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*The Patient: At the centre of everything we do*  
*Ko te tūroro: Ki te pokapū o mātou mahi*



[caa.net.au](http://caa.net.au)

# Diagnostic Imaging at the Point of Care: A Possible Role for Community Paramedics?

VICTORIA YOUNG, PHD, PENG, UNIVERSITY HEALTH NETWORK –  
TORONTO REHABILITATION INSTITUTE

## Supervisors:

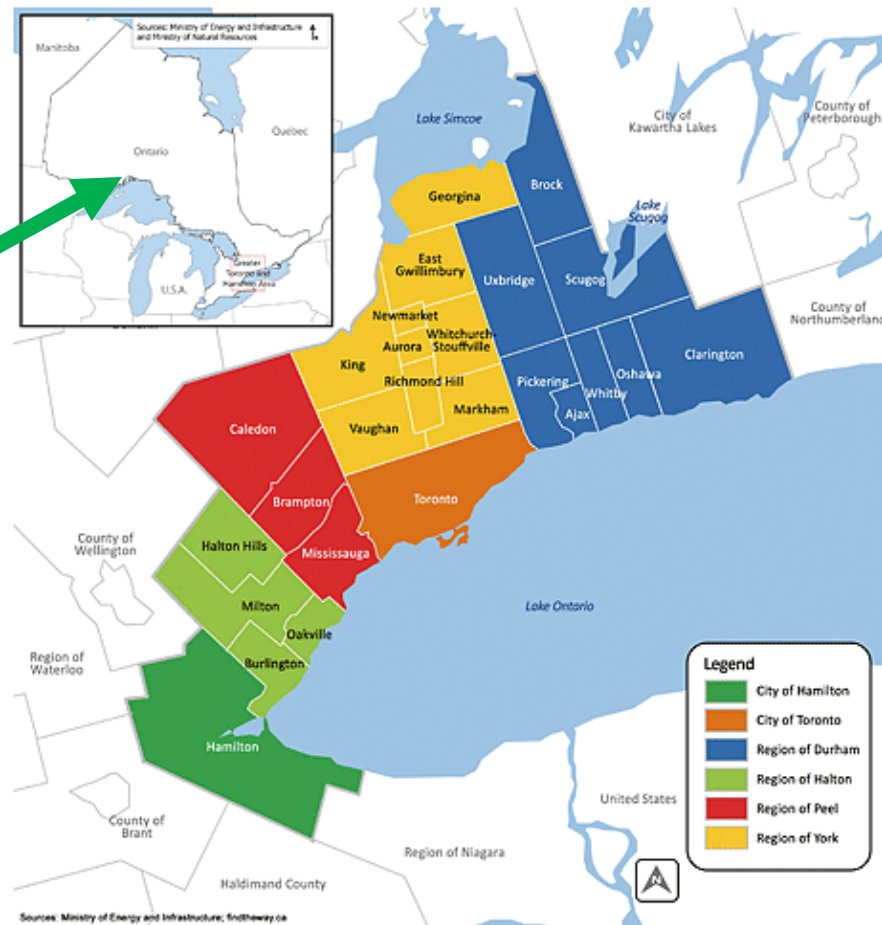
Dr. Susan Jagal, UHN-Toronto Rehab Institute | University of Toronto

Dr. Walter Tavares, University of Toronto | York Region Paramedic and Senior Services

Mr. Chris Spearen, York Region Paramedic and Senior Services



# Canada – Ontario – York Region



Ontario  
Population (2016):  
13,448,494  
Area: 1,076,395 km<sup>2</sup>

York Region  
Population:  
1,109,909  
Area: 1,762.13 km<sup>2</sup>

# Current Events

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## Strain of balancing ER demand with capacity leads to ambulance offload delays

Dartmouth General, QEII meet provincial offload standard only 17% of the time

By Michael Gorman, [CBC News](#) Posted: Oct 10, 2017 7:00 AM AT Last Updated: Oct 10, 2017 7:00 AM  
AT

For all the talk about patient wait times in the health-care system, at least one group of health-care professionals can also be prone to long delays.

When an ambulance arrives at one of the major hospitals in the Halifax area, paramedics will be waiting a while before they can return to regular duty. That's because the Halifax Infirmary and the Dartmouth General Hospital fall well short of the province's Health Department.

The standard calls for a patient to be transferred into the care of hospital staff within 90 per cent of the time. The two largest hospitals, however, only meet the mark 17 per cent of the time.

At Dartmouth General, 12 per cent of offloads take more than three hours, while at the Halifax Infirmary stretch to that mark or longer.

### 'Pressure on the EHS system'

The information was included in briefing notes prepared for Health Minister Randy Delorey when [he assumed the position in June](#). CBC News received a copy through a freedom-of-information request.

"Ambulances that are backed up at emergency departments, sometimes for hours, waiting to offload patients (particularly within HRM) results in pressure on the EHS system ... and adverse events for



(Andrew Vaughan/Canadian Press)

# CURRENT EVENTS



## Hospital overcrowding leaves patients in hallways, despite province adding beds

~~Doctors are worried the problem will get even worse with flu season upon us~~

By Philip Lee-Shanok, [CBC News](#) Posted: Dec 08, 2017 7:00 AM ET Last Updated: Dec 08, 2017 7:56 AM ET

The experience of a 41-year-old woman with pneumonia this week highlights the growing overcrowding in Ontario hospitals, in spite of the measures already taken by the province to add more beds.

Holly Pothiah went to a hospital in Brampton, but then had to be rushed by ambulance to another hospital because of a shortage of space.

She ended up spending one day in a hallway followed by more than two days in the emergency department because no rooms were available there — a problem doctors say is on the verge of getting worse if this flu season is as bad as predicted.

- [Opposition slams Wynne government over 'hallway medicine crisis'](#)

Pothiah was not feeling well Monday morning, so she and her husband went to Brampton's emergency department.

She was seen quickly and diagnosed with pneumonia, but hospital staff said they were overwhelmed by more patients.

"They told us it could be days before she could get a bed, because there weren't enough beds available," said her husband Mark Pothiah. "She was 34th in line for a bed."

The hospital confirms that a "Code Gridlock" was declared that day. That's when there is a surge of admitted patients waiting in the emergency department for a bed.

Mark Pothiah says a doctor spent hours calling around trying to find a bed for his wife, but finally told them to go by ambulance to Etobicoke General Hospital's emergency department.

### Patients sitting in the middle of the hallway



(CBC news, submitted by Mark Pothiah)

ughan/Canadian Press)

# CURRENT EVENTS

## Hospital overcrowding leaves patients in hallways, despite province adding beds



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→ [Chief Public Health Officer's reports on the state of public health in Canada](#)

→ [The Chief Public Health Officer's Report on the State of Public Health in Canada 2013 – Infectio...](#)

### The Chief Public Health Officer's Report on the State of Public Health in Canada 2013 – Healthcare-associated infections – Due diligence

[Previous page](#)

[Table of Contents](#)

[Next page](#)

#### Healthcare-Associated Infections–Due Diligence

##### Highlights

- More than 200,000 patients get infections every year while receiving healthcare in Canada; more than 8,000 of these patients die as a result.
- Mortality rates attributable to *Clostridium difficile* infection have more than tripled in Canada since 1997.
- The healthcare-associated methicillin-resistant *Staphylococcus aureus* infection rate increased more than 1,000% from 1995 to 2009.
- About 80% of common infections are spread by healthcare workers, patients and visitors.
- Proper hand hygiene can significantly reduce the spread of infection.
- Best practices in preventing infection can reduce the risk of some infections to close to zero.

[Becoming infected](#)

[Preventing infection in healthcare settings](#)

[Standards and best practices](#)

[Actions for success](#)

ec 08, 2017 7:56



(CBC news, submitted by Mark Pothiah)

gh beds available,"

ughan/Canadian Press)

is a surge of

but finally told

# CURRENT EVENTS

## Hospital overcrowding leaves patients in hallways, despite province adding beds



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### The Chief the State Healthcar diligence

# BMJ

## RESEARCH

### Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada

Astrid Guttman, senior scientist,<sup>1,2,3,4</sup> Michael J Schull, senior scientist and 2010-11 Commonwealth Fund  
Harkness fellow,<sup>1,4,5,6,7</sup> Marian J Vermeulen, epidemiologist,<sup>1,6</sup> Therese A Stukel, senior scientist<sup>1,4,6</sup>

#### ABSTRACT

**Objective** To determine whether patients who are not  
admitted to hospital after attending an emergency  
department during shifts with long waiting times are at  
risk for adverse events.

**Design** Population based retrospective cohort study

with the problem of waiting times, policymakers in  
Canada, Australia, and England<sup>2,7</sup> have instituted  
health reforms that include setting targets for the time  
patients spend in the department. Recently, however,  
the British government has rescinded National Health  
Service (NHS) emergency department targets for lack

#### Highlights

- More than 2  
infections e  
healthcare i  
8,000 of the  
result.
- Mortality rate  
*Clostridium*  
more than t
- The healthc  
increased n
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to zero.

<sup>1</sup>Institute for Clinical Evaluative  
Sciences, Toronto, ON, Canada

<sup>2</sup>Divisions of Paediatric and  
Emergency Medicine, Hospital for  
Sick Children, Toronto

<sup>3</sup>Department of Paediatrics,  
University of Toronto, Toronto

# CURRENT EVENTS

Hospital overcrowding leaves patients in hallways, despite province adding beds



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# NATIONAL POST

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## Ontario's long-term care problem: Seniors staying at home longer isn't a cure for waiting lists

*Though few would dispute that seniors want to live in their own homes for as long as possible, the push for home care over institutional care comes from Ontario's need to cut health costs*



Sohail Gandhi  
Just an old country doctor

### THE BLOG

## Ontario's Heading For Another Family Doctor Shortage

06/13/2017 12:33 EDT | **Updated** 06/13/2017 12:36 EDT

## CBCnews | Health

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**Health** Rate My Hospital

## Canadian seniors least satisfied with quality of health care in international survey

Seniors may face challenge accessing specialists, a new report suggests.

By Amina Zafar, CBC News Posted: Feb 08, 2018 4:06 PM ET | Last Updated: Feb 08, 2018 4:06 PM ET



About 33 per cent of Canadian seniors live with at least three chronic conditions, a new report suggests. (Pixabay)

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Nearly 33 per cent of Canadian seniors said they were dissatisfied with the quality of the health care they received, compared with an average of 24 per cent in many other countries, according to a new report.

The **Canadian Institute for Health Information's** analysis released Thursday is based on results from the Commonwealth Fund's 2016 survey of adults in 11 countries.

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### SECOND OPINION

A vital dose of the week's news in health and medicine, from reporter Kelly Crowe and CBC Health. Delivered Saturday mornings.

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# CURRENT EVENTS



# Learning Health System

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# Learning Healthcare Systems

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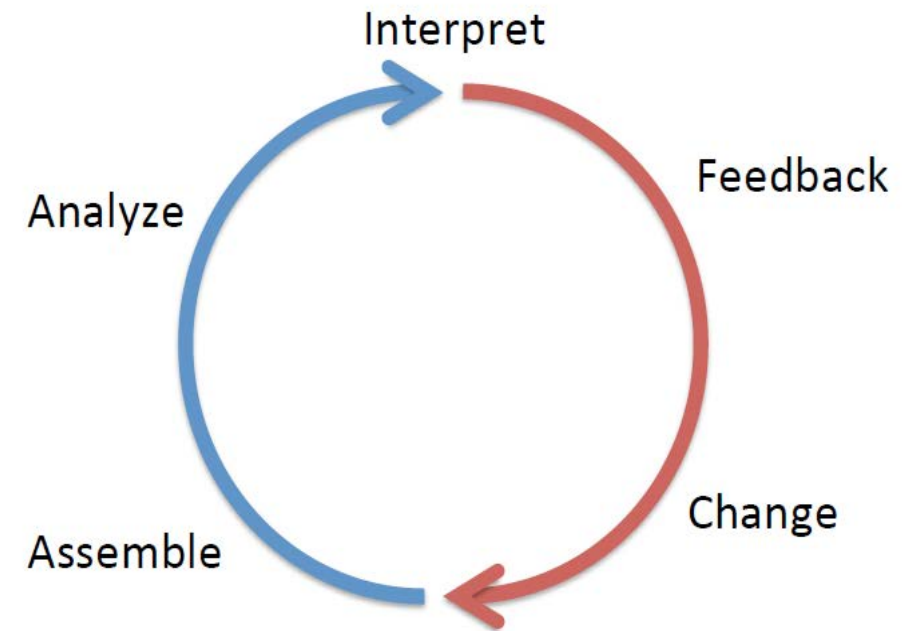
- Link research outcomes to policy
- Embedded partners  
(e.g., researchers in healthcare organizations)

# The Learning Health System Cycle

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Learning health system processes:

1. Afferent side (blue)
2. Efferent side (red)
3. Scale
  - institutional, national, international



# Health System Needs?

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# High-Cost Hospital Users

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Most common reasons for hospital admissions:

1. Chronic disease
2. Infection
3. Acute events
4. Palliative Care

# Healthcare System Needs

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1. More comprehensive care *(poor availability/quality)*
  - **Chronic care** management
  - Care of the **elderly** (home, LTC, end-of-life)
  - Effective **health promotion**
  - **Mental health** care/ **addiction**
2. Better access to care *(long wait times)*
  - especially **marginalized or vulnerable** populations
  - **after-hours** care

# The Older Adult Patient

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- Over 6 years, > **1 in 6 older adults** (65 years +) required **repeat EMS transport** within 30 days (17.7% of 689,644)
- Increased over 30 days – 30.6% and 90 days – 39.8%
- Costly and suggests patients are not receiving adequate medical care to meet needs

# The Older Adult Patient

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- **Pneumonia** - top reason for LTC resident ED visit (30.1% of 3,658)
- **Fall-related injury** - top “low acuity/other” visit (37% of 1,637, 22.7% of 9,589)  
(Gruneir et al., 2010)
- **Falls:** common dispatch complaint among elderly  
(Evans et al., 2017; Gruneir et al., 2010; Simpson et al., 2014; Tiedemann et al., 2013)



# York Region Community Paramedicine

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# Community Paramedicine

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Paramedics providing support in community

- Expanding Paramedicine in the Community (EPIC) 2013-15
  - Patients from Family Health Teams – CHF, COPD, DM
  - Hospital at Home
- CHAPS – EMS (social housing)
- Emergency Housing



**Chronic Disease Management  
Health Promotion  
Community Services Navigator**

**Calls to 911?**

# YRPSS Research study

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- 3000 adult patients
  - called 9-1-1 and brought to hospital Emergency (<CTAS1)
- CTAS 4-5 – 82.2% (n=350) not admitted
- CTAS 4-5 and >65 years, 77.2% (n=173) not admitted
- *Up to 85% of patients who visit ED are not admitted - US data (Pitts et al. 2006)*

# YRPSS Research study

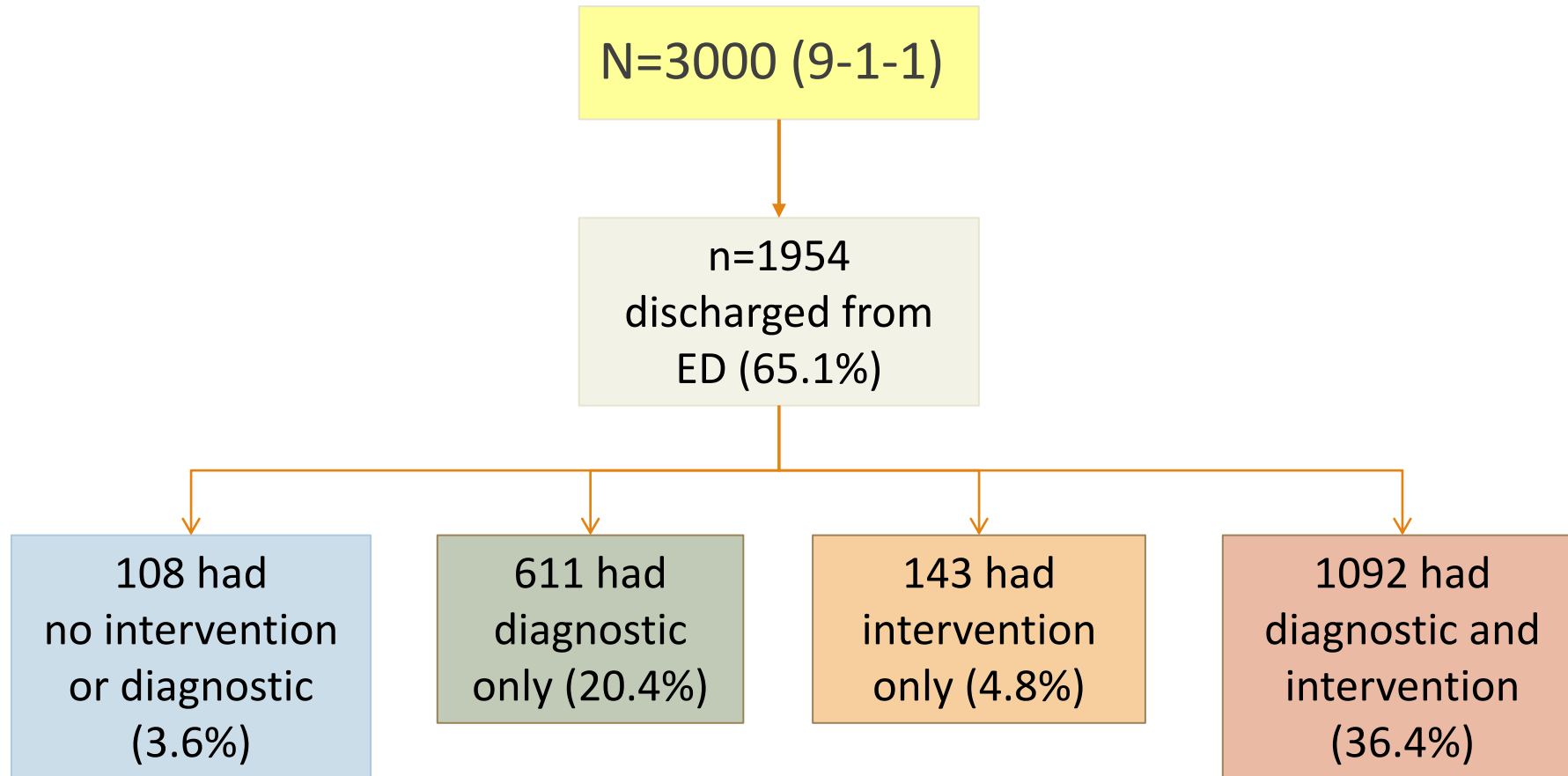




TABLE 4. Summary of paramedic service model (intervention and diagnostics) having the greatest impact on reductions for the need for additional services in EDs.

All nonadmitted patients (Groups 1–4)	Baseline (Group 1)		Model 12*	
	No Diagnostics in ED	Diagnostics	Model 4	
				CBC/Differential
				Creatine Kinase
				Urinalysis
				GEM Consult
				Crisis Consult
				Hydromorphone
				Zofran
				Metoclopramide
				Percocet
				Ceftriaxone
				Chem7
				Troponin
				INR
				PTT
				X-ray
	No interventions in ED	Interventions	Model 8	Pink Lady
				Ativan
				Tylenol 3
				TD
				Sutures
(N = 1954)	Baseline n = 108 (5.53%)	—	Predicted n = 691 in total in Group 1 (35.36%)	

\*Model that resulted in the greatest number of patients who would not require additional ED services (i.e., group 1), if available in the prehospital setting and requiring the least amount of diagnostics and interventions (see Supplemental Sections 4 and 5 for additional details regarding all other models; Supplementary Material Available Online).

YRPSS Research study  
(Tavares et al., 2017)

# Research question

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**Should radiography be included in the scope of practice for paramedics?**

## **Hypothesis**

Performing **radiography** in urgent situations out-of-hospital at the *point-of-care* will better aid in assessing a patient's medical condition and help guide decision-making in selecting the most appropriate care approach.

# Radiography Images



(Siemens Radiography Room)



(Siemens Mobillett)



(Sedecal Dragon X Xray)



(MinXray 100 HF)



# Questions?

## Emerging Technologies in EMS: Help or Hindrance?

Fri, Sep 1, 2017 |

By Vincent D. Robbins, FACPE, FACHE

We've seen some remarkable changes in the way EMS is provided around the country since its inception more than 50 years ago. We've gone from rudimentary first aid skills and rushing every patient to the hospital, to an expanded scope of practice that includes numerous treatment modalities and drugs, coupled with triaged response and selective, cautious transport.

But we haven't always relied on science and evidence to make our decisions about new devices or protocols. Until recently, we've demonstrated a propensity to grab on to the latest gizmo

## How to Avoid Over-Testing and Under-Testing Patients

Tue, May 2, 2017 |

By Dennis Edgerly, EMT-P  
P

In its early days, EMS was fairly straightforward and not too complex. Treatment modalities were simple and patient assessment focused mostly on the physical exam and patient history.

Over just a few short years, ambulances went from carrying single-lead cardiac monitors to monitors that can obtain 12-lead tracings. Pulse oximetry devices that originally gave providers just a number are now accompanied with a waveform and a capnography value and waveform as well. Manual blood pressure cuffs have been supplemented with automatic

Who can perform test?  
What can be tested?  
When to test?  
Where to test?  
How fast to test?

## To Transport or Not to Transport? Part 1 of 2

EMS and the Law

Sat, Dec 31, 2005 |

W. Ann Maggiore"> By W. Ann "Winnie"  
Maggiore, JD, NREMT-P

W. Ann Maggiore

JEMS Editorial Board member

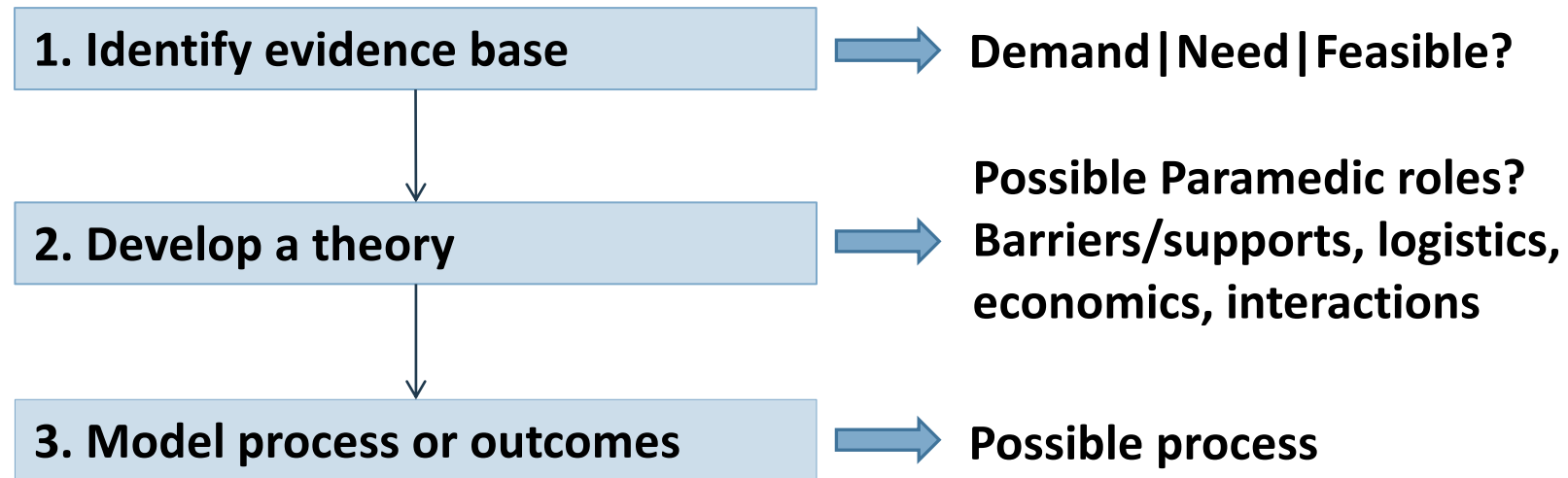
The question of when it's medically and legally safe to leave a patient at a scene



# Project Goals

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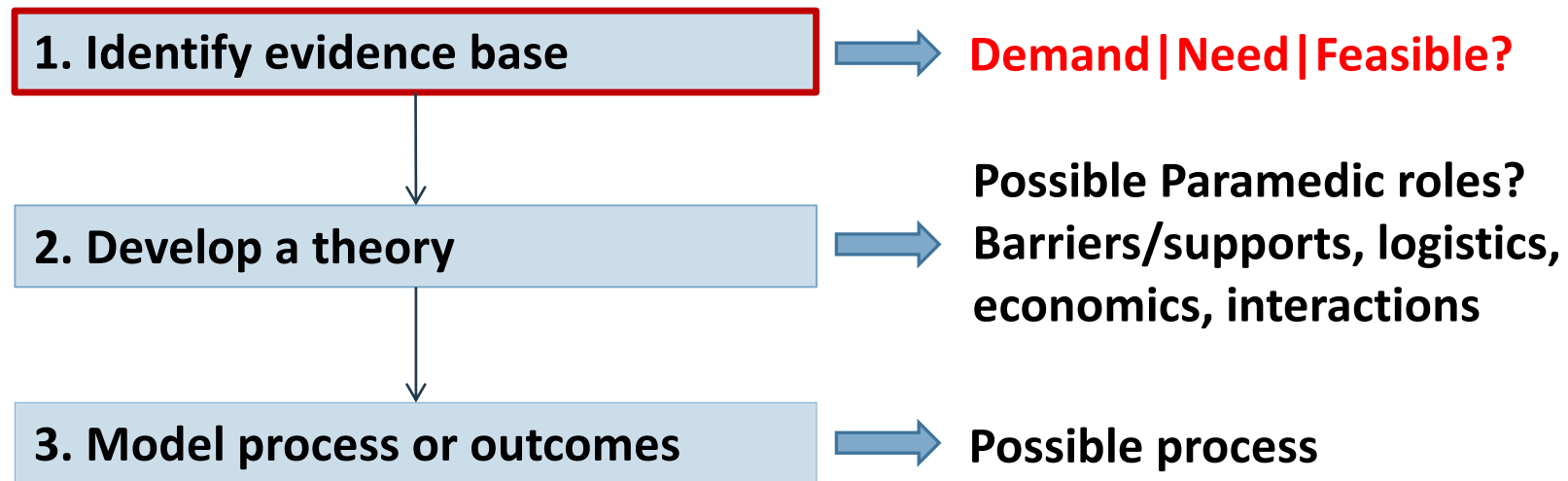
Framework: MRC Guidance for Complex Interventions (Craig et al., 2000)



# Project Goals

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Framework: MRC Guidance for Complex Interventions (Craig et al., 2000)



# Identify Evidence Base - Method

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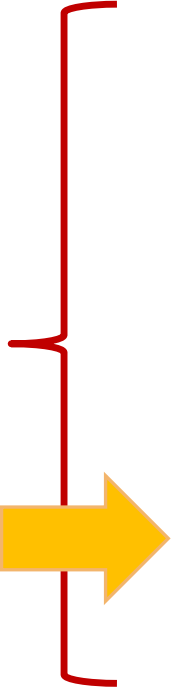
(Medical Research Council's Guidance for Complex Interventions - Craig et al., 2012)

- 
1. Stakeholder interviews/focus groups (qualitative)
  2. Examine 9-1-1 call and hospital data (quantitative)
    - Age, image type, CTAS level
  3. Review published research and grey literature
    - Environmental scan (e.g. EMS providers)

# Identify Evidence Base - Method

---

(Medical Research Council's Guidance for Complex Interventions - Craig et al., 2012)

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# Current Radiography provision?

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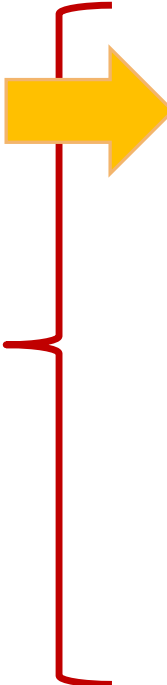
- Private providers of portable x-ray in Canada
- Research studies: portable units in long-term care (Laerum et al., 2005)
- Have not found any studies involving paramedics providing radiography
- Alberta EMS Stroke Unit/ Renfrew (Ottawa) Portable Ultrasound
- Taking Images: mostly Radiation Technologists , sometimes nurses
- Reading Images: Radiologists, Emergency Physicians, Critical Care Paramedics
- Radiation Technologists are a regulated profession

**Paramedics?**

# Identify Evidence Base - Method

---

(Medical Research Council's Guidance for Complex Interventions - Craig et al., 2012)

- 
1. Stakeholder interviews/focus groups (qualitative)
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    - Age, image type, CTAS level
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# Urgent Care @ Home Stakeholders (n=42)

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## Personal Supports

- Personal Caregivers
- Caregiver Support Facilitator

## Home-Based

- Physician (Family, Geriatric)
- Nurses (Nurse Practitioner, Community)
- Paramedics (911, Community)
- Home Care Coordinators
- Personal Support Worker
- Occupational Therapists
- Telehealth Clinical Care Coordinator

## Other

- Gov't Health Administrator
- Mobile X-ray Company
- Health Care Administrator

## Health Care Facilities

- Medical Lab Technician
- Radiation Technologist (mobile)
- Physicians (Emergency, Internal Medicine, Radiology, Cardiology, Family, EMS-base )
- Nurses
- Care Organization Administrator

# Joe

- Home in a big urban city
- 80 years old
- Lives with wife also 80 yrs
- Multiple specialists outside home
- Home care come 2x/week
- **Mild Dementia & Kidney Disease**

**Situation:** Just returned from hospital to fix a broken hip. **No longer mobile, has delirium, and a fever.**

# Martha

- Long-term care home in small city
- 83 years old
- Family lives in same city
- Speaks Greek with broken English
- Uses a wheelchair to get around
- **Diabetes and asthma**

**Situation:** Has **fallen** out of bed at night. Experiences **pain in her leg** and has a small **bleeding cut on arm.**

# Alena

- Community housing in suburbs
- 85 years old
- Lives alone, no family close
- No home care support
- On Long-Term Care (wait list)
- No family physician
- Uses a walker
- **Arthritis and Urinary incontinence**

**Situation:** **In-dwelling catheter** has fallen out. It is 11pm in the middle of winter (very cold).

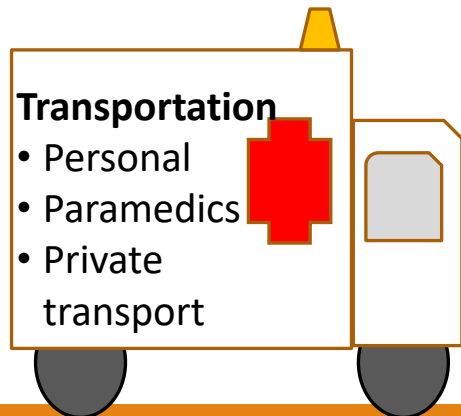


# Out-of-Home Care

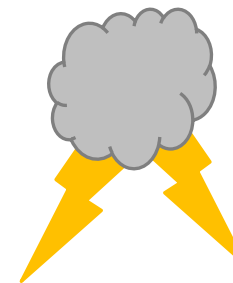
## *Primary Care*



## *Secondary Care*



## Weather & Environment



# Joe

- Own home in a big urban city
- 80 years old
- Lives with wife also 80 yrs
- Multiple specialists outside home
- Home care come 2x/week
- Has **mild Dementia and Kidney Disease**

**Situation:** Just returned from hospital – had broken hip. **No longer mobile, has delirium, and a fever.**

## Emergency Physician doing a house call:

“...the first you thing you have is the wife in tears, and saying, “**the hospital forced me to take my [...] husband home, and I don’t know what to do.** I called the family doctor and they say, have the house call doctor come and do a house call,” well, what [...] am I supposed to do?”

## Personal Support Worker:

“Right now, she has **a lot of caregivers** going in there, whether it be family or agencies. [...] you've got a lot of people that you are working with, and I'll be honest, it's very frustrating, because **they don't know her.**”

## Nurse Care Coordinator:

“I think we're trying to hurry the healing process along too quickly. We need to **slow it back down** again and allow people to heal and have **more visits from nursing.**”

# Martha

- **Community Housing in suburbs**
- 85 years old
- Lives alone, no family close
- No home care support
- On Long-Term Care (wait list)
- No family physician
- Uses a walker
- Has **arthritis and urinary incontinence**

**Situation:** In-dwelling catheter has fallen out at 11pm. It is the middle of winter and very cold.

## Community Paramedic:

“So, most of our folks, they may have saved well for retirement, but [...] they outlive their resources.”

## Personal Support Worker:

“...it's just **so hard for them**, it's such an issue just to get in a car or just to get down the steps, or it's so hard on them to get to these places that they just ... I don't want to go. [...] Doctors can only do so much when they're coming into the home. Then they order the tests [...] and you're stuck with this problem, well, how do you get them there?”

# Alena

- **Long-Term Care Home in a small city**
- 83 years old
- Family lives in same city
- Speaks Greek and broken English
- Uses a wheelchair
- Has **diabetes and asthma**

**Situation:** Has **fallen** out of bed at night. Experiences **pain in her leg**, has trouble rising and has a small **bleeding cut on arm**.

## Radiation Technologist:

“...in fact, there are many requisitions that we receive, that say, **to prevent emergency transfer**, many, many. [...] [...] if you can't get here, we'll have to send them to the hospital because they really need that [portable] x-ray.”

## Radiation Technologist:

“[...] once the patient [...] comes back to the nursing home, they're ordering a chest x-ray [...] They immediately come back and are put in isolation as a precaution, until they **rule out C. diff, MRSA, and all the other big bugs**, that's a routine now for most homes.”

# Benefits of Staying Out of Hospital

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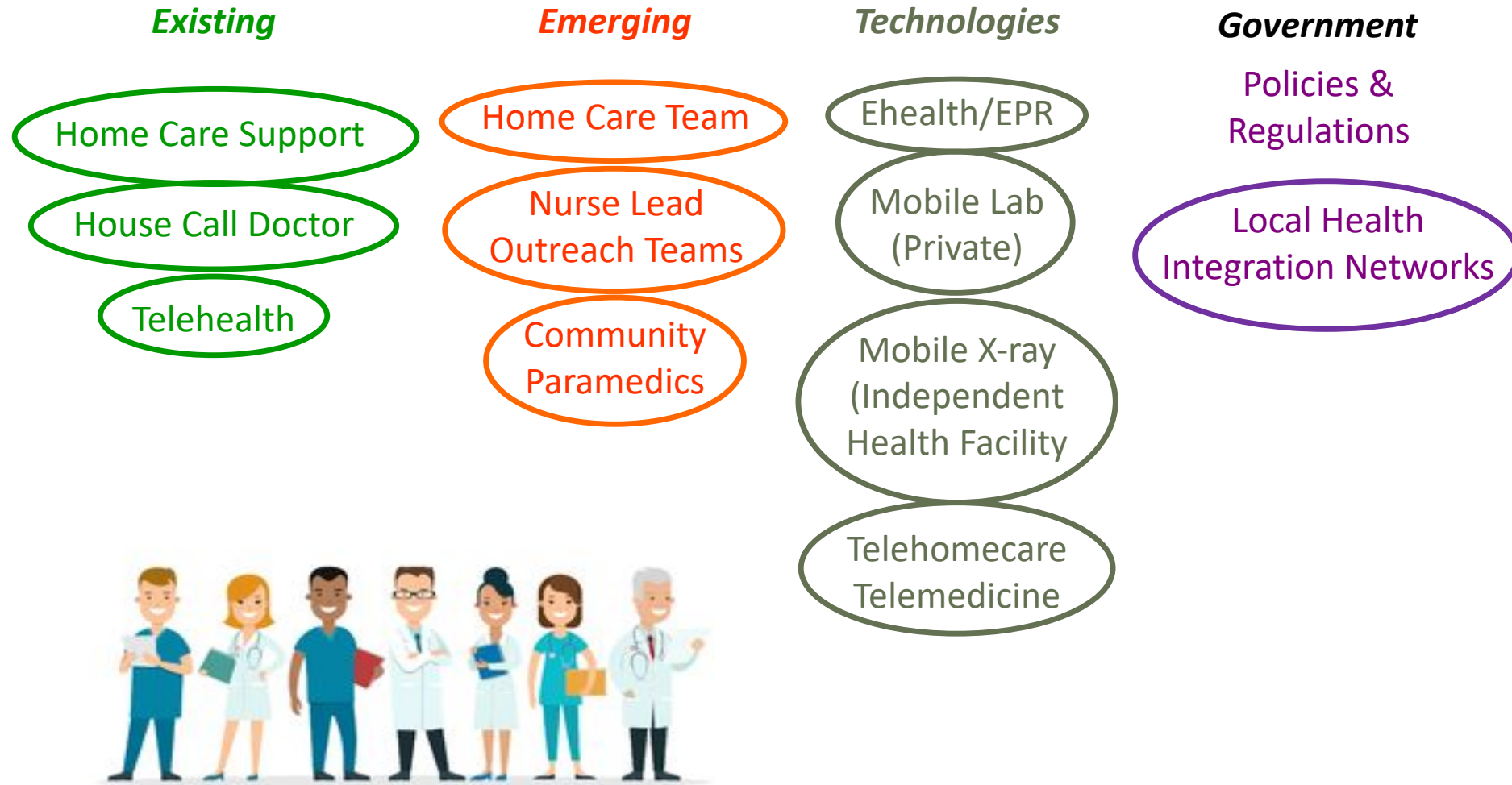
## Health Administrator/Caregiver:

“So, it's the three things. It's not **exposing them to more contagion, better use of Emerg** and **not contributing to the distress and possible further agitation** of the elderly person.”

## Geriatrician:

“A **huge health benefit** because Emerg can be challenging place for older adults if they're waiting there a long time. **It's busy and it's noisy.** Especially for a person with dementia there is increased risks of issues like **delirium** and other problems that can develop. If you're waiting on an Emerg stretcher for longer than eight hours, you can start developing **skin breakdown** on your sacrum.”

# In Home Care



# In Home Care



# Home Care Team Challenges

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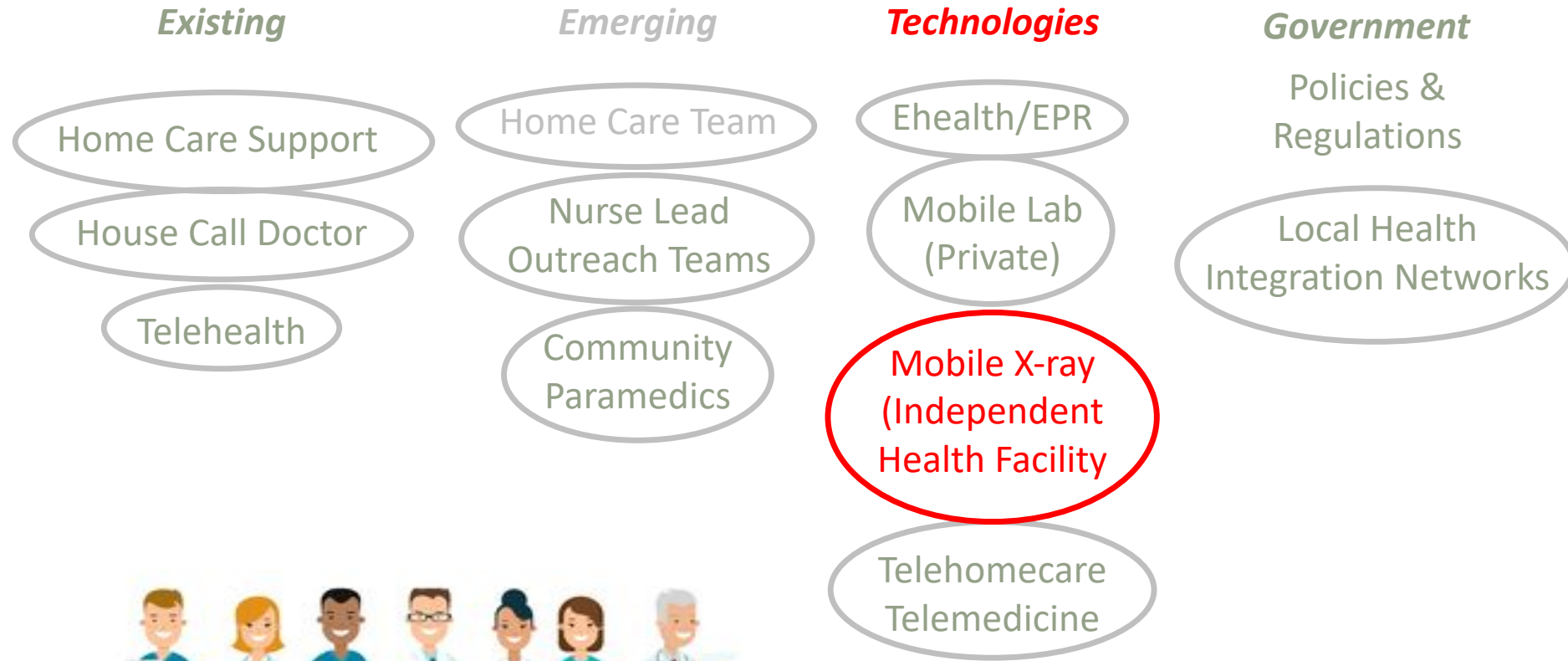
## Occupational Therapist on a Home Care Team:

“... it would be great to have access to more. [...] we would send people to the Emergency, even a doctor, [...], when it's beyond what they can do **because they don't have any of the equipment.**”

“We were getting labs done through [our community paramedic], which was super helpful, because then the results, **everything, was done in time** [...]. because, again, labs [...] take [...] a couple of days to get blood work and everything back, and then back uploaded to the EMR.”



# In Home Care



# Demand for Mobile X-Ray at Home

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## Radiation Technologist:

"[...] we get many requisitions that say, **query fractured hip, query pneumonia, CHF question mark**. Subjectively, as a clinician, you would say, well, those are urgent type of environments, aren't they?"

## Radiation Technologist:

"[...] You think, well, if you're going to hire [an] ambulance to bring them from there to there, why wouldn't they just transfer them out for the x-ray. **But obvious concerns about physically leaving.**"

## Caregiver of Husband with Alzheimer's:

"This is the winter time. It's really quite a challenge to get him out. [...] And I said, I'm not taking him out. This is crazy. You get an x-ray to come in here. [...] his healing was very slow. [...] So, they had a couple of different times when they checked and, oh, it's not quite healed yet, it's not completely knit. **So, it makes a huge difference to have the portable x-ray machine.**"

# Support for Urgent Care at Home

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## Phlebotomist and Lab Technician:

“[... ] I think having that service will help in the long-term, help people heal a little bit better because they **won't suffer the anxiety** of being in an environment that they are **not familiar with**, they are in the comfort of their **own home**. They can use their **own bathroom**, they are sleeping in their **own bed**. Because that's one huge factor, in **the comfort of your home** [...] and sleeping in **your bed is probably the best medicine** [...].”

# Preliminary Results...

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- All stakeholders supported medical diagnostic service provision at home;
- Clear method needed for **team communication** and accessing **patient information**;
- Preferred timing to receive diagnostic results: **a few hours to < 1 day**;
- **Risks:** benefit to patient outweighs risks for clinician;
- Opinions differed on **acuity level of target populations** treated at home;
- **Direction:** define target population, define “urgent”, design service model that integrates and leverages existing services, develop a clinical process/business plan, and assess economic feasibility. (Focus on X-rays.)

# Identify Evidence Base - Method

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(Medical Research Council's Guidance for Complex Interventions - Craig et al., 2012)



1. Stakeholder interviews/focus groups (qualitative)

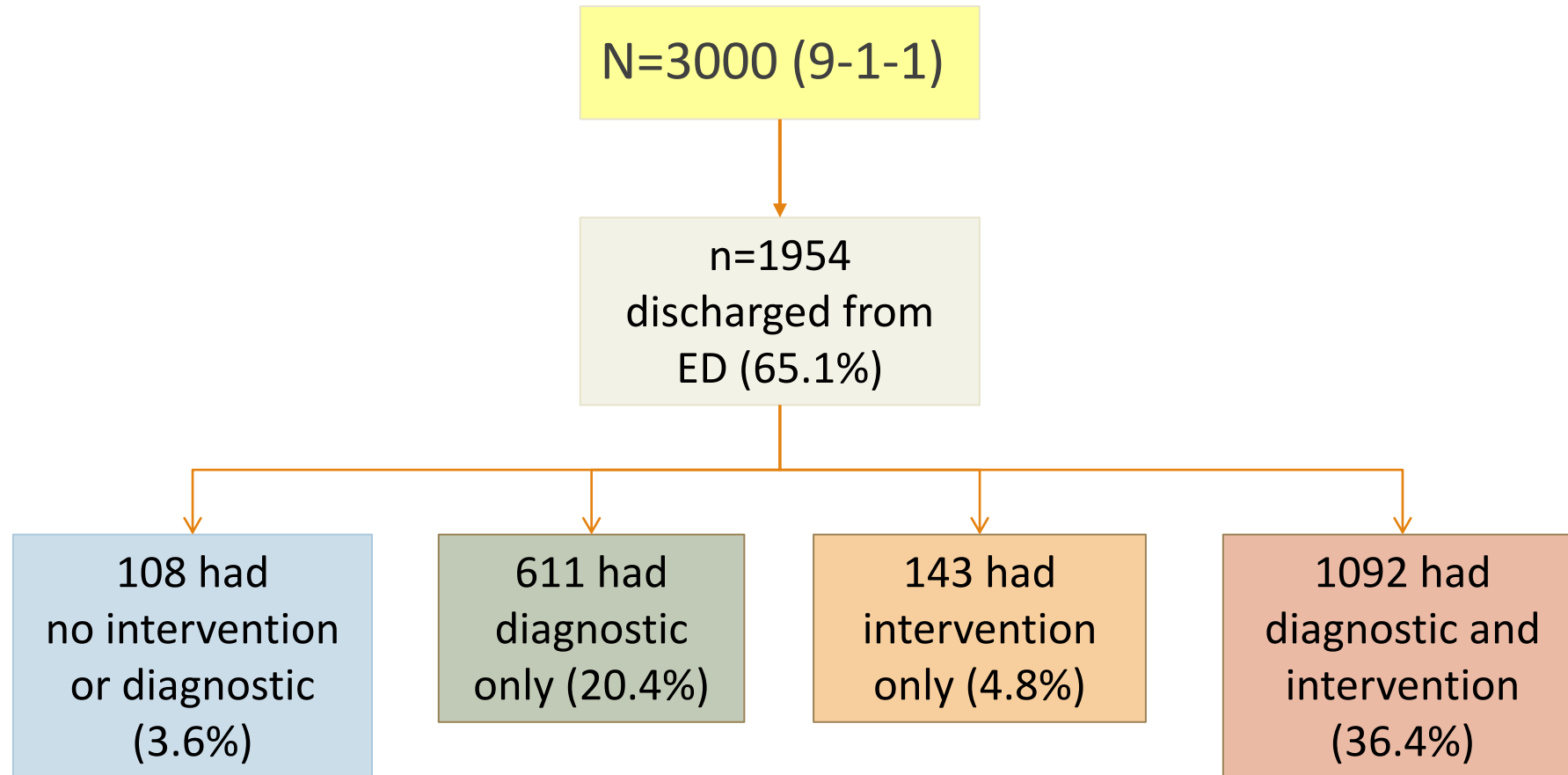
2. Examine 9-1-1 call and hospital data (quantitative)

- Age, image type, CTAS level

3. Review published research and grey literature

- Environmental scan (e.g. EMS providers)

# Back to the YRPSS Research study



# Who gets an X-ray?

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n=3000 all patients

**57.2% Women** | 41.9% Men | 0.9% Other

n=1652 patients with  
x-ray order

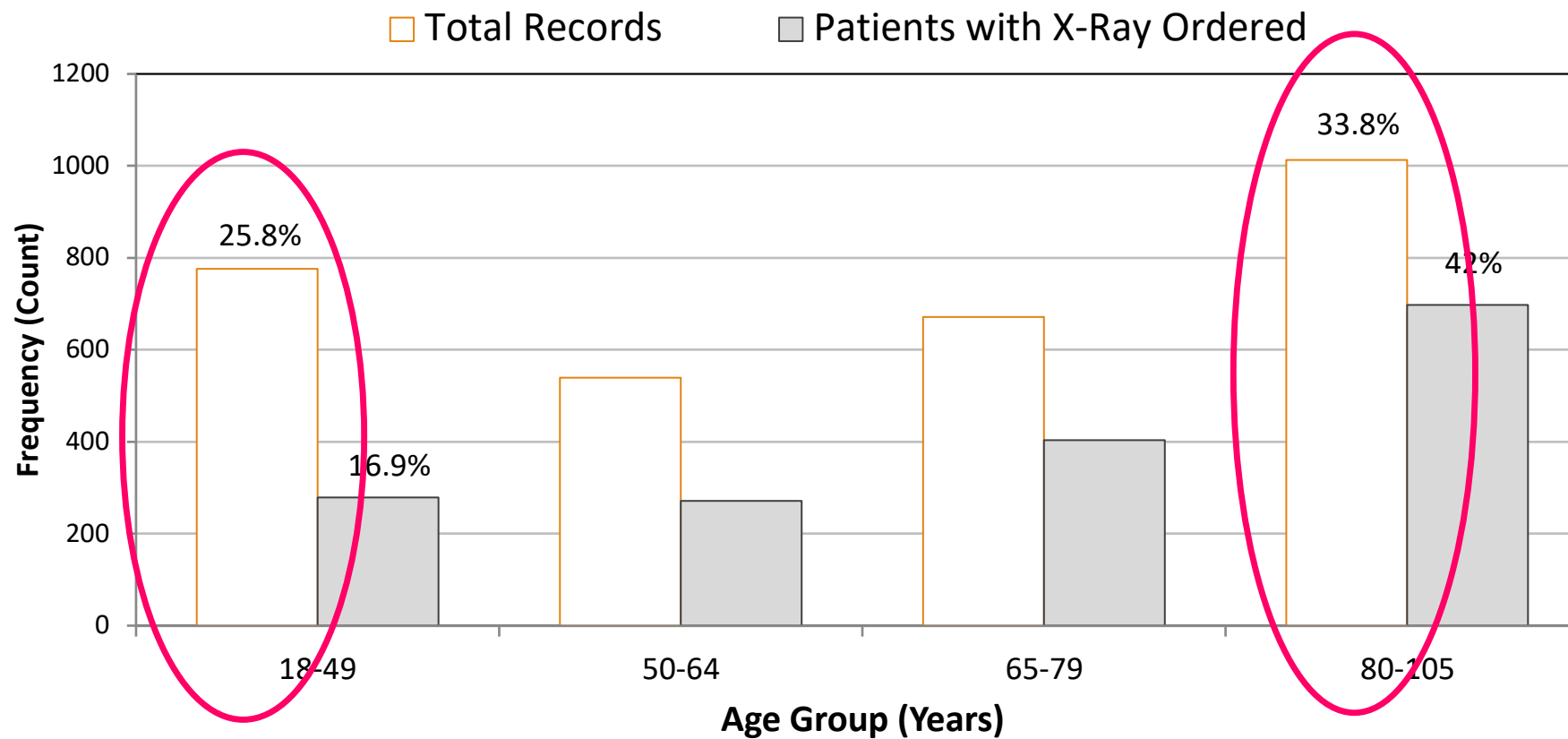
**58.1% Women** | 41.3% Men | 0.6% Other

n=211 patients with  
x-ray order,  
discharged, CTAS 3-5

**64.5% Women** | 34.6% Men | 0.9% Other

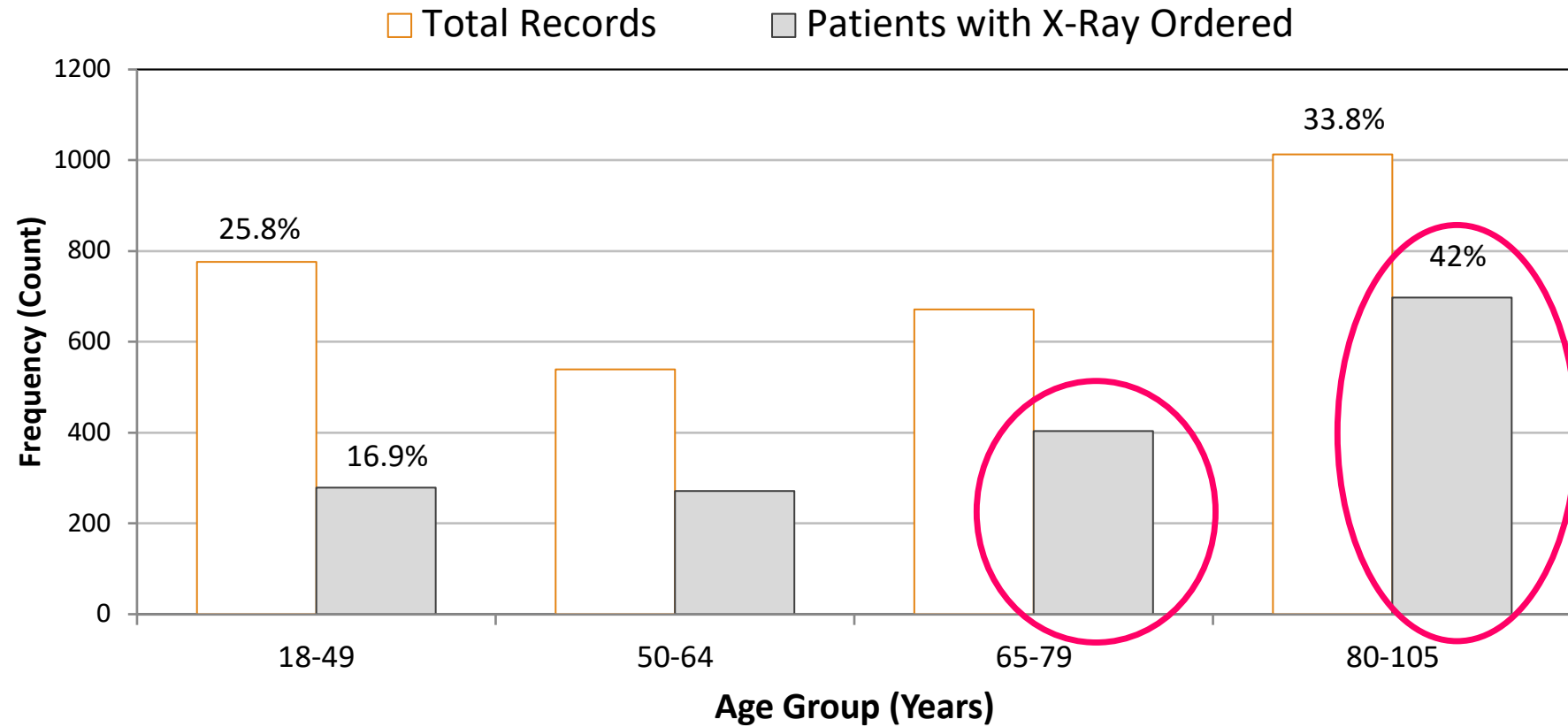
**Slightly more women than men**

## Age Distribution of Patients Requiring Radiography in Emergency Room (Regardless of Disposition)



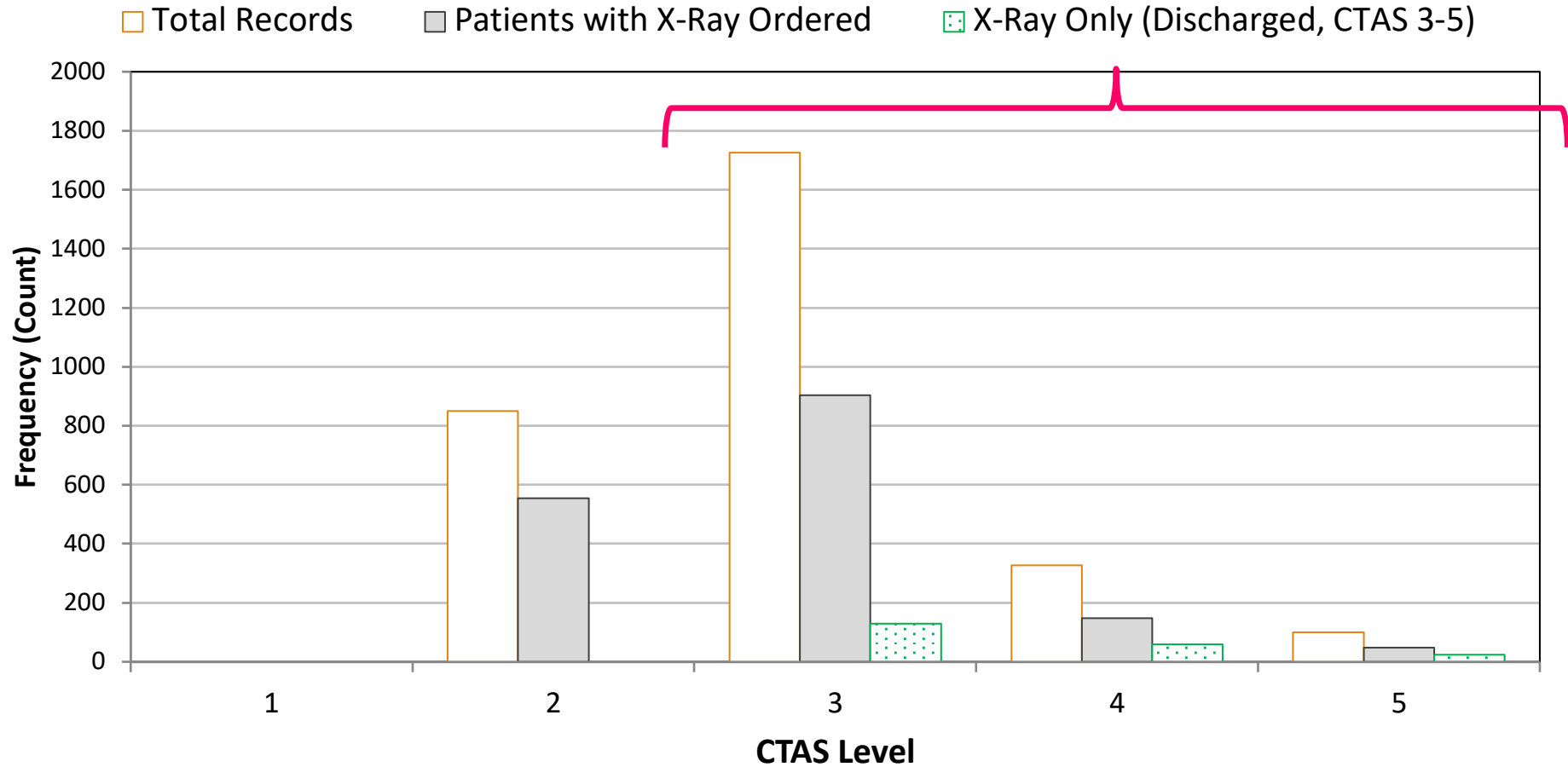


## Age Distribution of Patients Requiring Radiography in Emergency Room (Regardless of Disposition)



**Mostly older (65 and older)**

# CTAS Level Distribution of Patients By Varying Diagnostics Ordered and Disposition

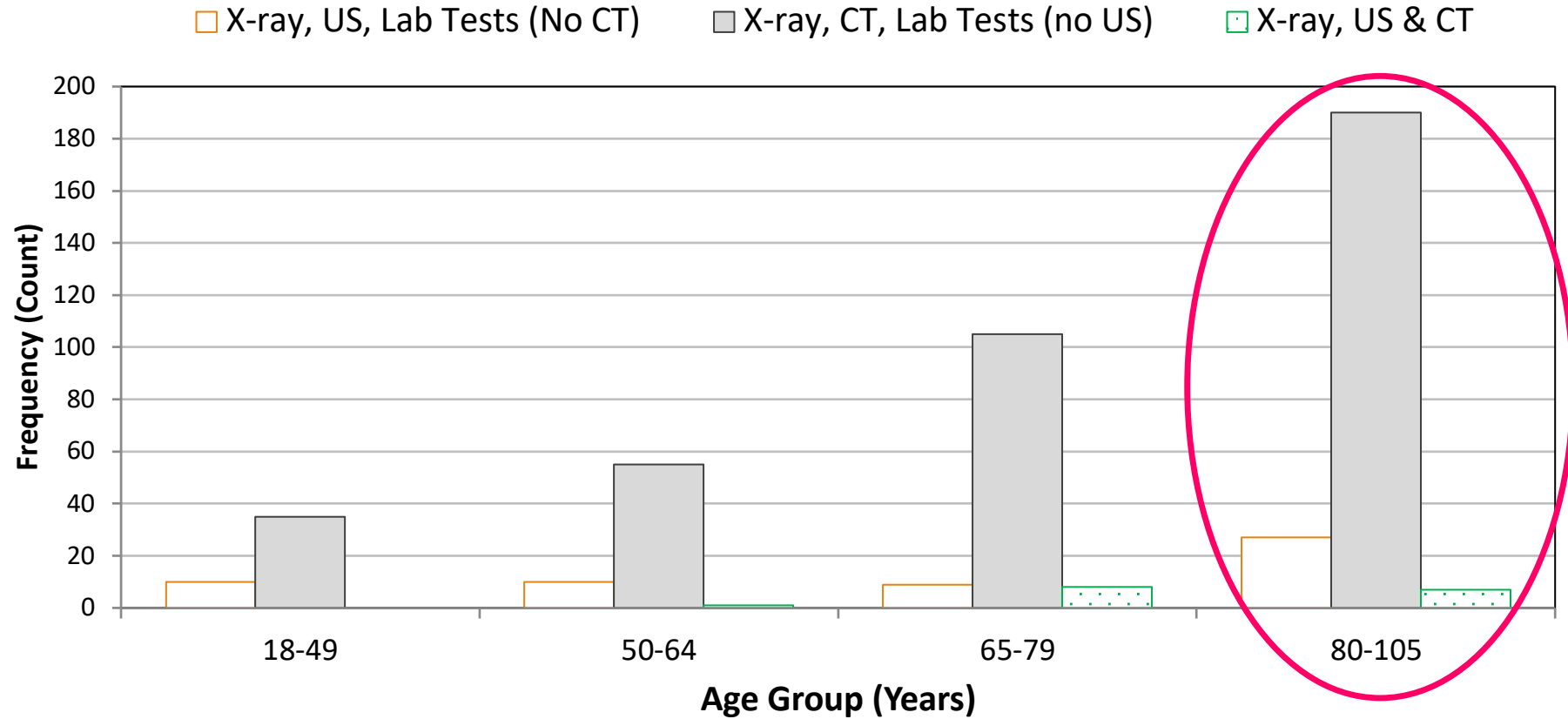


**CTAS 3-5 Covers a Majority**

# What about other diagnostics?

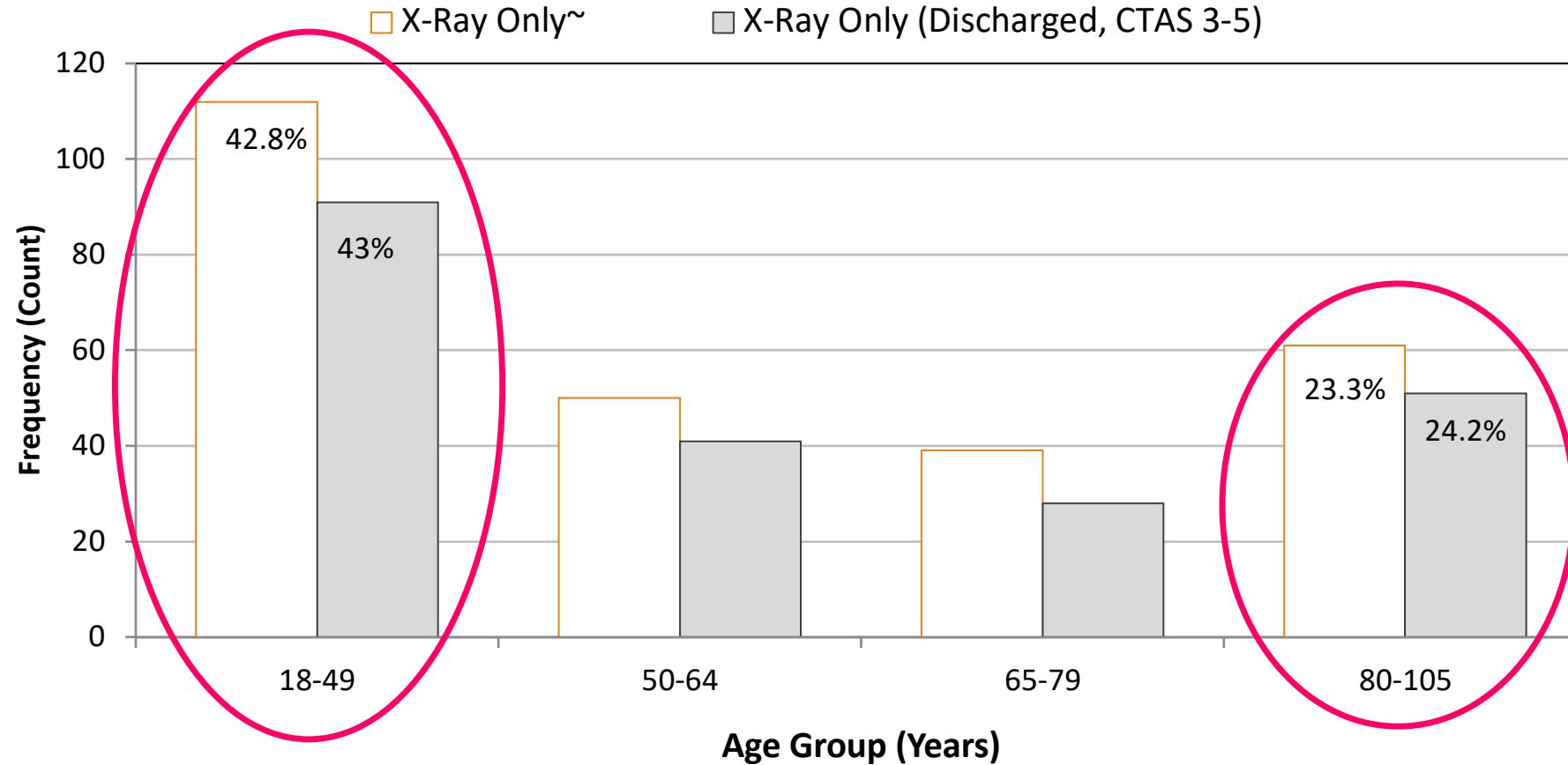
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## Distribution of Patients Requiring Ultrasound and/or CT in Emergency Room (Regardless of Disposition)



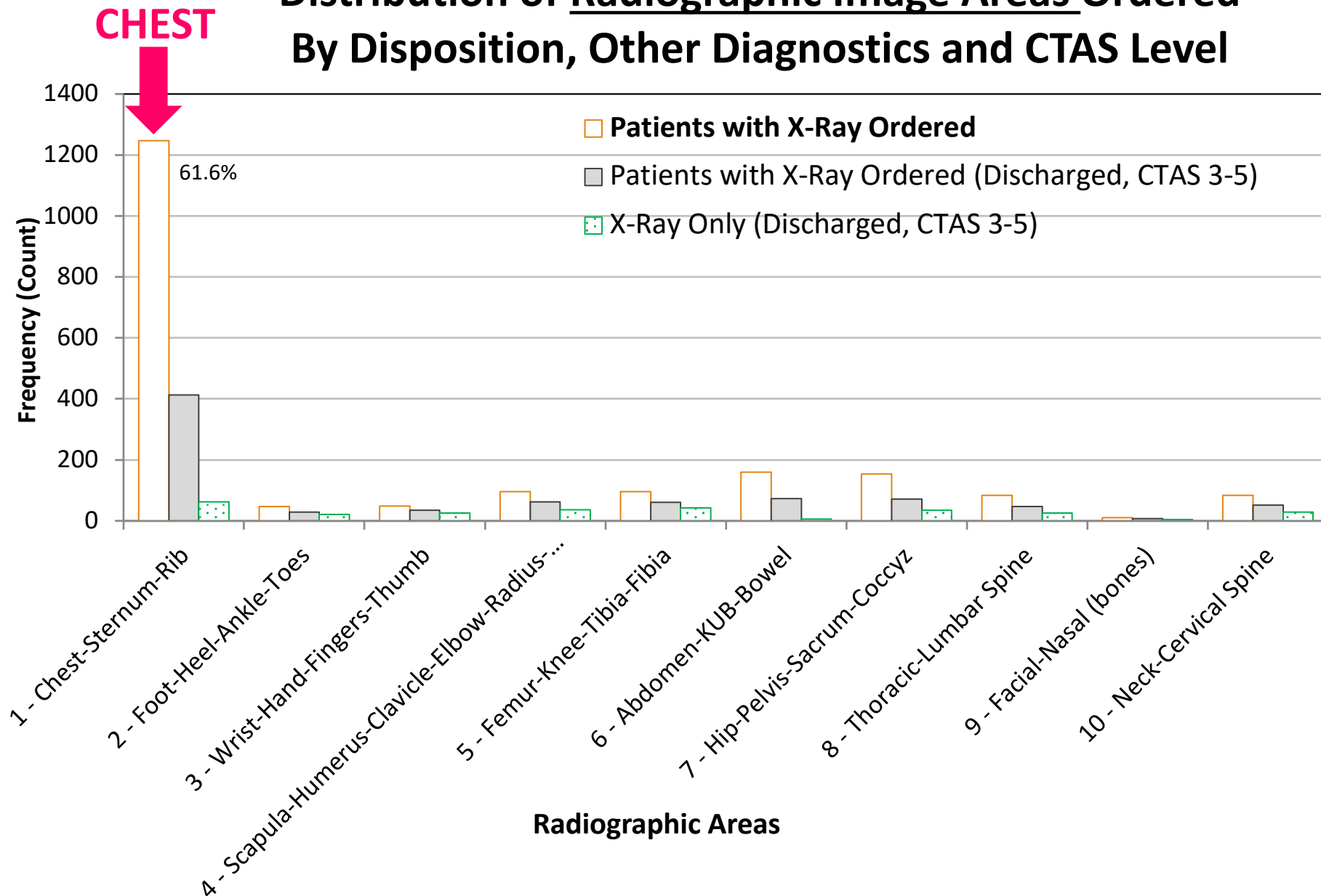
**Mostly older (80+)**

## Distribution of Patients Only Requiring Radiography in Emergency Room (No US, CT or Hospital-based Lab)

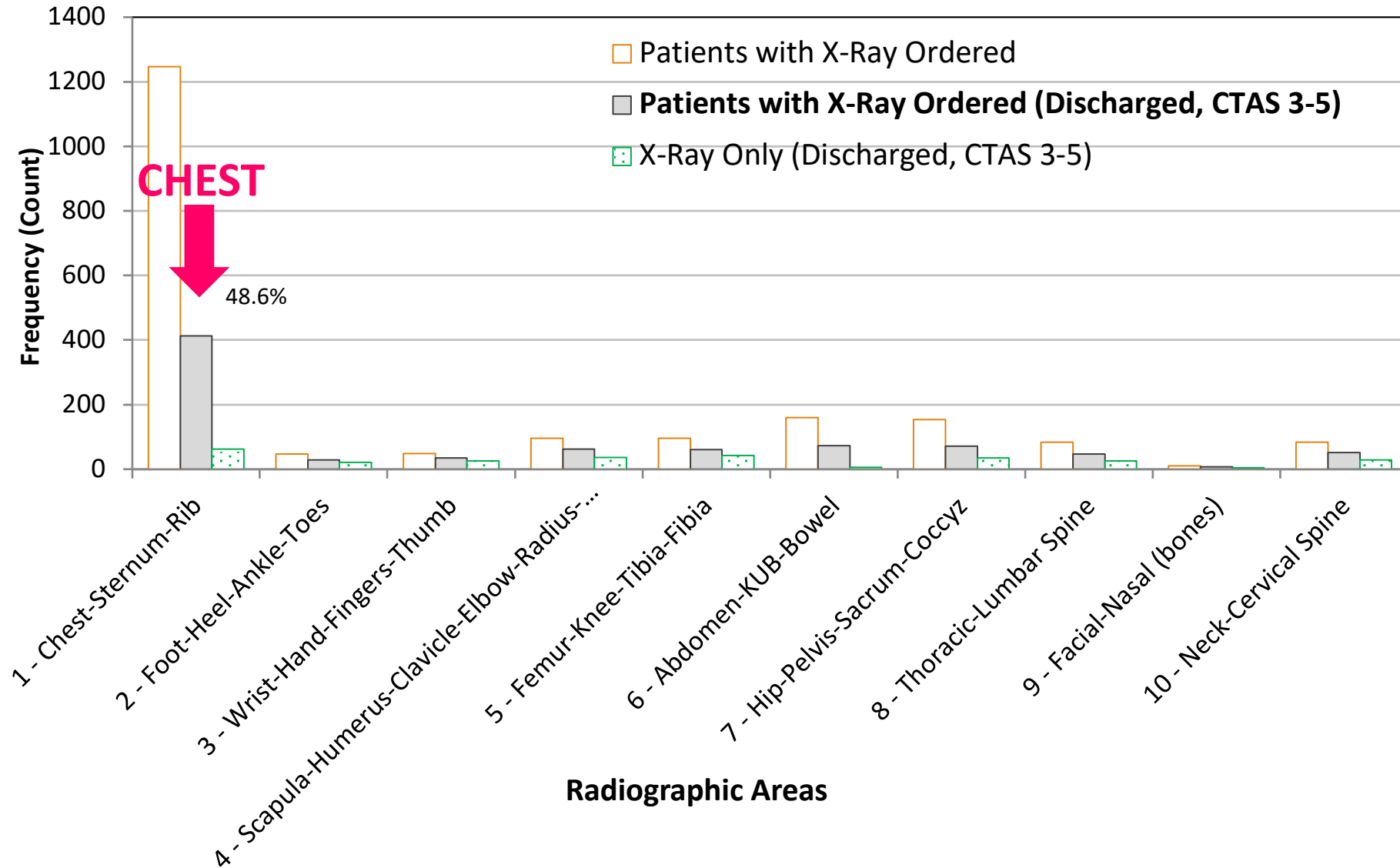


**Mostly younger (<49) followed by older (80+)**

# Distribution of Radiographic Image Areas Ordered By Disposition, Other Diagnostics and CTAS Level

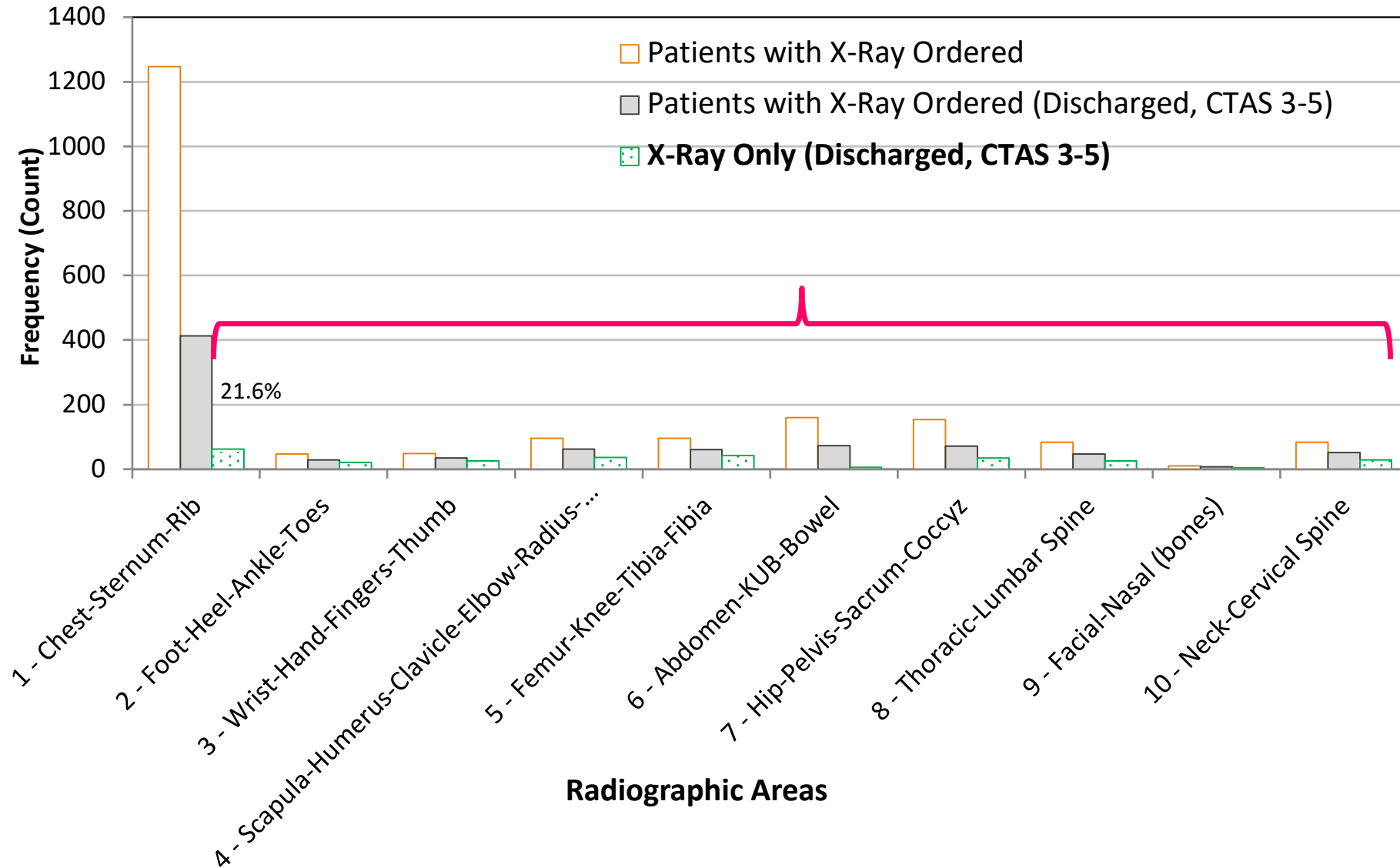


# Distribution of Radiographic Image Areas Ordered By Disposition, Other Diagnostics and CTAS Level





# Distribution of Radiographic Image Areas Ordered By Disposition, Other Diagnostics and CTAS Level



What about patient type?

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# Top 10 Patient Types

170 Different CCS Codes in Total Population (n=3000)

TABLE 3. Top 10 patient types (

Group Patient Type (See Supplemental Material Section 2 for conditions that define each group; Supplementary Material Available Online)		Freq.Out of N = 1954*
A →	Other injuries and conditions due to external causes	184
B →	Nonspecific chest pain	145
C →	Conditions associated with dizziness or vertigo	91
D	Abdominal pain	88
E	Superficial injury; contusion	74
F	Spondylosis; intervertebral disc disorders; other back problems	65
G	Syncope	76
H	Anxiety disorders	54
I	Open wounds of head; neck; and trunk	44
J	Sprains and strains	43

\*1,954 is the number of patients that were not admitted. The values i complete the list.

†3000 patients were analyzed; however 71 left against medical advice.

‡Calculated by multiplying "frequency" with "association with disch

All Discharged Patients

	Frequency	%	Situation
All Patients	n=	3000	
	203 →	6.77%	Other injuries and conditions due to external causes
	170 →	5.67%	Nonspecific chest pain
	105 →	3.50%	Abdominal pain
	101	3.37%	Syncope
	100	3.33%	Conditions associated with dizziness or vertigo
	97	3.23%	Urinary tract infections
	94	3.13%	Cardiac dysrhythmias
	76	2.53%	Superficial injury; contusion
	71	2.37%	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)
	69	2.30%	Spondylosis; intervertebral disc disorders; other back problems

All Patients

(Tavares et al., 2017)

**All Patients with X-ray ordered.**

All Radiographs	n=	1652	
	138	8.35%	Spondylosis; intervertebral disc disorders; other back problems ←
	108	6.54%	Other injuries and conditions due to external causes ←
	70	4.24%	Pneumonia (except that caused by tuberculosis or sexually transmitted disease) ←
	58	3.51%	Congestive heart failure; nonhypertensive
	56	3.39%	Chronic obstructive pulmonary disease and bronchiectasis
	54	3.27%	Superficial injury; contusion
	51	3.09%	Cardiac dysrhythmias
	50	3.03%	Abdominal pain
	49	2.97%	Urinary tract infections
	47	2.85%	Syncope
X-ray Only	n=	211	
	46	21.80%	Other injuries and conditions due to external causes ←
	34	16.11%	Superficial injury; contusion ←
	21	9.95%	Sprains and strains ←
	16	7.58%	Fracture of upper limb
	13	6.16%	Spondylosis; intervertebral disc disorders; other back problems
	10	4.74%	Other fractures
	9	4.27%	Joint disorders and dislocations; trauma-related
	8	3.79%	Fracture of lower limb
	5	2.37%	Other non-traumatic joint disorders
	4	1.90%	Open wounds of extremities
	4	1.90%	Other connective tissue disease

**All Patients with X-ray ordered, no other imaging or labs**

# Conclusion

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Should radiography be included in the scope of practice for paramedics?

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# What We Know So Far...

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- Some private companies provide portable x-ray in the community (also some lab and ultrasound)
- Limited access to diagnostic tests to assist with urgent care provision in community
- Identified some barriers/supports to urgent community care provision
- Mostly younger aged patients <49 years followed by older patients (80+) visit hospital emergency department for x-ray only diagnostic
- Older patients often obtain multiple diagnostic tests when visiting the hospital emergency department (x-ray plus lab, CT, and/or US)

# Diagnostic Imaging at the Point of Care: A Possible Role for Community Paramedics?

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Where can community paramedics best assist and complement existing services?

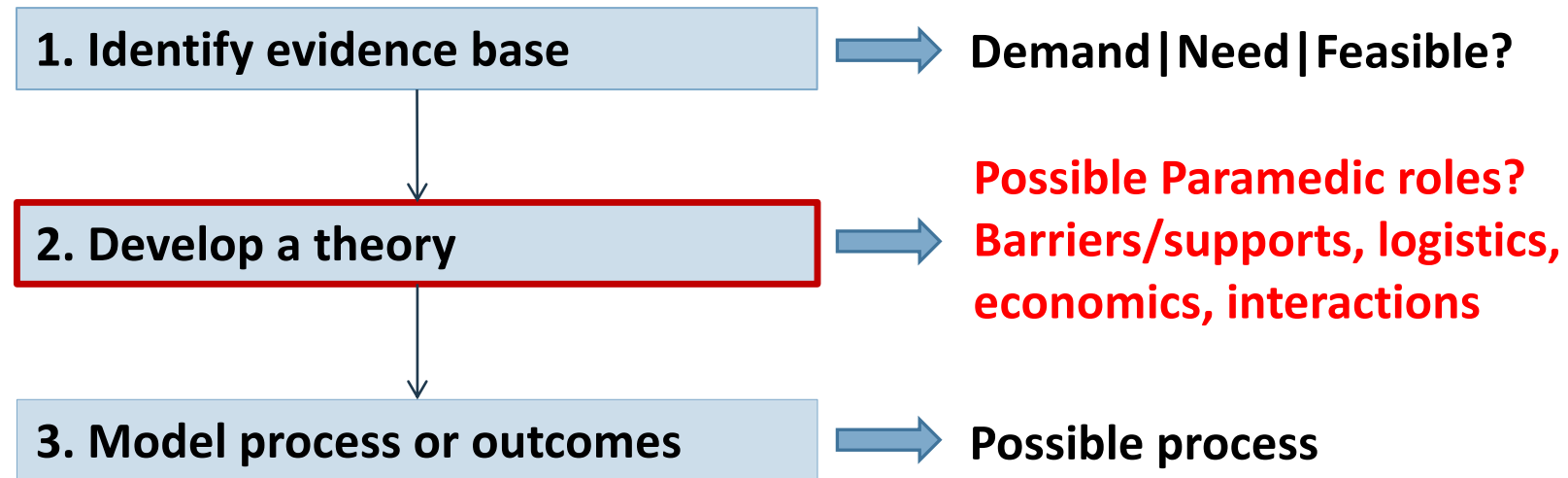


# NEXT STEPS

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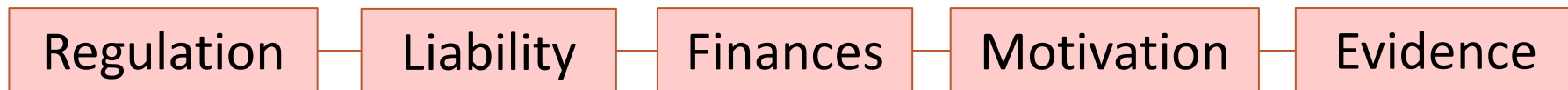
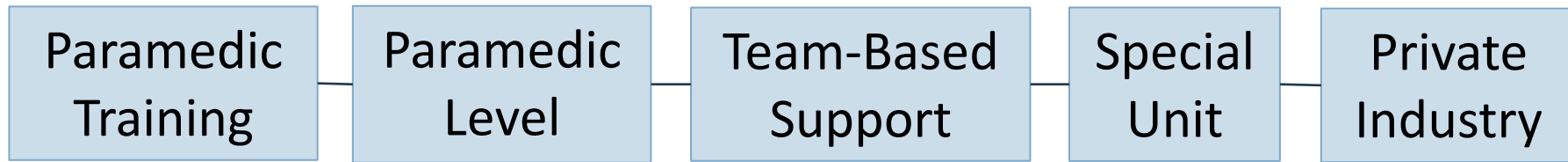
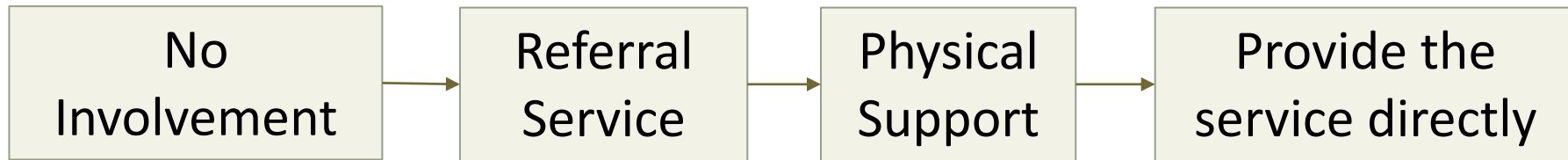
## Framework: MRC Guidance for Complex Interventions

(Craig et al., 2000)



# Possibilities?

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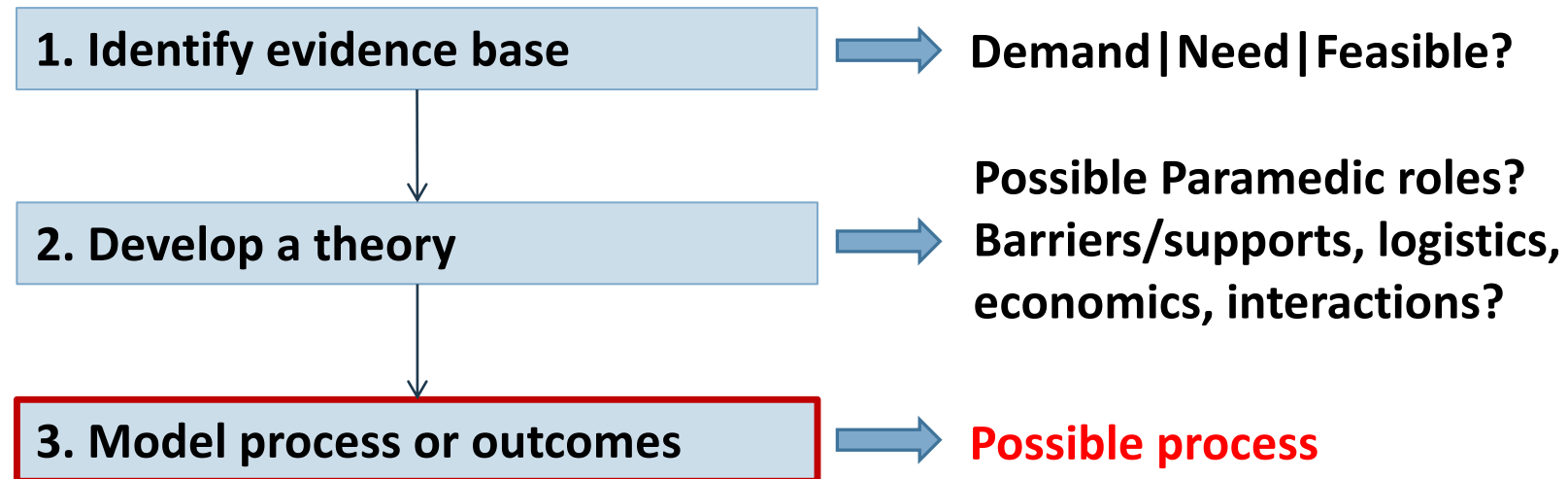


# NEXT STEPS

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## Framework: MRC Guidance for Complex Interventions

(Craig et al., 2000)





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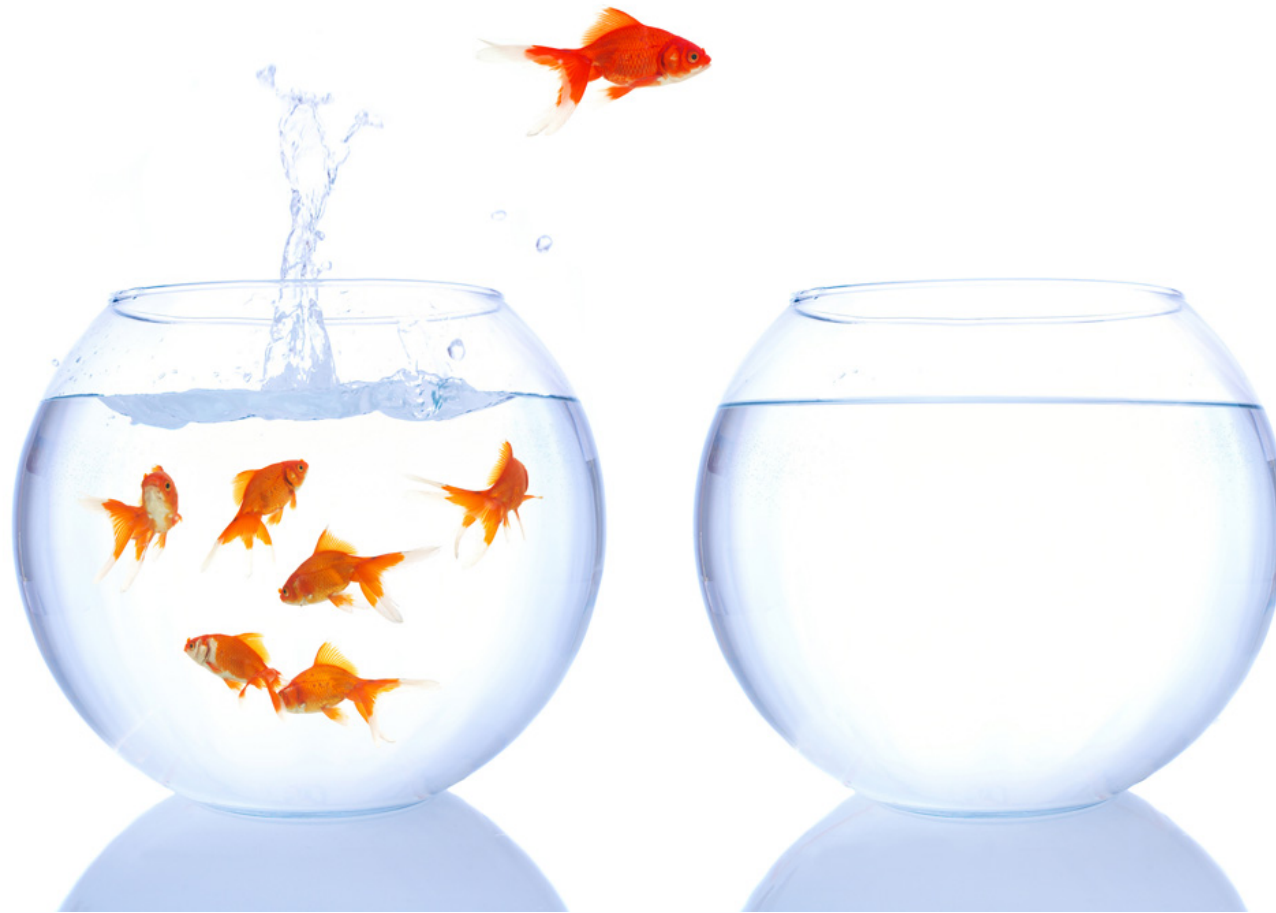
Drs. Veronique Boscart, George Heckman, Sandra McKay, Gary Naglie, Patricia Trbovich, also STL Imaging, BC Mobile Medical Unit, Schlegel Villages (Waterloo).

## Research Labs

Health Services and Evaluation Research Unit at UHN – Toronto Rehab  
York Region Paramedic and Senior Services Research unit

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# Questions?

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# A Learning Healthcare System

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“Science, informatics, incentives, and culture are aligned for **continuous improvement** with best practices **seamlessly embedded** in the delivery process and **new knowledge** captured as an integral **by-product** of the delivery experience”

*– Institute of Medicine 2015*