Using “Big Data” to improve population health: The VA Homeless Program Hotspotter initiative

NCHV Annual Meeting

May, 2016

Homeless Veterans and Acute care use

- 40% of homeless adults went to an emergency department in the previous year and 7.9% accounted for 54.5% of all visits (Kushel et al. 2002) The top five reasons: substance abuse, trauma, mental illness, chronic disease exacerbations (O'Toole, et al. 1999).

- Homeless Veterans were 1.7 times more likely to have repeat ED visits within 30 days (Hastings, et al. 2011) Often frequent users of other parts of health system as well

- Risks include: recent ED visit or hospitalization, SA, MH, illness severity, unresolved psychosocial distress/need, no follow-up care, unsheltered homelessness

We also know that…

- Emergency departments are one of the most commonly reported sites of “first access” when someone becomes homeless.
- Social needs and consequences of homelessness often cause and define acute care presentations
- Both homelessness and concerns related to an acute illness are independent and significant motivators for behavior changes needed to exit homelessness

Institute for Healthcare improvement

Hotspotter Guiding Principles

- Population-based/focused
- Data driven
  - Process for identifying high risk/high cost utilizers
  - Interventions matched to population-specific needs
- Systems Design considerations
  - Interventions based within Care Models and Clinical Platforms
  - Process-driven to effect patient recruitment/engagement
  - Community-level support

Administrative data analysis

- Identifies key event/populations at highest-risk
- Baseline risk factors
- Temporal risk factors

Data Dashboard

- Timely
- Sensitivity/Specificity
- Patient level data

Secondary Review/Care Plan implementation:

- Addressing underlying need/engaging in care (MH, SUDS, CCM)
- Stabilizing environment
- Assisting in care navigation
- Developing alternative access/expanded access POC
- Intensive case/care management, CTI

Feedback

5 W's

WHO

WHY

WHERE

WHAT

WELL?

Current “Hotspotter” Projects within the National Center on Homelessness Among Veterans

- Who are and who will be Super-utilizers of acute care services?
- Who is at highest risk for eviction/negative discharges from HUD-VASH housing?
- Which criminal justice system-involved Veterans will become homeless?

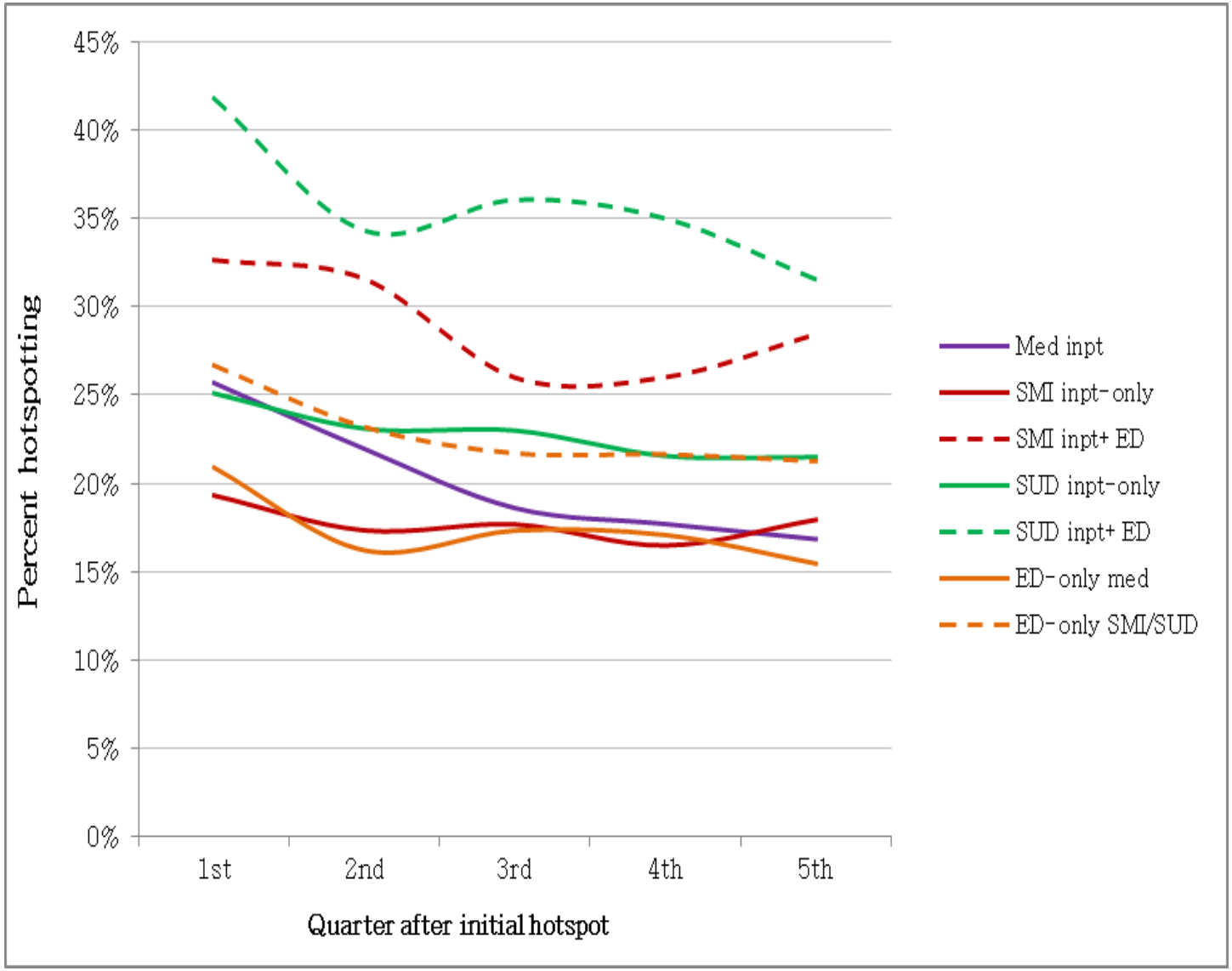
WHO? “Big Data” Case finding process

- High Risk cohort:
  - Homeless Registry includes 851,072 Veterans who have either been homeless or at risk of becoming homeless since 2006 (1 in 12 active VHA patients)

- High Risk case finding algorithm:
  - At least 2 Emergency Department visits (or) at least 1 Bed Day of Care during the previous 3 months
  - Approximately 10% of enrolled patients/70% of all acute care service use

- Field acceptance testing: Providence VAMC, VA Puget Sound, Birmingham VAMC, VA Greater Los Angeles – West LA Campus

Variable	Med inpt	SMI inpt-only	SMI inpt+ED	SUD inpt-only	SUD inpt+ED	ED-only med	ED-only SMI/SUD
Trimorbidity	18.2%	29.8%	37.1%	43.9%	55.4%	0.0%	17.9%
Avg hospitalizations	1.18	1.06	1.47	1.11	1.61	.00	.00
Avg ED encounters	1.41	.68	3.10	.68	3.25	2.54	2.74
Homeless services							
Any	49.1%	51.4%	61.9%	50.3%	62.7%	49.5%	64.4%
HUD-VASH	27.3%	20.0%	24.2%	22.1%	27.4%	22.9%	32.9%
GPD	8.5%	8.3%	12.7%	8.5%	14.3%	9.7%	14.8%
HCHV/HCMI	27.4%	34.0%	46.3%	28.7%	41.5%	33.2%	43.0%
VJO	2.6%	7.0%	6.3%	8.1%	6.6%	3.3%	6.6%
Female	5.1%	7.9%	7.8%	3.6%	2.8%	9.0%	6.2%
Age							
<35	5.0%	27.0%	22.9%	22.2%	17.3%	18.3%	19.3%
35-49	10.5%	26.1%	22.7%	23.3%	21.7%	21.2%	20.0%
50-64	54.4%	37.1%	43.4%	46.5%	52.4%	45.9%	49.3%
≥65	30.1%	9.8%	11.0%	8.1%	8.7%	14.6%	11.5%
Race/ethnicity							
Black (NH)	33.7%	27.4%	29.4%	24.1%	22.4%	35.8%	30.6%
White (NH)	48.8%	54.0%	53.0%	62.1%	60.6%	43.8%	52.4%
Hispanic/Latino	6.9%	6.6%	6.1%	3.8%	6.9%	8.7%	7.4%
(Missing/other)	(4.8%)	(6.3%)	(4.9%)	(5.7%)	(4.0%)	(5.4%)	(5.3%)
Combat exposure	8.8%	14.5%	13.3%	12.1%	12.3%	12.3%	11.8%
(Missing)	(8.8%)	(12.1%)	(11.6%)	(11.4%)	(10.4%)	(10.2%)	(8.8%)
OEF/OIF	5.2%	27.5%	22.3%	23.4%	18.8%	18.1%	18.2%
Service-connected disability	35.1%	48.1%	46.7%	40.3%	38.4%	40.2%	44.2%


45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Percent hotspotting
1st
2nd
3rd
4th
5th
Quarter after initial hotspot
Med inpt
SMI inpt-only
SMI inpt+ ED
SUD inpt-only
SUD inpt+ ED
ED-only med
ED-only SMI/SUD

Hotspotter Resolution Intervention points: team assignment/follow-up care

H-PACT*	1.430	1.204-1.698	<.0001
Outpatient, primary care	1.159	1.003-1.340	.0457
Outpatient, social work	1.259	1.016-1.559	.0349
Outpatient, rehab/therapy	1.540	1.282-1.851	<.0001

Variable	1 - Medical inpatient			2 - SMI inpatient			3 - SUD inpatient		
	AOR	95% CI	p	AOR	95% CI	p	AOR	95% CI	p
Mental illness, ≤7 days	1.58	1.08-2.32	.018						
Substance abuse, ≤7 days							1.61	1.26-2.2	.0004
Social work, ≤7 days	1.73	1.11-2.70	.016						
Rehab/therapy, ≤7 days	1.59	1.11-2.27	.011	1.75	1.25-2.45	.001	1.34	.96-1.86	.084

Developing Applications

- Corporate Data Warehouse (CDW) – includes data from all 152 VA Medical Centers
- Domains in the CDW include Outpatient Encounters, Inpatient Stays, Labs, Pharmacy, Vital Signs, Diagnoses, PCMM, etc.
- Homeless Operations Management and Evaluation System (HOMES) Database – used by VA Homeless Staff and contains Homeless Program Data.

Fiscal Year 2016 | Type National | View Report

Location National | HPACT Team

1 of 1 | 100% | Find | Next

	Oct	Nov	Dec	Jan	Feb	Mar
Inpatient Admits % Change						
Inpatient Admissions by Specialty						
Domiciliary Admits	82	63	72	58	59	86
Intermediate Med Admits	0	0	0	0	1	0
Medicine Admits	255	274	203	259	212	242
Neurology Admits	2	1	1	1	0	3
NHCU Admits	16	10	17	17	14	13
Psychiatry Admits	166	143	141	158	103	137
Rehab Medicine Admits	2	1	1	1	0	1
Surgery Admits	62	30	41	46	34	34
Hot Spot Veterans						
Vets with 2 ER Visits or Admit Past 3 Months	2,162			2,034		
% of Panel w 2 ER Visits or Admit Past 3 Mth	12.54%			11.41%		
ER Encounters for Hot Spot Veterans	5,136			4,553		
Inpatient Admissions for Hot Spot Veterans	1,858			1,757		
Inpatient Bed Days of Care for Hot Spot Vets	13,044			12,482		
# of Repeat Hot Spot Veterans	591			671		

Homeless Services Registry

Homeless and At Risk Veteran Profile

ZTEST,BLUE - 001-15-1234

Display All Homeless Services	Display Mental Health Services	Display Primary Care Services	Display VBA Claims

HEC/VHA Name: ZTEST,BLUE
Housing Status: Housing Unknown
Chronically Homeless: No

Gender: M
Age: 50

Birth: 1/1/1966
DOD:

Marital Status:
Children:

Contact:
POC Phone:

Assigned PCP:
PCP Facility:
Assignment Date:
Primary Care Team:

OEFOIF: N
Service: HUMANITARIAN (NON-VET)
SC%:
Elig: HUMANITARIAN EMERGENCY

Address Source: (V17) (674) Temple, TX
Address: 2605 YUMMY LANE
Address:
City: COPPERAS COVE **State:** TX **Zip:** 76522

Diagnoses in Last 2 Years			
PTSD		Weather-Related	
MDD		Cardiac/Cardiovascular	
Depression		Respiratory	
Bipolar Disorder		Infectious	
Substance Use		Neurology	
Schizophrenia		Musculoskeletal	
Personality		Endocrine	
Psychosis NOS		GI	

	Service	Date	
First Homeless Contact	HUD-VASH	1/18/2013	(4V17) (674) Olin E Te
Last Homeless Contact	HUD-VASH	1/18/2013	(4V17) (674) Olin E Te
Last Homeless Program	HUD-VASH	1/18/2013	(4V17) (674) Olin E Te
Last Outpatient Primary Care			
Last Outpatient Mental Health	(530) TELEPHONE/HUD VASH	1/18/2013	(4V17) (674) Olin E Te
Last Outpatient Care	(530) TELEPHONE/HUD VASH	1/18/2013	(4V17) (674) Olin E Te
Last Mental Health Admission			
Last Longterm Care Admission			

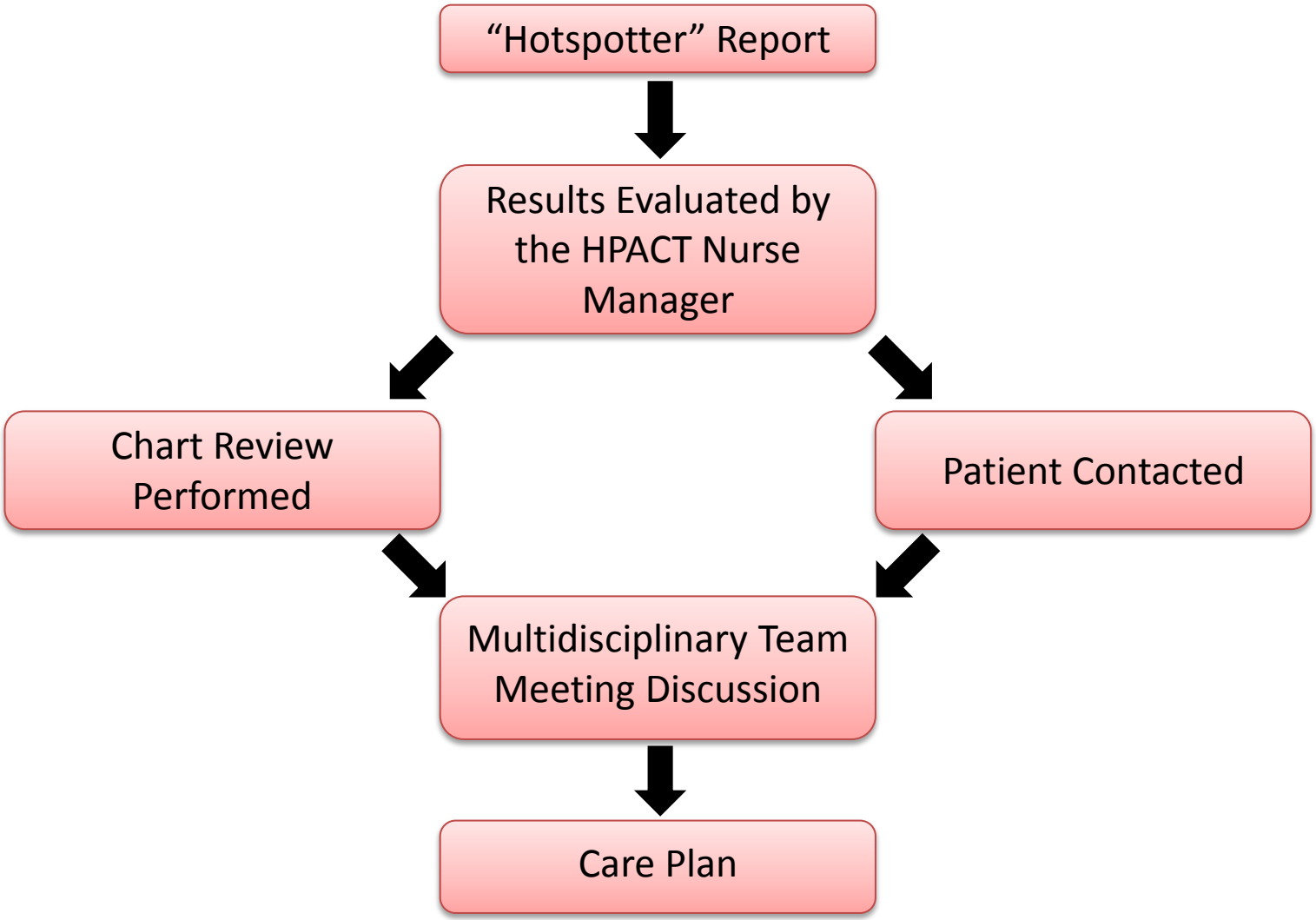
Future Appointments

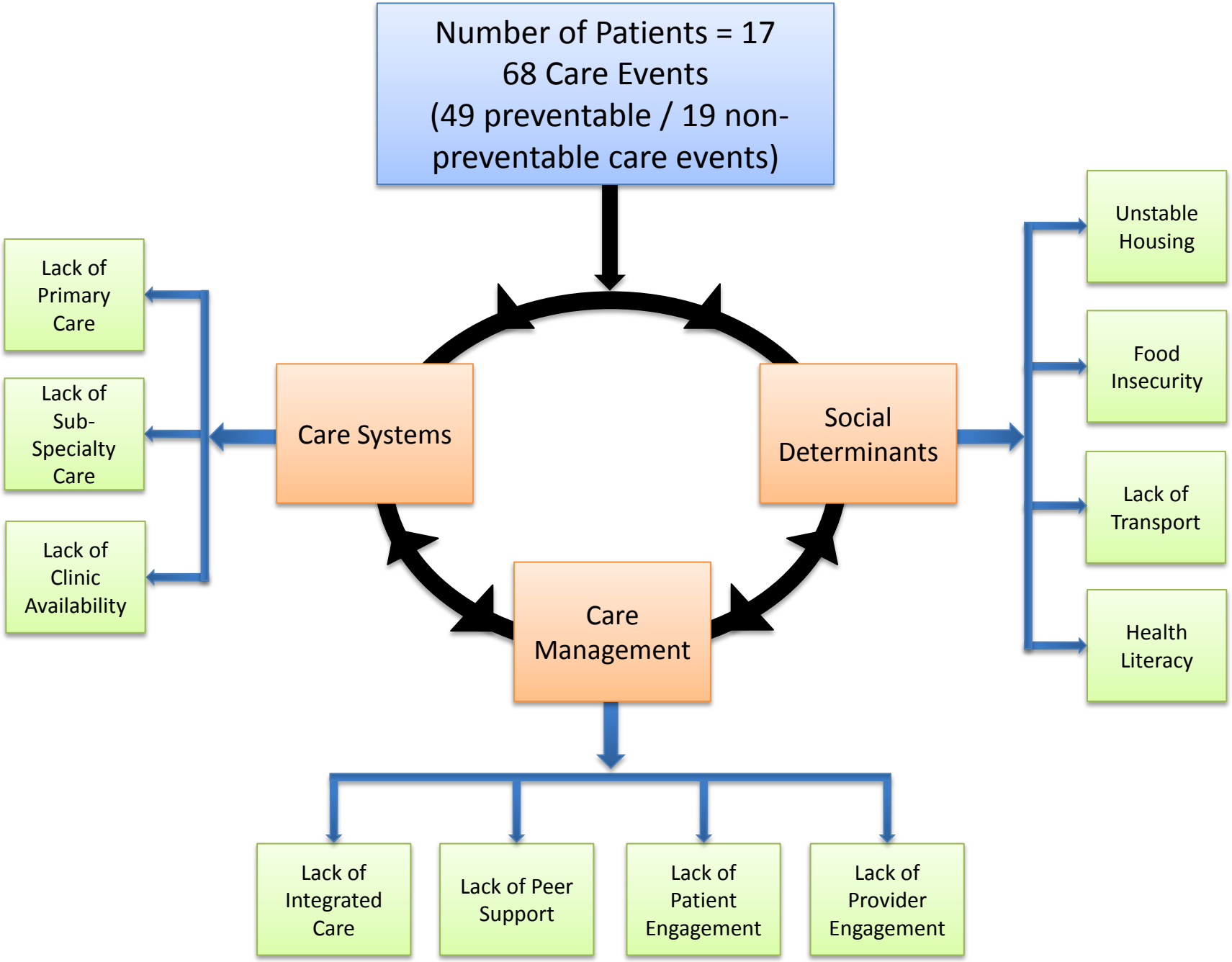
Appointment Date	Location Name	Division	Cancellation Date	Ca

Clinical Case

- Kenny is a 62 year old Veteran who had been chronically homeless for 7 years.
- He moved to Providence in February 2015 and established care at the Providence HPACT.
- He subsequently had 5 visits to the Emergency Room and one hospitalization within a 2 month period.
- Due to his multiple care events, Kenny was flagged in the Providence “hotspotter” report.

The Providence HPACT Team




Number of Patients = 17
68 Care Events
(49 preventable / 19 non-preventable care events)
Care Systems
Social Determinants
Care Management
Lack of Primary Care
Lack of Sub-Specialty Care
Lack of Clinic Availability
Unstable Housing
Food Insecurity
Lack of Transport
Health Literacy
Lack of Integrated Care
Lack of Peer Support
Lack of Patient Engagement
Lack of Provider Engagement

Clinical Case Revisited

- An examination of root causes underlined the significant impact of Kenny's chronic homelessness on his health.
- Kenny expressed a need for stable housing so that he could engage in outpatient substance abuse treatment.
- During his last hospitalization Kenny was able to be discharged directly into a new apartment.
- He subsequently successfully enrolled in a substance abuse treatment program, and has not been seen on the "hotspotter" report for the past 12 months.

Project Team

- Tom O'Toole, MD
- Dorota Szymkowiak, PhD
- Ann Elizabeth Montgomery, PhD
- Todd Manning
- Erin Johnson
- Betsy Lancaster
- Nora Hutchinson, MD MPhil