CIHI

Exploring multimorbidity trajectories in the Canadian population

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Outline

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4. Conclusion and next steps
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Project Goal and motivation

Multimorbidities are existing, co-occurring health conditions that affect a person's health and treatment.

Understand how multimorbidity develops over time:

- Focus on diabetes, cardiovascular disease, and respiratory disease
- Identify different trajectories leading to multimorbidity and death

Motivation

- Multimorbidity patterns requiring different healthcare resources
- Sociodemographic differences across multimorbidity patterns
- Differences in access to primary care and emergency department visits

Data and settings

Data

- Longitudinal chronic files from CIHI's population grouping methodology
- Province of Ontario, most populous province of Canada, ~ 14 millions

Settings

- Time period: FY 2011 – 2018
- Cohort of people aged 40-74 in FY 2011
- Initially have none or just one disease, and by the end, have at least two diseases.
- Baseline population of 508, 792

Methodology and Clustering

Methodology

- 3 diseases, 8 possible states, + exit and death
- Date of the first diagnosis is used to order diseases
- Monthly sequence, from April 1, 2011 to March 31, 2019

Clustering

- Stratified sampling (~10%) due to computational issues, 51, 626 persons
- Sequential clustering technique based on pairwise similarity of sequences, multiple iterations tested
- 7 clusters

Preliminary findings

Descriptives

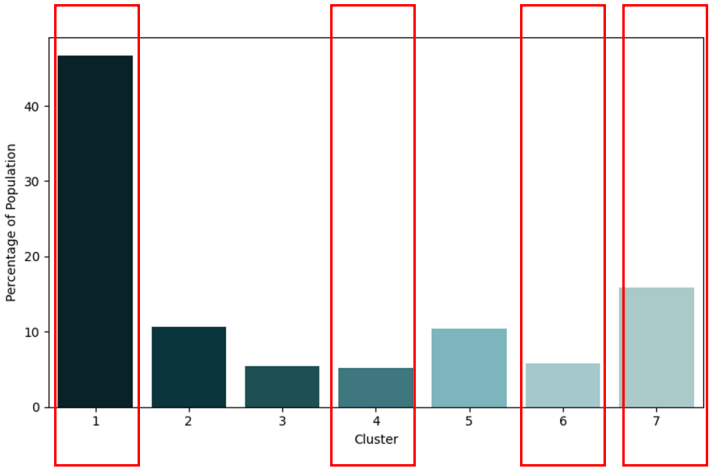
- In April 2011, 82.39% of individuals had none of the three diseases of interest
  - 3.4% had CVD, 12.33% had Diabetes and 1.87% had resp. disease
- By March 2019,
  - 40.84% had diabetes and CVD
  - 11.79% had diabetes and resp. disease
  - 15.41% had CVD and resp. disease
  - 10.89% had the 3 diseases
  - 11.80% patients died
  - 9.28% exited the healthcare system

Cluster Analyses: 7 clusters identified

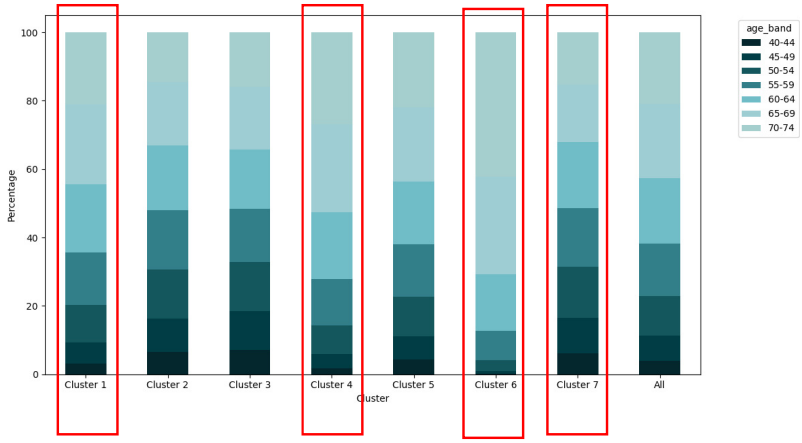
1. **Medium paced transition into Diabetes &CVD**
2. Relatively fast transition into diabetes and resp
3. Slow transition into respiratory multimorbidity
4. **Fast transition into complex multimorbidity**
5. Relatively fast transition into CVD & respiratory
6. **Fast transition into multimorbidity & death**
7. **Slow transition into multimorbidity**

Distribution & demographics of people in clusters

Percentage of population in each cluster

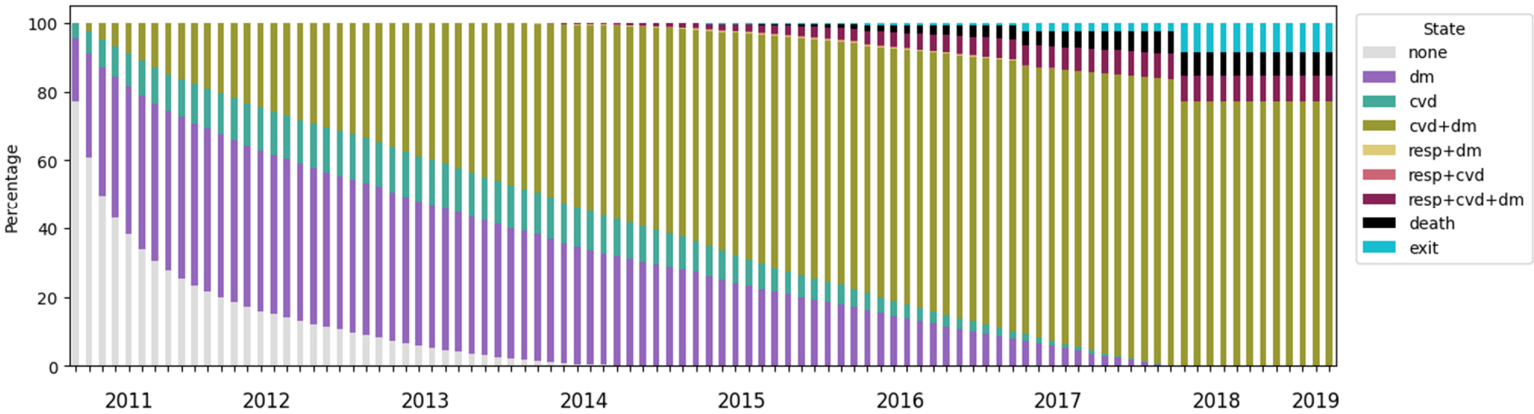


Age distribution, by cluster, lighter older



We look at 4 clusters in depth, clusters 1, 4, 6 and 7

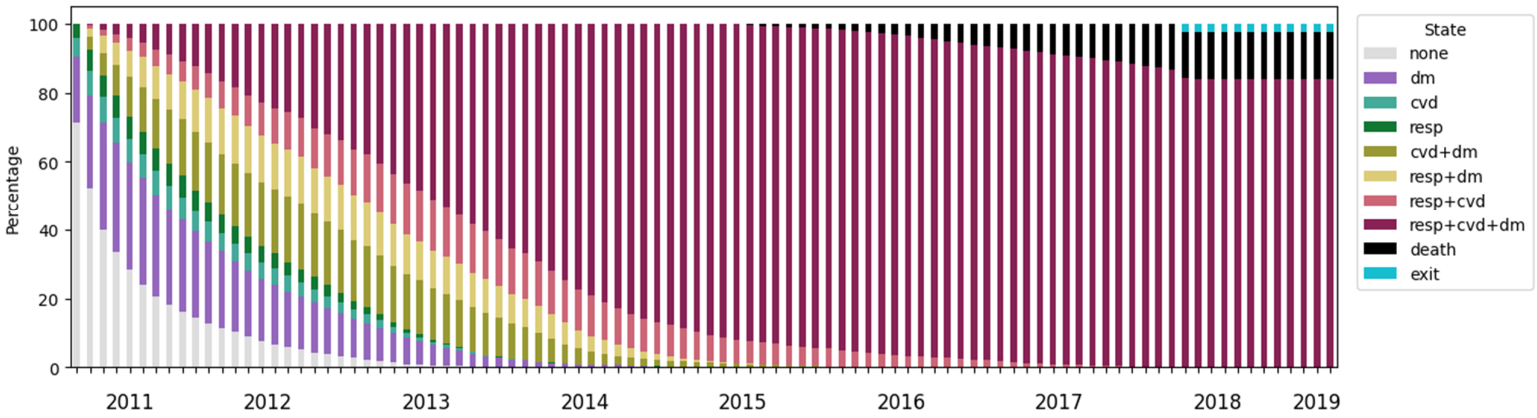
Cluster 1 : Medium paced transition into Diabetes &CVD



- Avg time to first multimorbidity: **3.1** years
- 45% of population, across all ages

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
6.39	3.57	4.59	5.57	6.58	7.55	8.46	8.38

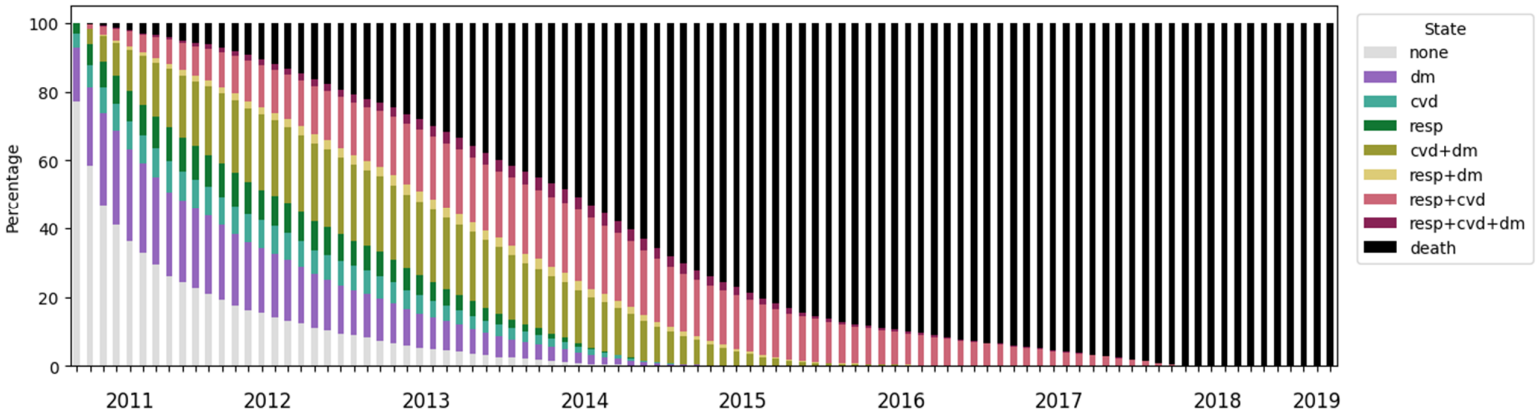
Cluster 4: Fast transition into complex multimorbidity



- Avg time to first multimorbidity: **1.1** years
- 5% of population, older population 65+

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
9.93	5.81	7.81	9.31	10.49	11.51	12.37	12.21

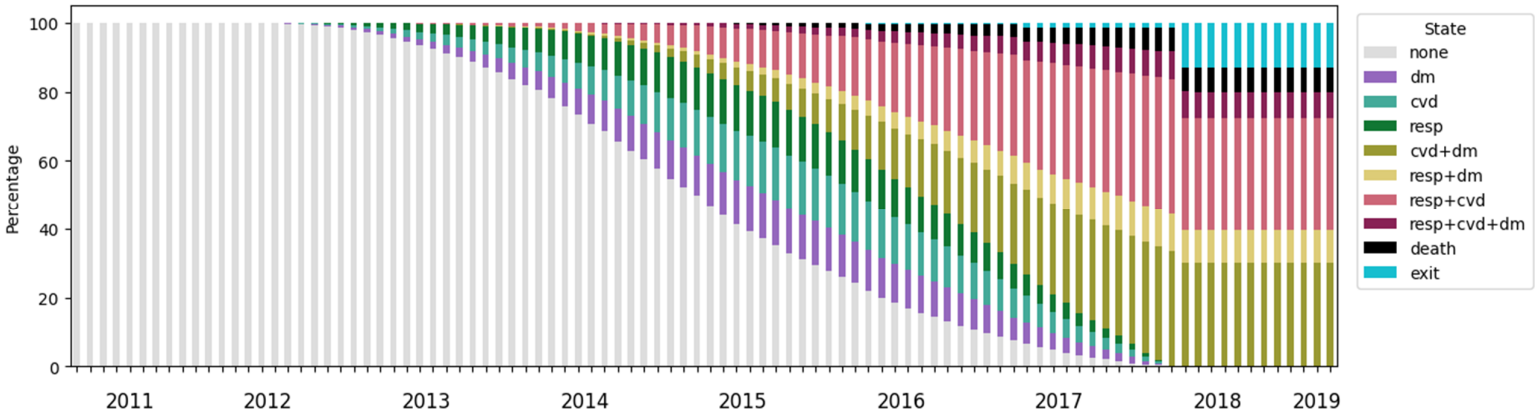
Cluster 6: Fast transition into multimorbidity & death



- Avg time to first multimorbidity: **1.5** years
- 7% of population, cluster with the oldest population 65+

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
10.05	5.97	7.86	9.38	10.43	11.42	12.27	13.03

Cluster 7 : Slow transition into multimorbidity

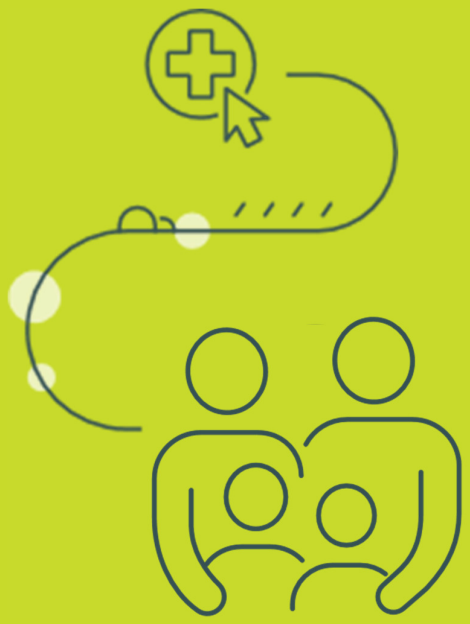


- Avg time to first multimorbidity: **5.2** years
- 15% of population, relatively younger population

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
5.16	2.22	2.85	3.90	5.16	6.50	7.78	7.74

Conclusion and Next steps

- Various trajectories of multimorbidity based on three diseases of interest
- Looking at sociodemographic determinants of health across clusters
- Comparison of number of health conditions and ED visits across clusters
- Finding ways to expand our analysis to the whole population



Better data.
Better decisions.
Healthier Canadians.

This isn't just our mission —
it's our commitment to Canada.

Thank you

For more information, visit

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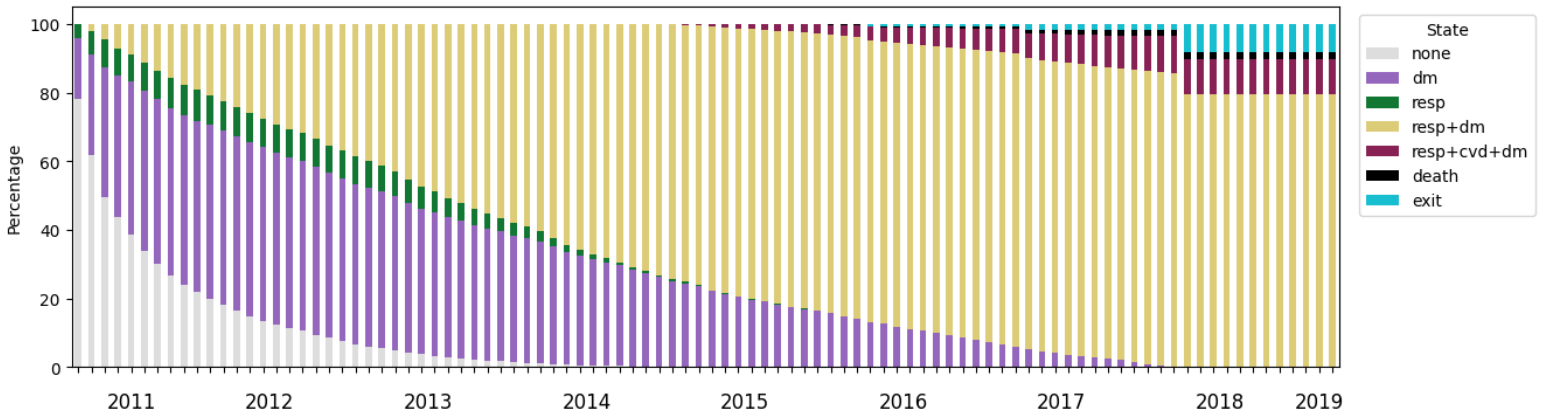
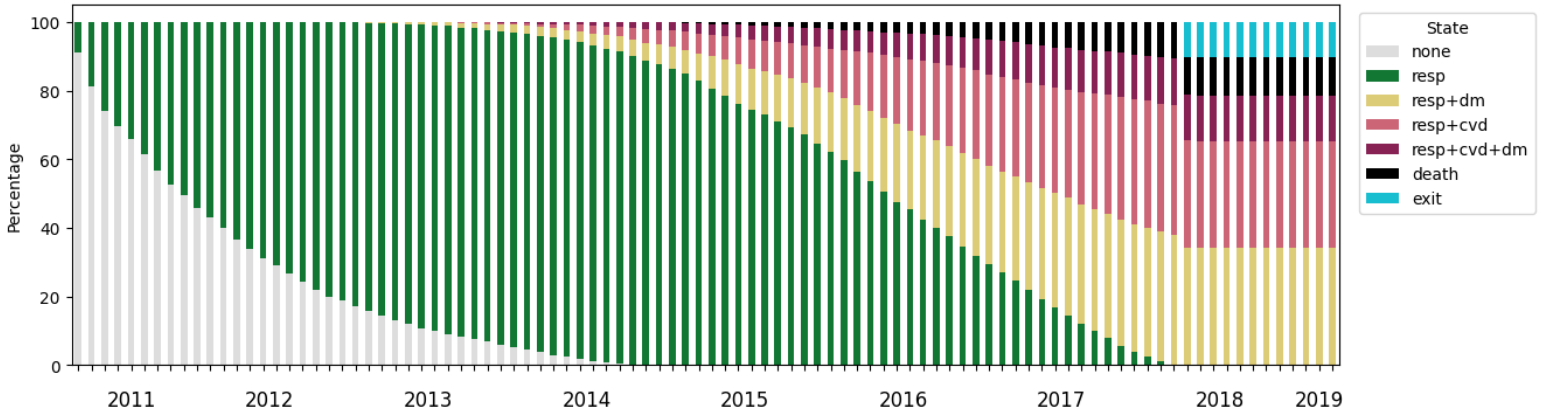
Cluster 2: Relatively Fast transition into diabetes and resp



- Avg time to first multimorbidity: **2.7** years

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
5.56	3.27	4.13	4.96	5.71	6.47	7.21	7.19

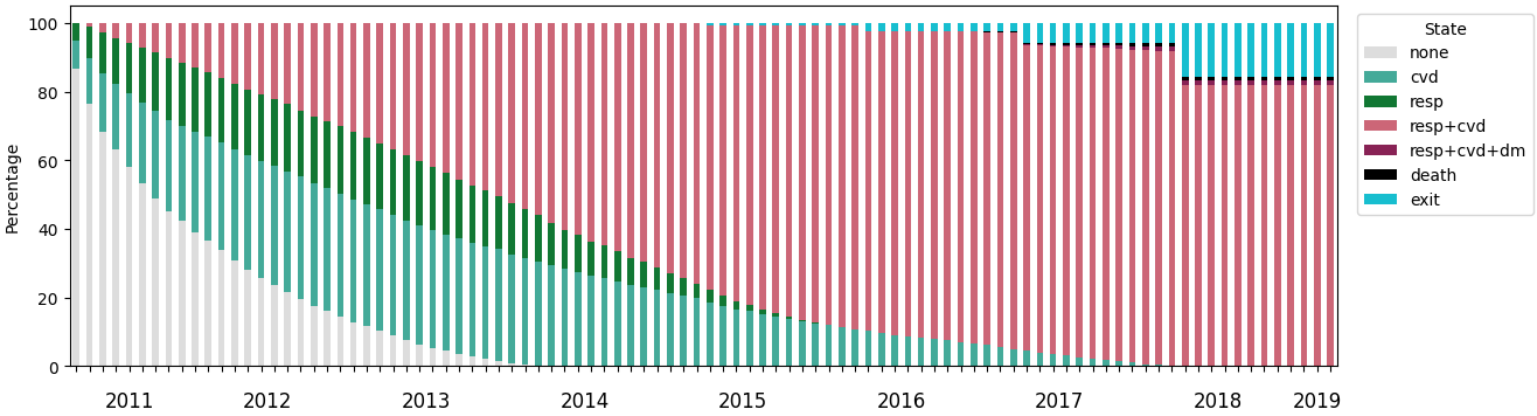
Cluster 3: Slow transition into resp multimorbidity



- Avg time to first multimorbidity: **5** years

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
5.49	2.81	3.55	4.40	5.45	6.67	7.81	7.76

Cluster 5: Relatively fast transition into CVD & resp



- Avg time to first multimorbidity: **2.8** years

Average # chronic conds	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
7.04	4.00	5.25	6.40	7.39	8.20	9.02	9.01