

LINGUISTIC FACTORS IN HEALTHCARE DELIVERY AND OUTCOMES IN ON

Research on the Health of Linguistic Minorities in Ontario

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Some of our Linguistic Minority Team



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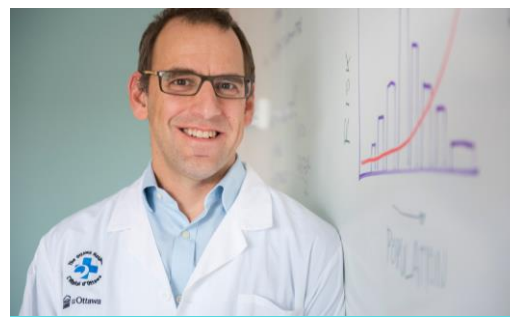
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Our Programs of Research

Linguistic
Minorities

COVID-19
Response

Predictive
Analytics

Public Health:
Alcohol + Cannabis

Physician
Health

Palliative Care

Surabaya, Indonesia – 1978



Mojokerto



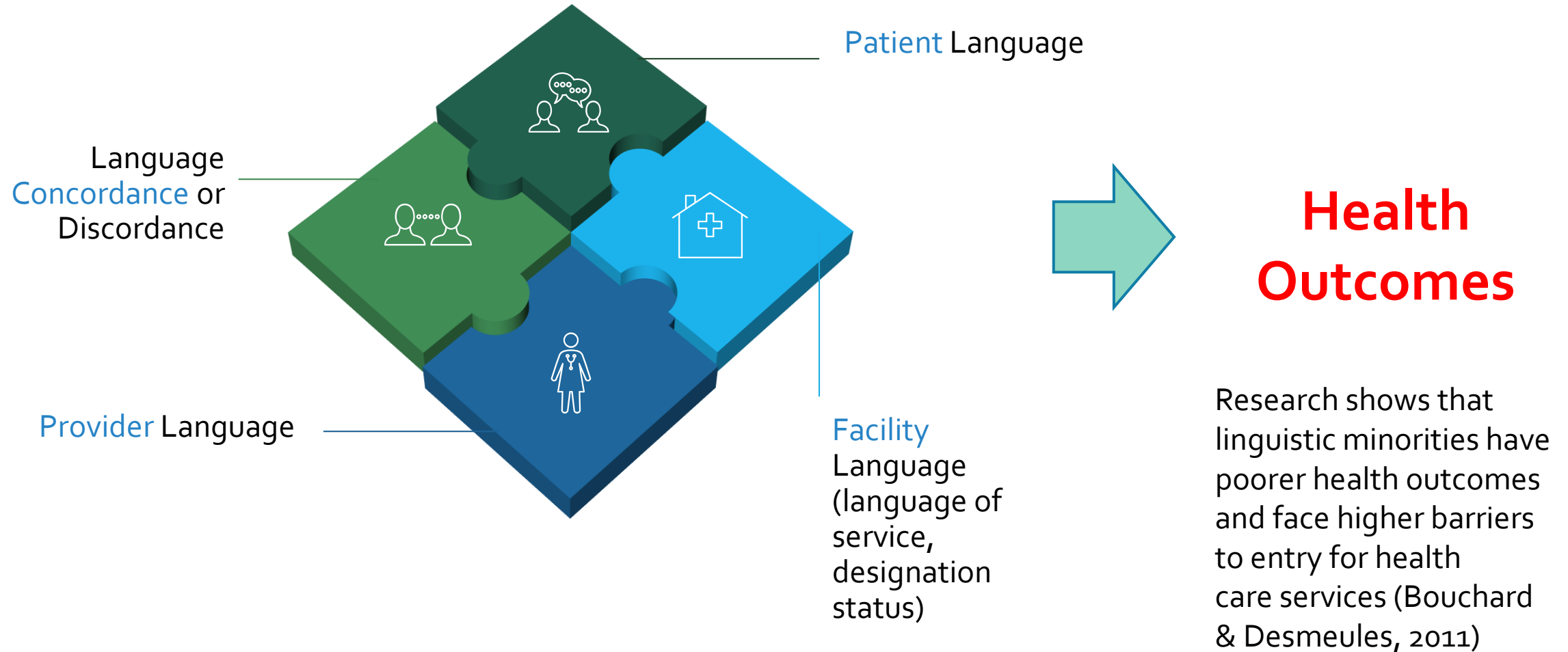
GTA - 1986



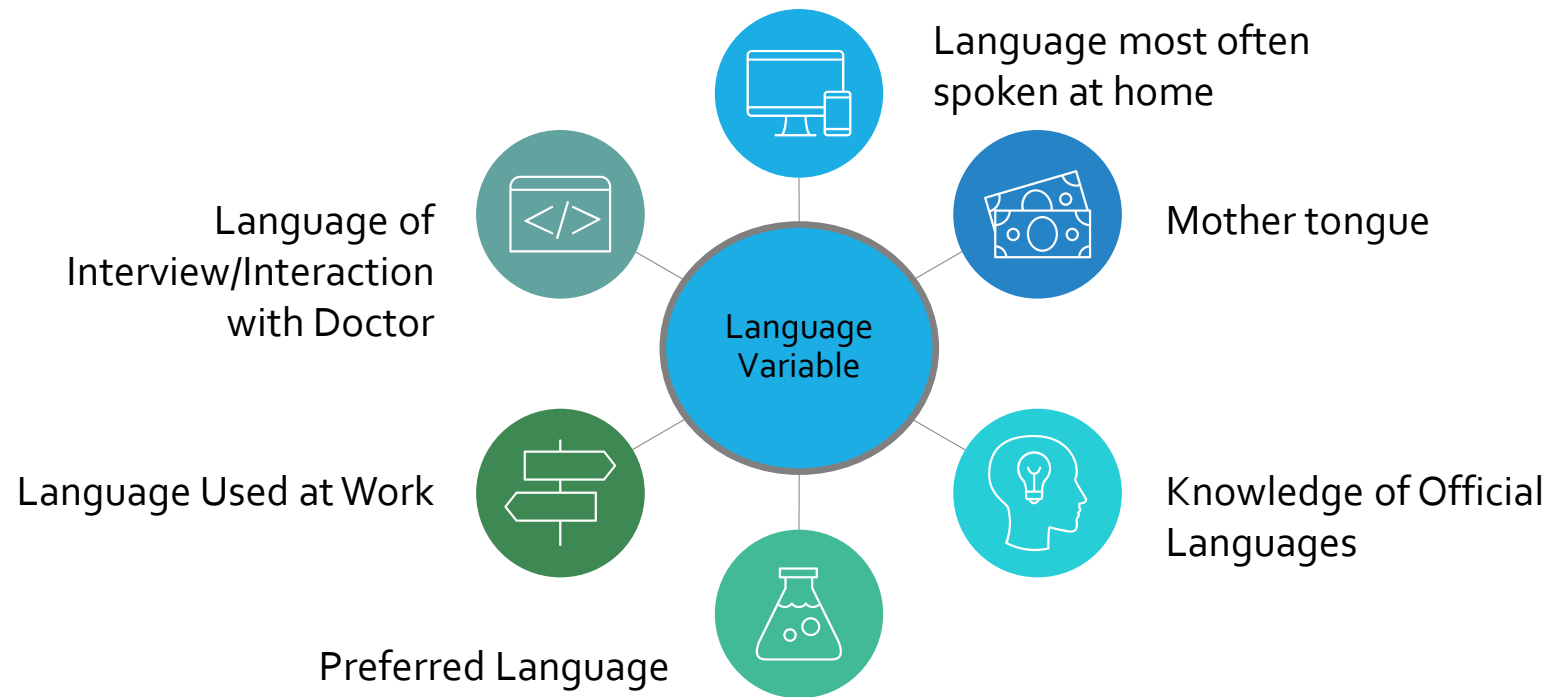
Ottawa - 2012



Language and Healthcare



Language Variables



Language variables in health data hosted at ICES

- Total datasets: 91
- Datasets with language variable: 25 (11 of the Health service datasets)
- Most frequent variable: 'Mother tongue', 'Know. Can Official Lang.' and 'Primary language spoken at home on a regular basis (LOSH)'

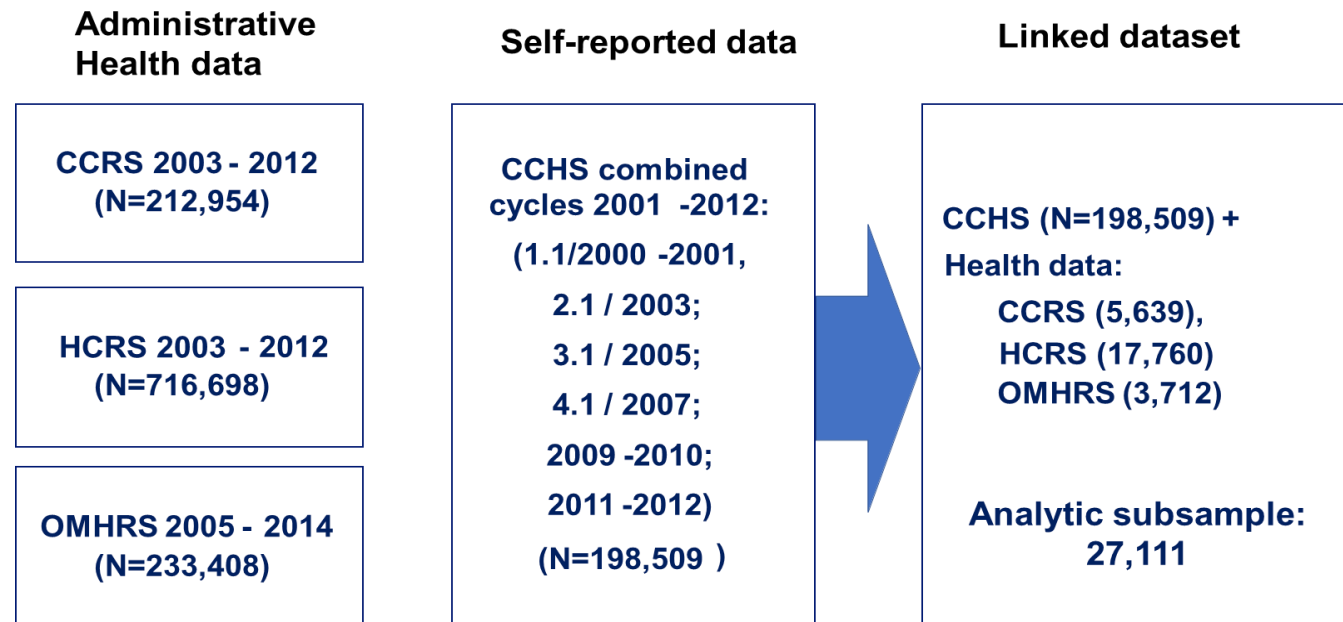
Dataset category	Mother tongue	Lang. often spoken/ on a regular basis	Know Can. Off. Lang.	Lang. Conversation	Lang. of preference	Lang. Interview	Primary Language*	Other type+
Acquired Cohorts / Registries	2	1		1	1		1	
Health Services	2	2	1		2		6	1
Population & Demographics	3		3					
Social					1			
Surveys	5	3	3	3	2	4		1
Total	12	6	7	4	6	4	7	2

* Primary language spoken at home on a regular basis

+ For example: Language to talk to doctor, language of education

Language Variables

- Assess validity of language variables in health data to identify the Francophones
- CCHS respondents from Ontario (combined cycles 2001-2012), linked to three administrative databases at ICES.



Agreement analysis of language variables identifying Francophones: survey vs administrative health data (kappa statistic score)

Language variables in CCHS	Language variables in health data		
	Long-term care- CCRS (N=214)	Home care - RAI-HC (N=632)	OMHRS (N=66)
Mother tongue	0.6114	0.6068	0.3599
Language often spoken at home (LOSH)	0.7502	0.7638	0.5398
Knowledge of official languages (KOL)*	0.4205	0.2842	-
Language spoken to doctor	0.6781	0.6082	0.4560
First official language spoken (FOLS)	0.7103	0.6928	0.5275

Research projects of Language factors in health and healthcare

Main Exposures

- 1) **Linguistic group:** *Anglophone, Francophone, Allophone*
- 2) **Language of service:** *Main language of facility ('Francophoneness'), French Designation of facility*
- 3) **Language discordance:** Patient-facility, Patient-physician

Outcomes

- 1) Healthcare and health outcomes:
 - End of life/ Palliative care,
 - Quality and safety of care
 - Hospitalization
 - ED visits
- 2) Diseases/health conditions
 - Multimorbidity
 - Dementia
 - Neuropsychiatric disorders (psychosis, schizophrenia, dementia, stroke, suicide)
- 3) Mortality

Data sources

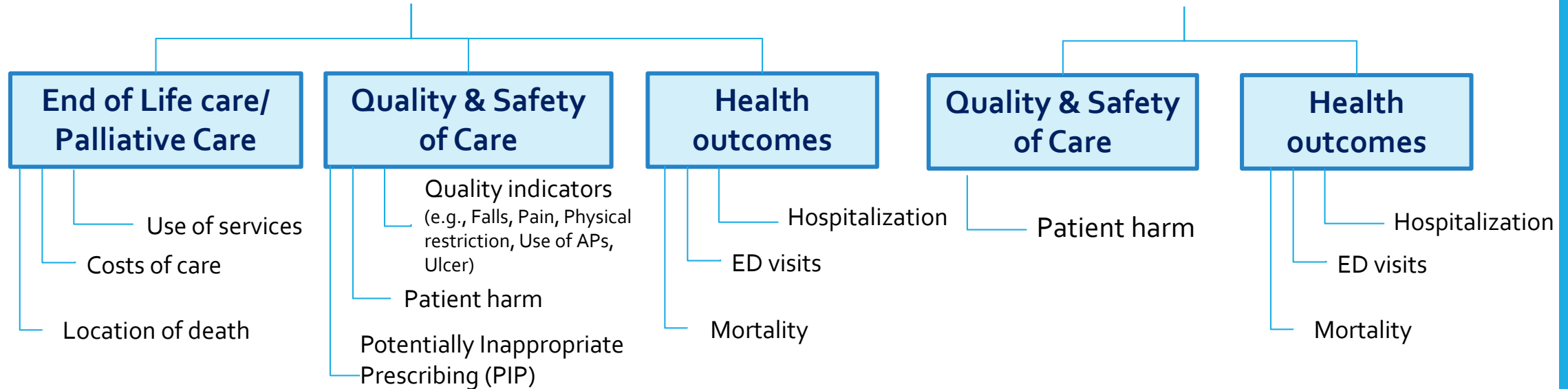
- RPDB, OHIP
- CCRS, interRAI-HC
- DAD, NACRS, OMHRS, ODB,
- IRCC
- IPDB, CPSO

Research projects on Language Factors in Older and frail Ontarians

Healthcare settings

Long-term Care (LTC)

Type of Care & outcomes



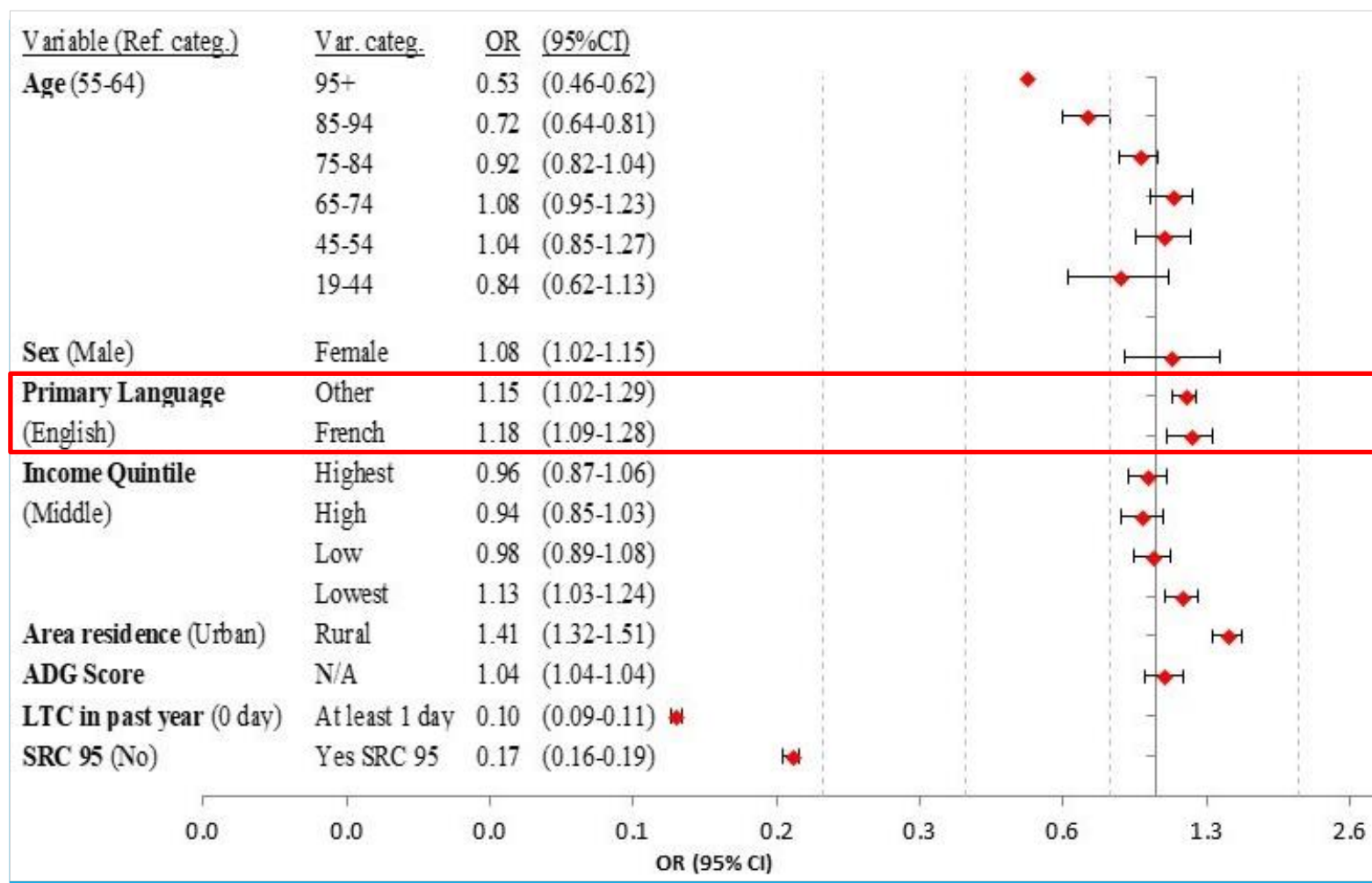
Health Care use at the End-of-life

Sector	Anglophone			Francophone			All decedents		
	Number of users	Proportion of all decedents	Mean cost (\$) among users	Number of users	Proportion of all decedents	Mean cost (\$) among users	Number of users	Proportion of all decedents	Mean cost (\$) among users
Continuing care sectors									
Long-term care	7172	37.1	\$34,903.73	2204	47.6	\$34,362.58	10,167	39.5	\$34,816.76
Complex continuing care	1554	8.0	\$48,393.75	520	11.2	\$34,104.45	2212	8.6	\$45,251.27
Home care	14,754	76.3	\$7,662.57	3305	71.3	\$6,790.28	19,354	75.1	\$7,679.27
Rehabilitation	869	4.5	\$23,564.00	177	3.8	\$22,813.05	1120	4.3	\$24,274.84
Acute care sectors									
Inpatient—No ICU	11,318	58.5	\$28,900.22	2765	59.7	\$27,306.91	15,213	59.1	\$28,728.22
Inpatient—1+ ICU	3228	16.7	\$53,700.10	635	13.7	\$50,678.63	4119	16.0	\$53,876.07
Emergency department	16,138	83.5	\$1,716.70	3799	82.0	\$1,670.66	21,466	83.3	\$1,705.17
Outpatient care sectors									
Outpatient clinics	5882	30.4	\$11,258.13	1149	24.8	\$10,226.40	7422	28.8	\$1,113.03
Physician billings	19,306	99.8	\$5,101.34	4624	99.8	\$4,425.10	25,709	99.8	\$4,965.70
Nonphysician billings (OHIP)	11,345	58.7	\$770.12	2824	60.9	\$736.03	15,140	58.8	\$766.52
Laboratory (OHIP)	15,146	78.3	\$269.00	3524	76.0	\$281.42	20,125	78.1	\$272.24
Drugs/Devices	18,703	96.7	\$3,685.71	4524	97.6	\$4,089.35	24,974	97.0	\$3,740.40
All decedents ^a	19,331	100	\$63,814.02	4635	100	\$62,084.78	25,752	100	\$63,918.26

- Health care utilization and cost in the last year of life by sector in Ontario Decedents from fiscal year 2010/2011 to 2012/2013

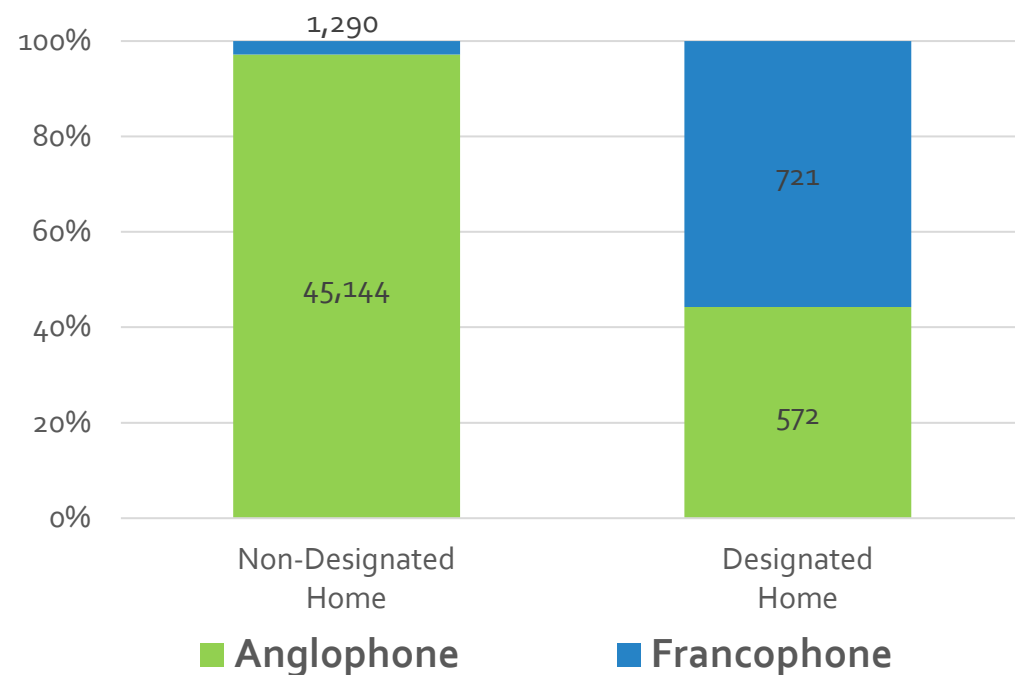
Guerin E, Batista R, Hsu AT, et al. Does End-of-Life Care Differ for Anglophones and Francophones? A Retrospective Cohort Study of Decedents in Ontario, Canada. *J Palliat Med.* 2019; 22: 274-81.

Odds of dying in hospital

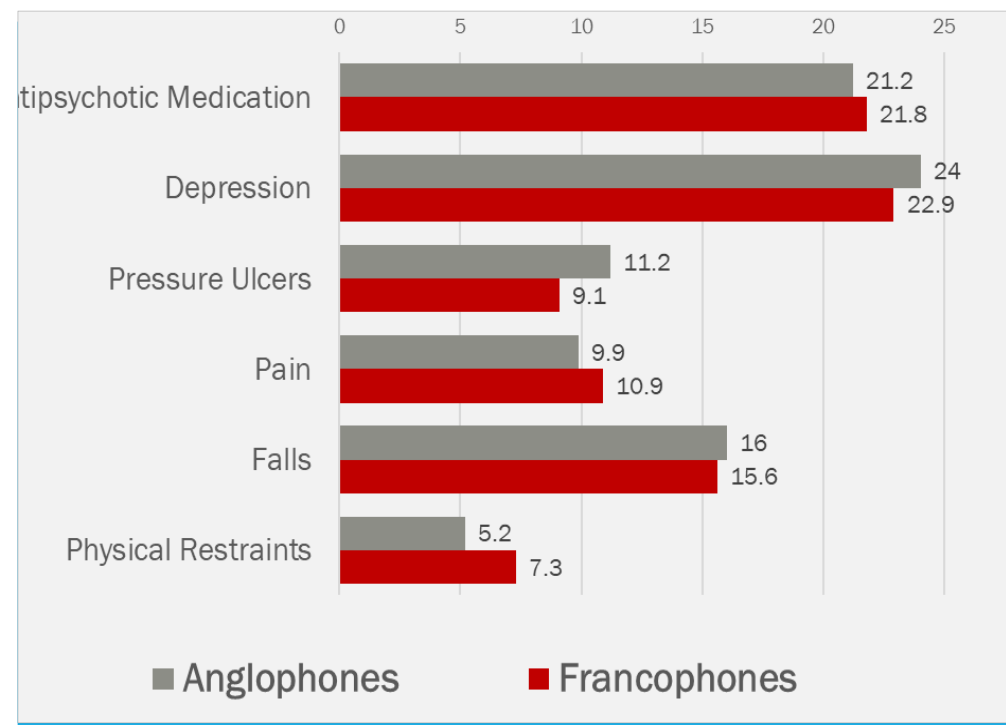


Odds of Dying in Hospital. Cohort of Ontario Decedents from 2010-2013 who lived in long-term care facilities or received care at home before death (n = 25, 759)

Effect of Language on Outcomes – LTC homes



Distribution of residents by and linguistic group and French designation status of the home



Quality Indicators by language group (%)¹

1. Batista, R., Prud'homme, D., Rhodes, E., Hsu, A., Talarico, R., Reaume, M., ... & Tanuseputro, P. (2021). Quality and Safety in Long-Term Care in Ontario: The Impact of Language Discordance. Journal of the American Medical Directors Association.

Effect of Language on Outcomes – LTC Homes

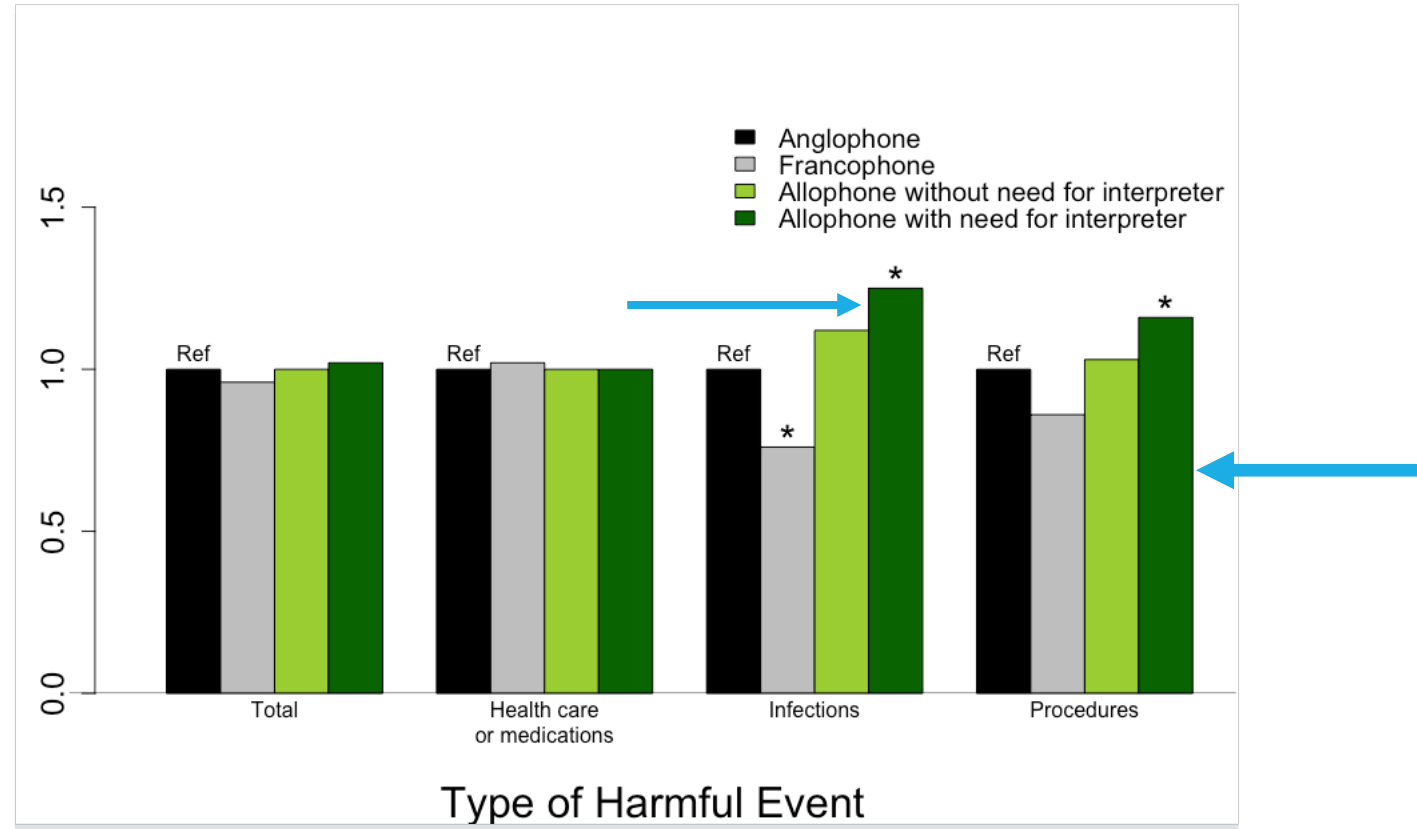
	Anglophones (N=45,716)			Francophones (N=2,011)		
	Non-Designated home	Designated home	p-value*	Non- Designated home	Designated home	p-value*
Antipsychotic Medication	21.1	23.2	0.2163	23.3	19.1	0.0005
Depression	24.0	24.9	0.0956	23.6	21.6	0.0002
Pressure Ulcers	2.8	2.5	0.6242	2.5	1.8	0.0001
Pain	9.9	10.7	0.2377	9.4	13.5	0.0000
Falls	16.0	16.9	0.9323	16.2	14.5	0.0763
Physical Restraints Use	5.1	6.7	0.0006	7.3	7.3	0.2952

Quality indicators by language of resident and Designation status (%)¹

1. Batista, R., Prud'homme, D., Rhodes, E., Hsu, A., Talarico, R., Reaume, M., ... & Tanuseputro, P. (2021). Quality and Safety in Long-Term Care in Ontario: The Impact of Language Discordance. Journal of the American Medical Directors Association.

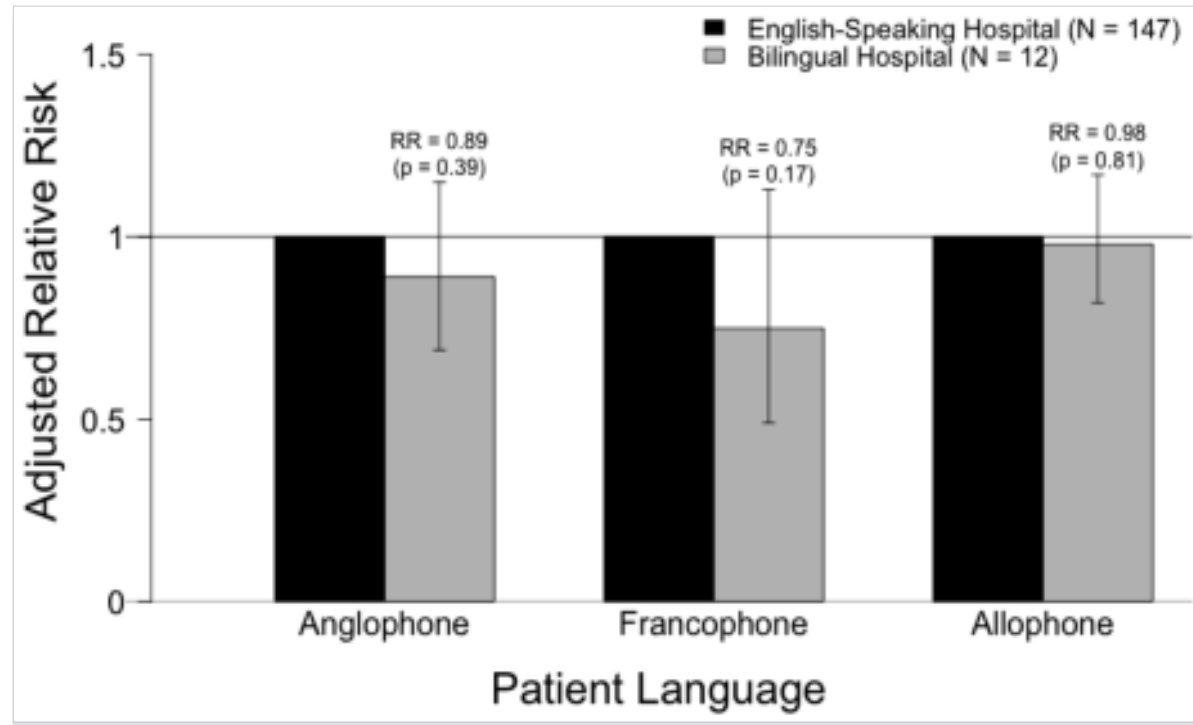
Safety and Harm Outcomes – Acute Care Hospitals

By linguistic group



Adjusted RR of harm for hospitalized home care recipients in Ontario from 2010 to 2015, by linguistic group and English proficiency.

Effect of Language on Outcomes – Language of Hospital



Adjusted relative risk of harm, stratified by hospital language²

1. Reaume, M., Batista, R., Talarico, R., Rhodes, E., Guerin, E., Carson, S., ... & Tanuseputro, P. (2020). The impact of hospital language on the rate of in-hospital harm. A retrospective cohort study of home care recipients in Ontario, Canada. *BMC health services research*, 20(1), 1-11.

Health outcomes of Acute Care Patients x Language Concordance with Physicians

- **Cohort:** 510,685 home care recipients in Ontario, April 1, 2010 and March 31, 2018
- **Data sources:** interRAI-HC data on publicly funded home care services, using the Resident Assessment Instrument (RAI). CPSO database, for physician language

Main exposure:

- *Language group:* Anglophones, Francophones, Allophones (neither English nor French) (RAI-HC); Physician (CPSO)
- *Language concordance:* Patient-physician language

Chronic conditions and multimorbidity: : list of 18 *chronic diseases* (ICES macro)

Outcomes: hospitalization, hospital readmission, in-hospital harm, ED visits, mortality.

Adjusted Health Care Use for Linguistic Minorities (*Ref. Anglophones*)

Outcome	Francophones (N=5,136)				Allophones (N=25,709)			
	<i>Hazard Ratio</i>	<i>HR Lower CL</i>	<i>HR Upper CL</i>	<i>p-value</i>	<i>Hazard Ratio</i>	<i>HR Lower CL</i>	<i>HR Upper CL</i>	<i>p-value</i>
Hospitalization	1.02	0.93	1.13	0.6500	1.07	1.03	1.11	0.0012†
Hospital readmission	1.16	0.93	1.46	0.1868	1.05	0.95	1.15	0.3402
Repeat ED Visits	1.02	0.95	1.11	0.5536	1.10	1.07	1.14	<.0001†
Mortality	0.97	0.84	1.12	0.6816	1.14	1.07	1.21	<.0001†

Logistic regression, cause-specific hazard model

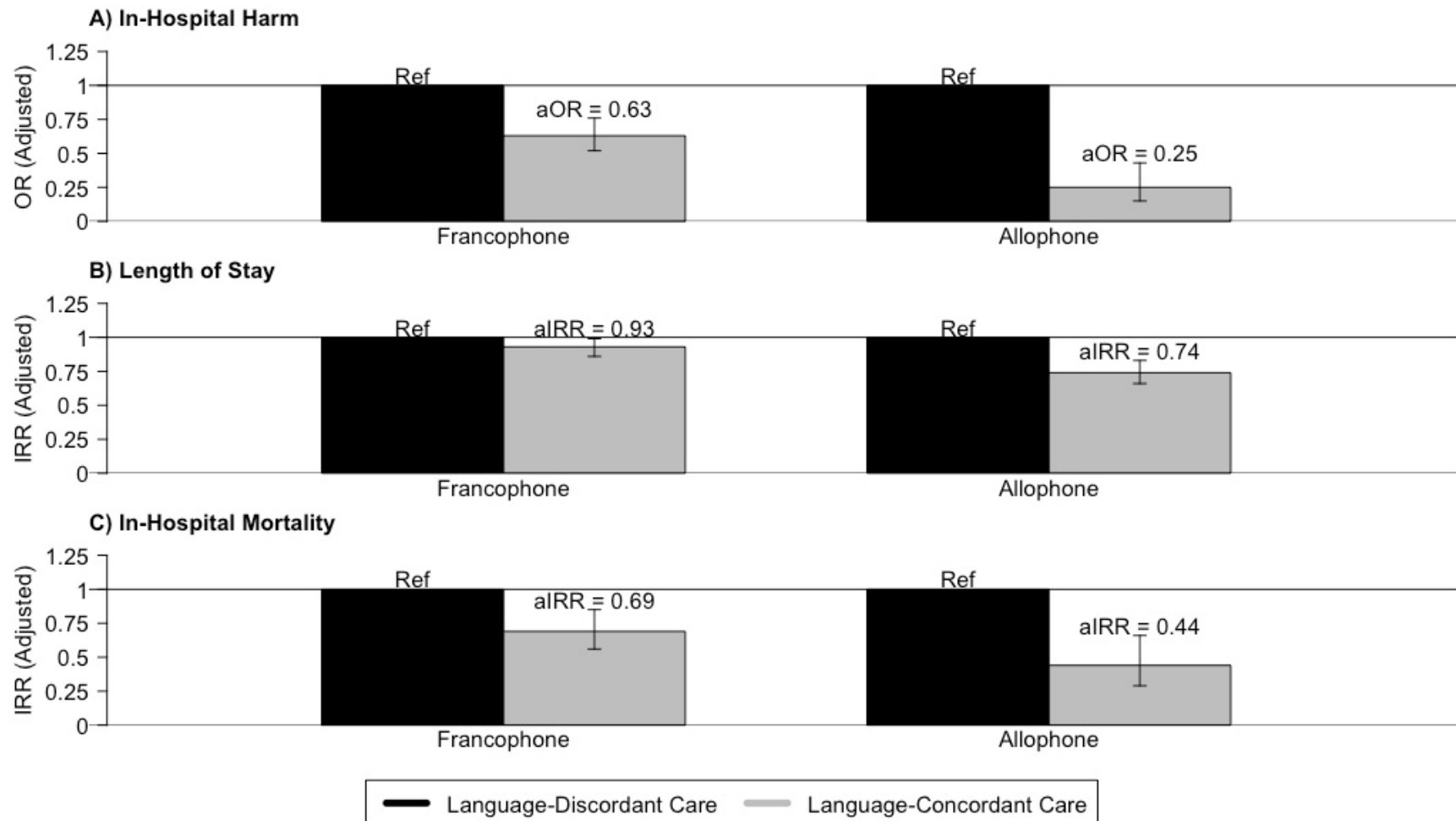
† Denotes statistical significance at the 0.05 level

Unadjusted In-hospital outcomes: Acute Care Patients Stratified by Language Concordance (Patient & Physician MRP)

Outcome	Francophone (N=5,118)			Allophone (N = 24,951)		
	Language-discordant hospitalization (N = 2,845)	Language-concordant hospitalization (N = 2,273)	P-value	Language-discordant hospitalization (N = 24,564)	Language-concordant hospitalization (N = 387)	P-value
Harmful Hospitalization – no. (%)	388 (13.6%)	288 (12.7%)	0.310	3,209 (13.1%)	14 (3.6%)	< 0.001†
Length of Stay – mean +/- s.d.	15.0 ± 27.2	14.6 ± 27.2	0.628	13.8 ± 29.6	10.4 ± 23.4	0.021†
Mortality in hospital – no. (%)	374 (13.1%)	235 (10.3%)	0.002†	3,310 (13.5%)	26 (6.7%)	< 0.001†

† Denotes statistical significance at the 0.05 level

Adjusted outcomes for Francophone and Allophone home care recipients, stratified by language concordance status of the hospitalization (Patient – MD)



COVID-19 and linguistic characteristics of patients receiving LTC in Ontario

Cohort of 85,367 home care recipients and residents in LTC facilities in Ontario between April 1st, 2010 and September 31st, 2020.

A total of 12,620 COVID-19 cases were diagnosed in this period

Main exposure:

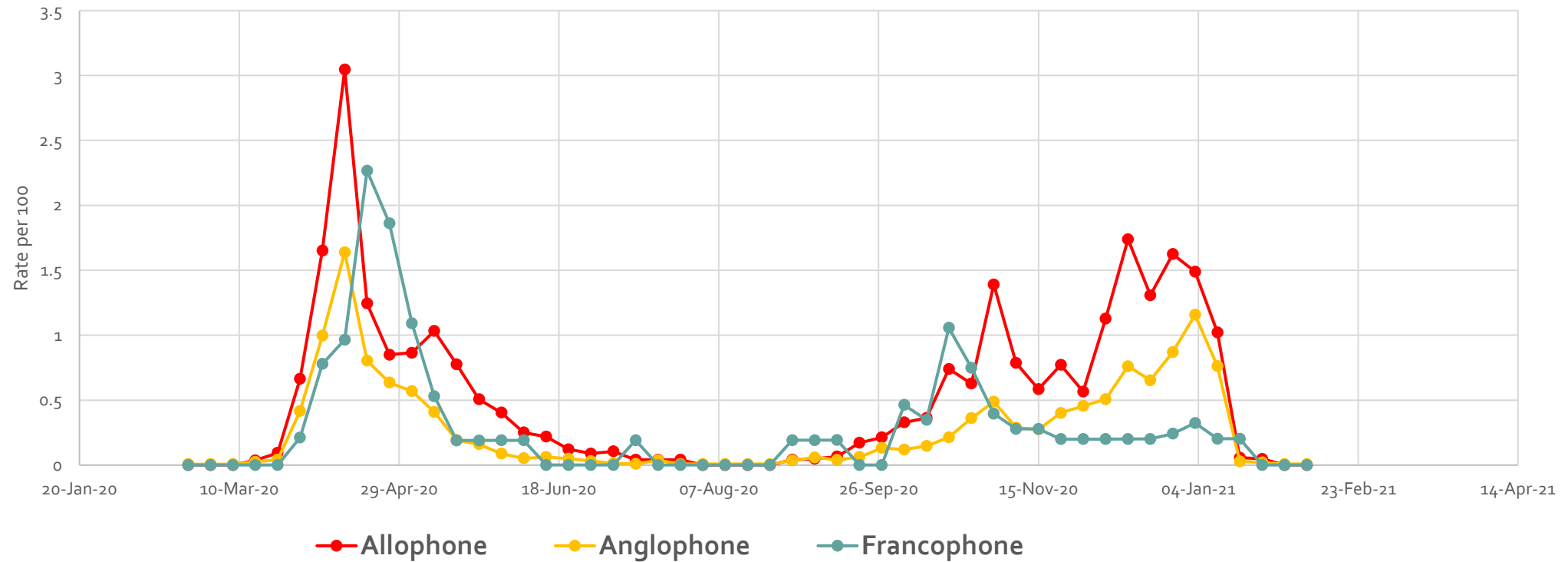
- Patient language: anglophones, francophones and allophones
- Main language of the LTC facility: English (non-Designated), French (Designated)

Outcomes:

- a. Incidence of COVID-19 infections
- b. Healthcare outcomes: Hospitalizations, ED visits, ICU care, Deaths.

Evolution of the COVID-19 diagnosis in nursing homes by language group in Ontario

Rates of COVID-19 diagnosis by language group in LTC Ontario
(Follow-up window: Jan15, 2020-Mar31, 2021)



Frequency of Covid-19 diagnosis, by language group and main language of the homes.

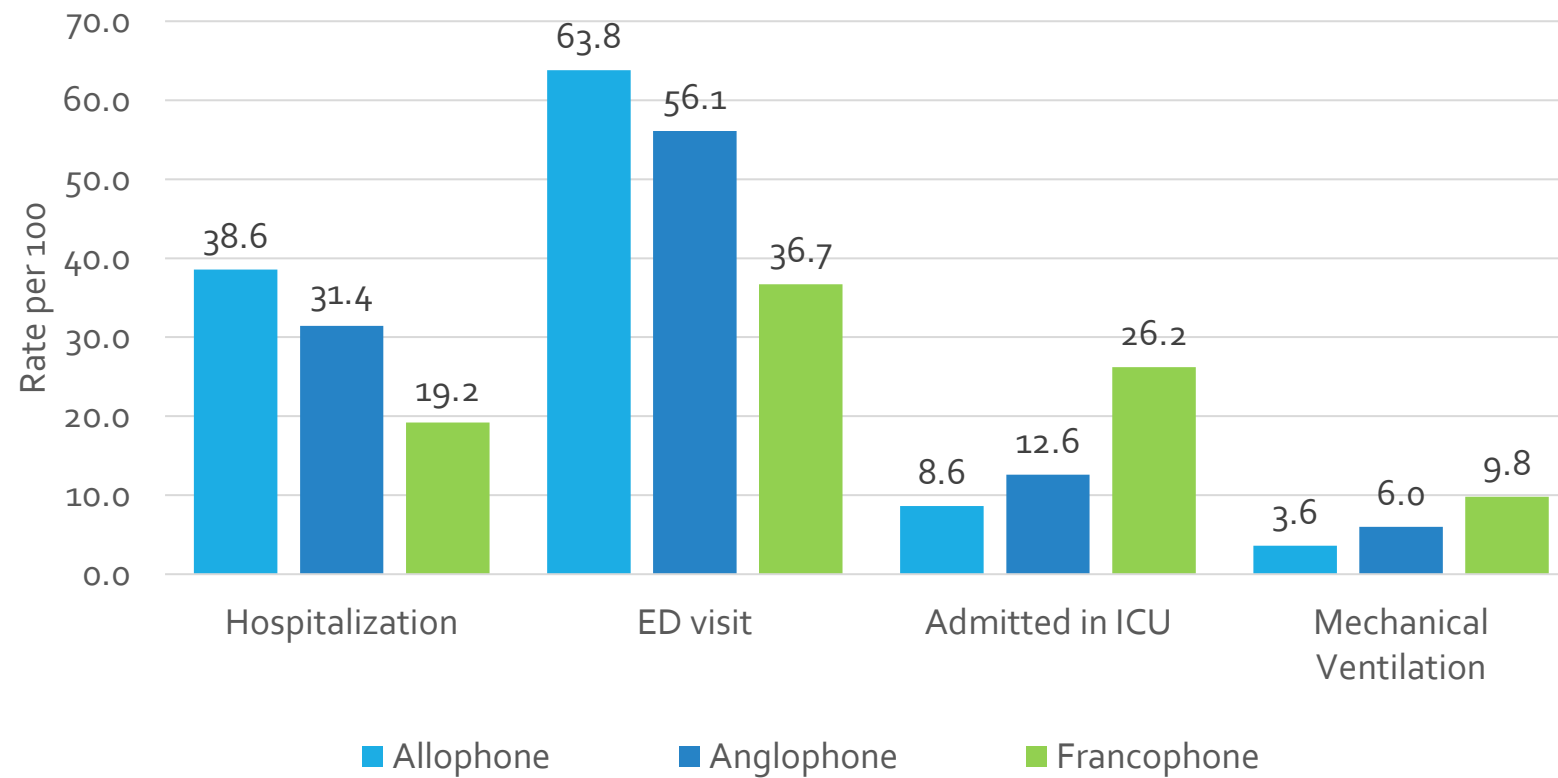
Main language of LTC home ¹	Total Homes		Allophone N=13,834			Anglophone N=68,681			Francophone N=2,852		
	# Homes	Ave % ²	# Residents	# Covid patients	%	# Residents	# Covid patients	%	# Residents	# Covid patients	%
English	572	88.0	9463	2133	22.5	67446	8748	13.0	1538	142	9.2
French	20	76.3	*33-37	8	~22.9	456	72	15.8	*1309-1313	212	~16.2
Other	32	-	*4334-4338	1122	~25.9	779	183	23.5	*1-5	0	-
Chinese	6	62.6	1222	203	16.6	*114-118	10		*1-5	0	-
Dutch	1	52.0	87	0	-	62	0	0.0	0	-	-
Estonian	1	88.7	*30-34	0	-	*1-5	0	-	0	-	-
Finnish	1	81.2	*28-32	*23-27	-	*2-6	*2-6	-	0	-	-
Greek	2	83.3	204	*93-97	-	7	*1-5	-	0	-	-
Italian	9	71.4	1312	490	37.3	*322-326	84	~25.9	*1-5	0	-
Korean	1	100	56	0	-	0	0	-	0	-	-
Latvian	1	53.8	70	24	34.3	42	17	40.5	0	-	-
Lithuanian	1	89.2	81	*1-5	-	7	0	-	0	-	-
Polish	1	83.9	209	63	30.1	26	13	50.0	0	-	-
Portuguese	1	56.5	49	*1-5	-	35	*3-7	-	0	-	-
Slovenian	1	62.3	56	*6-10	-	9	*1-5	-	0	-	-
Ukrainian	2	82.1	193	65	33.7	49	20	40.8	0	-	-
YUE	4	45.3	733	147	20.1	95	26	27.4	0	-	-

¹ Main Language of home: based on the predominant language spoken by the majority of residents (person-day for most spoken language in the home)

² Average % of person-day for most spoken language in the home

YUE: Yue Chinese (ISO 639-3: <https://iso639-3.sil.org/code/yue>)

Health Outcomes of COVID-19 patients by language group



Conclusions

- 1) Population-level routinely collected health data can be used to examine health care delivery, health, and health outcomes of linguistic minorities
- 2) There are important differences in health services delivery, health, and health outcomes for linguistic minorities
- 3) There are impacts of health outcomes based on language of facility
- 4) The strongest signals in disparities in health outcomes occur in linguistic minorities receiving language discordant care