



Wellness Hub:
Immunogenicity
Sub-Study

AB-Protect

Ontario, Canada

Funded by



COVID-19
IMMUNITY
TASK FORCE

GROUPE DE TRAVAIL
SUR L'IMMUNITÉ
FACE À LA COVID-19



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Antibody responses to vaccine and protection from COVID-19 in residents of long term care homes.

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Immunogenicity Sub-Study Objectives

- Primary objective:
 - ▶ To compare antibodies to COVID-19 after vaccination in residents and staff of long term care homes (LTCHs).
- Exploratory objectives:
 - ▶ Compare the nature of antibodies to COVID-19 after infection to those after vaccination in residents of LTCHs
 - ▶ Assess the decline in antibodies to COVID-19 over time in vaccinated and infected residents and staff of LTCHs
 - ▶ Assess impact of doses of mRNA vaccines on antibody levels
 - ▶ *Contribute to data assessing antibody correlates of protection*

Resident participants

- Participants:

- ▶ Median age 88 yr (range 53-105); 137 (69%) female
- ▶ Median Charlson index 2 (range 0-8), median BMI 26 (range 15-45)
- ▶ 8 (4%) immunosuppressed
- ▶ 25 residents with prior laboratory-confirmed COVID-19

- Homes/vaccines

- ▶ Three homes (29, 26, 60 residents) – all vaccines mRNA-1273
- ▶ One home (88 residents) – first 3 doses BNT162b2

Sampling time points

200 LTC residents (*serum, dried blood spots*)

Pre-
dose 1

Pre-
dose 2
Feb 2021

14 days
Post
dose 2

4 mos
Post
dose 2

6 mos
Post
dose 2

Pre-
dose 3
Oct 2021

14 days
Post
dose 3

3 mos
Post dose
3

Pre- dose
4
Jan 2022

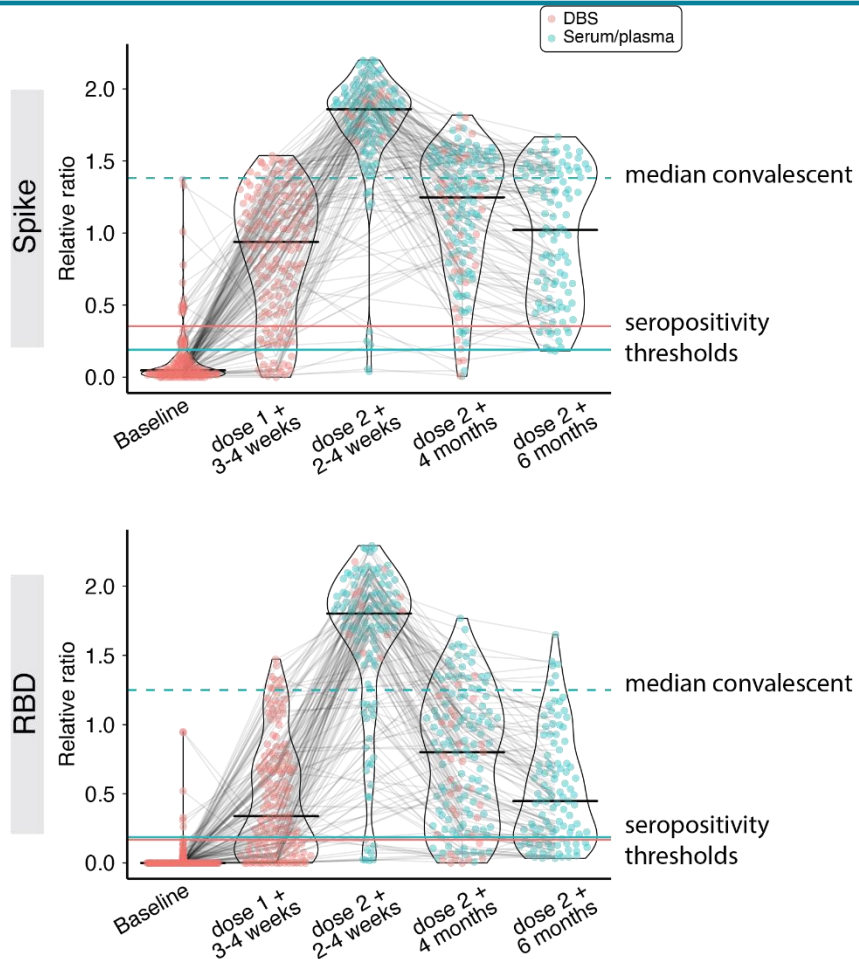
14 days
Post dose
4

Pre-
bivalent
Booster
Oct 2022

14 days
Post
bivalent
booster

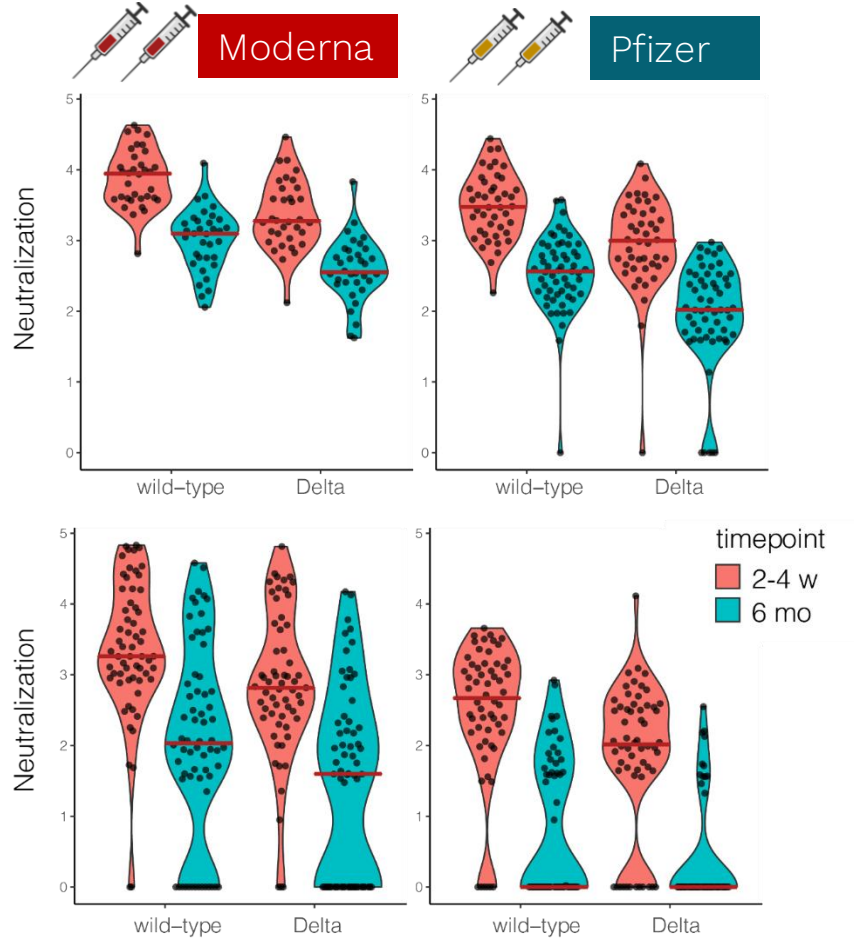
Ongoing monitoring of COVID-19 infection; Serum/DBS 4 weeks post-infection

Initial high levels of anti-Spike and anti-RBD decline more quickly than expected



- 3–4 weeks post dose 1:
 - ▶ Seroconversion in **67%** of residents
 - ▶ **7%** had higher anti-RBD IgG than median convalescents
- 2–4 weeks post dose 2 (apex):
 - ▶ Seroconversion in **92%** of residents
 - ▶ **80%** had higher anti-RBD IgG than median convalescents
- 4 months post dose 2:
 - ▶ Seroconversion in **88%** of residents
 - ▶ **23%** had higher anti-RBD than median convalescents
- 6 months post dose 2:
 - ▶ Seroconversion in **72%** of residents
 - ▶ **12%** had higher anti-RBD than median convalescents

Multiple factors affect antibody titres

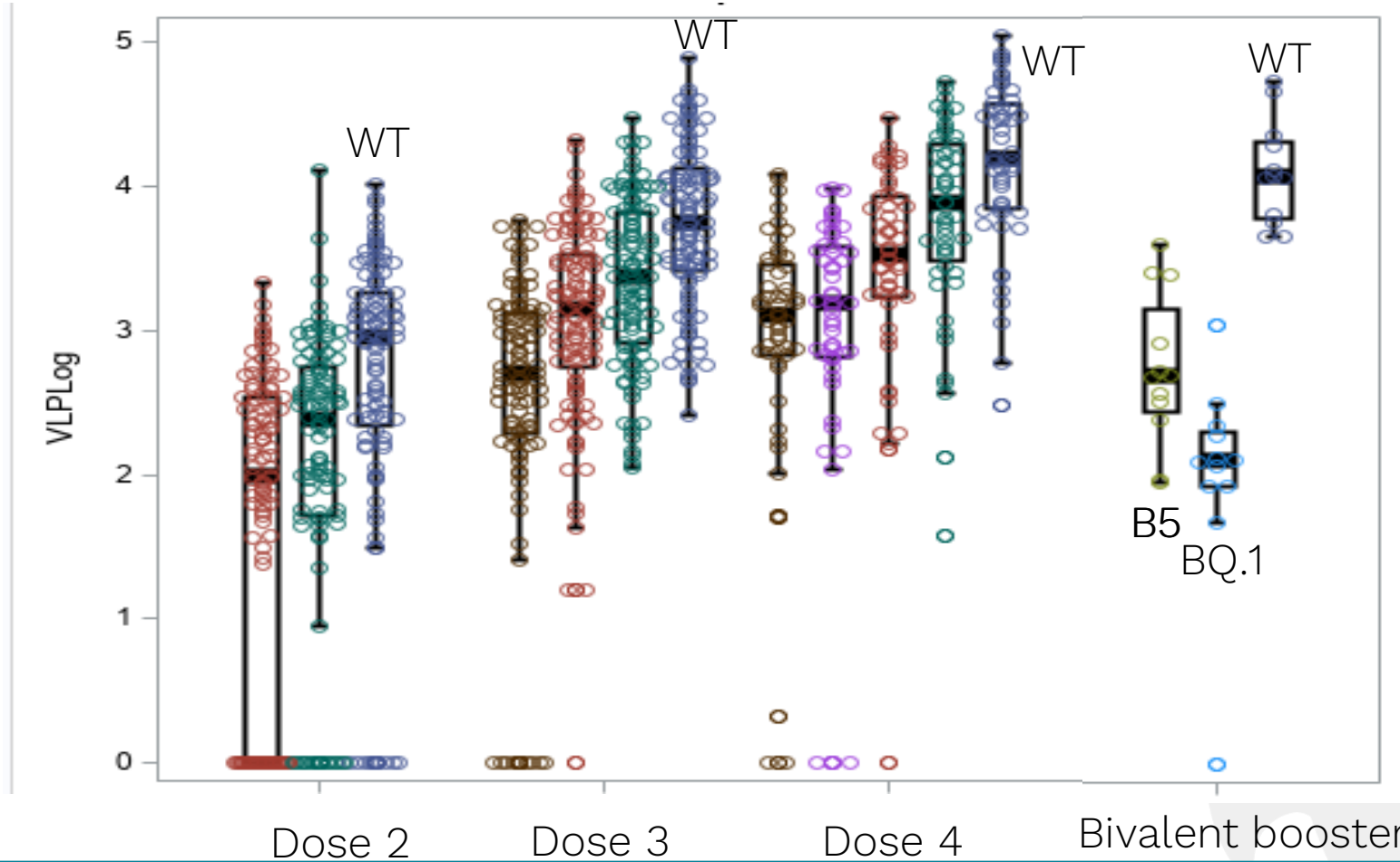


Staff

LTCH residents

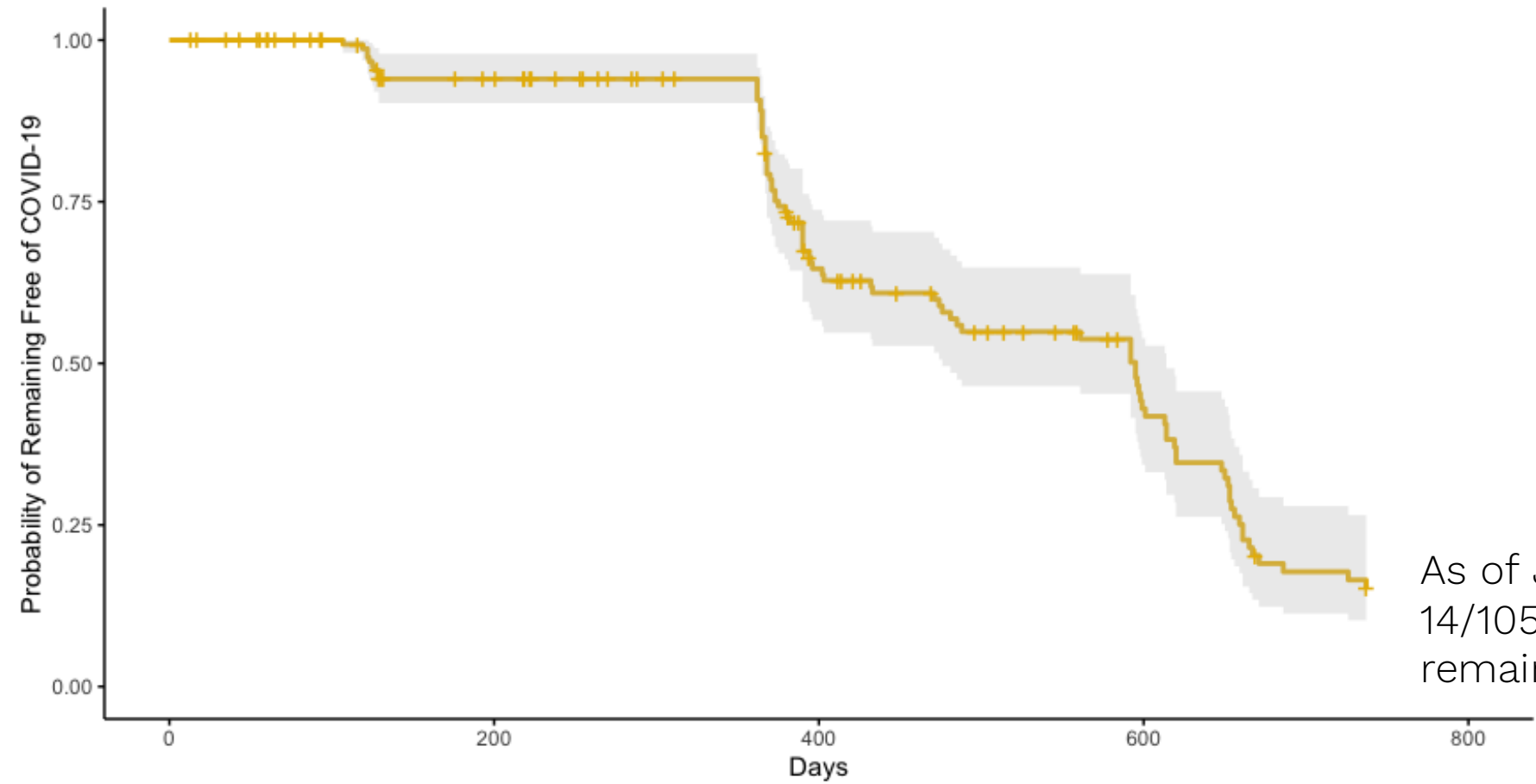
- Vaccine:
 - ▶ Moderna > Pfizer (~3.6 fold)
- Population:
 - ▶ Staff > resident (~6.3 fold)
- Virus variant:
 - ▶ Wild-type > Delta (~2.9 fold)
- Time post dose 2:
 - ▶ 2-4 weeks > 6 months (~7.3 fold)
- Cumulative drop in neutralization
 - ▶ 480 fold (*from top left to bottom right*)

Pseudo-neutralization titers (uninfected residents)



Probability of resident participants who were uninfected at study start remaining infection free over time

25 residents (13%)
Infected prior to
study start



As of Jan 2023,
14/105 residents
remain uninfected

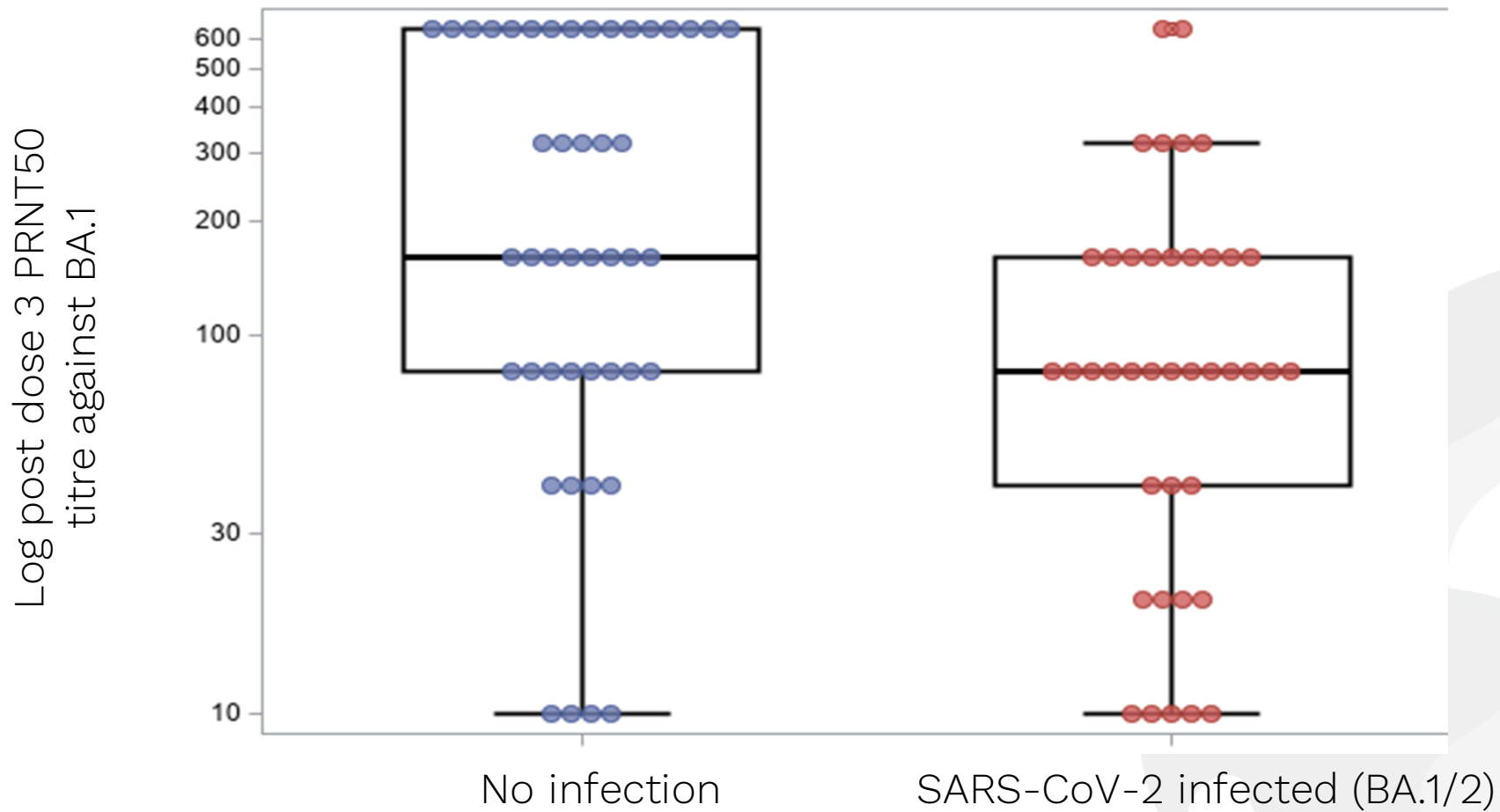
Gamma (P.1) outbreak, April/May 2021



Correlation between antibody titres and protection against Omicron (only significant correlations shown)

Timing	Antibody measure	Against infection with which variant	OR MV analysis (95% CI)	P value
Post dose 2	WT PRNT-50	BA.1/2	1.003 (1.000-1.006)	0.03
Post dose 3	Delta PRNT-90	Any omicron	1.004 (1.001-1.007)	0.01
	BA.1 PRNT-50		1.003 (1.000-1.005)	0.05
	WT Pseudoneut		4.4 (1.0-19)	0.05
Post dose 3	Beta PRNT-90	BA.1/2	1.004 (1.001-1.006)	0.05
	Delta PRNT-90		1.002 (1.000-1.004)	0.04
	BA.1 PRNT-50		1.016 (1.003-1.029)	0.005

Correlation between post-dose 3 PRNT50 titre against BA.1 and BA.1/2 infection



Lessons learned

- Vaccines:
 - ▶ Amount of antigen matters
 - ▶ Frail older adults need greater stimulus to achieve same concentrations as younger adults
- Correlates of protection
 - ▶ Neutralizing antibody correlation > pseudoneutralization > EIA
 - ▶ Correlation between antibody titres and protection from infection appears to be variant specific
 - ▶ Even with PRNT titres and matched variants, correlation imperfect
 - ▶ Assessment limited by differential risk exposure



Study Team

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Staff, residents, caregivers at study homes