FUTURE HEALTH SERVICES

COMMUNITY PARAMEDICINE REMOTE PATIENT MONITORING: AN EVALUATION

PRESENTED TO: IRCP 2019, 16TH MEETING
DATE: SUNDAY, JUNE 16TH, 2019
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DISCLOSURE

COMMERCIAL INTEREST

❑ Grants/Research Support: Canada Health Infoway

❑ Speaker Bureau/Honoraria: None

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❑ Other: No endorsement by the Institute for Clinical Evaluative Sciences (ICES) or Canada Health Infoway is intended of should be inferred

DISCLOSURE

COMMERCIAL SUPPORT

Potential for Conflict(s) of Interest: The presenters do not have any affiliation (financial of otherwise) with any for-profit or not-for-profit organizations

DISCLOSURE

MITIGATING POTENTIAL BIAS

- Does not specifically discuss any individual participating paramedic services Community Paramedicine Remote Patient Monitoring program
- Program evaluation was conducted by the Smith School of Business, Queen's University [CAN][1]
- The analysis, conclusions, opinions and statements expressed herein are that of the presenters, and not necessarily those of the funding or evaluation sources

1. Broham MK, et al. 2018. Community Paramedicine Remote Patient Monitoring (CPRPM): Benefits Evaluation & Lessons Learned, 2015/17.

INTRODUCTION

SPEAKERS

CEO, Project Lead

RICK WHITTAKER

Rick has been the Executive Director of a Community Futures Development Corp. for the past 15 years, as well as the CPRPM Project Lead. Rick has a degree in Business, Psychology, and International Development. He is the recipient of the Community Futures Development Ontario Innovation Award for CPRPM.

Superintendent, Community Paramedicine

DUSTIN CARTER

Dustin has worked as a paramedic for 12 years and has achieved CMM III EMS Professional certification. He is the recipient of the Medical Directors Commendation Award, Western University Community Professor Award, Local Health Integration Network Quality Improvement Award, and Canadian Frailty Innovation Award.

PRESENTATION

OBJECTIVE

- To provide an overview of the Smith School of Business, Queen's University Community Paramedicine Remote Patient Monitoring Benefits Evaluation and Lessons Learned (2018), and discuss key findings

ONTARIO PARAMEDIC SERVICE

AMBULANCE SERVICE PROVIDERS

- Combined coverage area of 1,076,395 sq. km[2]
- Population of 14.32 million[2]
- 52 Designated Delivery Agents providing 59 paramedic services (Land, Air)[3]
- 8,500 primary, advanced and critical care paramedics[3]
- 830 ambulances and 300 emergency response vehicles[3]
- Respond to over 1.4 million emergency calls annually[3]
- Transport over 1 million patients annually[3]

(Image courtesy of: Future Health Services)

2. Statistics Canada. 2018. Available from: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Comprehensive.cfm

3. Ontario Association of Paramedic Chiefs. 2019. Available from: https://www.oapc.ca/about/.

COMMUNITY PARAMEDICINE

EXPANDING THE PARAMEDICS ROLE IN THE COMMUNITY

- In 2014, the Ministry of Health and Long-Term Care (MOHLTC) invested in paramedic services to demonstrate their role in supporting *Ontario's Action Plan for Health Care*

- Program delivery is generally defined through the model of care and may vary based on the local needs

- The MOHLTC outlined three (3) core models of care[4]:
    I. Assessment and Referral
    II. Community Paramedic-Led Clinics
    III. Home Visits (In-person / Virtual)


Ontario

Community Paramedicine

Framework for Planning, Implementation and Evaluation

July 2017

Home and Community Care Branch
Ministry of Health and Long Term Care

4. Home and Community Care Branch, Ministry of Health and Long-Term Care. Community Paramedicine Framework for Planning, Implementation and Evaluation. 2017.

OVERVIEW

COMMUNITY PARAMEDICINE REMOTE PATIENT MONITORING

(Video courtesy of: Future Health Services)

HOME VISITS

REMOTE PATIENT MONITORING

- Community Paramedicine Remote Patient Monitoring (CPRPM) is an initiative of paramedic services across Ontario to keep patients with chronic illness, such as but not limited to congestive health failure (CHF), chronic obstructive pulmonary disease (COPD), and diabetes mellitus (DM)

- Enlists the expertise of community paramedics to provide community-based monitoring, education and management to learn how to better self-manage their care and improve quality of life

(Image courtesy of: Future Health Services)

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HOW IT WORKS

- Patients are provided Bluetooth enabled at-home medical devices for daily use

- Biometric readings transmit real-time via communications network to a secure health tracking and information management platform

(Image courtesy of: Future Health Services)

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HOW IT WORKS CONT.

- The platform generates two types of alerts with readings exceed individualized or preset thresholds:
    I. Medical alerts
    II. Compliance alerts

- Paramedics are notified through various electronic devices prompting review of the patient status and follow up to determine the most appropriate course of action, and the most appropriate level of care required

(Images courtesy of: Future Health Services)

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CHRONIC DISEASE MANAGEMENT

- The goal of CPRPM is to promote self-management and understanding of the disease process to improve overall health through several elements:
    - I. Patient involvement in his or her own health management
    - II. Patients ability to understand, define, and appropriately act upon symptoms
    - III. Providing educational resources and promoting self-regulation and self-efficacy
    - IV. Motivational coaching
    - V. Reinforcement of primary care provider instructions

(Image courtesy of: Future Health Services)

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PARTICIPATING LAND AMBULANCE SERVICES

- 21 participating paramedic services
- >2,000 patients have participated since 2016
- >1,000,000 biometric readings
- >75,000 alerts responded by paramedics
- >6,000 coaching sessions

(Image courtesy of: Future Health Services)

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STUDY SETTING

- Included patients with congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD), and co-morbidities of diabetes and hypertension

- Enrollment eligibility requirements:
    - Diagnosis of CHF and/or COPD
    - Minimum of either three (3) 911 calls, two (2) ED presentations or one (1) hospitalization in the 12 months prior
    - Target program duration of 3 to 6 months

- Eligibility for evaluation cohort required:
    - Enrollment prior to June 30, 2017
    - At the time of the evaluation 745 of the 1,109 enrolled patients met criteria
        - Of which 650 (87%) were eligible
        - Remaining 95 (13%) were excluded due to variable factors

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STUDY GOALS

High-level goals were established for the CPRPM program as follows:

I. Help patients take a more active role in self-managing their conditions;

II. Provide access to medical professionals who can provide real-time coaching and feedback to patients on how to better manage their conditions and proactively respond to concerns in a more timely manner;

III. Reassure patients their health is being monitored in an effort to provide comfort and decrease stress and anxiety;

IV. Build a circle of care around the patient that would allow the community paramedic to share results with primary care providers and family members via the Patient Portal; and

V. Reduce costs and burden on the health care system through reduced 911 calls, ED visits and hospitalizations.

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STUDY METHOD

Quantitative and qualitative methods were as follows:

- Quantitative data included analysis of:
    I. Hospitalization Data – Discharge Abstract Database and ED Data (National Ambulatory Care Reporting System) available through the Institute for Clinical Evaluative Sciences
    II. Paramedic Service Data – 911 call and hospital transport data available through Interdev Technologies
    III. CPRPM Data – biometric readings, program alerts and paramedic activity data available through Ideal Life

- Qualitative data included analysis of:
    I. CPRPM Data – paramedic notes available through Ideal Life
    II. Survey Data – pre-enrollment and post-discharge patient use and satisfaction surveys made available through participating paramedic services

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PATIENT DEMOGRAPHICS

Table 1.1: Queen's University Evaluation - Patient Demographics[1]

		Gender Summary		Diagnostic Summary			# of Comorbidities		
Years	Total	Male	Female	CHF	COPD	Diabetes	1	2	3
35-49	0	-	-	-	-	-	-	-	-
50-64	13	7	6	8	6	3	8	3	1
65-74	22	8	14	13	15	3	20	4	1
75-84	32	15	17	19	10	4	18	6	1
85-94	24	8	16	16	20	2	22	5	2
95+	4	2	2	2	3		3	1	0
Total	95	40	55	58	54	12	71	19	5
Average	100%	42%	58%	61%	57%	13%	75%	20%	5%
Average Age	77	76	78	77	79	72	79	75	75

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PATIENT STATUS

Table 1.2: Queen's University Evaluation – Socio-Economic Status[1]

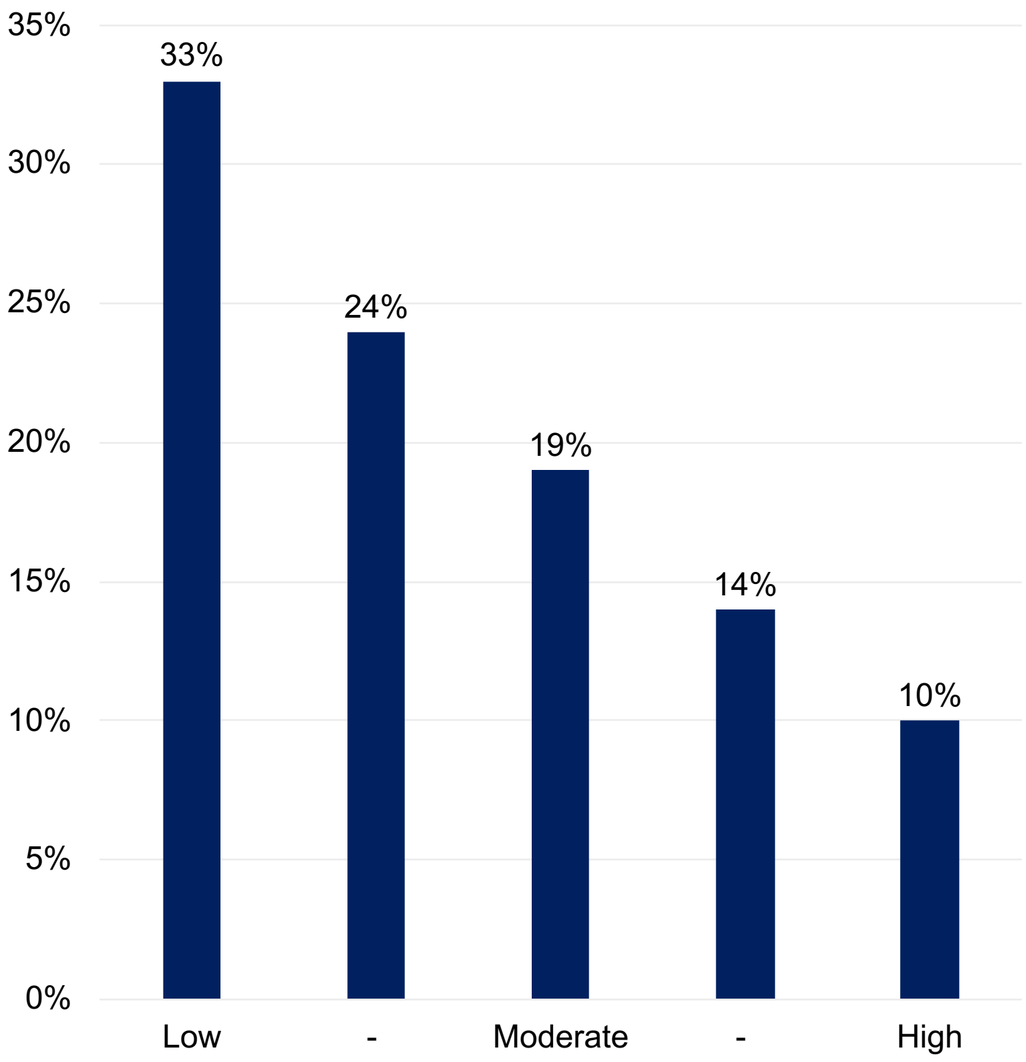
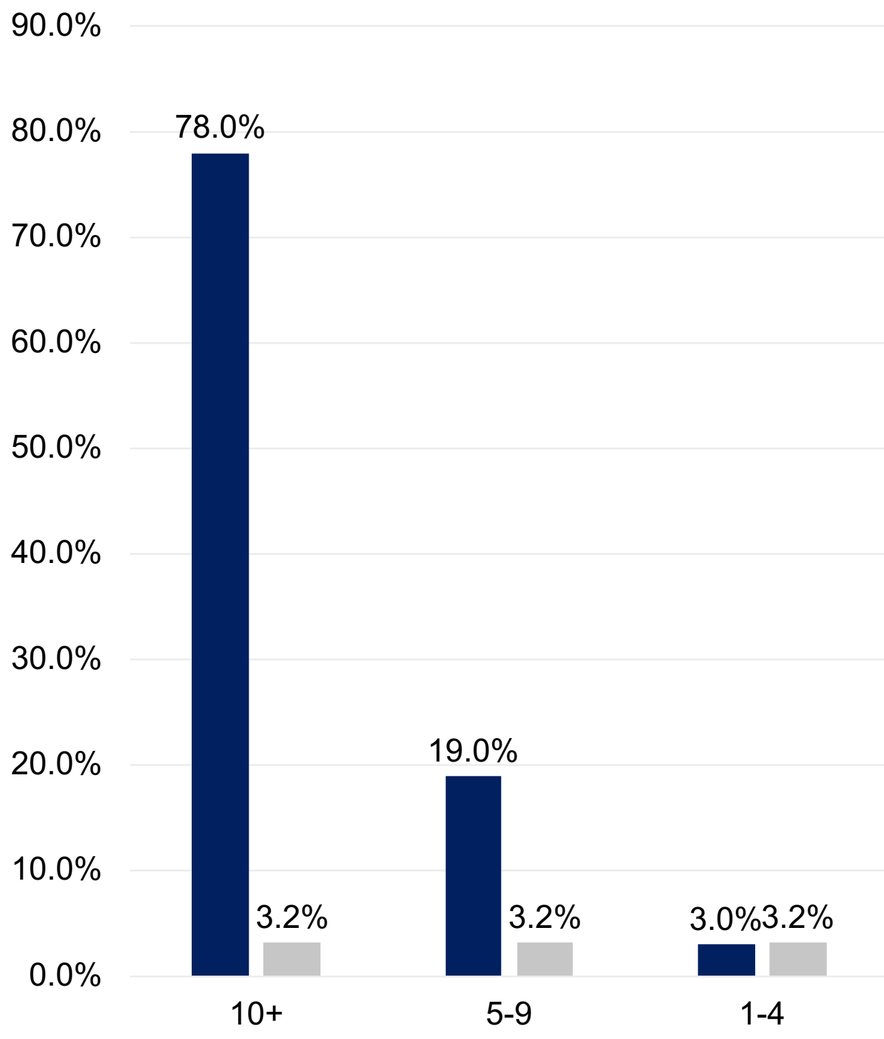


Table 1.3: Queen's University Evaluation – ADG Score[1]



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RETENTION RATE

Table 1.4: Queen's University Evaluation – Retention Rate[1]

	Total Enrolled	Total Did Not Finish	Retention Rate	Months on Program
Chatham	11	2	82%	14
Cochrane	14	0	100%	25
Essex-Windsor	144	22 (8 Deceased)	90%	27
Grey	89	11 (4 Deceased)	92%	27
Guelph	47	5	89%	11
Hamilton	40	15 (2 Deceased)	68%	10
Hastings	14	1	93%	15
Middlesex-London	90	7	92%	8
Parry Sound	95	12 (3 Deceased)	90%	25
Peterborough	32	4 (2 Deceased)	94%	5
Rama	5	0	100%	8
Renfrew	164	16 (3 Deceased)	92%	27
Total / Average	745	95 (22 Deceased)	90%	17

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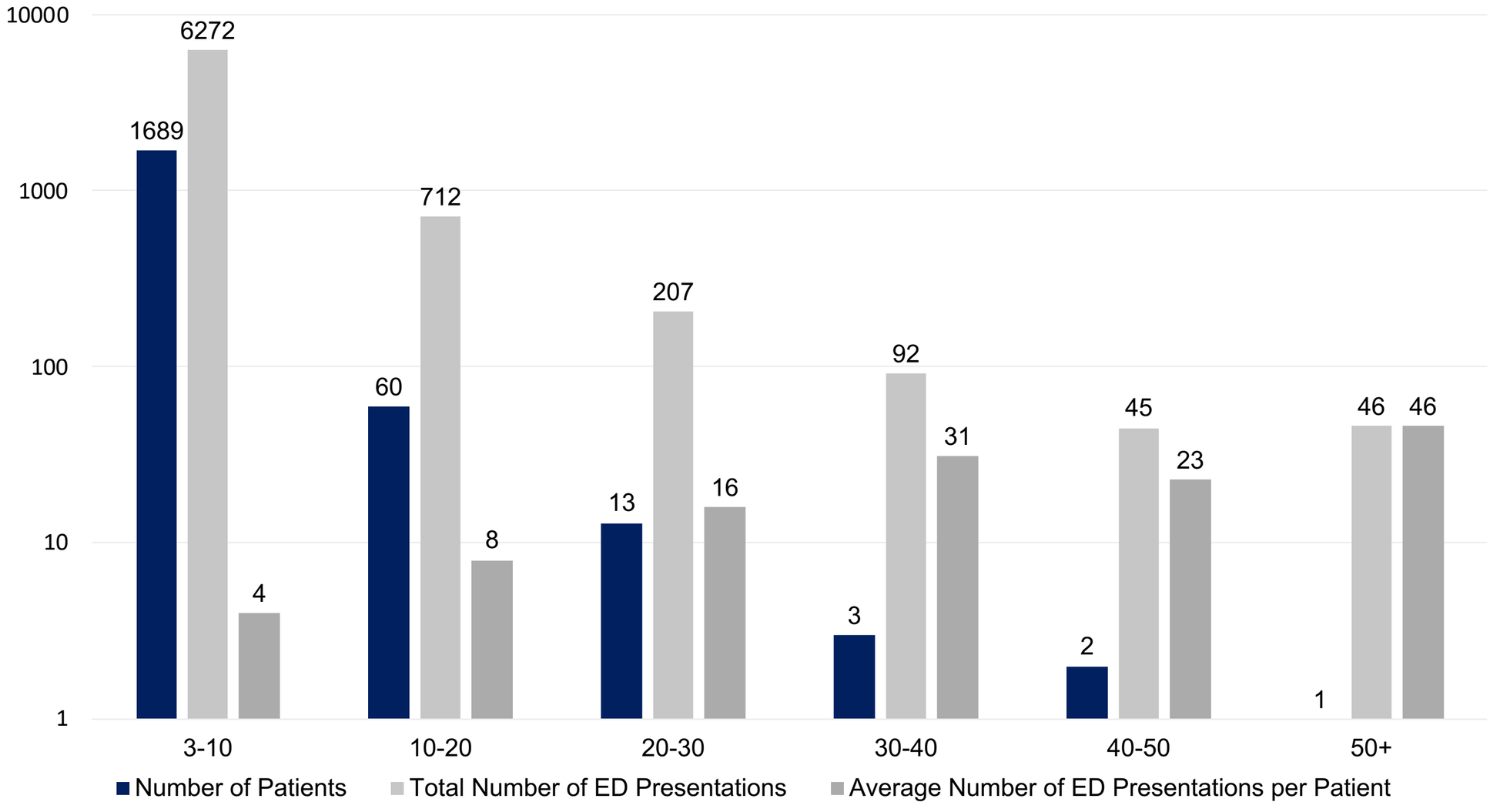
COMLIANCE RATE

Table 1.5: Queen's University Evaluation – Compliance Rate[1]

	# of Patients	BP Manager	Weight Scale	SpO2 Manager	Glucose Manager	Average
Female	328	82%	61%	92%	76%	78%
Male	322	94%	61%	113%	73%	85%
Average Compliance		88%	61%	102%	84%	
18-34 Years	1	61%		62%		61%
35-49 Years	13	51%	38%	90%	106%	71%
50-64 Years	87	73%	40%	117%	90%	80%
65-74 Years	174	87%	54%	103%	73%	79%
75-84 Years	227	93%	68%	98%	76%	84%
85-94 Years	134	84%	66%	89%	58%	74%
95+ Years	13	209%	101%	235%	103%	162%
Average Compliance	-	94%	62%	113%	83%	-
CHF	322	89%	74%	97%	83%	86%
COPD	452	92%	56%	112%	75%	84%
Diabetes	121	84%	64%	91%	108%	87%
1 Comorbidity	427	85%	50%	100%	38%	68%
2 Comorbidities	192	96%	75%	110%	102%	96%
3 Comorbidities	28	84%	79%	93%	110%	92%

Table 1.6: Queen's University Evaluation - EMS Call Count[1]



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CALL REDUCTION BY PATIENT

Table 1.7: Queen's University Evaluation - 911 Call Reduction[1]

49																							
Currently in Program (49)																							
Patient ID	**Action**	**Pre Total**	**-12**	**-11**	**-10**	**-9**	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**Enrolled**	**1**	**+2**	**+3**	**+4**	**+5**	**+6**	**Post Total**	**Variance**	
EW1A-0037	911 Calls	3		1							1	1			20-May							0	-3	6.53
	ER Visits	3		1							1	1										0	-3	
EW1A-0052	911 Calls	9		1	2	1	1	1	1		2				25-May							0	-9	6.37
	ER Visits	9		1	2	1	1	1	1		2											0	-9	
EW1A-0118	911 Calls	2				1					1				25-Jun							0	-2	5.33
	ER Visits	2				1					1											0	-2	
EW1A-0143	911 Calls	3	1			1			1						20-May							0	-3	6.53
	ER Visits	3	1			1			1													0	-3	
EW1A-0184	911 Calls	5	2								1	1	1		8-Jun	1						1	-4	5.90
	ER Visits	4	1								1	1	1									0	-4	
EW1A-1044	911 Calls	9			1				2	1	2	2	1		26-Aug	1						1	-8	3.27
	ER Visits	9			1				2	1	2	2	1			1						1	-8	
EW1A-1046	911 Calls	0													3-Sep							0	0	3.00
	ER Visits	0																				0	0	
EW1R-1001	911 Calls	9					1	2		1	3	1		1	13-May							0	-9	6.77
	ER Visits	9					1	2		1	3	1		1								0	-9	
EW1R-10024	911 Calls	1										1			10-Jul							0	-1	4.83
	ER Visits	1										1										0	-1	
EW1R-1004	911 Calls	17				1	1	2		1	2	9	1		25-May							0	-17	6.37
	ER Visits	5				1		1		1		2										0	-5	
EW1R-1005	911 Calls	6		2	1				2	1					5-Jun							0	-6	6.00
	ER Visits	5		1	1				2	1												0	-5	
EW1R-1007	911 Calls	4		1	1									2	15-Sep							0	-4	2.60
	ER Visits	1												1								0	-1	
EW1R-1009	911 Calls	10				1			4	1		2	1	1	16-Jun							0	-10	5.63
	ER Visits	2				1							1									0	-2	
EW1R-1010	911 Calls	4			1	1				1			1		28-May	1						1	-3	6.27
	ER Visits	3				1				1			1									0	-3	

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CALL REDUCTION BY PATIENT CONT.

Table 1.8: Queen's University Evaluation – 911 Activation/ED/Transport Reduction[1]

		911 Calls			ED Transports			Transport Rate		
	N	Pre	Post	Reduction	Pre	Post	Reduction	Pre	Post	Reduction
CHF	169	801	592	26%	685	496	28%	86%	84%	2%
COPD	245	1274	926	27%	1079	734	32%	85%	79%	5%
Diabetes	59	256	231	10%	217	140	36%	85%	60%	24%
Total/Average	473	2331	1749	25%	1981	1370	31%	85%	78%	7%
1 Comorbidity	230	1195	851	29%	1018	692	32%	85%	81%	4%
2 Comorbidities	103	497	409	18%	411	302	27%	83%	74%	9%
3 Comorbidities	13	47	27	44%	47	25	47%	100%	93%	7%
Total/Average	346	1739	1287	26%	1476	1018	31%	85%	79%	6%

Table 1.9: Queen's University Evaluation – Pre-Post 911 Activity[1]

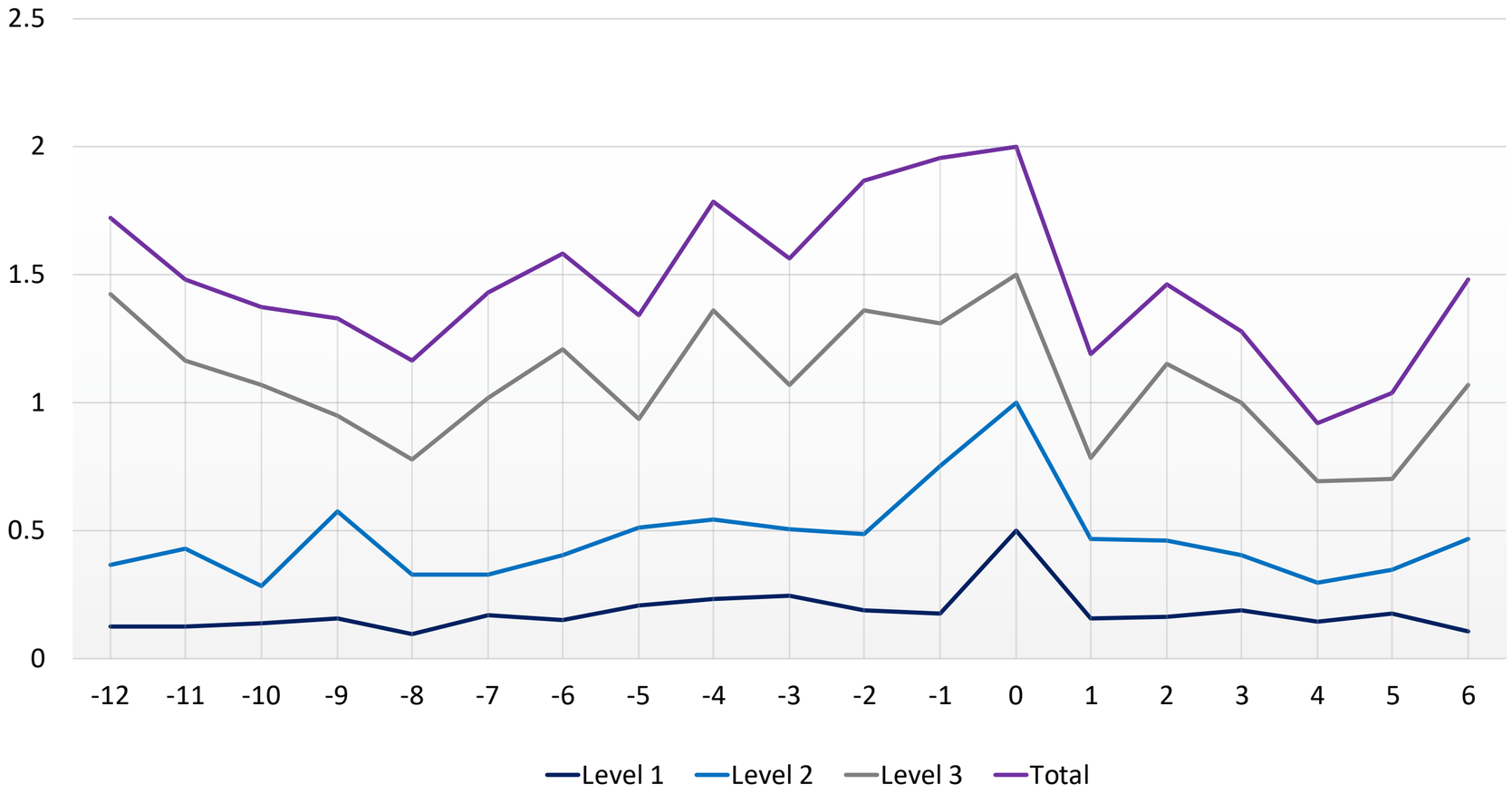
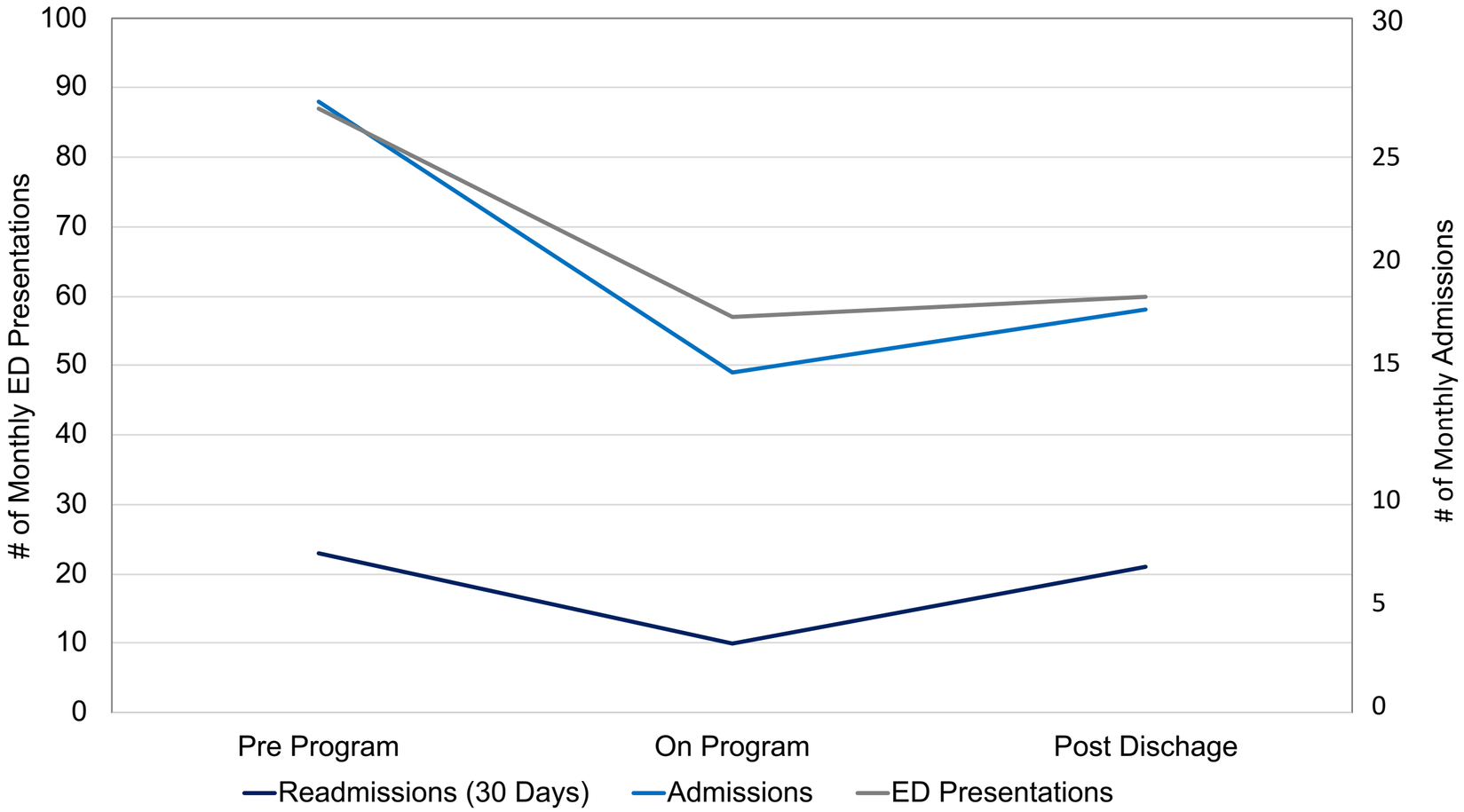


Table 1.10: Queen's University Evaluation – Hospital Presentation Before, During, After[1]



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HOSPITAL PRESENTATION CONT.

Table 1.11: Queen's University Evaluation – ED & Hospital Admission[1]

	Pre-Program	On Program	Savings	Reduction
ED Visits	1,780	1,313	467	26%
Admissions	535	65	170	32%
# of Readmissions (7 Days)	52	34	18	35%
# of Readmissions (30 Days)	143	84	59	41%
% of Admissions Readmitted (30 Days)	27%	23%	4%	14%
Hospital Days (7.1 days Estimate)	4,814	3,188	1,626	34%
Total Hospital Cost - ED ($655 Estimate)	$1,165,900	$860,015	$305,885	26%
Total Hospital Cost - Hospital Days ($954/day Estimate)	$4,592,365	$3,041,256.60	$1,551,109	34%
Total Hospital Savings	$5,758,265	$3,901,272	$1,856,994	32%
Total Savings / Patient	-	-	**$6,316**	-

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EVALUATION RESULTS

Table 1.12: Queen's University Evaluation – Results[1]

Total Patients Enrolled (as of December 2017) **Patient in Evaluation (enrolled by June 2017)**	1109 745
Total Retention (>3 months on program)	650/745 (87%)
Total # of Device Readings	368,510
Total Medical Alerts	28, 703 (1 Alert / 12.8 Readings)
# of Paramedic-Patient Coaching Interactions	3, 281
911 Call Reduction	26% (453 Calls)
Time Reallocated to Paramedic Services **Total Reallocated Savings to Paramedic Services**	764 Hours $331, 576
Reduction in ED Visits (ICES)	31% (467 ED Visits)
Reduction in Hospital Admissions (ICES)	32% (170 Admissions)
Reduction in Hospital Readmissions (ICES)	35% (18 7-day Readmits) 41% (59 30-day Readmits)
Estimated Savings to Overall Health System (650 patients)	$ 4,731,350 $7,279/patient
Estimated Cost to Implement CPRPM Program (assuming 6-month program duration)	$ 737,100 $1,134/patient
Patient Satisfaction Survey	90% satisfied/highly satisfied

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CONCLUSION

- The evaluation provides a very compelling business case, confirmed and validated using actual health system utilization data from ICES for the target patient population

- Integrating the CPRPM into front line care providers, with community paramedics as a point of local access can:
    - Increase:
        - Efficiencies of each care provider by sharing patient information on a real time basis
        - General care for patients with chronic illness
        - Number of patients managed in each community

    - Decrease:
        - Non-essential 911 calls
        - Non-essential emergency department presentations
        - Hospital admittance/re-admittance

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1. Brohman MK, Green ME, Dixon J, Whittaker R, Fallon L. Community Paramedicine Remote Patient Monitoring (CPRPM): Benefits Evaluation & Lessons Learned, 2015/17. Toronto, ON: Canada Health Infoway; 2018. Available from: https://www.infoway-inforoute.ca.

2. Statistics Canada. 2018. Available from: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Comprehensive.cfm

3. Ontario Association of Paramedic Chiefs. 2019. Available from: https://www.oapc.ca/about/.

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