ICSs and PHM in context: a Dorset perspective

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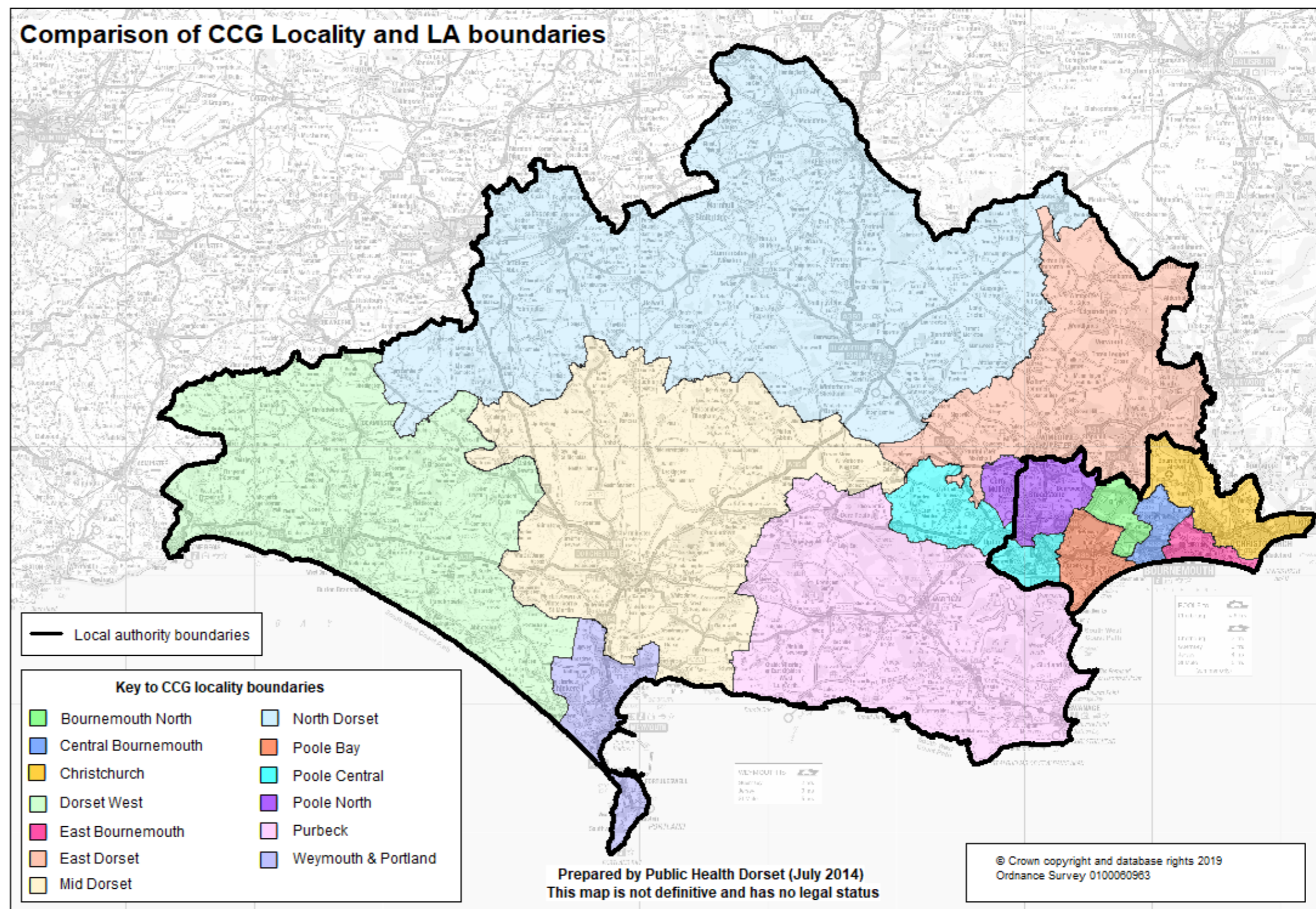Director of Public Health, Public Health Dorset
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Dorset ICS

- Population 770,000
- One CCG (not a CSU)
- Two Unitary Authorities
- One Community Provider
- Three Acute Trusts – with plans for merger of two
- 13 Localities
- ? 16 Primary Care Networks expected
- One public health team

Comparison of CCG Locality and LA boundaries

— Local authority boundaries

Key to CCG locality boundaries

- Bournemouth North
- Central Bournemouth
- Christchurch
- Dorset West
- East Bournemouth
- East Dorset
- Mid Dorset
- North Dorset
- Poole Bay
- Poole Central
- Poole North
- Purbeck
- Weymouth & Portland

Prepared by Public Health Dorset (July 2014)
This map is not definitive and has no legal status

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Ordnance Survey 0100060963

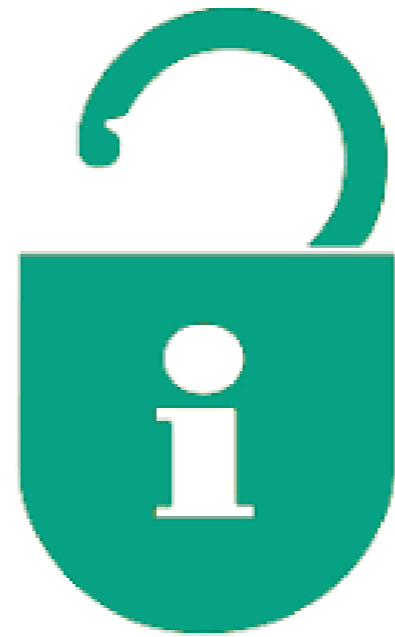Our Dorset
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Population Health Management

- 20 week programme working with Optum
- Funded by NHS England
- 3 pilot localities focusing on:

   North Dorset - Frailty

   Bournemouth East - Diabetes

   Weymouth and Portland   - COPD

                                              - Primary Care Operating Model

Initial Challenge –
getting any data!

Weymouth and Portland Data

Weymouth and Portland Locality

- Population of around 70,000
- To become a single Primary Care Network
- Most deprived locality in West Dorset with worst health outcomes
- 6 practices (with a 7th which shut in March 19)
- Two community hospitals
- History of collaborative working – frailty service, home visiting service, leg ulcer club
- Level of delivery pressure varies by practice

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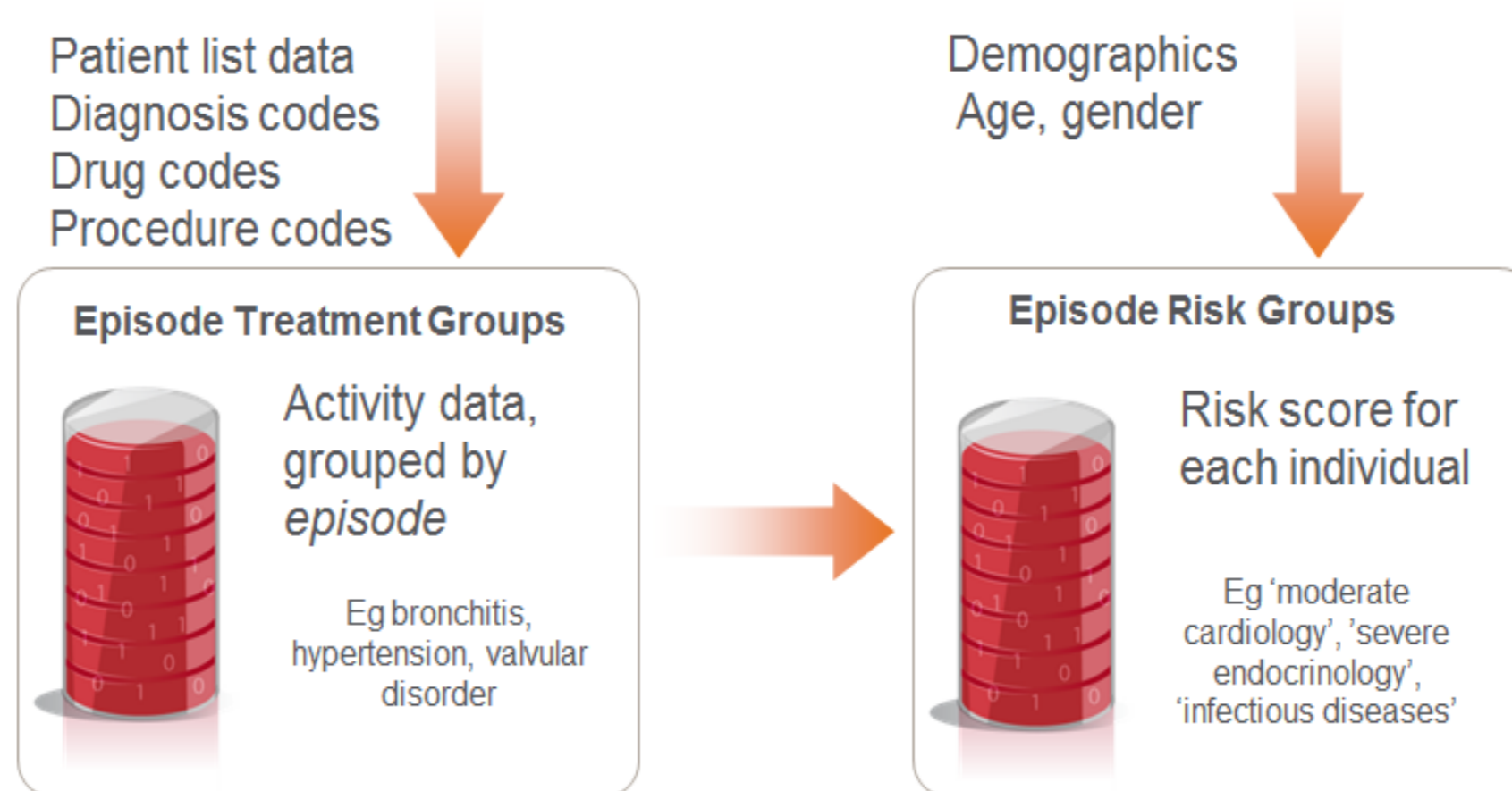Your Local NHS and Councils Working Together

Optum Symmetry Suite

The Symmetry Suite is a **software solution** created by Optum and used across the United States (not just by Optum) to manage the healthcare of over 160 million individuals.

It is used to **rationalise clinical coding** into coherent, concise and clinically relevant groups – called **Episode Treatment Groups**.

These are further distilled into **Episode Risk Groups**, for population-based health risk assessment. ETGs can be considered a distant cousin of HRGs, albeit used for purposes – HRGs for acute reimbursement, ETGs & ERGs for strategic population health analyses.

Patient list data
Diagnosis codes
Drug codes
Procedure codes

Demographics
Age, gender

Episode Treatment Groups

Activity data, grouped by *episode*

Eg bronchitis, hypertension, valvular disorder

Episode Risk Groups

Risk score for each individual

Eg 'moderate cardiology', 'severe endocrinology', 'infectious diseases'

An example would be a patient who develops bronchitis, and goes to see their GP. They end up attending A&E and being admitted to a hospital bed. The GP consultation, A&E visit and admission would be a single Episode Treatment Group, for Bronchitis. This would then group to a broader ERG, such as 'Respiratory Issues'.

Mono-dimensional segmentation: Complexity

For low complexity patients, the profile is fairly flat and then tapers off, indicating a roughly even population of those under 65, and then decreasing numbers beyond that. There is also a high number of the 5-19 year olds.

For middle and high complexity, the age distribution is skewed towards the older end of the spectrum, but with a slightly higher number of 0-4s.

	Population	Spend	£ PPPY
Complexity 1 - Low	53,385	£12,880,762	£241
Complexity 2 - Middle	15,702	£19,650,590	£1,251
Complexity 3 - High	1,813	£8,427,965	£4,649
Total	70,900	£40,959,318	£578

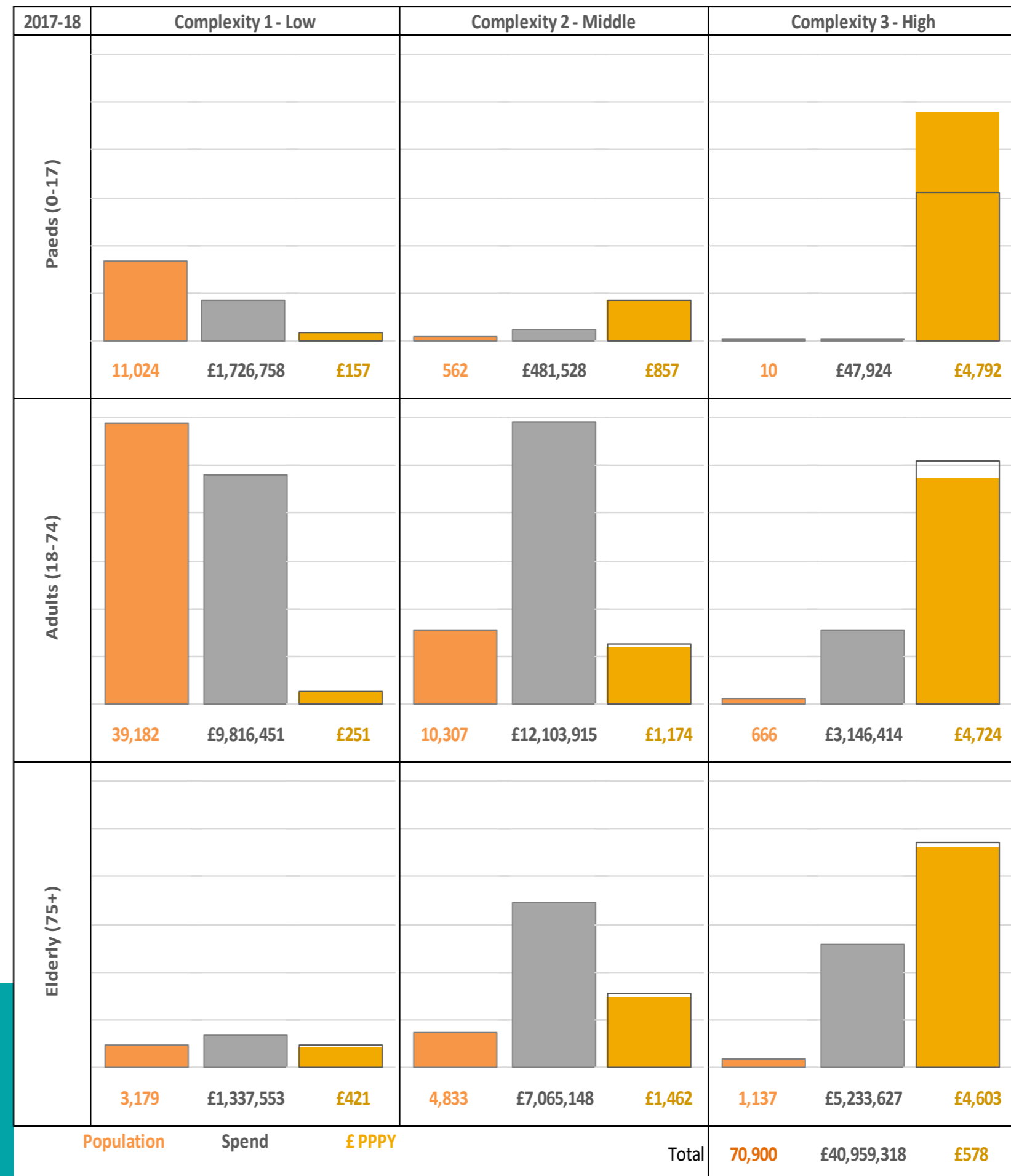

Weymouth & Portland   Total Dorset
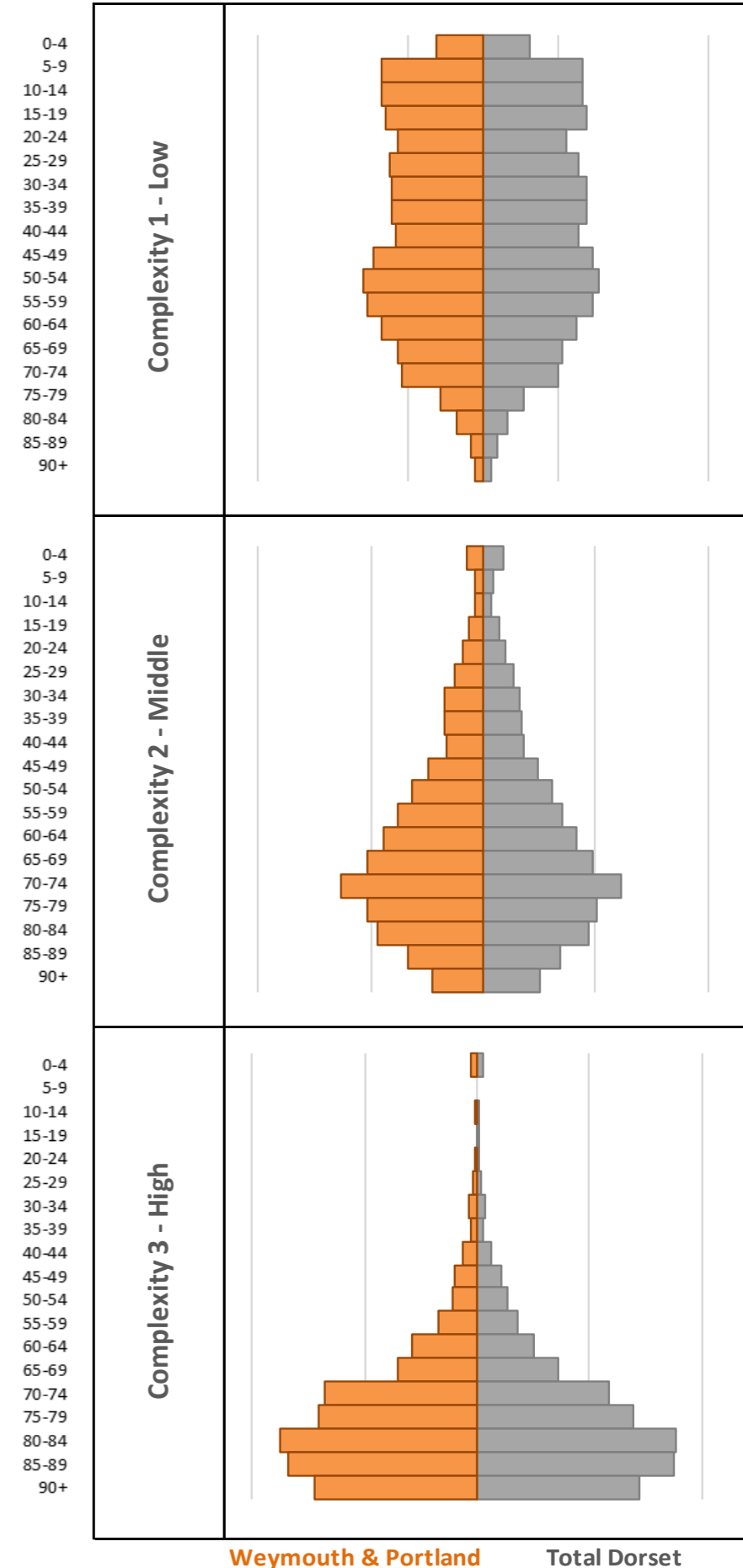
Matrix segmentation

A more advanced technique is to combine two segment dimensions in a matrix format. This allows a more granular view of the population.

Note that increasing age (looking down the matrix) does not increase costs as substantially as increasing complexity (looking left to right).

Also noteworthy is that low complexity adults (middle left), middle complexity adults (centre) and middle complexity elderly (middle bottom) all have similar total spend figures, but very different populations.

Finally, we have added a black outline to the PPPY chart to denote a benchmark against the total Dorset population of participating localities.

2017-18	Complexity 1 - Low			Complexity 2 - Middle			Complexity 3 - High		
Paeds (0-17)	11,024	£1,726,758	£157	562	£481,528	£857	10	£47,924	£4,792
Adults (18-74)	39,182	£9,816,451	£251	10,307	£12,103,915	£1,174	666	£3,146,414	£4,724
Elderly (75+)	3,179	£1,337,553	£421	4,833	£7,065,148	£1,462	1,137	£5,233,627	£4,603
	Population	Spend	£ PPPY						
						Total	70,900	£40,959,318	£578

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Socio-demographic profile of patient lists by practice

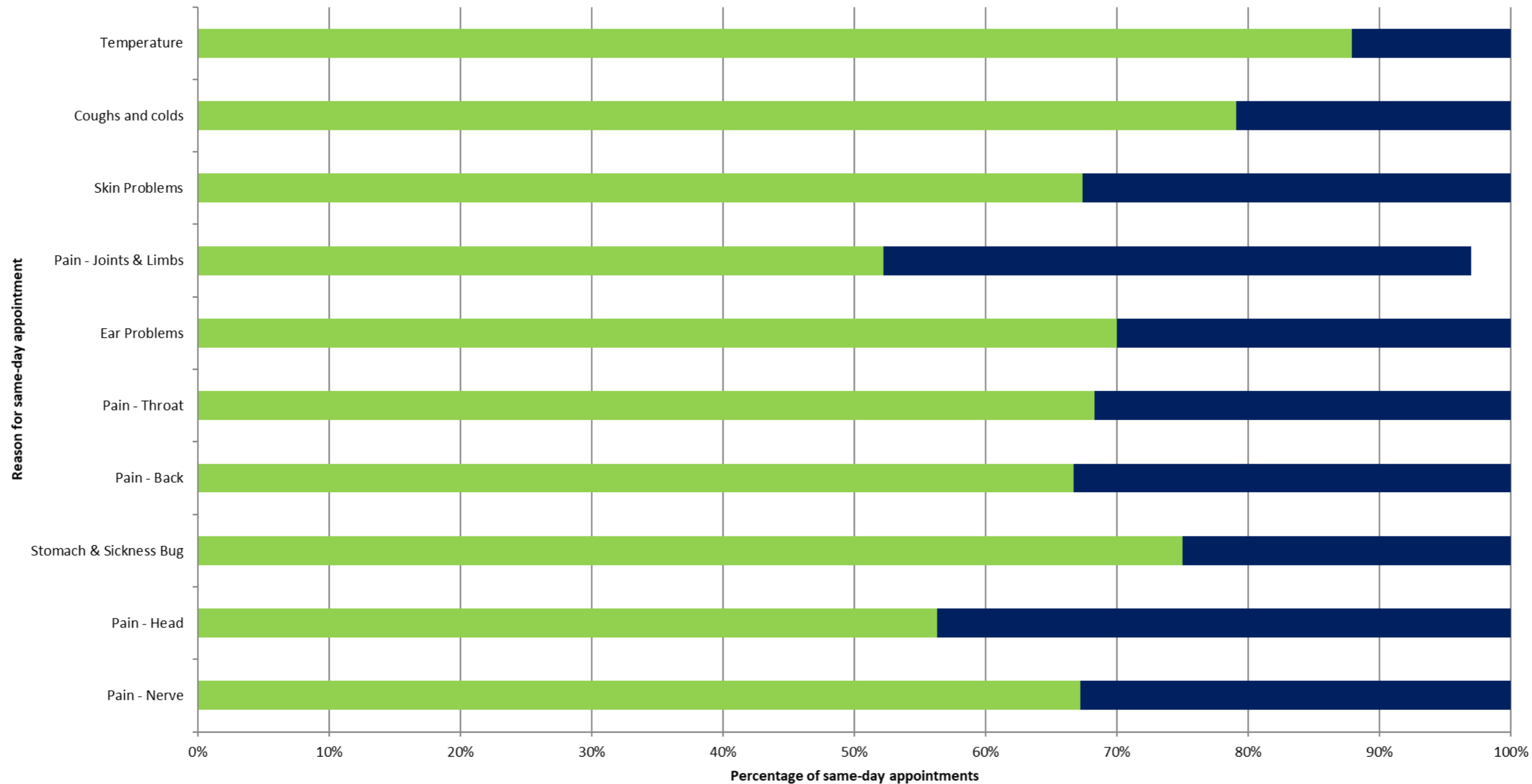|	Practice 1	Practice 2	Practice 3	Practice 4	Practice 5	Practice 6	Practice 7	**W&P General Practice Federation**
Practice list size	3,863	5,353	6,547	19,326	12,349	16,440	11,528	**75,406**
Mean age	45.2	48.1	45.4	48.5	44.9	45.6	46.2	**46**
% female	49.6%	51.1%	50.6%	50.3%	50.2%	51.1%	50.5%	**50.4%**
Mean IMD decile (1 - most deprived, 10 - least deprived)	5.2	5.3	6.2	5.7	4.0	4.6	5.3	**5.1**
Output area classification	Hard-pressed living	Urbanites	Urbanites	Suburbanites	Urbanites	Hard-pressed living	Hard-pressed living	**Urbanites**

Percentage of patients by Episode Risk Group
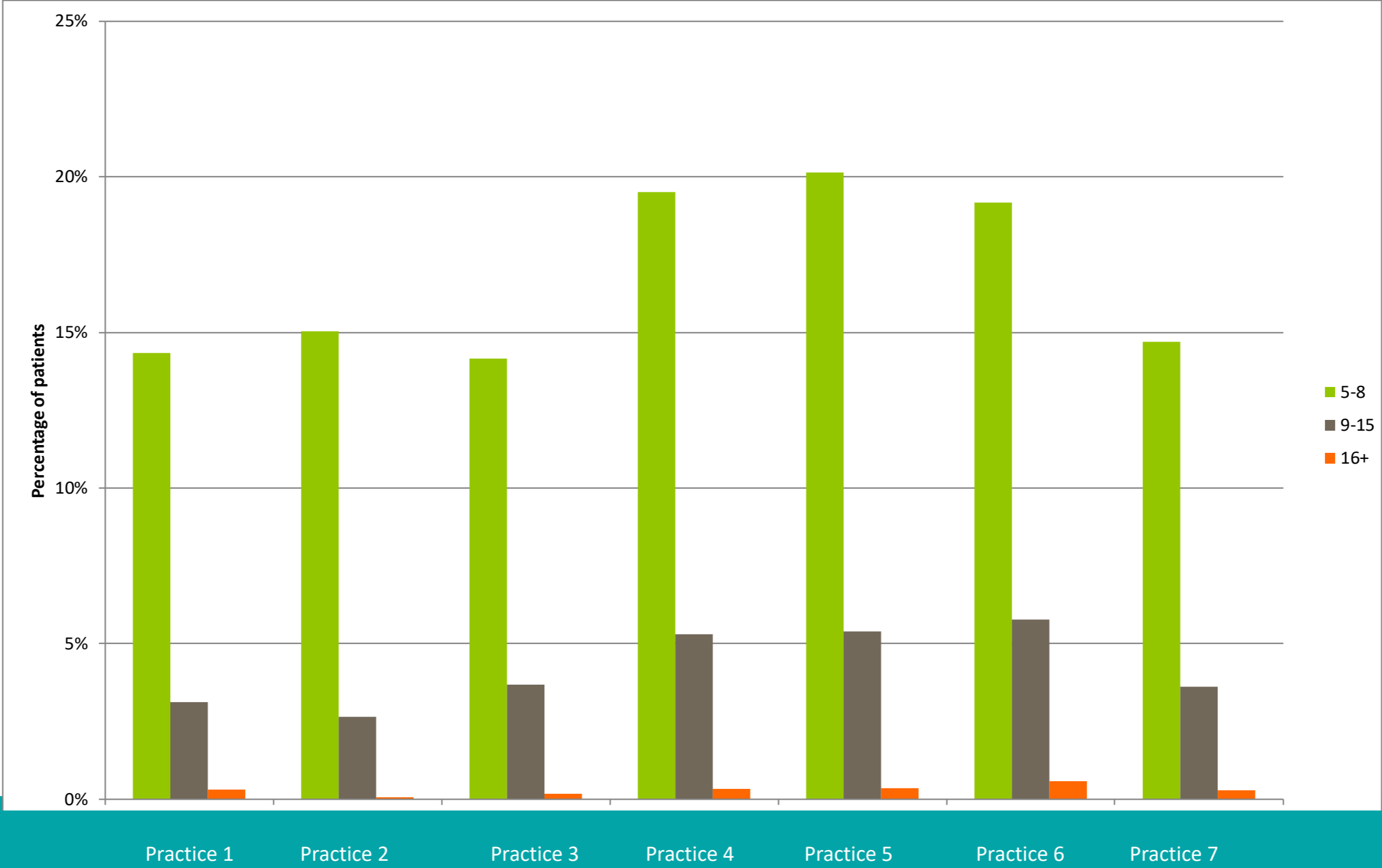
Health profile of patient lists by practice

Practice:	1	2	3	4	5	6	7	Whole Pop.
Mean number of ERGs	2.01	2.18	1.93	2.65	2.61	2.73	2.01	2.41
Mean number of ERGs (65+)	3.84	3.64	3.8	4.54	4.9	4.8	3.73	4.34
Risk of non-elective admission in next 12 months amongst 65+ - no. of times more likely compared with general pop	x1.7	x1.6	x1.6	x1.8	x1.9	x1.9	x1.7	x1.8
Prevalence - Physical health								
Asthma/COPD	14.1%	16.8%	15.7%	15.6%	15.2%	18.2%	12.9%	15.5%
Acute renal failure	0.7%	0.7%	0.5%	0.6%	0.6%	0.8%	0.7%	0.7%
Arthritis	0.4%	0.8%	0.7%	0.8%	0.7%	0.8%	0.5%	0.7%
Bronchitis	1.5%	1.8%	2.0%	1.6%	2.4%	2.2%	1.5%	1.9%
Cancer	12.5%	14.5%	11.8%	16.0%	14.3%	18.1%	13.2%	14.9%
Cardiology	10.1%	13.8%	10.1%	12.6%	13.6%	13.7%	10.6%	12.2%
Chronic renal failure	3.7%	4.5%	3.9%	4.7%	5.0%	6.3%	5.1%	4.9%
Depression	12.3%	3.8%	8.7%	13.6%	5.9%	14.9%	7.3%	10.5%
Dermatology	15.6%	15.9%	14.4%	18.7%	20.3%	20.2%	16.1%	18.0%
Diabetes	5.2%	5.9%	4.5%	5.6%	6.4%	6.1%	5.7%	5.7%
Endocrinology	9.2%	5.9%	5.5%	8.4%	11.3%	8.4%	7.5%	8.5%
Gastroenterology	7.1%	12.3%	6.6%	8.9%	12.5%	11.6%	7.6%	9.6%
Heart failure	4.3%	4.8%	4.0%	5.8%	4.9%	5.7%	4.3%	5.0%
Hypertension	16.0%	16.1%	16.6%	17.9%	16.8%	17.5%	15.7%	16.9%
Neurology	7.0%	6.7%	6.6%	9.2%	8.0%	10.3%	7.4%	8.3%
Pulmonary	3.0%	4.8%	2.7%	4.2%	3.1%	4.0%	3.1%	3.6%
Urology	3.0%	3.6%	2.9%	4.1%	6.0%	3.3%	2.8%	3.3%
Physiological-social								
BMI (18+)	26.9	27.3	26.8	26.8	27.4	27.1	27.6	27.1
Frailty	*to be populated using source methodology*							

Adults over the age of 65 in Weymouth and Portland are on average 1.8x more likely to have an emergency admission than the general population.
As we would expect the practices with the higher mean ERG scores also have the higher risk of non-elective admission in the next 12 months

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Individual Practice Data: Same-day appointments by patient reason and clinical allocation

Utilising insights from the primary care system we can start to identify opportunities for patient redirection. This example shows opportunities for re-direction of up to 50% for same-day appointments.

Percentage of same-day appointments

Reason for same-day appointment:
- Temperature
- Coughs and colds
- Skin Problems
- Pain - Joints & Limbs
- Ear Problems
- Pain - Throat
- Pain - Back
- Stomach & Sickness Bug
- Pain - Head
- Pain - Nerve

Legend:
- Appropriate
- Could be re-directed

COPD data

Segmentation – Matrix View

According to the data, there are 2,880 patients living in Weymouth & Portland, who have been recorded as having COPD

| 2017-18	Complexity 1 - Low			Complexity 2 - Middle			Complexity 3 - High		
Adults (18-59)	288	£128,498	£446	213	£250,364	£1,175	30	£139,755	£4,658
Older Adults (60-74)	461	£173,855	£377	636	£895,478	£1,408	130	£614,385	£4,726
Elderly (75+)	223	£115,130	£516	640	£1,054,920	£1,648	259	£1,317,371	£5,086
	Population	Spend	£ PPPY				Total 2,880	£4,689,757	£1,628

Segmentation – Dashboard View

We can show the COPD population of Weymouth & Portland, by complexity level, in terms of their demographic characteristics, activity & economic measures, and their physical and mental health disease casemix.

Immediately we can make some observations:

- Middle complexity is the largest group

- Age tends to increase with complexity

- Deprivation is consistent across complexity

- Even the low complexity group are fairly multimorbid

- Steep increase in mental health prevalence

	Low Complexity	Middle Complexity	High Complexity	Whole Pop
Demographic & Clinical Measures				
Population	973	1,489	419	2,881
Average Age	65	72	77	70
Average ERGs	1.9	6.0	12.6	5.6
Average Deprivation Decile	4.8	4.8	4.8	4.8
Care Plan in Place	18%	37%	66%	35%
Pulmonary Rehab	6%	10%	6%	8%
Activity & Economic Measures				
Spend - Total	£0.4m	£2.2m	£2.1m	£4.7m
Spend PPPY - Total	£429	£1,478	£4,944	£1,628
Spend PPPY - Acute	£238	£1,118	£4,415	£1,301
Acute - Inpatient EL	£71	£370	£699	£317
Acute - Inpatient EM	£74	£502	£3,124	£739
Acute - Outpatients	£78	£192	£346	£176
Acute - A&E	£15	£54	£245	£69
Spend PPPY - GP	£191	£360	£529	£327
Activity PPPY - Inpatients	0.1	0.7	2.2	0.7
Activity PPPY - A&E	0.1	0.3	1.5	0.4
Prevalence - Physical Health				
Acute Renal Failure	0.2%	1.3%	9.3%	2.1%
Cancer	9.4%	28.7%	55.1%	26.0%
Cardiology	7.2%	24.2%	45.6%	21.6%
Chronic Renal Failure	0.9%	8.7%	33.9%	9.7%
COPD	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Dermatology	8.1%	28.2%	53.2%	25.1%
Diabetes	4.0%	15.0%	31.5%	13.7%
Endocrinology	6.0%	20.8%	38.7%	18.4%
Gastroenterology	4.3%	17.8%	34.4%	15.7%
Heart Failure	6.4%	21.9%	50.6%	20.8%
Hypertension	18.4%	48.4%	74.9%	42.1%
Infectious Disease	0.6%	2.8%	13.6%	3.6%
Neurology	4.6%	24.5%	58.5%	22.7%
Pulmonary	8.6%	14.3%	19.1%	13.1%
Smoking	35.6%	36.0%	45.3%	37.2%
Prevalence - Mental Health				
Mental Health	4.3%	14.9%	35.8%	14.4%
Depression	10.5%	22.0%	29.1%	19.2%

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# COPD – Decision Tree – Focus: Emergency Admission Spend
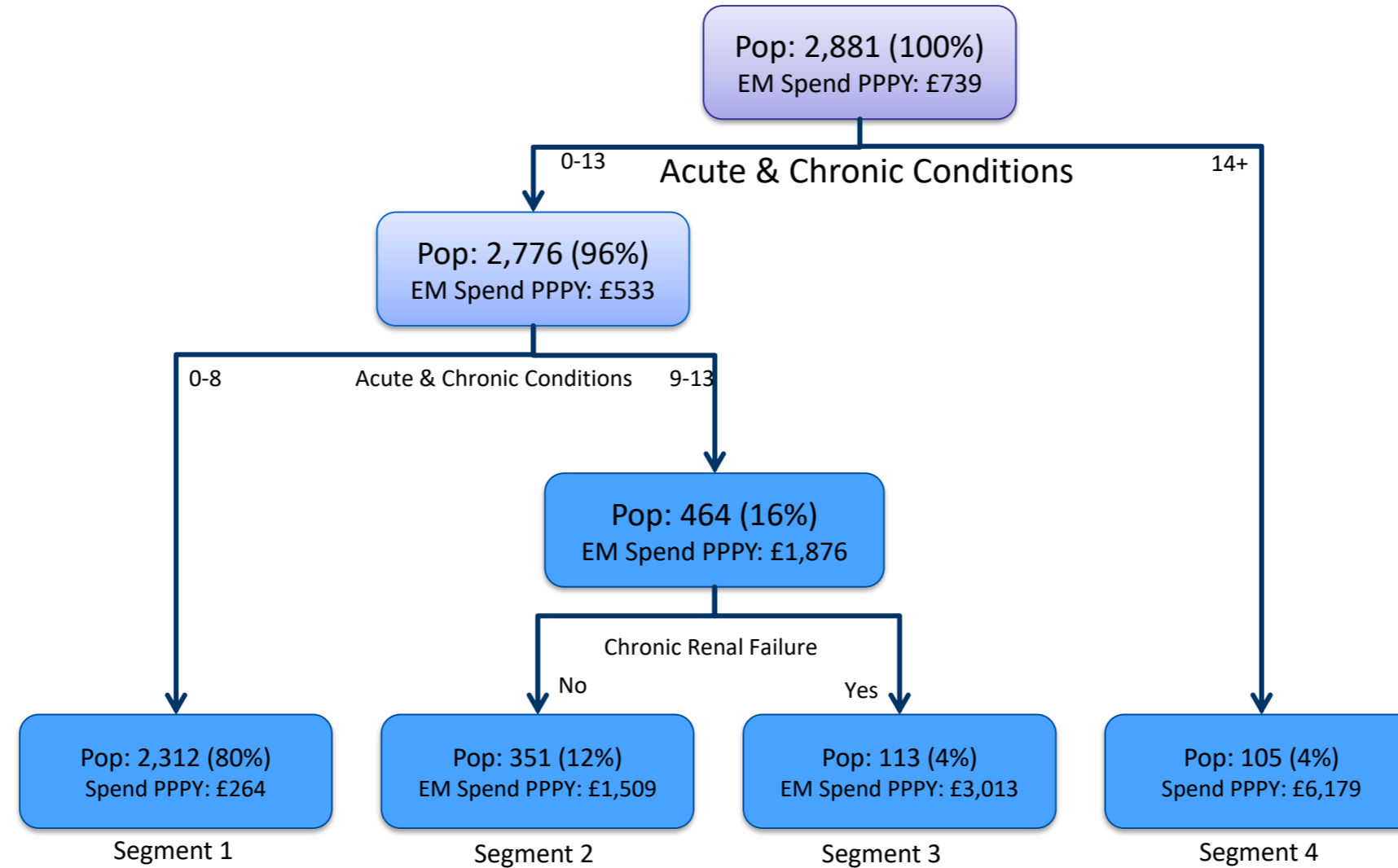
A more data-driven method of segmenting populations is to use a decision tree model, a machine-learning statistical model that uses regression techniques to construct segments. We can feed in many dozens or even hundreds of variables, and the model will suggest the most appropriate ones to use

For the W&P COPD population, the model has created five segments – three based on patient complexity, and two differentiated on whether the patient has chronic renal failure or not.

COPD – Intersegmental Drift

We are also able to show the movement between segments using a Sankey Diagram – and can see that there is a significant amount of movement in our COPD cohort.

Not pictured are 2,142 patients who remained in Segment 1 from 16/17 to 17/18.
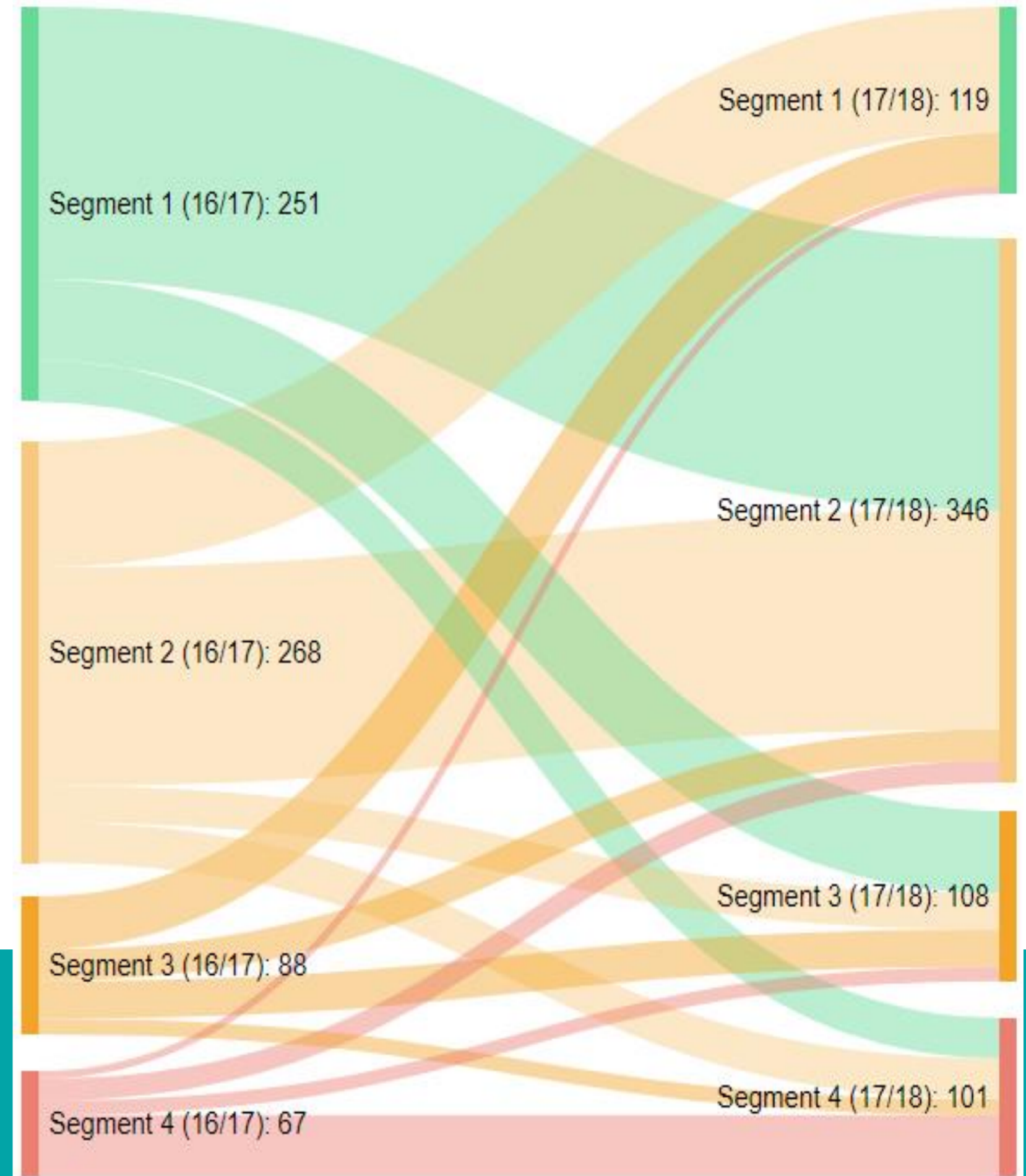
COPD – Intelligent Segmentation

- 80% of patients are in Segment 1
- Age rises with segments
- High mental health prevalence for those in Segment 2

	Segment 1 0 to 8 ERGs	Segment 2 8 to 13 ERGs, no chronic renal failure	Segment 3 8 to 13 ERGs, w/ chronic renal failure	Segment 4 14+ ERGs	Whole Pop
Demographic & Clinical Measures					
Population	2,312	351	113	105	2,881
Average Age	69	74	80	79	70
Average ERGs	4.1	10.4	11.1	16.6	5.6
Average Deprivation Decile	4.8	4.8	4.7	5.1	4.8
Care Plan in Place	28%	53%	68%	77%	35%
Pulmonary Rehab	8%	6%	6%	10%	8%
Activity & Economic Measures					
Spend - Total	£2.2m	£1.1m	£0.5m	£0.9m	£4.7m
Spend PPPY - Total	£948	£3,047	£4,750	£8,484	£1,628
Spend PPPY - Acute	£664	£2,584	£4,206	£7,903	£1,301
Acute - Inpatient EL	£228	£636	£675	£818	£317
Acute - Inpatient EM	£264	£1,509	£3,013	£6,179	£739
Acute - Outpatients	£139	£282	£327	£466	£176
Acute - A&E	£33	£156	£192	£440	£69
Spend PPPY - GP	£284	£464	£543	£582	£327
Activity PPPY - Inpatients	0.4	1.4	2.1	3.6	0.7
Activity PPPY - A&E	0.2	1.0	1.2	2.6	0.4
Prevalence - Physical Health					
Acute Renal Failure	0.6%	4.0%	8.0%	21.0%	2.1%
Cancer	19.5%	49.9%	44.2%	70.5%	26.0%
Cardiology	16.4%	38.7%	46.0%	50.5%	21.6%
Chronic Renal Failure	5.0%	0.0%	100.0%	49.5%	9.7%
COPD	100.0%	100.0%	100.0%	100.0%	100.0%
Dermatology	19.0%	47.9%	42.5%	63.8%	25.1%
Diabetes	9.9%	26.2%	26.5%	41.0%	13.7%
Endocrinology	14.2%	31.3%	29.2%	54.3%	18.4%
Gastroenterology	11.0%	34.8%	24.8%	44.8%	15.7%
Heart Failure	14.7%	40.5%	42.5%	66.7%	20.8%
Hypertension	34.9%	66.7%	76.1%	81.9%	42.1%
Infectious Disease	1.6%	7.7%	9.7%	28.6%	3.6%
Neurology	15.2%	47.3%	48.7%	78.1%	22.7%
Pulmonary	11.5%	17.4%	13.3%	32.4%	13.1%
Smoking	35.9%	40.2%	41.6%	52.4%	37.2%
Prevalence - Mental Health					
Mental Health	9.9%	32.8%	20.4%	45.7%	14.4%
Depression	16.9%	30.5%	16.8%	34.3%	19.2%

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What is our population pyramid…….?
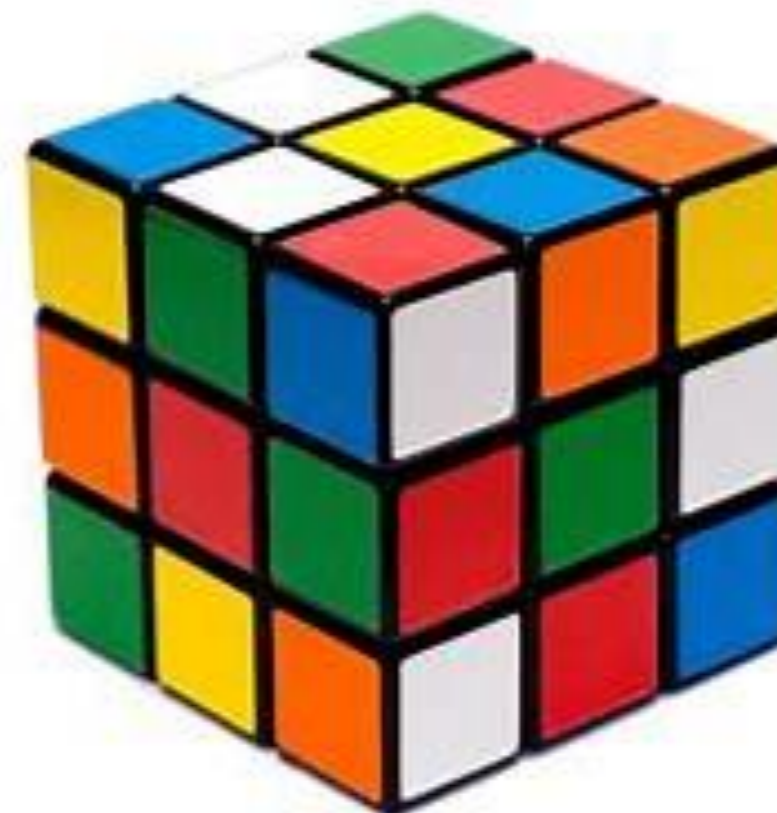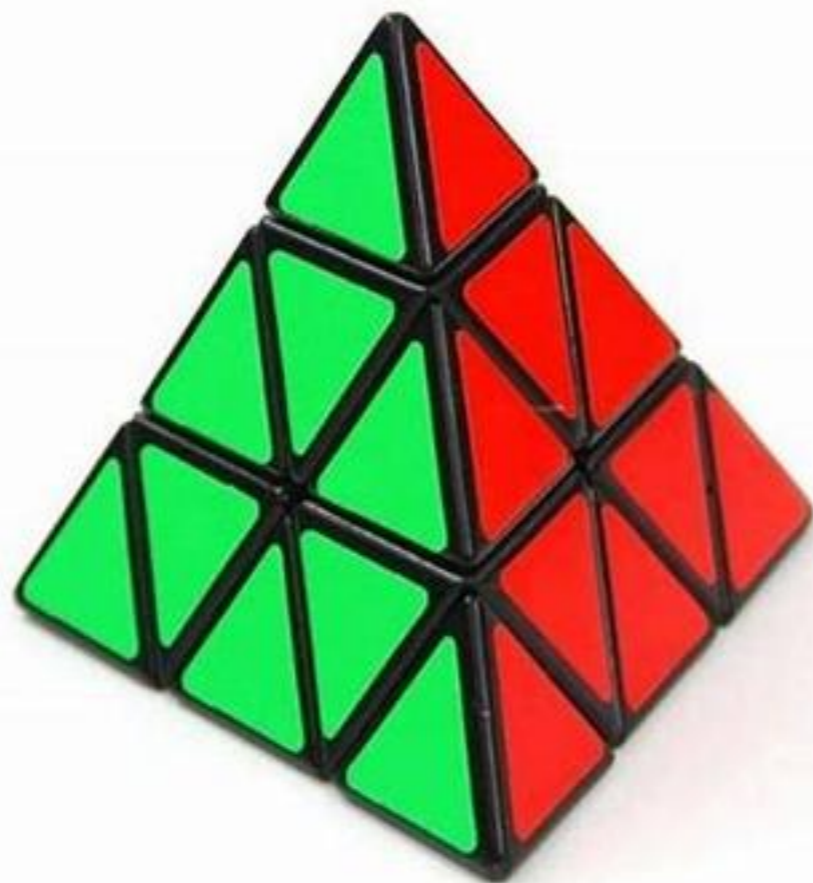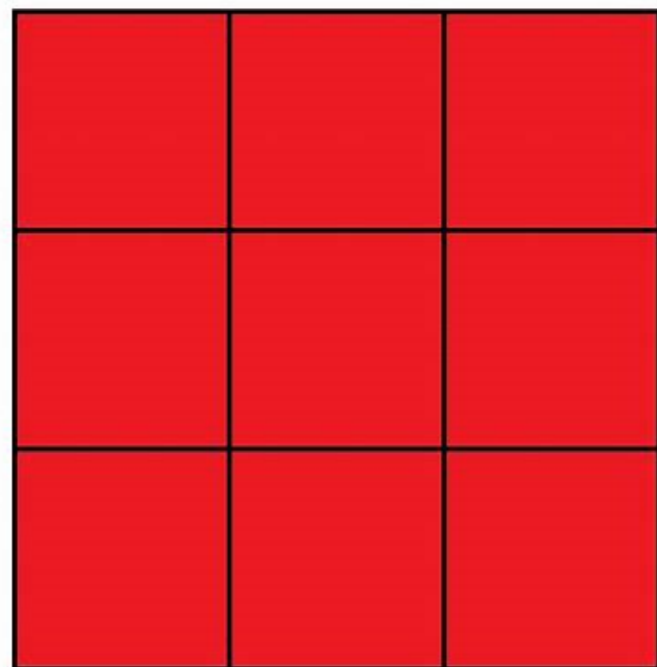
Challenges and risks moving forward

- Skills
- Capacity
- Expectations of our public health team
- Risk that this becomes all about performance management and cost
- Capacity/willingness for practices to work together effectively
- Quality of data
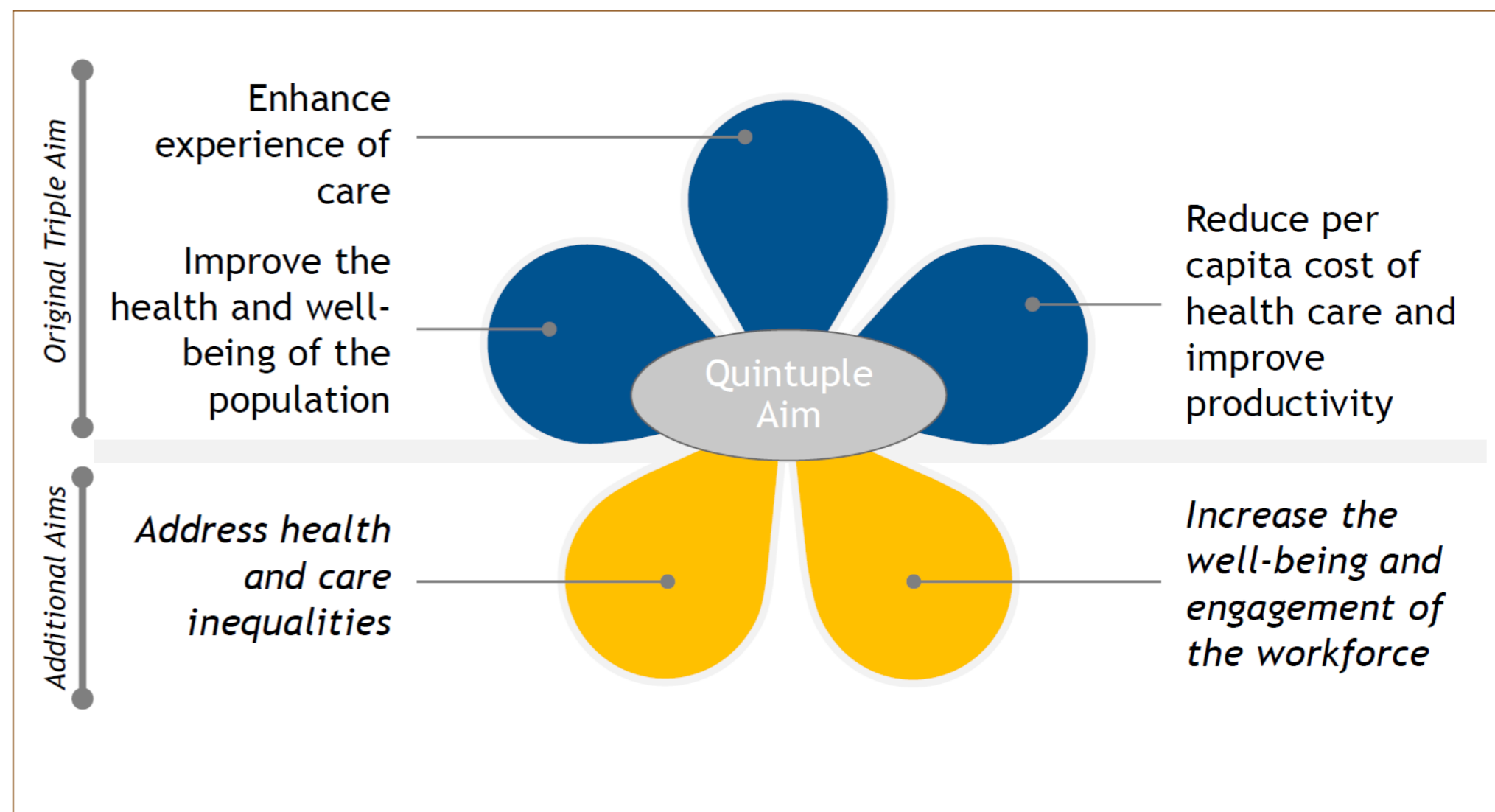
Thank you

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