist circumference of risk for chronic disease, which correlates with:

- Living in outer regional and remote Australia (74%) compared to in major cities (66%)
- Living in areas of most disadvantage (69%) compared to least disadvantage (64%) areas

(Australian Bureau of Statistics, 2023)

WA Primary Health Alliance (WAPHA) reported:

- Whole of WA has estimated obesity prevalence of 36%
- Nearly 1 in 2 (47%) people in Goldfields (SA3) are obese
- Approximately 2 in 5 (~40%) residents in the Pilbara, Wheatbelt, Mid West, Great Southern and South West regions of WA are obese

(WAPHA, 2025)

Conditions, Complications and Complexity

Obesity increases risk of chronic conditions & comorbidity:

- diabetes, CVD, all cancers (Ng et al., 2025),
- hypertension, stroke (Blomkalns & Silver, 2011),
- respiratory & endocrine disorders (Prottengeier et al., 2014),
- poor mental health, ovulatory or endometrial dysfunction, infertility, and kidney diseases (Kerr et al., 2025).

Obesity causes a chronic inflammatory state that:

- exacerbates during acute illness or trauma
- results in poorer outcomes due to co-morbidities
- requires consideration in clinical decision-making.

(Blomkalns & Silver, 2011; Grant & Newcombe, 2004).

Aeromedical bariatric retrievals have higher risk of:

- being clinically complex (Lauria et al., 2022).
- respiratory symptoms and/or distress (Lauria et al., 2021; Parker et al., 2019)
- failed intubation due to prehospital rapid sequence intubation (RSI) (Burns et al., 2016)
- complications during transfer, like peri-intubation hypoxia (O'Hare et al, 2024)

Safety and Wellbeing of Patients and Staff

- Diligent reporting of hazards & injuries experienced by staff during bariatric care (McClean et al., 2021)
- Safety & dignity of bariatric patients during moving & handling must be protected (Dockrell & Hurley, 2021)
- Use of correct equipment, training & staff to mitigate adverse outcomes (Dockrell & Hurley, 2021; McClean et al., 2021)
- Universal bariatric definition & interoperability across health services & systems for dignified, safe and efficient bariatric transportation and care (Cowley et al., 2013; McClean et al., 2021; Prottengeier et al., 2014)
- Bariatric risk management programs - evidence-based bariatric care strategy, policy & guidelines (Cowley et al., 2013; Dockrell & Hurley, 2021)
- Health services research around obesity and bariatric care to improve:
  - obesity data utility and quality
  - understanding of bariatric risks to health services and staff
  - accurate identification of bariatric patient admissions
  - ability to measure bariatric patient handling hazards and related staff injuries
  - assessment of bariatric intervention effectiveness (McClean et al., 2021)

Logistically Complex Care

Greater logistical complexity of aeromedical bariatric retrievals requires:

- ✓ weight & girth measurement to determine stretcher fit
- ✓ training in bariatric care and systems
- ✓ special equipment, procedures, and staffing
- ✓ high-level clinical skills
- ✓ special clinical equipment suitable for larger bariatric patients
- ✓ pre-retrieval preparation for critical intervention, e.g. intubation

(Blomkalns & Silver, 2011; Cowley et al., 2013; Grant & Newcombe, 2004; Lauria et al., 2022; McClean et al., 2021; O'Hare et al., 2024)

A survey of 24 European aeromedical services found:

- 95% consider transfer of obese patients challenging
- 21% experienced critical incidents related to patient obesity
- 47% have standard operating procedures for bariatric transports
- 26% dispatch extra staff for bariatric retrievals

(Prottengeier et al., 2014)

Definitions and measures of ‘obese’

Waist circumference
- good indicator of total body fat
- predictor of certain chronic conditions (e.g. CVD, T2D)
- waist circumference measurements of risk:

Sex	Increased risk	Substantially increased risk
Males	94cm	102cm
Females	80cm	88cm

(Australian Bureau of Statistics, 2023)

Body mass index (BMI) classifications:

- BMI of 25 or more is overweight OR obese
- BMI of 25 – 29.9 is overweight but not obese
- BMI of 30 – 34.9 is obese class I
- BMI of 35 – 39.9 is obese class II (severely)
- BMI of 40 or more is obese class III (morbidly)

(AIHW, 2023, 2024; WHO, 2000, 2024)

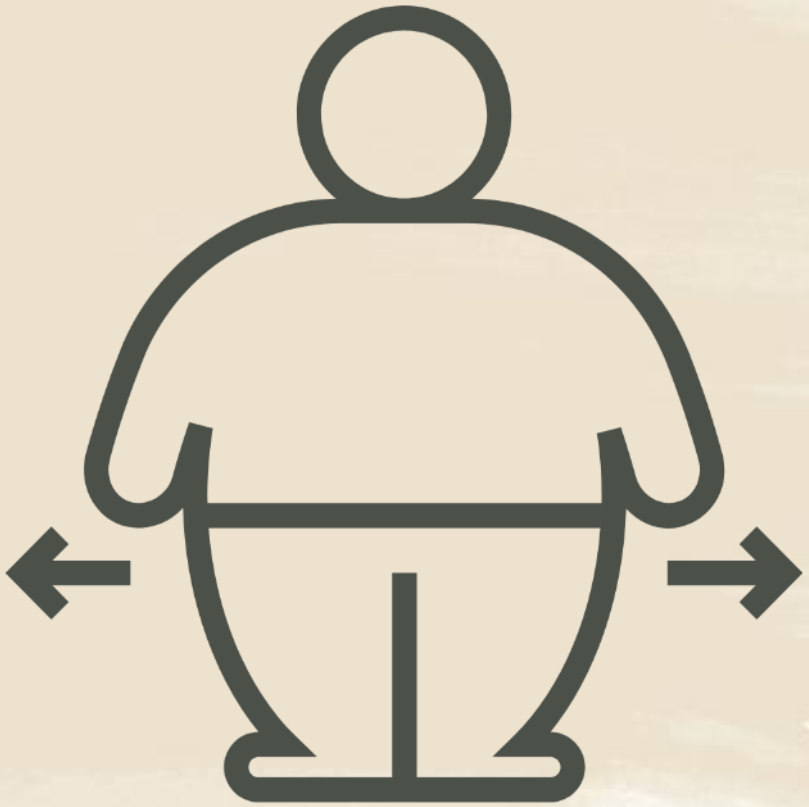
Defining ‘bariatric’ in healthcare

- Bariatric: morbidly obese (i.e. BMI ≥40) proportion of the obese population (Cowley et al., 2013)
- Height / weight measurements - BMI calculations (≥30)

  (McClean et al., 2021).
- Weight & girth measures

  - width & weight capacity of standard beds & stretchers

  (Lauria et al., 2022).

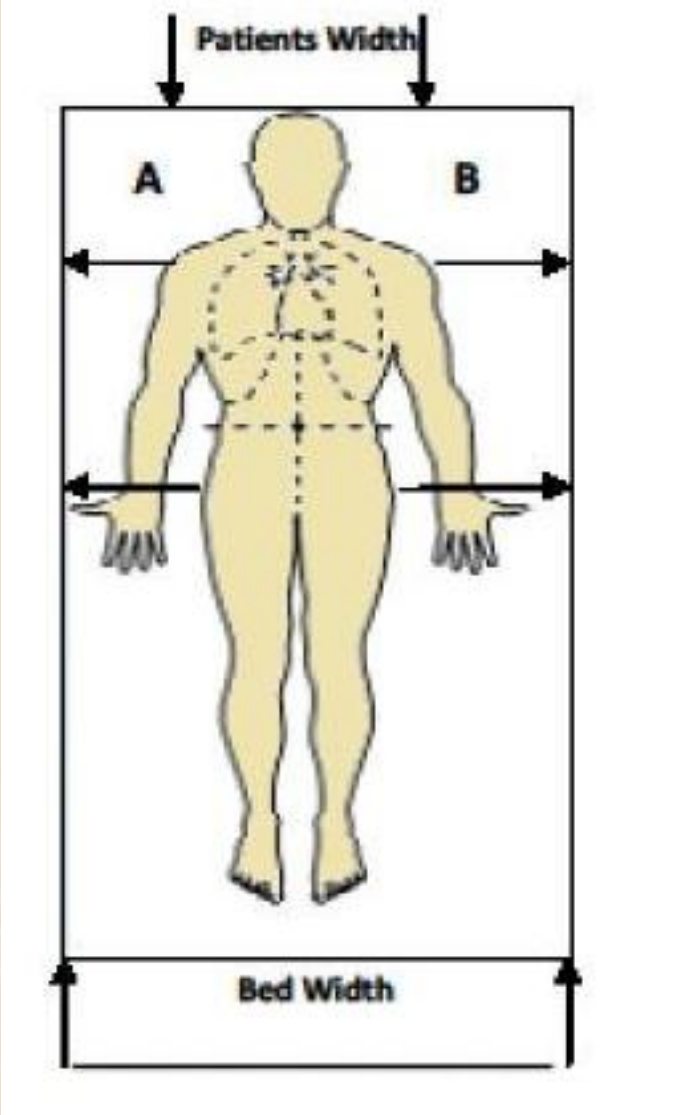


- At RFDS WO, a bariatric patient is defined as:
  - weighing ≥150kg
  - having girth measurement of >60cm
  - having any body width dimension of >68cm

  (RFDSWO, 2022, 2025)

RFDSWO Bariatric Transfer System

Determining Bariatric Needs for Patients



(RFDSWO, 2025)

Stretcher Capacity (RFDSWO, 2021)

PC-12 Standard Stretcher
- Bed width 68cm
- Max patient width 60cm
- Max patient weight 148kg
- Max total weight 168kg (inc equipment)

PC-12 Bariatric Stretcher
- Bed width 100cm
- Max weight 285kg

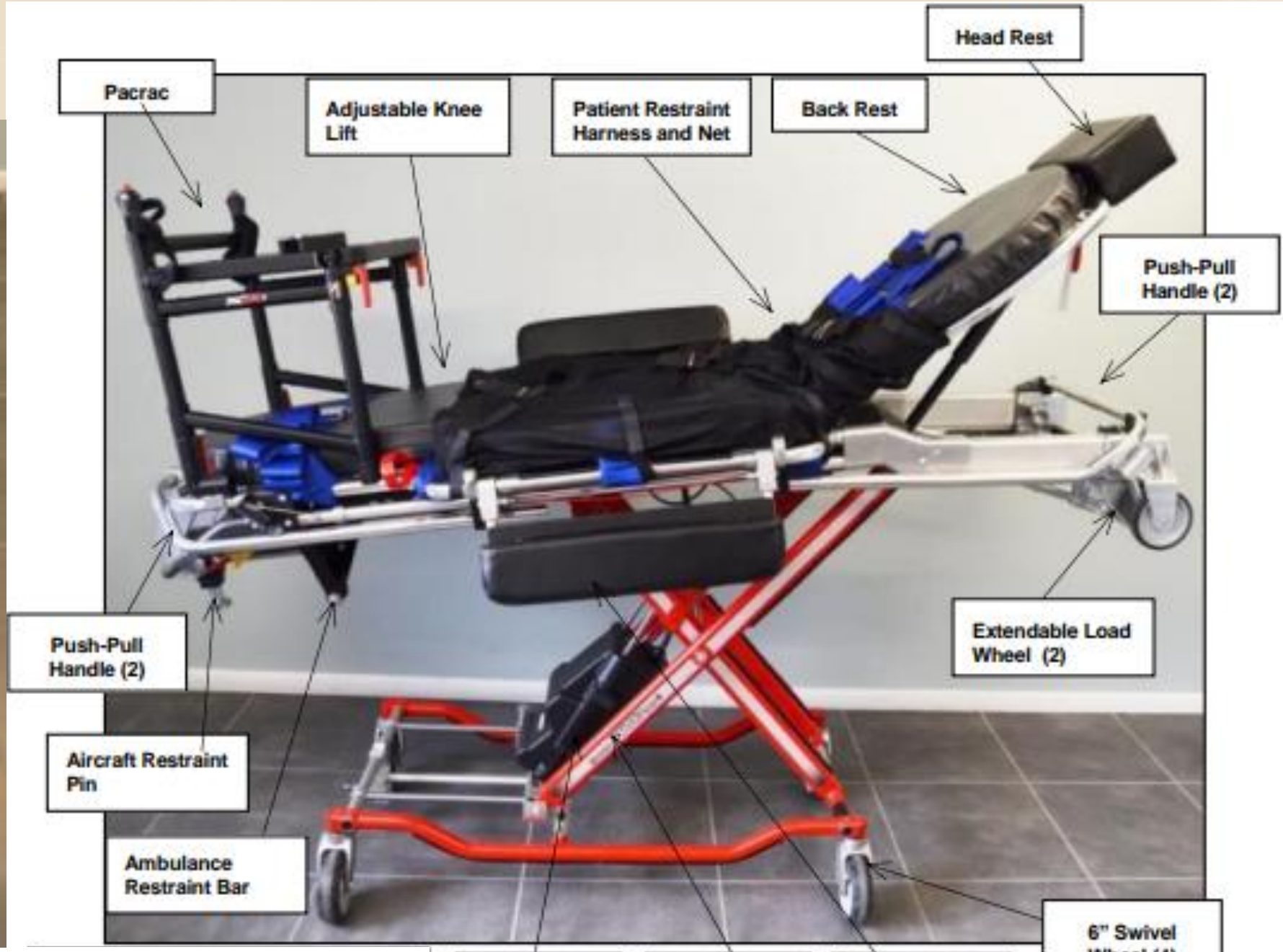
PC-24 Standard Stretcher
- Bed width 68cm
- Max patient width 60cm
- Max weight 225kg

Usually, the limiting factor is patient width dimensions.

RFDS WO
Bariatric Stretcher System

- Single extra-wide heavy-duty stretcher
  - Retrofitted to PC-12 aircraft
  - Maximum weight: 285kg (no equipment)
  - Maximum width: 100cm
- Retrofitted loading platform for PC-12 aircraft
- Stretcher lifting device (SLD) (max weight 200kg)
- Removable forward & rear floor brackets
- Hover mat

Stretcher



FERNO Australia

POWERFlexx+ Bariatric Stretcher

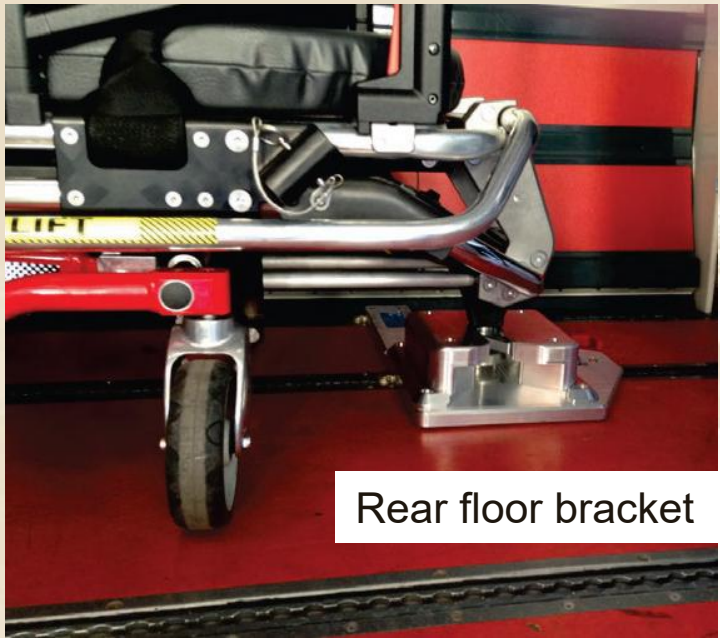
Bariatric Transport System

Stretcher lifting device (SLD) pedestal

Loading platform

System seen here in the workshop with 300kg total load.

Forward floor brackets



Rear floor bracket

Bariatric Transfer System

User Manuals – stretcher, loading platform, SLD, stretcher restraints
Engineering Bariatric Transport Operating Manuals
Clinical Manual – Bariatric Patients
Bariatric Training Manual

Bariatric Training Course Syllabus
Bariatric Stretcher Training Checklist

Standard Operating Procedures – Bariatric Patients
Bariatric Transfer Policy
Bariatric Stretcher System Policy

Bariatric Transport System Updates
Aviation Training & Checking System Manual & Syllabus
Aviation Equipment Standards and Procedures
Bariatric Stretcher Ambulance Loading Procedures

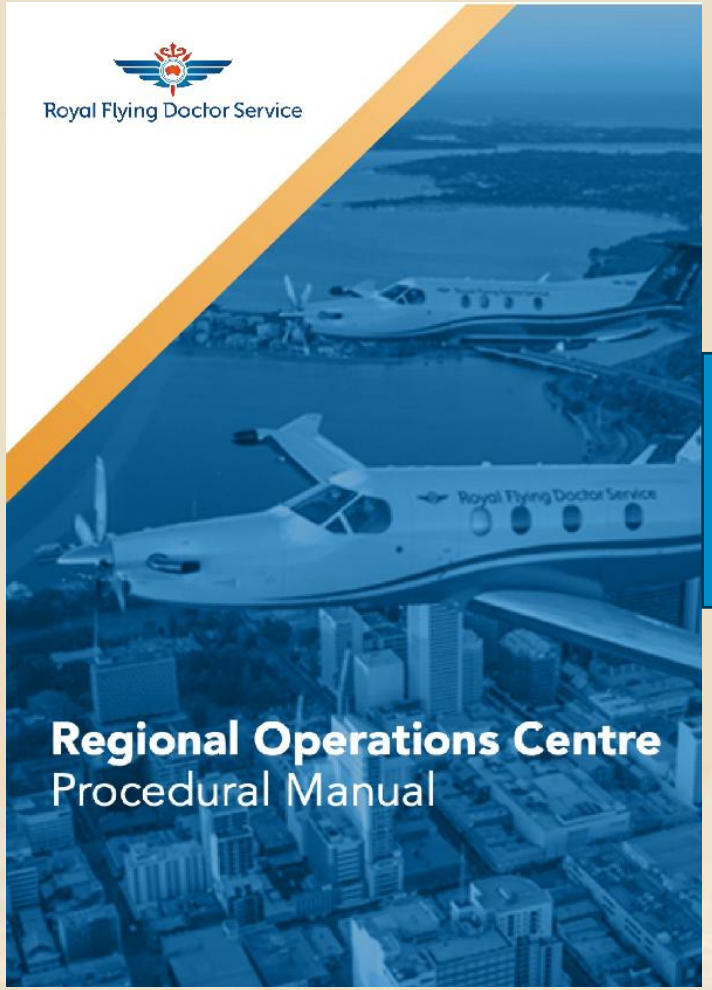
Bariatric Training

Clinical Education

Clinical considerations in bariatric transport are:

- Respiratory function
- Airway and ventilation
- Underlying CVD
- Difficulty with procedures
- Difficult patient examination and clinical assessment
- General patient handling in flight

Bariatric Transfer Tasking



Important Points:

1. As a rule, all patients with a weight above 150kg will require a Doctor to accompany the flight.
2. All 3 of the attending crew have completed the 'Bariatric' Training before consideration for a Bariatric Flight.
3. If all the available crew are not Bariatric trained, then there is a need to escalate to the on-call Regional Operations Centre Manager
4. If there is a need to utilise the *Bariatric Transfer System*, then **NO** consideration is to be given to a meet.
5. Bariatric patients' condition may require RFDS WO staff to attend the hospital with bariatric equipment.
6. Complete ambulance CAD booking to arrange the above.

(RFDSWO, 2022)

Only PC-12 aircraft are tasked for bariatric stretcher retrievals

What did the clinical audit tell us?

Data extraction protocol

Aeromedical cohort:
- 100-149kg patients 2005 – 2024 (20 yrs)
- 150+kg patients 2005 – 2024 (20 yrs)
- Use of bariatric stretcher 2016–2024 (8yrs)

Clinical data:
- Gender
- Age (10 yrs or over)
- Ethnicity
- Weight of patient
- Principal diagnosis / reason for transfer
- Ventilated
- Intubated
- Resuscitated

Operational data:
- Source region
- Destination region
- Type of transfer

100kg+ Patient Demographics

100+kg Cohort = 25,610 patients transferred between 2005-2024

Since 2014, increase in 230kg+ patients

- **Max weight = 300kg; 21 patients 250-300kg**

SEX

- 100+kg patients - 70% were male and 30% were female
- 150+kg patients – 3% were male and 1.5% female

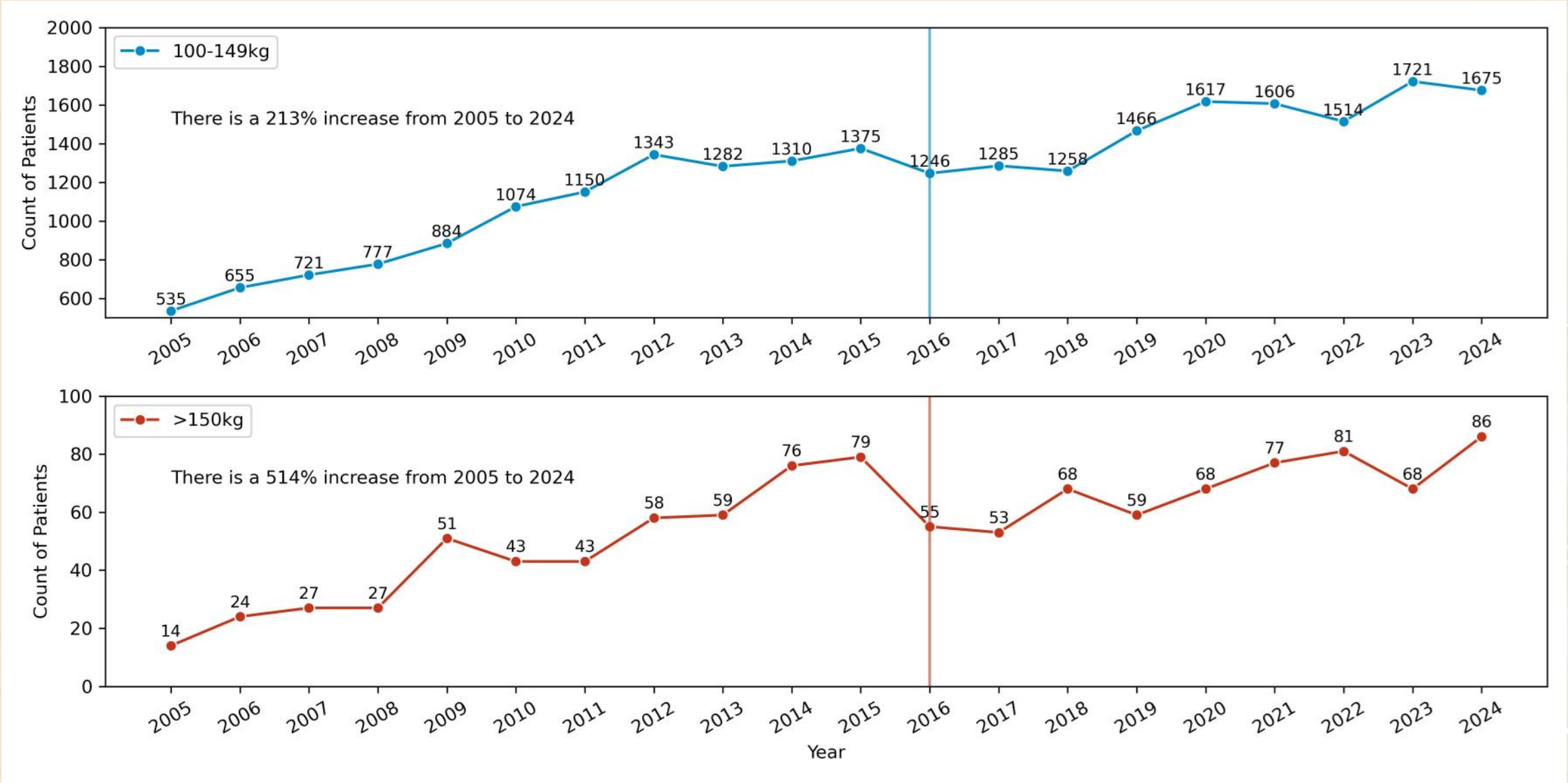
AGE

- 100+kg cohort age range – 11 to 96 years
- 1 in 5 patients weighing 100+kg were aged between 50-59 years
- Over 40% of 100+kg patients were aged between 45-64 yrs
- 150kg patients more common between 40-49 yrs age group

INDIGENEITY

- 100+kg patients were 3 times more likely to be Non-Indigenous (74.5%) than Aboriginal and / or Torres Strait Islander (25.6%)
- 150kg+ patients: twice as likely to be Non-Indigenous (3%) compared to 1.5% Indigenous

Patients transferred per year between 2005 – 2024 by RFDSWO that weighed 100-149kg and 150kg+



Year	Weight Categories	Total Patients	Percentage of which used a bariatric stretcher
2016	100-149kg	769	0
	150-199kg	31	13
	200-249kg	2	100
	250-299kg	2	100
2017	100-149kg	1285	0
	150-199kg	53	30
	200-249kg	0	0
	250-299kg	0	0
2018	100-149kg	1258	0
	150-199kg	61	39
	200-249kg	7	100
	250-299kg	0	0
2019	100-149kg	1466	0
	150-199kg	53	43
	200-249kg	6	83
	250-299kg	0	0
2020	100-149kg	1617	0
	150-199kg	57	51
	200-249kg	9	89
	250-299kg	2	100
2021	100-149kg	1606	0
	150-199kg	63	30
	200-249kg	12	100
	250-299kg	2	100
2022	100-149kg	1514	0
	150-199kg	72	38
	200-249kg	6	100
	250-299kg	3	100
2023	100-149kg	1721	0
	150-199kg	62	39
	200-249kg	6	100
	250-299kg	0	0
2024	100-149kg	1675	0
	150-199kg	80	32
	200-249kg	6	100
	250-299kg	0	0

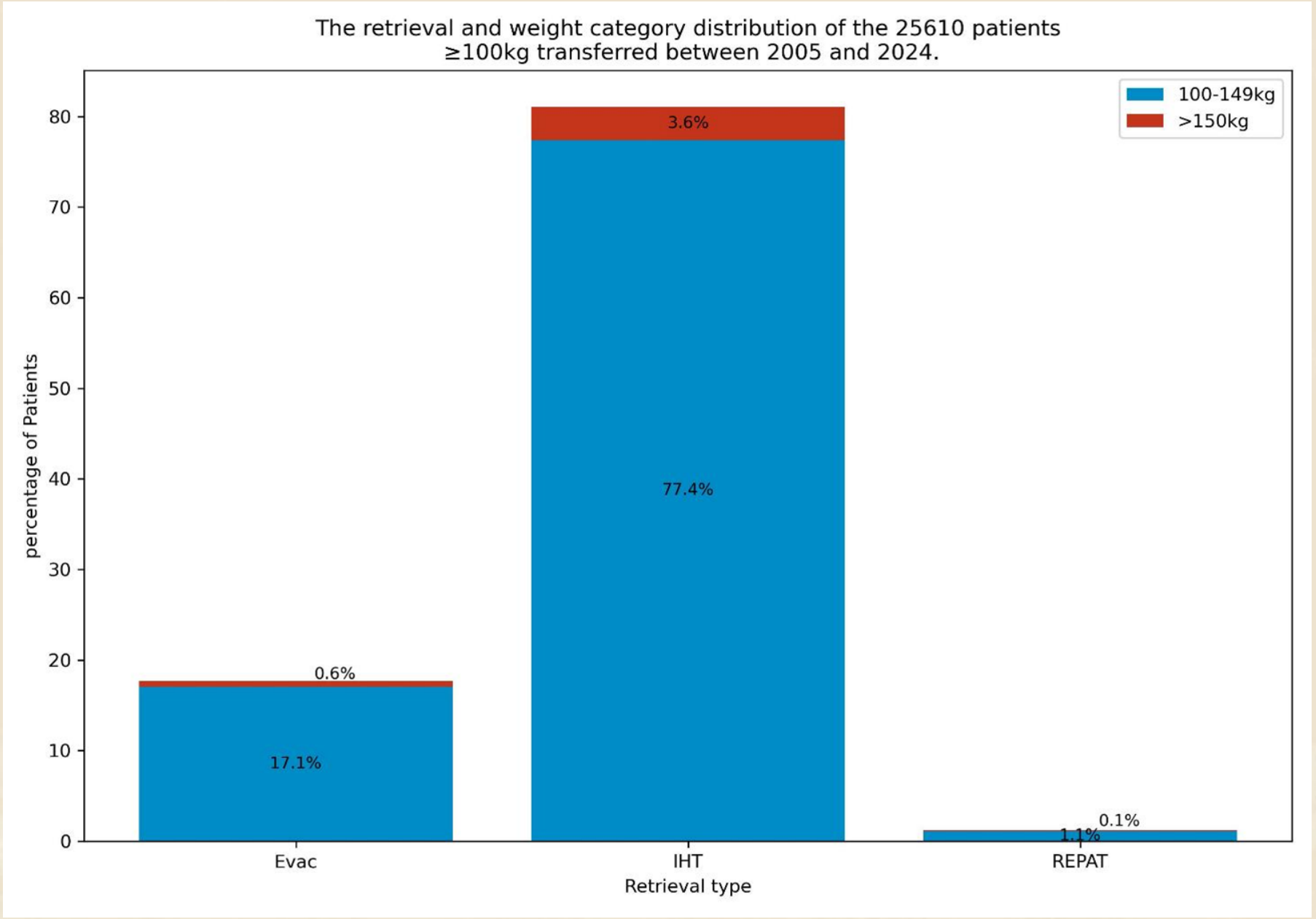
Number of RFDSWO 100kg+ patients, categorized by year and weight bracket, and percentage of those transfers that used a bariatric stretcher between 2016 – 2024

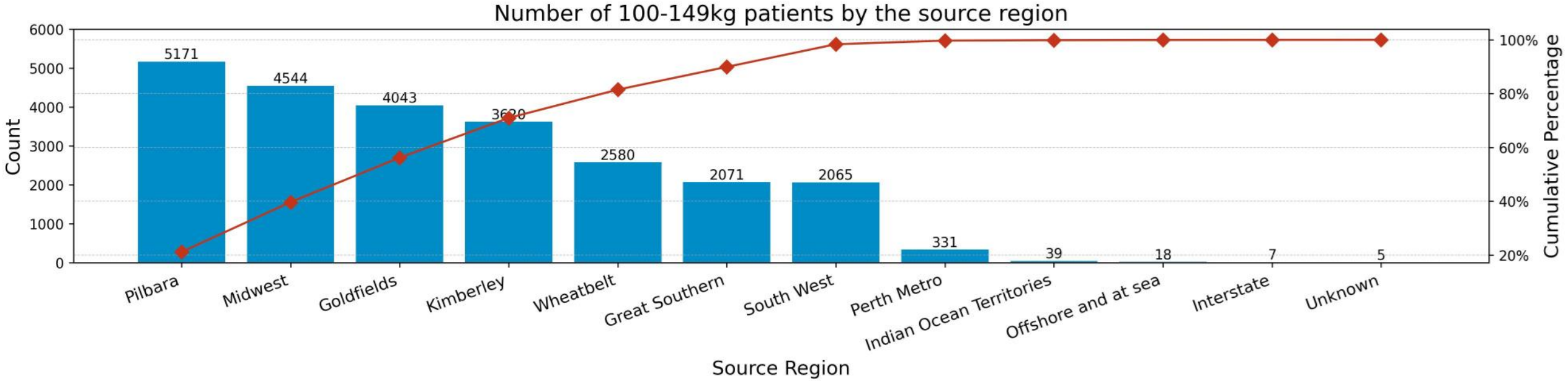
Weight Group	ICD CHAPTER TITLE	Patients	% of all patients ≥100kg
100-149kg	Circulatory system	6891	26.91%
	Injury & poisoning	4967	19.39%
	Digestive system	2741	10.70%
	Symptoms, signs & abnormal findings	2449	9.56%
	Respiratory	1693	6.61%
	Genitourinary	1098	4.29%
	Pregnancy, childbirth & puerperium	982	3.83%
	Mental & behavioural disorders	754	2.94%
	Infectious & parasitic diseases	603	2.35%
	Musculoskeletal	548	2.14%
>150kg	Circulatory system	245	0.96%
	Respiratory	153	0.60%
	Injury & poisoning	150	0.59%
	Digestive system	130	0.51%
	Symptoms, signs & abnormal findings	130	0.51%
	Genitourinary	78	0.30%
	Skin & subcutaneous	65	0.25%
	Infectious & parasitic diseases	56	0.22%
	Endocrine, nutritional & metabolic	25	0.10%
	Musculoskeletal	24	0.09%

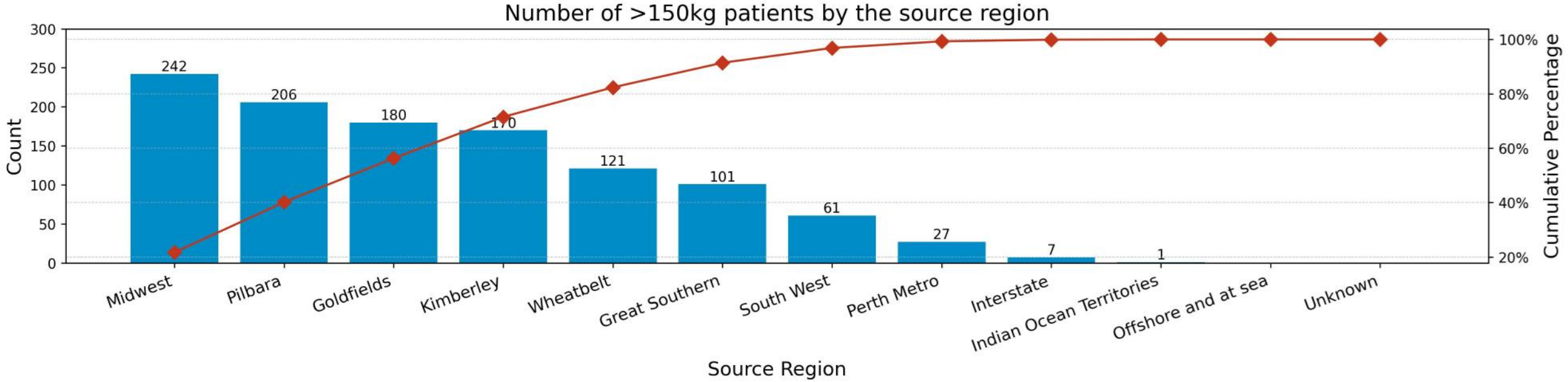
Top ten reasons by ICD-10 code for RFDSWO transfer of patients that weighed 100-149kg and 150kg+ between 2005 – 2024.

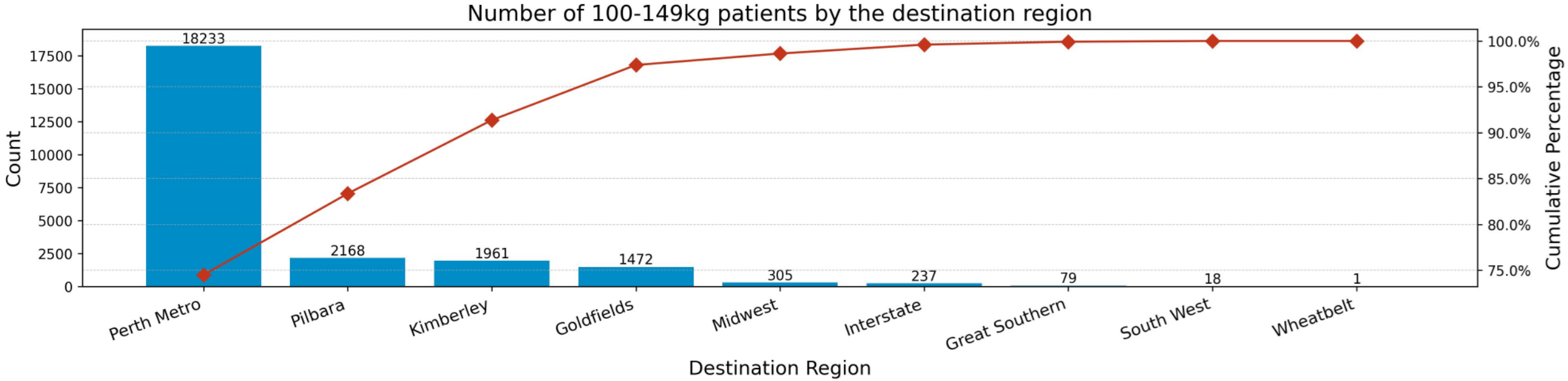
Year	Weight Group	Total Patients	CPR	VENT
2005	100-149kg	535	0	28
	>150kg	14	0	2
2006	100-149kg	655	0	37
	>150kg	24	0	1
2007	100-149kg	721	0	43
	>150kg	27	0	3
2008	100-149kg	777	1	54
	>150kg	27	0	4
2009	100-149kg	884	0	72
	>150kg	51	0	5
2010	100-149kg	1074	0	71
	>150kg	43	1	7
2011	100-149kg	1150	2	69
	>150kg	43	0	8
2012	100-149kg	1343	3	74
	>150kg	58	0	4
2013	100-149kg	1282	1	63
	>150kg	59	0	3
2014	100-149kg	1310	0	66
	>150kg	76	1	2
2015	100-149kg	1375	1	85
	>150kg	79	0	4
2016	100-149kg	1246	1	61
	>150kg	55	0	3
2017	100-149kg	1285	1	67
	>150kg	53	1	4
2018	100-149kg	1258	2	55
	>150kg	68	0	2
2019	100-149kg	1466	2	66
	>150kg	59	0	3
2020	100-149kg	1617	3	43
	>150kg	68	0	0
2021	100-149kg	1606	1	56
	>150kg	77	0	3
2022	100-149kg	1514	2	48
	>150kg	81	0	6
2023	100-149kg	1721	3	51
	>150kg	68	0	2
2024	100-149kg	1675	2	55
	>150kg	86	0	2

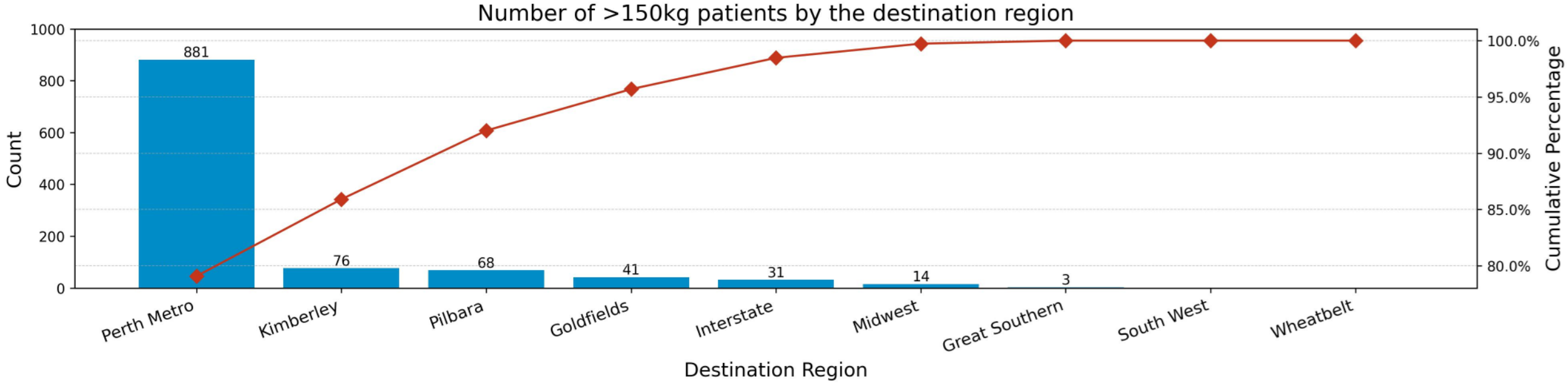
Number of patients per year categorized by 100-149kg and 150kg+ weight brackets that were ventilated, intubated and resuscitated when transferred by RFDSWO between 2005–2024


The retrieval and weight category distribution of the 25610 patients
≥100kg transferred between 2005 and 2024.
100-149kg
>150kg
percentage of Patients
0
10
20
30
40
50
60
70
80
0.6%
17.1%
3.6%
77.4%
0.1%
1.1%
Evac
IHT
REPAT
Retrieval type


Number of 100-149kg patients by the source region
Count
Cumulative Percentage
Source Region
Pilbara
Midwest
Goldfields
Kimberley
Wheatbelt
Great Southern
South West
Perth Metro
Indian Ocean Territories
Offshore and at sea
Interstate
Unknown
5171
4544
4043
3620
2580
2071
2065
331
39
18
7
5


Number of >150kg patients by the source region
Count
Cumulative Percentage
Source Region
Midwest
Pilbara
Goldfields
Kimberley
Wheatbelt
Great Southern
South West
Perth Metro
Interstate
Indian Ocean Territories
Offshore and at sea
Unknown
242
206
180
170
121
101
61
27
7
1


Number of 100-149kg patients by the destination region
Count
Cumulative Percentage
18233
2168
1961
1472
305
237
79
18
1
Perth Metro
Pilbara
Kimberley
Goldfields
Midwest
Interstate
Great Southern
South West
Wheatbelt
Destination Region


Number of >150kg patients by the destination region
Count
Cumulative Percentage
881
76
68
41
31
14
3
Perth Metro
Kimberley
Pilbara
Goldfields
Interstate
Midwest
Great Southern
South West
Wheatbelt
Destination Region

Explore variable bariatric tasking for 150-199kg patients for greater insight into decision-making with focus groups

Publish project findings to demonstrate demand for bariatric capability in aeromedicine

Promote safety & wellbeing - bariatric patients & retrieval staff

Support evidence-based service planning e.g. tasking, PHC

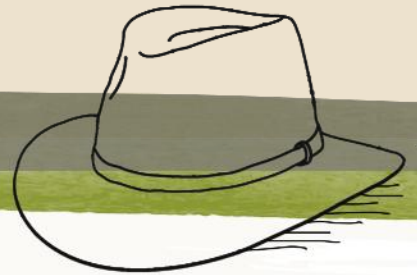
Advocate for bariatric stretcher allocation at each RFDSWO base

Aeromedical Excellence

When patients no longer fit the health system

- Increasing bariatric retrieval demand and patient weights
- Class III obese patients over 300 kg
- Risk of access inequities
- Aeromedical limitations: > 285 kg
- 500 kg capability possible, but not cost-effective

- Sustainable solutions and strategy for bariatric care & transport
- Prevention, early intervention & targeted treatment for obesity
- Reduce obesity rates and bariatric weights
- Promote healthy living & weight management



Sustainable Bariatric Solutions

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