# A Return On Investment Evaluation of the Central East Geriatric Emergency Management Program

## FINAL REPORT

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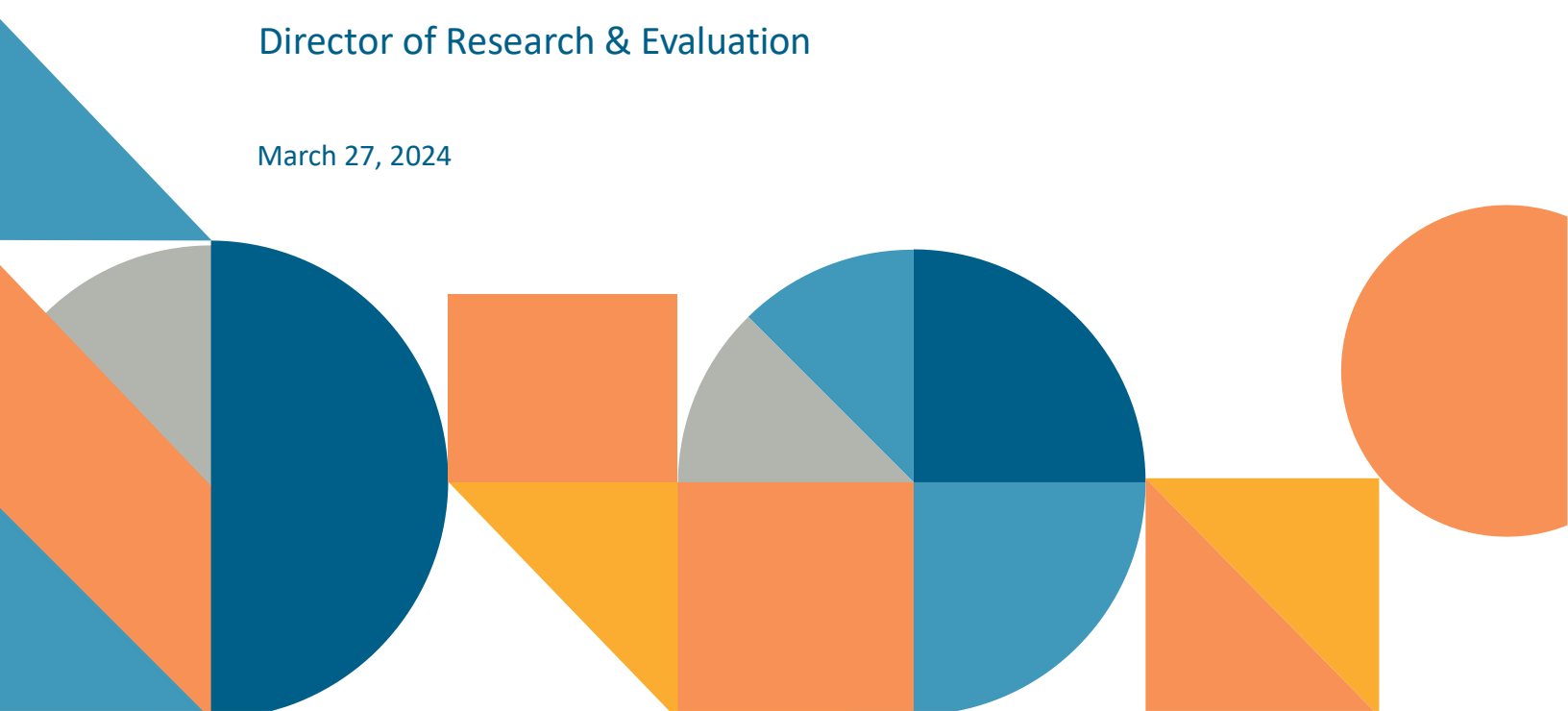
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March 27, 2024

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To cite this Report:

Li, T. & Hawkins, S.A. (2024). A Return On Investment Evaluation of the Central East Geriatric Emergency Management Program. Port Hope, ON: Seniors Care Network

# Executive Summary

## Introduction

The older adult demographic experiences the greatest illness complexity, hospital admission rates, lengths of stay (LOS), and risk of functional decline. To address this, the Geriatric Emergency Management (GEM) program has been implemented in nine hospital locations within the Central East Region of Ontario. Through the GEM program, older adults receive specialized geriatric emergency management services in the hospital emergency department (ED). These services are provided by GEM nurses or nurse practitioners with advanced training in gerontology.

This report presents findings from a return on investment (ROI) evaluation for the GEM program. The evaluation follows the ROI Methodology developed by Dr. Jack J. Phillips, which examines the program at several data levels: Program Inputs (level 0), Reaction (level 1), Confidence (level 2), Application (level 3), Impact (level 4), and ROI (level 5).

## Findings

The GEM program is generally available only on weekdays for eights hours. Outside of these hours, patients do not have access to GEM services. These shifts are staffed by one GEM, who often is the only GEM clinician employed at the site. The majority of the shift is allocated to clinical tasks, which includes providing clinical services for older adults living with complex health conditions and documenting the encounter.

As advanced practice nurses, GEMs are well-prepared for their role. All GEMs are certified in gerontology through the Canadian Nurses Association and have accumulated professional healthcare experience working with geriatric populations prior to their current GEM position. The majority of GEMs are either masters-prepared or are in the process of completing their masters.

There is buy-in towards the program from the GEMs and ED staff. Both GEM clinicians and ED staff are generally confident in their abilities to perform program-related activities. GEM program metrics show that these abilities are regularly being applied.

There was unanimous agreement from GEM clinicians that GEM has the following intangible impacts:

- Increased gerontological knowledge in ED and hospital staff
- Increased overall patient satisfaction with ED care

- Fostering of linkages with Specialized Geriatric Services and Programs

Data collected from one GEM site found that the program has the following tangible impacts:

- Reduced hospital admissions (in-patient and ALC)
- Reduced in-patient LOS after admission
- Reduced rate of becoming ALC after admission (≤ 30 days from admission)

However, data from the one GEM site also determined that the GEM program:

- Increased ED LOS
- Increased ED revisits (≤ 30 days from initial ED visit)

After converting the program's tangible impacts into monetary equivalents, a conservative ROI value of **354.27%** was found. This finding indicates that GEM program benefits are greater than program costs.

# 354.27% + Return on Investment

# Introduction

## Purpose

The purpose of this report is to present summative evaluation results for the Geriatric Emergency Management (GEM) program implemented at various locations in the Central East Region of Ontario. The evaluation followed a Return on Investment (ROI) approach to establish a chain of impact, tracing from the program's inputs to its tangible and intangible benefits, and ultimately leading to an ROI value.

The aim is to generate an ROI value to assist with making GEM-related decisions. However, it is important to understand that economic evaluation is one of many factors which should influence decision-making. Other important considerations include alignment with evidence-based practice (i.e., do GEM activities follow the best evidence available?) and bioethics (i.e., does GEM contribute to fairness in the healthcare system?).

## The Geriatric Emergency Management (GEM) Program

Older adults represent as many as 30% of patients seen in emergency departments (ED). Furthermore, illness complexity, hospital admission rates, lengths of stay, and risk of functional decline are also highest for the older adult demographic. Therefore, seniors need access to equitable care.

The GEM program contributes towards equitable healthcare for seniors. The GEM program functions to:

| |
|---|
| 1. Deliver targeted, geriatric assessments to older adults living with complex health conditions and help them access appropriate services and/or resources. |
| 2. Build ED and community capacity in the assessment and care of older adults with complex health conditions. |
| 3. Foster collaboration with community partners and specialized geriatric services (SGS) in the provision of comprehensive care to older adults. |

Through these functions, the decline/loss of independence in older adults can be prevented or postponed, ED revisits can be minimized, and hospital admissions can be shortened or prevented.

Pivotal to the program are GEMs, who are nurses or nurse practitioners with specialized training in gerontology. GEMs conduct geriatric assessments, identify older adult specific interventions, connect older adults with community services and resources, and contribute to capacity building activities.

After arrival to the ED, GEM-eligible patients can be connected to a GEM in several different ways:

|  |
| --- |
| ▪ GEM referral is triggered by triage nurse |
| ▪ GEM referral is triggered during the nursing or medical assessment following patient registration |
| ▪ GEM referral is triggered during disposition planning |
| ▪ GEM referral arises from case finding |
| ▪ Older adults and their caregiver/family members request GEM involvement |

Currently, GEM has been implemented in nine locations across the Central East Region of Ontario:

| Scarborough Health Network:<br><br>1. Birchmount Campus<br>2. Centenary Campus<br>3. General Campus | Lakeridge Health:<br><br>4. Ajax-Pickering Campus<br>5. Bowmanville Campus<br>6. Oshawa Campus | 7. Northumberland Hills Hospital |
| --- | --- | --- |
|  |  | 8. Peterborough Regional Health Centre |
|  |  | 9. Ross Memorial Hospital |

# Methodology

## Levels of Evaluation

To derive a credible ROI value from GEM inputs, data from several distinct layers were collected. This includes data related to:

- Program inputs (ex. program hours of availability and GEM clinician backgrounds)
- Level of buy-in from GEM and ED staff towards the program
- Level of confidence held by GEM and ED staff in their abilities to carry out program activities
- GEM program activity metrics
- Tangible and intangible program impacts

As illustrated in **Figure 1**, each layer of data was used to support subsequent data levels. Through this approach, a chain of impact was created from program inputs to the final ROI value.

*Figure 1*: *GEM Evaluation Methodology*
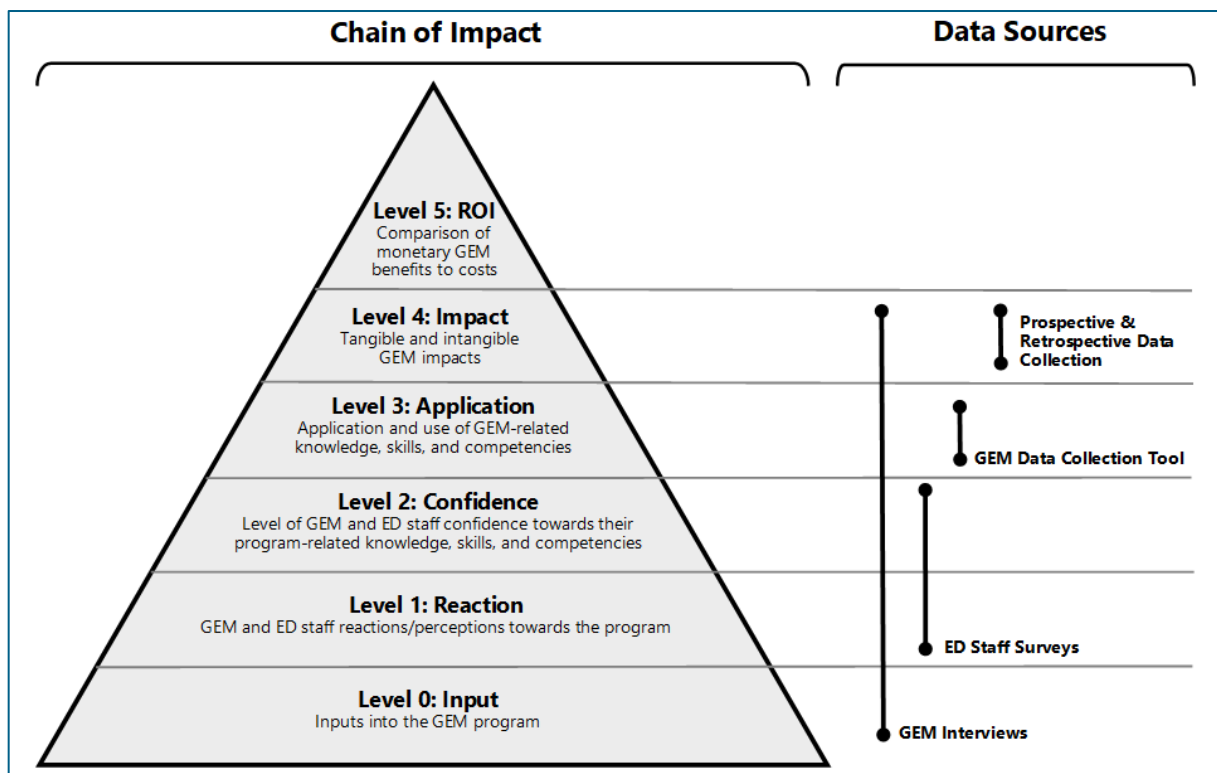
## Data Sources

**Figure 1** outlines the various sources of data were leveraged in the evaluation.  This includes:

- Virtual interviews/questionnaires completed by nine GEM clinicians
- Online ED staff surveys distributed to three GEM sites
- A GEM Data Collection Tool which is used to collect regularly reported GEM metrics
- Additional data collected by hospital decision support staff at one GEM site
- Additional data collected by GEM clinicians at three GEM sites

The final ROI value calculated relies on GEM impacts which can be converted into monetary values (i.e., tangible impacts). Measures to assess these tangible GEM impacts were chosen by referring to previous GEM program evaluations and through discussions with GEM program staff.

To determine the program's influence on hospital admissions, GEM clinicians collected the following:

- The number of diverted or additional admissions (in-patient)
- The number of diverted or additional admissions (in-patient ALC)

Hospital support staff also collected tangible GEM impact data to find how the program affects:
- Length of stay (LOS) in the ED
- LOS for in-patient hospitalizations
- Rate of becoming ALC (≤ 30 days from admission)
- Rate of ED revisits (≤ 30 days from initial ED visit)

## Isolating the Program Effects

Control groups were utilized where possible to isolate the effects of the program on the impact data gathered. To be included in both the GEM and comparator groups, patients needed to be older than 65 years and have an acuity level between 3-5.

Older adults with an acuity level between 1-2 tend to have more severe illness and be eligible for long-term care. For these patients, the most optimal clinical pathways given current health system resource limitations are likely to increase some of the impact metrics selected (ex. rate of becoming ALC). For this reason, acuity level 1-2

patients were screened out to ensure GEM program impact measures could be interpreted consistently (where a lower value is desirable).

If data for an appropriate control group could not be accessed, a conservative baseline value from external sources (ex. values reported by the Canadian Institute for Health Information) was used for the comparison instead.

To help further isolate the effects of the GEM program on impact data, GEM clinicians were asked to provide the following for each impact metric:

| A. | Estimate of the % of difference (between GEM patients and the comparison) that is caused by the GEM program |
|---|---|
| B. | Express confidence of the estimate as a % |

A * B = Adjusted % of difference (between GEM patients and the comparison) that can be attributed to GEM

## Converting Data to an ROI Value

From the data collected, the following was calculated:

- Change in number of admissions (in-patient, in-patient ALC) from the ED
- Change in ED LOS
- Change in in-patient LOS
- Change in rates of becoming ALC ($\leq$ 30 days from admission)
- Change in number of ED revisits ($\leq$ 30 days from initial ED visit)

Using standard costs, the results of these calculations were converted into monetary values. These values were then leveraged in the following formula to estimate the GEM program's ROI.

$$\text{ROI (\%)} = \frac{\text{Net GEM Program Benefits}}{\text{GEM Program Costs}} \text{ x } 100$$

It is important to note that intangible benefits arising from the GEM program are not captured within the final ROI calculated. Therefore, the GEM program's intangible benefits should always be considered in tandem with the ROI value.

# Results

## Level 0 - Input

To provide an overview for the current state of GEM, information was collected about inputs into the program. This included information about the program's hours of availability at each site, how these hours are divided in terms of GEMs' workloads, and the amount of GEM-related experience that each GEM has. A SWOT (strengths, weaknesses, opportunities, and threats) analysis for the GEM program was also performed.

### Program Availability and Staffing

As indicated in **Figure 2**, the GEM program is generally available on weekdays from 8:00am-4:00pm. These shifts are staffed by one GEM. At many sites, this staff member is their only GEM clinician. When GEMs are not scheduled, patients do not have access to GEM services.

**Figure 2:** *Program availability and staffing*
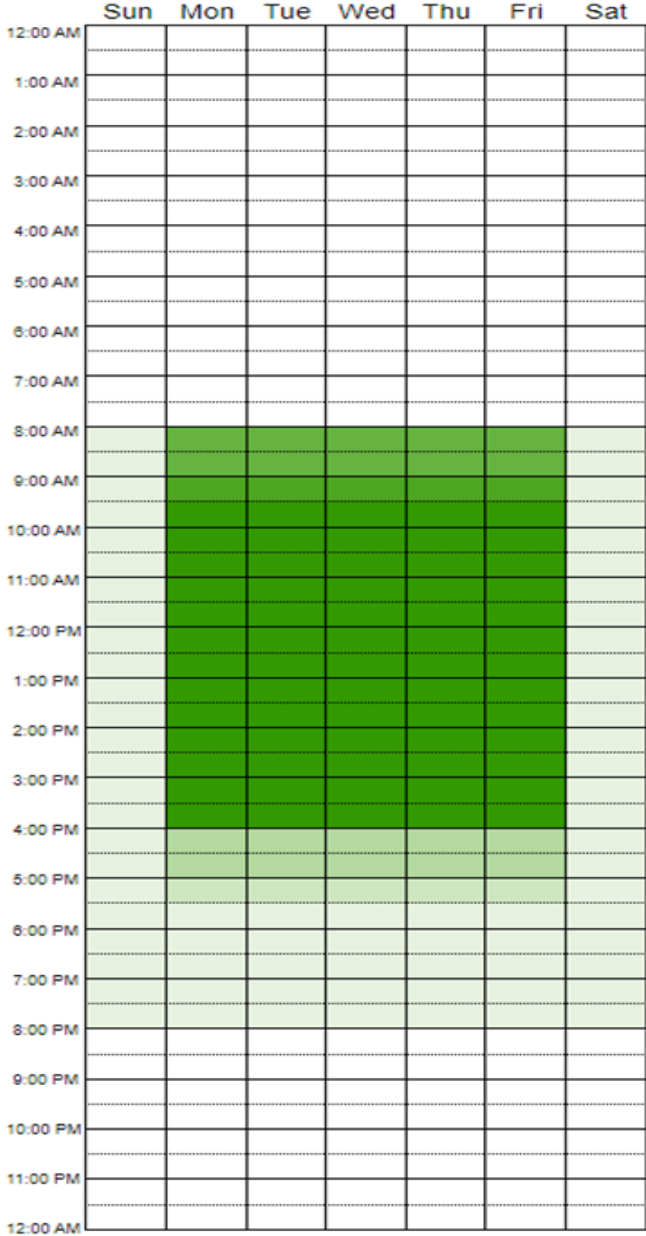


**GEM Availability**

| Site | Start Time | End Time | Weekday Availability | Weekend Availability |
|------|-----------|----------|----------------------|----------------------|
| SHN-B | 9:30am | 5:30pm | Mon-Fri | - |
| SHN-C | 8:00am | 4:00pm | Mon-Fri | - |
| SHN-G | 8:00am | 4:00pm | Mon-Fri | - |
| LH-AP | 9:00am | 5:00pm | Mon-Fri | - |
| LH-O | 8:00am | 8:00pm | Mon-Fri | Sat-Sun |
| PRHC | 8:00am | 4:00pm | Mon-Fri | - |
| RMH | 8:00am | 4:00pm | Mon-Fri | - |
| NHH | 8:00am | 4:00pm | Mon-Fri | - |

**GEM Staffing**

| Site | # of GEMs/site | # of GEMs/shift |
|------|---------------|-----------------|
| SHN-B | 1 | 1 |
| SHN-C | 1 | 1 |
| SHN-G | 1 | 1 |
| LH-AP | 1 | 1 |
| LH-O | 2 | 1 |
| PRHC | 1 | 1 |
| RMH | 1 | 1 |
| NHH | 1 | 1 |

### Time Distribution for GEM Tasks

The majority of the GEMs' time is dedicated towards clinical tasks, which includes direct patient care and documentation. On average, 88% of the shift is allocated to this work. 11% of the time is spent on average towards capacity building and education activities with/for hospital ED teams and community partners. An average of 1% from GEMs' time is used for other activities.

Some GEMS indicated that COVID-19 has disrupted capacity building and education activities which had been running in past years. A few sites have observed that time spent on capacity building and education has been slowly increasing as Ontario moves out of the COVID-19 pandemic.

**Figure 3:** *GEM average work distribution*



11% 1%

88%

■ Clinical Tasks    ■ Capacity building and education activities    ■ Other
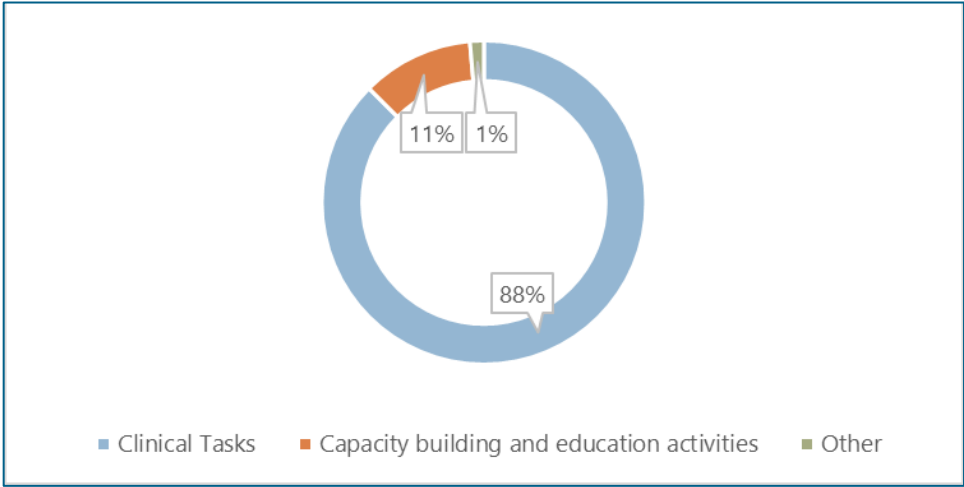
### GEM Education and Experience

As advanced practice nurses, all GEMs are certified in gerontology through the Canadian Nurses Association (CNA). 44% of GEMs are masters-prepared, with half of these GEMs completing their nurse practitioner training. 22% of GEMs are either enrolled or currently pursuing their Masters. GEMs are also frequently involved in opportunities for learning (ex. gentle persuasive approaches training).

*Figure 4:* *GEM preparation in terms of education*
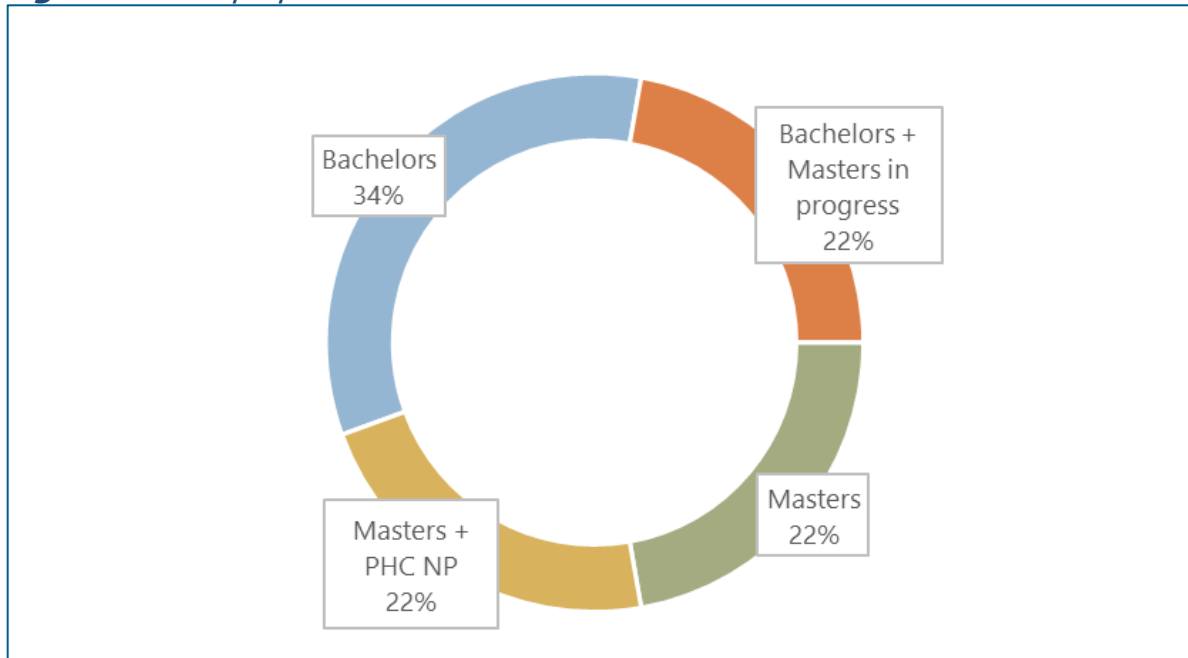


Data plotted in the dot chart (**Figure 5**) shows the variation in geriatric healthcare experience between different GEMs. A wide range can be observed in terms of GEM experience, other geriatric healthcare experience, and total geriatric healthcare experience. Given that the median values are smaller than the mean for each category, there appears to be a few GEMs with an abundance of GEM and/or geriatric experience that pull the averages upward.

On the dot chart, data from each GEM is represented using a specific color. From this, it can be observed that all GEMs had entered their current GEM role with prior professional healthcare experience working with geriatric populations (ex. as an emergency department nurse) already accumulated.

**Figure 5:** *GEM geriatric healthcare experience*



GEM Geriatric Healthcare Experience
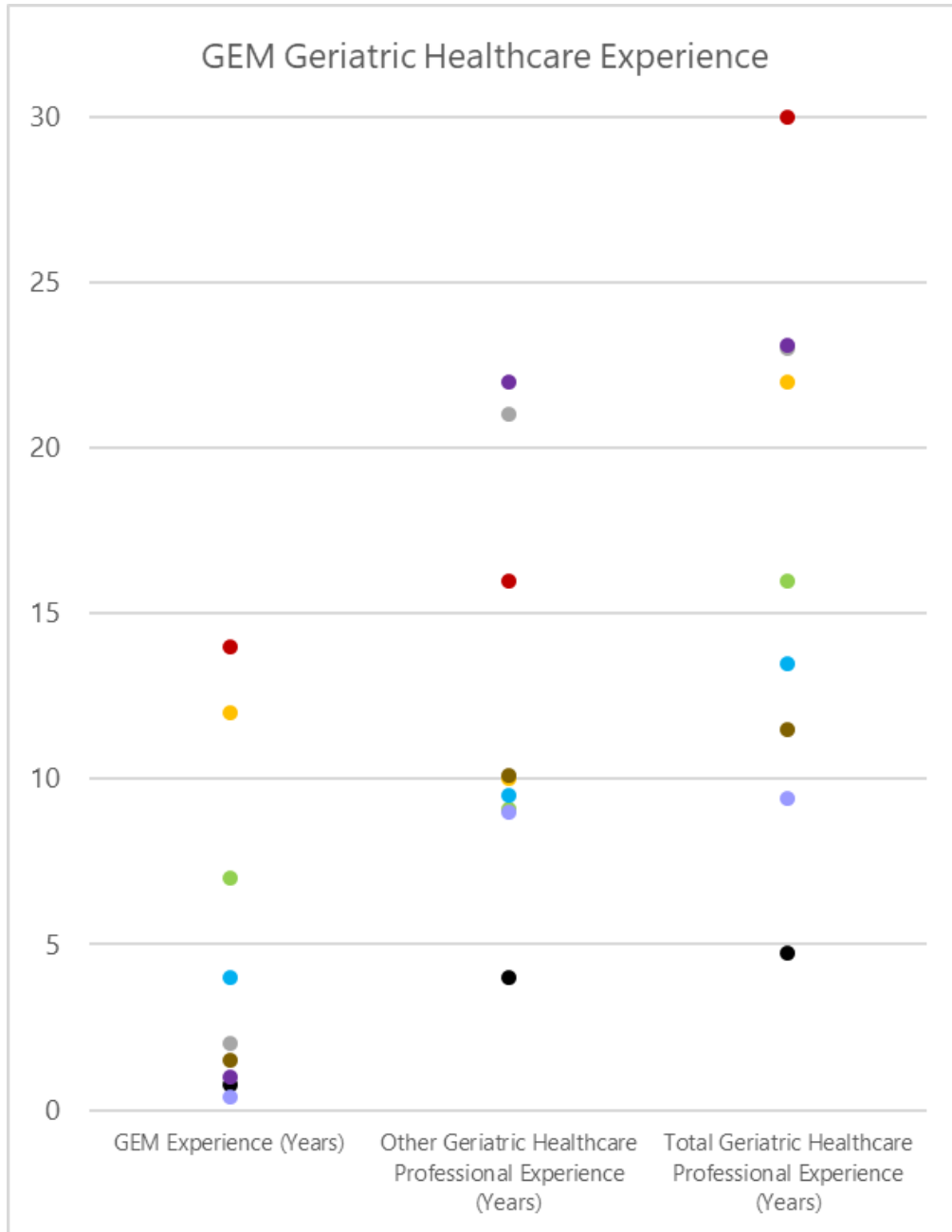
|  | GEM Experience (Years) | Other Geriatric Healthcare Professional Experience (Years) | Total Geriatric Healthcare Professional Experience (Years) |
|---|---|---|---|
| Mean | 4.74 | 12.28 | 17.02 |
| Median | 2 | 10 | 16 |
| Range | 11.58 | 18 | 25.25 |
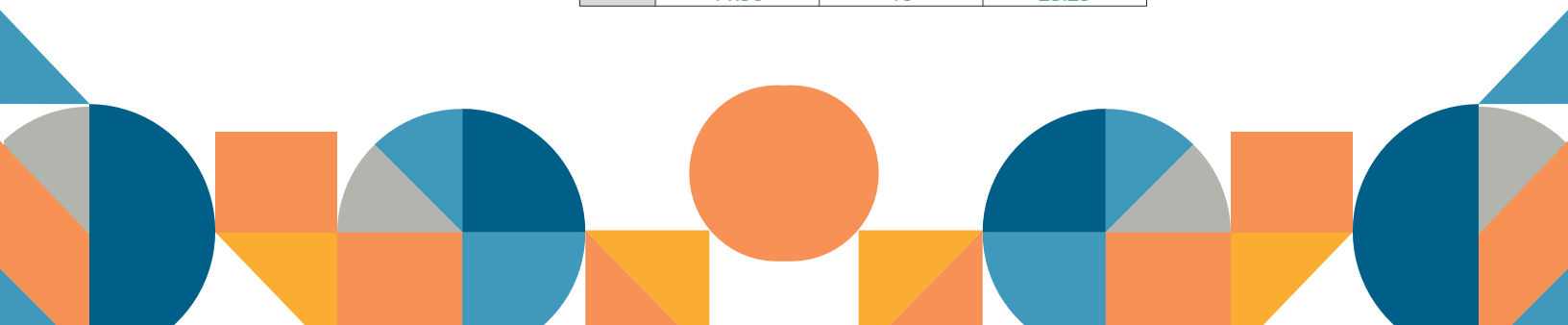
## *SWOT Analysis*

From interviews with GEM clinicians, several major themes regarding the GEM program's strengths, weaknesses, opportunities, and threats were identified. These themes are briefly discussed in this section and additional details can be found in the **appendix**.

In terms of strengths, the GEM program enables collaborative care within the ED, hospital, and community. For example, GEM is able to divert unnecessary admissions and promotes safe discharge by connecting patients with external supports and resources. This is significant since prolonged hospital admissions are associated with poorer health outcomes. GEM also improves the care experience for patients and their families. At many sites, GEMs are able to spend more one-on-one time with patients. This results in more through assessments along with improved patient understanding and subsequent participation in their own care.

The GEM program has a few weaknesses which can hinder its effectiveness. One of the weaknesses is that GEM referrals from other staff are not always appropriate. However, familiarizing staff on the GEM role and scope of practice can improve referral appropriateness. Another weakness is the gaps in GEM availability. As discussed in the *Program Availability and Staffing* section, most sites only have one GEM. As a consequence, there is virtually no coverage when GEM staff are away.

There are several opportunities that can leveraged by the GEM program. The presence of community services, resources, and programs present chances for GEMs to connect their patients to essential supports outside of the hospital. At some sites, there are also opportunities to strengthen areas of the GEM program. This includes initiatives to reduce geriatrician wait times and a GEM-led pilot program to improve GEM patient follow-up.

Threats to the effectiveness of the GEM program exist. Most community services and programs have significant wait times and staffing shortages. The residual effects from COVID-19 (ex. patients with more complex and poorly managed chronic conditions) and rapidly growing senior population further strain the already overwhelmed community resources.

## *Summary of GEM Program Inputs*

The GEM program is generally available only on weekdays for eights hours. Outside of these hours, patients do not have access to GEM services. These shifts are staffed by one GEM, who often is the only GEM clinician employed at the site. The majority of the shift is allocated to clinical tasks, which includes providing clinical services for older adults living with complex health conditions and documenting the encounter.

As advanced practice nurses, GEMs are well-prepared for their role. All GEMs are certified in gerontology through the CNA and have accumulated professional healthcare experience working with geriatric populations prior to their current GEM position. The majority of GEMs are either masters-prepared or are in the process of completing their masters.

In its current state, the GEM program has many strengths and opportunities which can be used to maintain or improve its effectiveness. The program facilitates collaborative care within the ED, hospital, and community. It improves GEM patients' care experiences through increasing the one-on-one time spent with health service users. There are also opportunities for initiatives and pilot-programs to help support the needs of specific GEM sites. However, several areas for improvement are present in the form of weaknesses and threats. The availability of GEM services at most sites is typically restricted to 40 hours per week. Furthermore, many community resources do not currently have the capacity to meet growing health service user demand.

## Level 1 - Reaction

The previous section established the current state of the GEM program and highlighted its inputs in terms of staff and hours. To determine the level of buy-in towards the GEM program in its current form, data related to how the program is perceived was collected.

### GEM Clinician Reaction

**Figure 6** displays the reaction of current GEM staff towards the program. Respondents were asked to rate their agreement with a set of statements on a Likert scale from 1 to 5 (with 1 being 'strongly disagree', 3 being 'neutral', and 5 being 'strongly agree').

**Figure 6:** *GEM clinician reaction towards the GEM program*
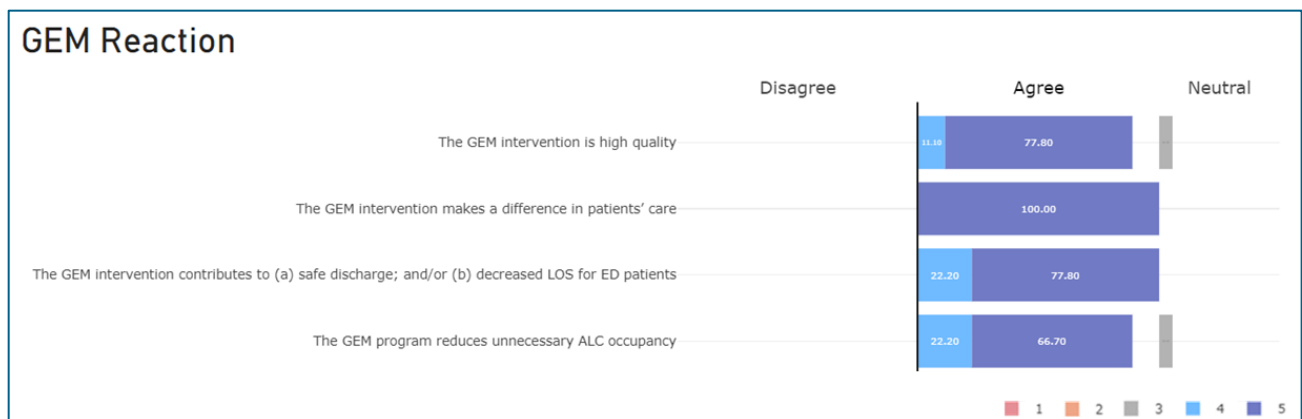


A large proportion of responses indicated agreement (rating of 4) or strong agreement (rating of 5) with the statements presented. This suggests that most GEMs believe that the program:

- Makes a difference in patients' care (100%)
- Contributes to safe discharge and/or decreased length of stay for ED patients (100%)
- Reduces unnecessary ALC occupancy (88.9%)
- Is of high quality (88.9%)

Based on these reactions, there appears to be strong buy-in towards the program from the GEMs.

### *ED Staff Reaction*

The GEM program is embedded within hospitals' emergency departments, with patients potentially being connected to GEM clinicians by ED staff. Therefore, support by ED staff towards the program is needed. An online survey was distributed to three hospital sites to determine the amount of ED staff buy-in towards GEM services. Respondents to the survey (n=29) were asked to indicate their level of familiarity towards the GEM program at their site. They also rated their level of agreement with reaction-specific statements on a Likert scale from 1 to 5 (with 1 being 'strongly disagree', 3 being 'neutral', and 5 being 'strongly agree').

**Figure 7** illustrates the current ED staff beliefs towards the GEM program. To ensure that ED staff reactions towards the GEM program are fully informed, only responses from staff who self-reported a familiarity level of three or higher (i.e., having at least moderate familiarity) were considered (n=28).

*Figure 7: ED staff reaction towards the GEM program*

Similar to the GEMs, a large proportion of responses indicated agreement (rating of 4) or strong agreement (rating of 5) with the statements presented. Most ED staff believe that the program:

- Makes a difference in patients' care (89.28%)
- Contributes to safe discharge and/or decreased length of stay for ED patients (92.85%)
- Reduces unnecessary ALC occupancy (92.14%)
- Is of high quality (82.1%)

From this response, there appears to be buy-in towards the GEM program from ED staff.

## Level 2 – Confidence

The reaction data suggests that there is generally a strong belief in the GEM program and its benefits from both GEM clinicians and ED staff. To effectively leverage this belief, GEMs must have the ability necessary to perform program-related tasks. Depending on the specific ED role, staff must have the expertise to appropriately refer patients to GEMs.

In order to obtain a better understanding of staff proficiency, proficiency level self-reported in the form of confidence was collected. Both GEM and ED staff were asked to rate their level of confidence for various role-specific tasks from a Likert scale of 1 to 5, with 1 being 'very low' and 5 being 'very high'.

**Figure 8** visualizes data collected from the GEMs. A large proportion of responses indicated high (rating of 4) or very high (rating of 5) confidence. This suggests that most GEMs believe that they are proficient in:

- Applying the Clinical Frailty Scale (88.9%)
- Performing targeted geriatric assessments (94.4%)
- Advocating for appropriate disposition of ED service users (100%)
- Developing a goal-based care plan for GEM Service Users (77.8%)
- Effectively referring patients for appropriate community-based services (100%)
- Effectively conducting follow-up with patients (88.9%)

*Figure 8:* GEM confidence levels



**GEM Confidence**

| | Low | High | Neutral |
|---|---|---|---|
| Confidence in applying the Clinical Frailty Scale for screening and prioritizing need for GEM services | 11.10 | 33.30 / 55.60 | |
| Confidence in performing targeted geriatric assessments | | 50.00 / 44.40 | |
| Confidence in advocating for appropriate disposition of ED service users | 11.10 | 88.90 | |
| Confidence in developing a goal-based care plan for GEM service users | | 55.60 / 22.20 | 22.2 |
| Confidence in effectively referring patients for appropriate community-based services | 16.70 | 83.30 | |
| Confidence for effectively conducting follow-up with patients | | 55.60 / 33.30 | |

Legend: 1, 2, 3, 4, 5

Although 11.10% of the respondents rated low confidence in applying the Clinical Frailty Scale for screening and prioritizing need for GEM services, this proportion represents findings from just one novice GEM. Based on this self-reported data, GEMs generally believe that they have the knowledge and skills needed to carry out GEM program activities.

**Figure 9** shows that the majority of ED staff whose role involves connecting patients to GEMs believe that they are able to do, with most respondents (76.93%) indicating high (rating of 4) or very high (rating of 5) confidence.

*Figure 9:* ED staff confidence level



**ED Staff Confidence**

| | Low | High | Neutral |
|---|---|---|---|
| Confidence in ability to appropriately refer patients to GEM | | 23.08 / 53.85 | 23.08 |

Legend: 1, 2, 3, 4, 5

## Level 3 – Application

The prior section established that GEMs and ED staff are generally confident in their abilities to perform program-related activities. To demonstrate that these competencies are currently being applied, data was collected from regularly reported GEM program metrics and through interviews with GEM clinicians.

**Figure 10** illustrates the number of patients seen by GEMs during the 2022 fiscal year. Health service users for GEM during this period includes both new and follow-up GEM patients. The volume of GEM patients present year-round suggests that GEM clinicians are actively applying skills and knowledge used for:

- Performing geriatric assessments
- Screening and prioritizing need for GEM services
- Being involved in the development of goal-based care plans for GEM service users
- Effectively conducting follow-up

The high volumes of new patients provide support to the idea that ED staff are utilizing the expertise needed to refer patients to GEMs.

**Figure 10:** Number of GEM patients seen during the 2022 fiscal year
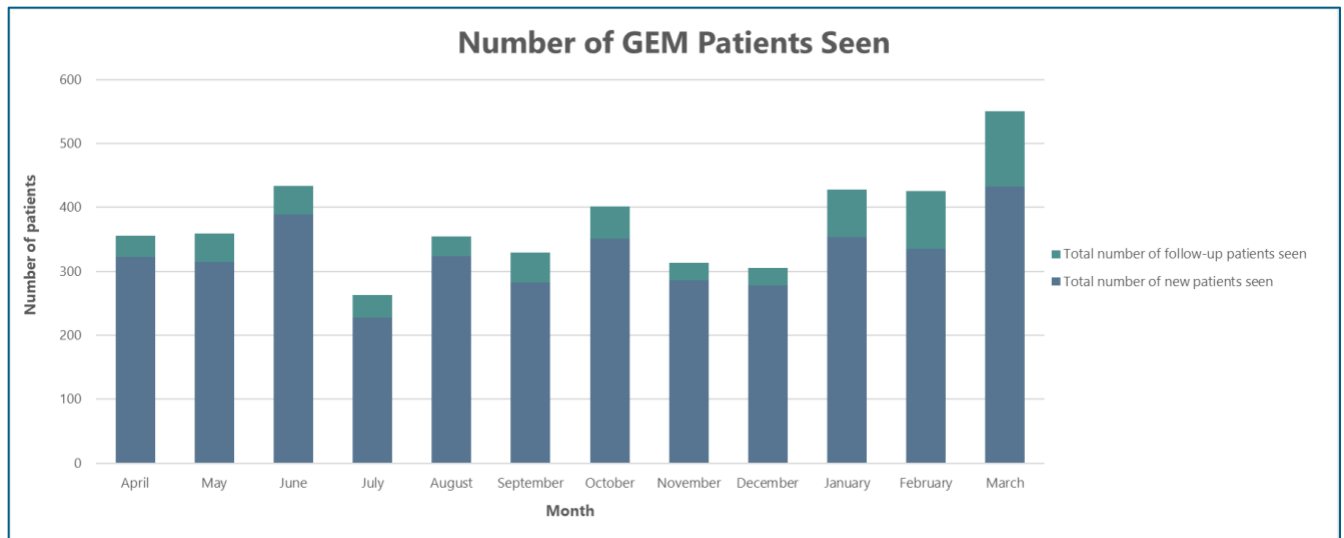
As indicated by **Figure 11**, most GEMs report that they currently advocate for the appropriate disposition of patients and connect them with relevant hospital resources. To do this, GEMs must apply their abilities and expertise to ensure GEM patients are connected to the appropriate resources within the hospital.

**Figure 11:** *Self-reported application of GEM-related skills and knowledge to connect patients with appropriate hospital services*



GEM: Connecting Patients to Appropriate Services Within the Hospital

Disagree — Agree — Neutral

In the last week, the GEM program has connected seniors with appropriate services within the hospital — 11.11 — 77.78

GEMs currently advocate for appropriate disposition (ex. admission or discharge) of ED service users — 11.11 — 88.89
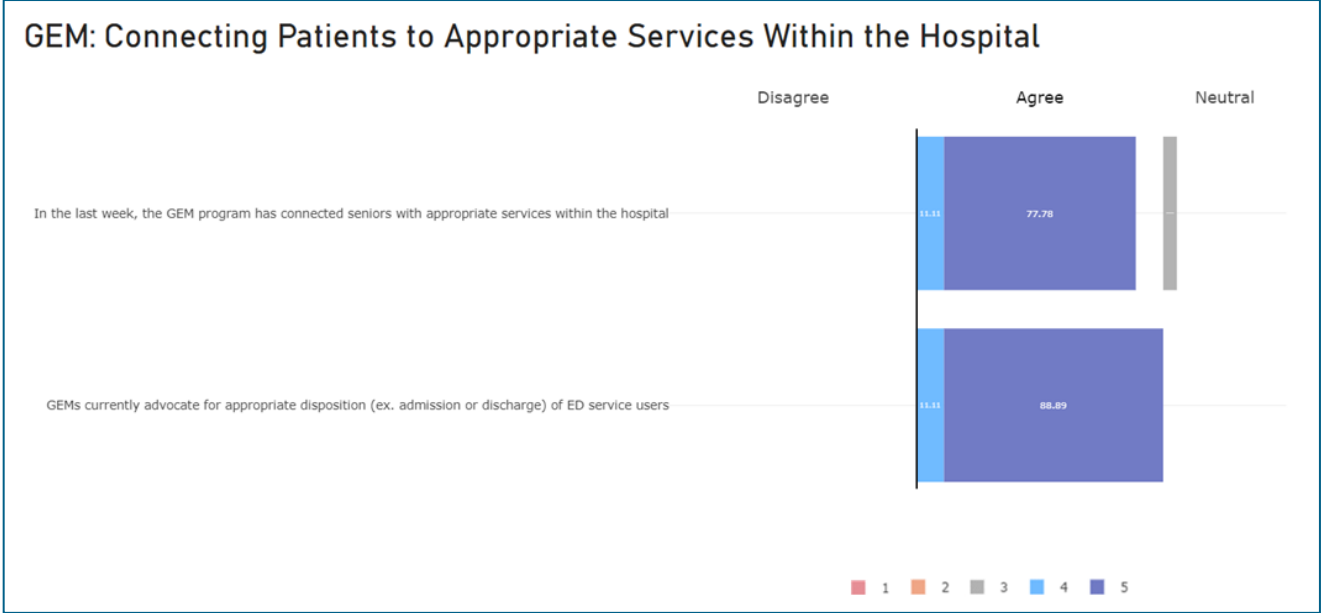
Legend: 1, 2, 3, 4, 5

**Figure 12** shows that referrals are actively being made from the GEM program to other services. As highlighted in **Figure 13**, GEMs report that the referrals being made are appropriate for the needs of GEM patients. Therefore, GEM clinicians are also applying the competencies needed to make effective referrals.

**Figure 12:** *Number of referrals to other services from GEM during the 2022/2023 reporting period*
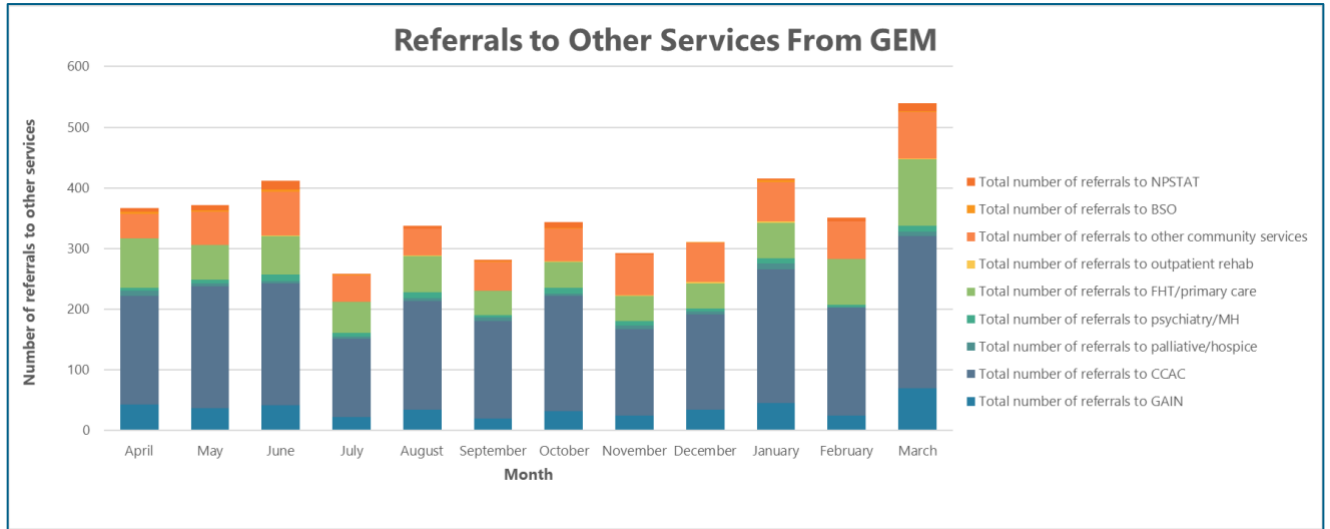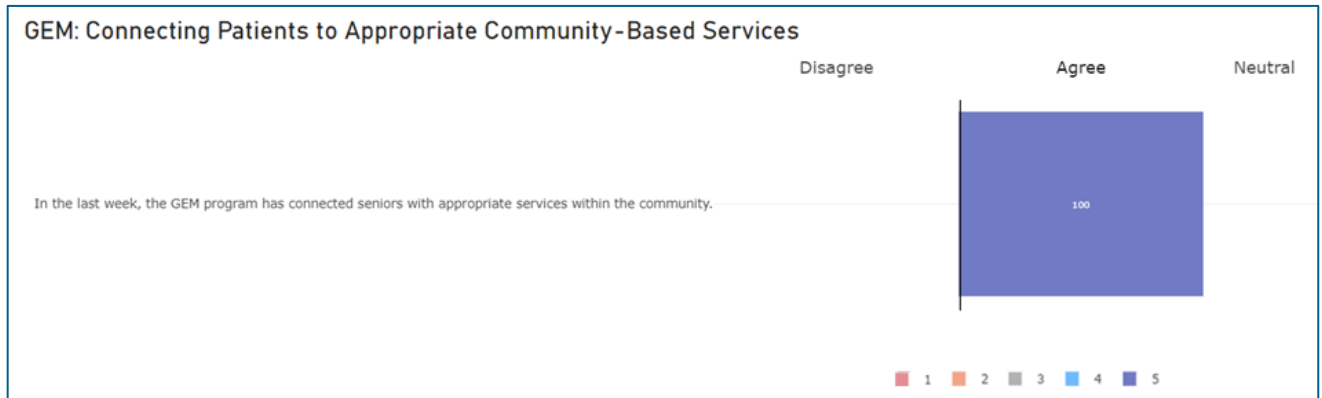


Referrals to Other Services From GEM

**Figure 13:** *Self-reported application of GEM-related skills and knowledge to connect patients with appropriate community-based services*



GEM: Connecting Patients to Appropriate Community-Based Services

Based on the data collected, GEM clinicians are regularly applying their skills and knowledge to ultimately contribute towards comprehensive care provision for seniors living with complex health conditions. It is likely that ED staff exercise their referral abilities to support this process.

## Level 4 - Intangible Impacts

The sections corresponding to data levels 0-3 provide insight into the current state of GEM program implementation. To identify the intangible impacts of the program, GEMs were interviewed. Functioning as the front-line workers for the program, these clinicians are able to provide insights as subject matter experts for GEM.

A list of intangible benefit statements were presented to GEM clinicians. They were then asked to rate their level of agreement with the statements on a Likert scale from 1 to 5 (with 1 being 'strongly disagree', 3 being 'neutral', and 5 being 'strongly agree'). The results of this exercise are summarized in **Figure 14**.

**Figure 14:** *Intangible GEM Benefits*
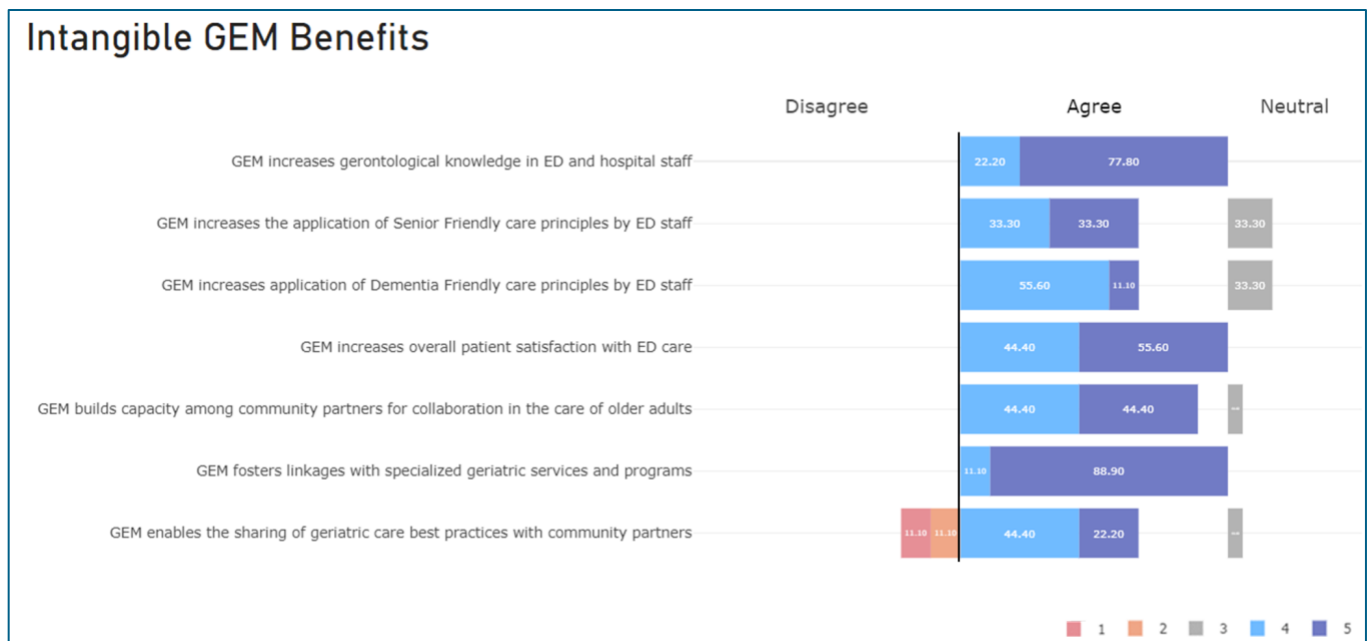


### Gerontological Knowledge in ED and Hospital Staff

All GEMs agreed that the program increases gerontological knowledge in ED and hospital staff.

GEMs have an abundance of geriatric expertise which can be transferred to their colleagues (ex. knowledge about aging, common geriatric syndromes, atypical presentation patterns, and relevant intervention and prevention strategies). All GEMs

certified in gerontology through the CNA, and they have a median of 16 years of experience as geriatric healthcare professionals (**Figure 5**). GEM clinicians are generally confident in their ability to perform GEM-related tasks (**Figure 8**), which intrinsically requires gerontological knowledge. GEM patient volumes illustrated in **Figure 10** suggest that this knowledge is being regularly applied. Since GEMs work closely with other hospital and ED staff, it is likely that some gerontological knowledge is passed to their colleagues.

### Application of Senior Friendly care (sfCare) & Dementia Friendly care (dfCare)

The majority of GEMs agreed that the GEM program increases the application of sfCare and dfCare principles by ED staff (~66.6% and ~66.7% respectively).

Approximately 33.3% of GEMs held a neutral opinion towards these claims. As identified by some GEMs, ED staff often have their own preferred practices which have already been entrenched. This may limit the spread of sfCare and dfCare principles from GEMs to the other ED staff.

### Overall Patient Satisfaction with ED Care

All GEMs agreed that the program increases overall patient satisfaction with ED care.

GEMs are well-equipped with gerontological knowledge and experience (**Figure 5**). They believe the program makes a difference in patients' care (**Figure 6**) and are confident in their abilities to perform GEM-related tasks (**Figure 8**). Data from **Figures 10-13** illustrate that these abilities are being applied. These conditions are conducive for increasing patient satisfaction with ED care.

Specific GEM activities which can increase ED care satisfaction were also identified during GEM interviews. A non-exhaustive list of these activities includes:

- Increasing the one-on-one time spent with GEM patients and their caregivers/families (from assessment, to admission, to discharge).
- Providing support to reduce caregiver burnout.
- Delivering education to maintain senior health and independence (ex. walker use information).
- Disseminating knowledge to improve GEM patients' understanding of their own health condition and care plan.
- Connecting GEM patients with community supports/resources that they may not be aware of.
- Supporting follow-up with GEM patients.

### *Building Capacity Among Community Partners for Collaboration in Care*

The majority of GEMs (~88.8%) agreed that the GEM program helps build capacity among community partners for collaboration in the care of older adults. However, ~11.1% of GEMs held a neutral opinion towards this claim.

As shown in **Figure 8**, GEMs are confident in their abilities to effectively refer patients to appropriate community-based services. **Figures 12-13** highlights that these referrals are actually being made, which can help foster community collaboration in senior care.

However, there are several potential reasons for why some GEMs maintain a neutral stance towards the program's capacity building abilities. GEMs have expressed that COVID-19 had disrupted many capacity building and education activities. While these activities have been slowly resuming, only 11% of GEMs' time is allocated to this task (**Figure 4**). Additionally, collaboration in care is limited by community partners' capacity to meet health service demands from a growing geriatric population. In some cases, community partners have asked GEMs to limit/halt referrals to their programs (see **Appendix A**). Unsurprisingly, the GEM program cannot build capacity for community partner collaboration when community partners do not have the resources and/or staff to collaborate.

### *Fostering Linkages with Specialized Geriatric Services and Programs*

All GEMs agreed that the program fosters linkages with Specialized Geriatric Services and Programs. GEMs have confidence in their ability to effectively refer patients for appropriate community-based services (**Figure 8**). Data from **Figure 12** shows that referrals are actively being made to Specialized Geriatric Services and Programs such as NPSTAT, BSO, and GAIN.

### *Sharing of Geriatric Care Best Practices*

The majority of GEMs (~66.6%) agreed that the GEM program enables the sharing of geriatric care best practices with community partners. However, ~33.3% of GEMs did not agree.

Being certified in gerontology through the CNA, GEMs are familiar with geriatric care best practices. Data shown in **Figure 12** and **Figure 13** demonstrate that GEMs interact regularly with community partners to make referrals. Therefore, GEMs have the expertise and relationships needed to share best practices for geriatric care.

Nevertheless, there are several factors which likely influence how effective the GEM program is at sharing geriatric care best practices. As discussed previously, only an average of 11% of GEMs' time is dedicated towards capacity building and education

activities (**Figure 4**). Furthermore, GEM sites may have different amounts of dedicated opportunities available to share best practices with community partners. The receptiveness of community partners toward changes in their current practices may vary as well.
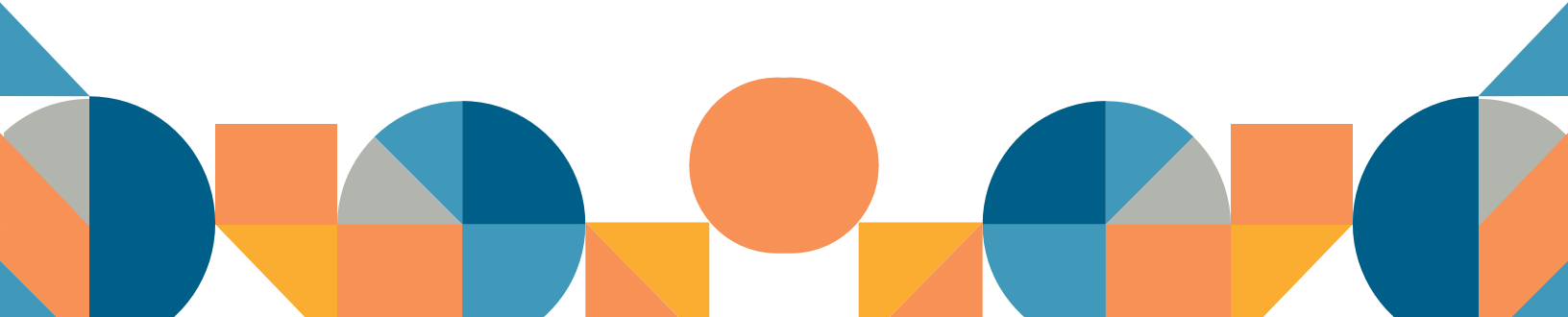
## Level 4 - Tangible Impacts

Tangible impacts refer to impacts which can be converted into monetary values and can be reasonably attributed to the GEM program.

### GEM Impact on Admissions from the ED

To determine the GEM program's impact on in-patient and ALC admissions from the ED, related prospective data was collected by GEM clinicians at three sites over a period of seven work days. Definitions for the measures captured are provided in **Table 1**.

**Table 1:** Definitions for prospective data measures collected

| Measure | Description |
|---|---|
| # of avoidable in-patient admissions diverted due to GEM | A count of the number of patients who would have been admitted as in-patients in the absence of the GEM program. |
| # of additional in-patient admissions from GEM | A count of the number of patients who would not have been admitted as in-patients in the absence of the GEM program. |
| # of avoidable in-patient ALC admissions diverted due to GEM | A count of the number of patients who would have been admitted as ALC in-patients in the absence of the GEM program. |
| # of additional in-patient ALC admissions from GEM | A count of the number of patients who would not have been admitted as ALC in-patients in the absence of the GEM program. |

The following values were determined by calculating the average daily counts across three sites and seven work days:

| | |
|---|---|
| Avg # of in-patient admissions diverted per site/day | 1.24 |
| Avg # of additional in-patient admissions per site/day | 0.62 |
| Avg # of ALC admissions diverted per site/day | 0.38 |
| Avg # of additional ALC admissions per site/day | 0.00 |

Using standard values, the following estimates could be determined:

| Estimate | Calculation |
|---|---|
| Annual change in in-patient admissions due to GEM | (Net # of in-patient admissions/day due to GEM) * (# of work days/year)<br><br>= [(Avg # of additional in-patient admissions/day) + (Avg # of in-patient admissions diverted/day)] * (# of work days/year)<br><br>= [(0.62) + (-1.24)] * 260<br><br>= -161.2<br><br>≈ **-161 in-patient admissions/year per site** |
| Annual change in ALC admissions due to GEM | (Net # of ALC admissions/day due to GEM) * (# of work days/year)<br><br>= [(Avg # of additional ALC admissions/day) + (Avg # of ALC admissions diverted/day)] * (# of work days/year)<br><br>= [(0) +(-0.38)] * 260<br><br>= -98.8<br><br>≈ **-99 ALC admissions/year per site** |
| Annual value from avoided in-patient admissions | $V_1 \Delta P_1$ = (Standard average cost per in-patient admission) * \| (Annual change in in-patient admissions due to GEM) \|<br><br>= (Standard average in-patient LOS per admission in hours) * (Standard average cost per hour in-patient) * \| (Annual change in in-patient admissions due to GEM) \|<br><br>= (175.667 hours/in-patient admission) * ($23.05/hour) * \| (-161 in-patient admissions/year) \|<br><br>≈ **$651,909.02/year per site** |
| Annual value from avoided ALC admissions | $V_2 \Delta P_2$ = (Standard average cost per ALC admission) * \| (Annual change in ALC admissions due to GEM) \|<br><br>= (Standard average in-patient ALC LOS per admission in hours) * (Standard average cost per hour in-patient ALC) * \| (Annual change in ALC admissions due to GEM) \|<br><br>= (442.093 hours/ALC admission) * ($20.83/hour) * \| (-99 ALC admissions/year) \|<br><br>≈ **$911,670.92/year per site** |

For each site, it is estimated that the GEM program reduces annual in-patient admissions by 161 and annual ALC admissions by 99. These are associated with estimated savings of $651,909.02 per site/year and $911,670.92 /year per site respectively.

It is vital to understand that the cases of hospital admissions diverted due to GEM are done to ensure that patients flow through the optimal clinical pathway. While health system savings may arise from this practice, minimizing the number of admissions should not be a target for the GEM program.

### *Impact on ED LOS*

To identify the program's influence on ED LOS, two months of data on GEM and comparable non-GEM visits occurring at one program site was retrospectively collected. Unlike GEM patients, non-GEM patients visited the ED outside of GEM program hours. These patients were not seen by a GEM clinician as a result. To be included in both the GEM and non-GEM groups, patients must have been 65+ years old and have an acuity level between 3-5.

**Table 2** summarizes the distribution of acuity levels in the GEM and comparison groups (GEM vs non-GEM). In both groups, acuity level 3 makes up the majority of patients followed by acuity level 4.

**Table 2:** *GEM vs. non-GEM acuity level distributions*

| Acuity | 267 GEM Visits | 28 Non-GEM Visits |
|--------|----------------|-------------------|
| 3 | 94.76% | 85.71% |
| 4 | 5.24% | 10.71% |
| 5 | 0.00% | 3.57% |

From the collected data, the average ED LOS for all GEM and non-GEM visits was calculated:

| | |
|---|---|
| Avg ED LOS for 1 GEM visit | 13.74 hours |
| Avg ED LOS for 1 non-GEM visit | 5.35 hours |

The following estimates were found using the calculated values above, standard values, and insight from GEM clinicians:

| Estimate | Calculation |
|---|---|
| Effect of GEM on ED LOS | [(Avg ED LOS for 1 GEM visit) - (Avg ED LOS for 1 non-GEM visit)] |
| | * (Estimated % of change attributed to GEM) * (Estimate confidence expressed as a % error) |
| | = [(13.74 hours) - (5.35 hours)] * 0.412 |
| | = +8.39 hours * 0.412 |
| | ≈ **+3.46 hours/visit** |
| Annual cost from GEM program impact on ED LOS | $V_3 \Delta P_3$ = (Standard ED cost per hour) * (Annual change in ED LOS hours due to GEM) |
| | = (Standard ED cost per hour) * (Effect of GEM on ED LOS/visit) * (# of GEM visits at one site over 2 months) * 6 |
| | = ($31.87/hour) * (+3.46 hours/visit) * (267 * 6 visits per year) |
| | ≈ **$176,652.86/year per site** |

It is estimated that the GEM program causes an average increase of 3.46 hours/ED visit. This change corresponds to a cost of $176,652.86/year per site.

### *Impact on In-Patient LOS*

Based on findings from previous reports, 'Falls' makes up a significant portion (25%) of presenting complaints for GEM patients in the Central East Region of Ontario. For this reason, two months of data from fall-related ED visits at one GEM site was examined to approximate the impact of the program on in-patient LOS.

In the two-month period represented by the data collected, none of the non-GEM patients with 'Fall' documented as their primary diagnosis were admitted. Due to this, a standard value for in-patient LOS was used as the comparator. Based on data from the Discharge Abstract Database managed by the Canadian Institute for Health Information, the average LOS for fall-related injuries is 13 days for individuals aged 75-84 years. Additionally, average LOS for fall-related injuries is nearly 14 days for individuals aged 85+.

From two months of data collected from a GEM site, the following averages were calculated:

| Avg in-patient LOS per 'Falls' GEM admission | 11.875 days |
|---|---|
| Avg age of 'Falls' GEM patients (n = 8) | 84.875 years |

The following estimates were found using the calculated values above, standard values, and insight from GEM clinicians:

| Estimate | Calculation |
|---|---|
| Effect of GEM on 'Falls' in-patient LOS | [(Avg in-patient LOS for 1 GEM admission) - (Avg in-patient LOS for 1 standard admission)]<br><br>* (Estimated % of change attributed to GEM) * (Estimate confidence expressed as a % error)<br><br>= [(11.875 days) - (13 days) * 0.31<br><br>= -1.125 days * 0.31<br><br>= -0.34875<br><br>= **-8.37 hours/admission** |
| Annual value from GEM program impact on 'Falls' in-patient LOS | $V_4 \Delta P_4$ = (Standard in-patient cost per hour) * (Annual change in in-patient LOS due to GEM)<br><br>= (Standard in-patient cost per hour) * (Effect of GEM on in-patient LOS/admission) * (# of GEM 'Falls' admissions at one site over 2 months) * 6<br><br>= ($23.05/hour) * (8.37 hours saved/admission) * (10 * 6 admissions per year)<br><br>= **$11,575.71/year per site** |

The data suggests that the GEM program reduces the average fall-related in-patient LOS by 8.25 hours/admission. This translates to estimated savings of $11,575.71/year per site.

### GEM Impact on Rate of Becoming ALC (≤ 30 days from admission)

Two months of hospital admissions data for both GEM and non-GEM patients (65+ years old and acuity level 3-5) were gathered from one GEM site. This data was analyzed to identify the GEM program's impact on patients' rate of becoming ALC ≤ 30 days from admission. As shown in **Table 3**, acuity level 3 makes up the majority of both GEM and non-GEM patients admitted.

**Table 3:** *GEM vs. non-GEM acuity level distributions*

| Acuity | 49 GEM Admissions | 1 Non-GEM Admission |
|--------|-------------------|---------------------|
| 3 | 97.96% | 100.00% |
| 4 | 2.04% | 0.00% |
| 5 | 0.00% | 0.00% |

From the collected data, the rate of admissions becoming ALC was calculated:

| | |
|---|---|
| Rate of GEM admissions becoming ALC (in ≤ 30 days) | 13 ALC/49 Admissions ≈ 0.265 ALC/Admission |
| Rate of non-GEM admissions becoming ALC (in ≤ 30 days) | 1 ALC/Admission |

The following estimates were found using the calculated values above, standard values, and insight from GEM clinicians:

| Estimate | Calculation |
|----------|-------------|
| Effect of GEM on rates of becoming ALC (≤ 30 days after admission) | [(Rate of GEM admissions becoming ALC) - (Rate of non-GEM admissions becoming ALC)] * (Estimated % of change attributed to GEM) * (Estimate confidence expressed as a % error)<br><br>= [(0.265 ALC/Admission) - (1 ALC/Admission)] * 0.439<br><br>≈ **-0.32 ALC/Admission** |
| Annual value from GEM program impact on rates of becoming ALC (≤ 30 days after admission) | $V_5 \Delta P_5$ = (Standard cost per ALC case) * (Annual change in # of ALC cases due to GEM)<br><br>= [(Standard ALC cost per hour) * (Standard ALC LOS)] * (Effect of GEM on ALC rate) * (# of GEM admissions at one site over 2 months) * 6<br><br>= [($23.05/hour) * (442.093 hours/ALC case)] * (0.32 ALC cases/Admission) * (49 * 6 admissions per year)<br><br>= **\$958,698.12/year per site** |

The GEM program is estimated to reduce the rate of patients becoming ALC by 0.32 ALC designations/admission. This suggests savings of $958,698.12/year per site.

*GEM Impact on ED Revisits (≤ 30 days from initial ED visit)*

GEM and non-GEM patient data gathered from one program site was used to determine how the GEM program impacts the number of ED revisits. To be included in the analysis, patients must have been 65+ years old, have an acuity level between 3-5, and have at least 30 days of follow-up data available after their initial ED visit. As indicated in **Table 4**, acuity level 3 makes up the majority of GEM and non-GEM patients followed by acuity level 4.

**Table 4:** *GEM vs. non-GEM acuity level distributions*

| Acuity | 122 GEM Patients | 17 Non-GEM Patients |
|--------|------------------|---------------------|
| 3 | 94.4% | 82.35% |
| 4 | 5.6% | 11.76% |
| 5 | 0.00% | 5.88% |

From the collected data, the rates of ED revisits were calculated:

| | |
|---|---|
| Rate of ED revisits (≤ 30 days from initial ED visit) by GEM patients | 77 ED revisits/122 patients ≈ 0.63 revisits/patient |
| Rate of ED revisits (≤ 30 days from initial ED visit) by non-GEM patients | 0 ED revisits/17 patients = 0 revisits/patient |

The following estimates were found using the calculated values above, standard values, and insight from GEM clinicians:

| Estimate | Calculation |
|---|---|
| Effect of GEM on ED revisit rates ($\leq$ 30 days after initial ED visit) | [(ED revisit rate for GEM patients) - (ED revisit rate for non-GEM patients)] * (Estimated % of change attributed to GEM) * (Estimate confidence expressed as a % error)<br><br>= [(0.63) - (0)] * 0.498<br><br>$\approx$ **+0.31 ED revisits/patient** |
| Annual cost from GEM program impact on ED revisit rates ($\leq$ 30 days after initial ED visit) | $V_6 \Delta P_6$ = (Standard cost per ED visit) * (Annual change in # of ED revisits due to GEM)<br><br>= (Standard cost per ED visit) * [(Effect of GEM on ED revisit rate) * (# of GEM patients at one site over 1 month) * 12]<br><br>= ($304/ED revisit) * (0.31 ED revisits/patient) * (122 * 12 GEM patients per year)<br><br>= **$137,967.36/year per site** |

The data suggests that participation in the GEM program increases the number of ED revisits/patient by 0.31. This increase in ED revisits corresponds to a cost of $137,967.36/year per site.

## Level 5 - ROI

After converting tangible GEM impacts into monetary values and estimating program costs, a final ROI number can be determined. **Table 5** provides a breakdown of how each tangible GEM impact contributes to the final ROI calculation.

*Table 5:* Breakdown of how tangible GEM impacts contribute to the ROI calculation

| ROI Calculation Component | GEM Tangible Impact | Effect on GEM Program ROI |
|---|---|---|
| Net GEM Program Benefits | GEM impact on in-patient admissions from the ED | +$651,909.02/year per site |
| | GEM impact on ALC admissions from the ED | +$911,670.92/year per site |
| | GEM impact on in-patient LOS | +$11,575.71/year per site |
| | GEM impact on rate of becoming ALC (≤ 30 days from admission) | +$958,698.12/year per site |
| GEM Program Costs | GEM impact on ED LOS | -$176,652.86/year per site |
| | GEM impact on ED Revisit rate (≤ 30 days from initial ED visit) | -$137,967.36/year per site |
| | Cost of GEM staff | $65.00/hour * 2000 = -$130,000.00/year per site |

Using the values from **Table 5** in the ROI formula found that the GEM program has an ROI of 569.89%. This ROI strongly suggests that GEM program benefits are greater than program costs.

$$\text{ROI (\%)} = \frac{\text{Net GEM Program Benefits}}{\text{GEM Program Costs}} \times 100$$

$$= \frac{(\$651,909.02 + \$911,670.92 + \$11,575.71 + \$958,698.12)}{(\$176,652.86 + \$137,967.36 + \$130,000.00)} \times 100 \approx \mathbf{569.89\%}$$

For a more conservative ROI estimate, the effect of GEM's impact on patients' rate of becoming ALC (≤ 30 days from admission) was omitted from the ROI calculation. The data gathered indicates that GEM reduces the rate of becoming ALC from 1 ALC designations/admission to 0.32. However, it is unlikely that 1 ALC/admission accurately reflects non-GEM patients' rate of becoming ALC due to the small sample size used.

$$\text{Conservative ROI (\%)} = \frac{\text{GEM Program Benefits}}{\text{GEM Program Costs}} \times 100$$

$$= \frac{(\$651,909.02 + \$911,670.92 + \$11,575.71)}{(\$176,652.86 + \$137,967.36 + \$130,000.00)} \times 100 \approx \mathbf{354.27\%}$$

A more conservative ROI value of 354.27% suggests that GEM program benefits are greater than program costs.

# Limitations

This evaluation relies on several main assumptions, which limit the robustness of the final ROI value calculated. The assumptions are as follows:

- The standard values used in GEM impact calculations mirror their respective true values
- Two months of data gathered from one program site can be extrapolated to accurately represent the entire year
- Data from one program site can accurately represent GEM and non-GEM patients visiting other program sites

Future evaluation projects should seek to collect more data on the GEM program's tangible impacts from multiple sites. Increasing the amount of data gathered (i.e., more months of data) from a greater number of program sites will:

- Reduce the use of standard values in calculations
- Reduce the effect of patient outliers
- Reduce the effect of potential confounding factors (ex. season, site location, etc.)

# Appendix A

## SWOT Analysis

| Strengths | Weaknesses |
|---|---|
| **Enables collaborative care within the ED and hospital**<br>• The GEM program is well utilized by ED staff<br>• GEM assessments supports care processes (ex. notes)<br>• Good network of resources within the hospital that can be utilized (ex. social workers, OTs) and coordinated<br><br>**Improves care experiences for patients and their families**<br>• At some sites, GEMs are able to spend more 1:1 time from assessements (ex. 30 min-1 hour) to discharge<br>• Helps improve patient understanding (and subsequent participation) in their own care<br><br>**Prevents unnecessary admissions and promotes safe discharge**<br>• Diverts unnecessary admissions, instead getting patients home with access to support from community resources/services<br>• Connects patients to external supports and resources that they may not be aware of | **Gaps in GEM avaiability**<br>• Most sites only have one GEM per site. Therefore, there is very limited coverage when GEM staff is not scheduled<br><br>**Most sites only have one GEM per site**<br>• Can be difficult to manage high patient volumes at some sites. Results in less time allocated to each patient, also limiting GEM patient follow-up after discharge<br><br>**For sites with extended coverage** (i.e., weekday + weekend hours)**, there is high turnover rate**<br>• At these sites, GEMs are not given a premium for working weekends. This has led to higher GEM turnover rates.<br><br>**GEM referrals are not always appropriate**<br>• At some sites, the ED team refers to GEM based only on patient's age<br>• A Long process of educating ED staff and others on the GEM role and scope of practice is sometimes needed to move away from less appropriate referrals |

**Enables collaborative care with community partners**

- GEMs work very closely with Home and Community Care Support Services (HCCSS). In many cases, the Home Care Coordinator's office is physically nearby
- Strong relationship with home care providers (ex. able to get same-day or next-day PSWs)

| Opportunities | Threats |
|---|---|
| **Presence of community services, resources, and programs that can be leveraged by the GEMs**<br><br>- Retirement homes, nursing homes, home care, community paramedicine, First Link (Alzheimer's Society), and community-specific initiatives (ex. Meals on Wheels programs), etc.<br><br>**Chances to collaborate with GEM patients' general practitioners**<br><br>- GEMs sometimes fax to patients' GPs when patients prefer to have the recommendations be made by their GP<br><br>**Opportunities to add supports to GEM programs to meet each site's unique needs**<br><br>- Pilot programs (ex. GEM-led pilot program of using OT outreach staff to follow up on GEM patients that visited the ED with mobility issues)<br>- Initiatives (ex. additional collaborations with GAIN to ensure | **Residual effects from COVID-19**<br><br>- Many community resources that were available pre-COVID are no longer running post-COVID<br>- More patients are presenting to the ED without having seen a general practitioner in years. This has resulted in more GEM patients with chronic conditions that are not well managed<br>- More patients presenting to the ED with dementia/cognitive impairment related to social isolation<br><br>**Growing elderly population**<br><br>- Increasing GEM patient volumes<br><br>**Limitations in community services, resources, and programs**<br><br>- Very long wait times (ex. 6-9 months wait for GAIN clinics)<br>- Limited capacity to meet growing demands. In some cases, community programs have asked GEMs to stop referring |

| | |
|---|---|
| the most urgent GEM patients can be seen by a geriatrician in the GAIN clinic within days) | <ul><li>Home care staffing shortages (ex. PSWs, OTs, etc.). When promises for home care are not delivered, patients may ask for hospital admission rather than relying on home care.</li><li>Lack of feedback/communicaiton after GEM referral (ex. GEMs do not know whether the referral was accepted, what the community program has done, etc.)</li></ul>**Financial barriers experienced by some GEM patients**<ul><li>Some community programs (ex. adult day program) require a fee from health service users</li><li>Patients may also have difficulties supplementing the limited community resources/services with privately-funded home supports</li></ul> |

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