

The Influence of an Emergency “Preflight” Transition Checklist on the Transfer of Senior
Facility Residents to the Emergency Department

Background

Older adults, age over 65, are the fastest growing population in the United States. This group is projected to increase from 13% to 25% in most countries over the next 25 years with the very elderly, 85+, projected to rise from 1.5% to 5% of the total population (Cameron, 2013). As the population ages, the proportion of the aged residing in a skilled, assisted, or independent care facility will increase. Currently in 2012, approximately 5% of geriatric population lives in a nursing home, and approximately 25-40% will require institutionalism at some point in their lives (U.S. Census Bureau, 2012). According to the National Center for Assisted Living (AL), there are over 36,000 licensed ALs nationwide with an estimated one million residents making their home in AL/residential care communities, including about 131,000 receiving assistance under the Medicaid program (Adelman Esq., 2013, p. 166)

Providers in the emergency department (ED) can expect an increasing volume of older patients. In 2004, there were 2.7 million ED visits by residents of nursing homes or other institutions (McCaig & Nawar, 2006). In 2013, the estimated number of ED visits by older adults could reach 11.7 million annually (Pitts, Pines, Handrigan, & Kellermann, 2012). ED visits represent a vulnerable transition time period because older adults do not use the ED unless they are seriously ill (Castillo & Pousada, 1993; Eagle, Rideout, Price, McCann, & Wonnacott, 1993; Grief, 2003; Shah et al., 2003). Moreover, their complex medical history and pharmacological profile along with possible visual, hearing, functional and/ or cognitive impairment becomes a perfect storm for adverse events for care not coordinated. Transitions of care are defined as “a set of actions designed to ensure the coordination and continuity of health

care as patients transfer between different locations or different levels of care in the same location” (Boiling, 2008, p. 135).

Flawed executed care transitions can further lead to greater use not only of emergency services but also increased hospital admissions thus increasing health care costs (Coleman et al., 2004, p. 1817). The John A. Hartford Foundation expresses concern with improving the care of older adults. These “frequent flyers” often return to the ED within 30 days of initial discharge, costing the nation an estimated 17.4 billion yearly (Berman, 2012, p. 1). It has been inferred that perhaps 25% of hospital readmissions are attributable to poor transitions from hospital to home (Park, Branch, Bulat, Vyas, & Roevers, 2013, p. 137).

Poor communication has been cited as the root cause of poor transitions (Terrell & Miller, 2006). Numerous studies have shown communication of care is substandard in both directions between the ED and nursing facility (NF) settings (Gillespie, Gleason, Karuza, and Shah, 2010). Healthcare facilities and EDs traditionally operate independently, thus sharing of information is inconsistent or missed. Ten percent of nursing home residents are transported to EDs without any documentation, and essential information typically is missing in the other 90% (Jones et al., 1997; Stier et al., 2001).

According to Terrell et al. (2009), incomplete data contribute to a flawed care plan, safety issues such as medication errors, and re-hospitalization thus increasing health care costs. Accurate medication history or records is essential to avoid imperfect medication reconciliation in the hospital. Common sense dictates that using an erroneous initial medication list makes discrepancies following discharge highly likely (Boiling, 2008, p. 137). In one study, 40% of medical errors were attributed to inadequate medication hand-off during transition (Rozich, Howard, & Justeson, 2004). According to (Coleman & Williams, 2007), readmissions are

recognized as a system failure and reflect a discharge process that has been described as random events connected to highly variable actions with only a remote possibility of meeting implied expectations.

Due to the normal physiology of aging, the older adult is predisposed to adverse drug events (ADEs) or drug-to-drug interactions that are identified as major sources of morbidity and mortality in transitional care (Blank, Benyo, & Glover, 2012). Without a complete medication administrations record (MAR), the ED provider is unable to discern last known time of drugs administration or medication changes, either newly prescribed or discontinued. Medication history alerts the ED to determine if presenting symptoms are related to ADEs. Moreover, a MAR can help guide appropriate antibiotic selection for those currently receiving therapy. Medication management and continuity of the care plan lead the list in problems that occur during transitions from one care setting to the next (Foust, Naylor, & Boiling, 2005).

The Society for Academic Emergency Medicine (SAEM) Geriatric Task Force, including members representing the American College of Emergency Physicians (ACEP) recognized quality gaps in transitions of care in both directions between facilities and the ED thus developed quality indicators for transitional care between nursing homes and ED (Terrell et al., 2009). These quality indicators strategies were instrumental in improving transition of care that mirrored the above communication deficiencies.

For the past 3 years, a hospital group, known as STARForUM, “Safe Transition of All Residents For yoU & Me” (STAR-F), led by a Nurse Practitioner, met with local senior NFs (including SNFs, ALs and ILs) to improve transition of care. A retrospective quality assurance review between November 19, 2013 and February 14, 2014 (n=123) demonstrated those facilities who sent a representative to the monthly meetings were more likely to send in key elements than

those who did not participate (non STAR-F). 5 out of 15 key elements showed there was a significant ($p\text{-value} < 0.05$) association between key elements and STAR-F status (Table I). The mean scores difference on a 15-point transfer of information scale was 2.83 ($p\text{-value} < 0.0001$, 95% CI (-3.98, -1.67). (Table II).

Importance

Because significant variability of information received continued especially in the non-STAR-F population the group was not satisfied with the results. Key elements such as code status, signed advance directive, medical/surgical history, medication profile, and baseline cognitive and functional status necessary for emergency decision, diagnosis and disposition were missing. Missing data resulted in unnecessary rework, inefficiencies and ED providers worked blindly. Moreover, incomplete information predisposes the resident to receive unwanted or less care, unnecessary tests, and wrongful resuscitation.

ED flow is interrupted because the ED nurse must call the facility for clinical information essential for competent care. A phone call diverts attention from other patient care responsibilities. This action contributes to ED turnaround time and throughput that can negatively impact patient and staff satisfaction. Therefore, frustration follows for all involved including Emergency Medical Service (EMS) personnel during transport because necessary helpful information has not been communicated

Frustration also occurs with Emergency Medical Service (EMS) personnel when necessary information has not been communicated (Lee, Westley, & Fletcher, 2004). EMS providers are the interim providers during transport. The quality or quantity of information EMS receives is the hand-over report the ED receives. Unacceptable, poor information exchange creates a serious quality problem and substantial danger for the resident during transport

especially for those cognitively impaired (Gaddis, 2005). Patient care in one site affects the care in the other (Terrell & Miller, 2006).

Goals of This Investigation

The checklist is a key instrument in reducing the risk of costly miscommunication and improving overall patient outcomes. Checklists have gained distinction as a tool for standardizing communication in clinical care especially during high-risk actions (Avery, O’Brien, Pierce, Gazarian, 2015). Checklists have been used as a simple tool in reducing errors especially in areas such as aviation, aeronautics, and product manufacturing (Hales & Pronovost, 2006) (Gwande, 2009). Transfer of care can be considered high-risk especially since 911 calls are for emergent care. Errors in communication not only place the older adult at risk, but also EMS and the facility. Wrongful resuscitation may occur without accurate resuscitation status.

Regardless, of the checklist use, the principal purpose of their implementation is commonly error reduction or best practice adherence (Hales & Pronovost, 2006, p.232). The use of simple tools for improved communication such as checklists may be the key to better patient outcomes and safety and a contributor to efficiency and improved allocation of funds and resource.

Because flawed transition of care continued to plague the ED despite the success of the transition collaborative group (STAR-F), a resident remained vulnerable to poor hand-over’s and ED practitioners continued to cope with work flow interruptions. The primary aim of this study is to explore whether an Emergency “preflight” transition checklist administered by EMS to facility personnel upon arrival will improve transmission of key elements between senior facilities and the ED.

This study will answer the following question (primary outcome): Will the use of a “preflight” checklist provided by EMS improve the number of key elements sent with a senior facility resident to the ED? (Secondary outcome): Is there a difference between participants in a hospital transition collaborative group STAR-F versus non-STAR-F? We hypothesize that the number of key elements will improve with the use of checklist delivered by EMS in the non-STAR-F facility.

MATERIALS AND METHODS

The Saint Joseph Mercy Health System institutional review board approved this study.

Study Design

This was a pre/post intervention study of seniors (>65 years) residing in a senior facility (skilled, assisted-living, and independent) before and after introduction of a pre-flight checklist by EMS personnel to facility staff to complete pre-hospital arrival during two time periods. We evaluated the use of the checklist by counting the number of key elements received on a 15-point scale (September 2014 to January 2015). We compared the number of preflight elements to the number of transferred elements received in the transition collaboration group review (November 2013 to February 2014). Each point represents a key point of information established as critical for patient care ([Appendix A](#)). The key elements were identified by expert ED healthcare professionals as essential to the provision of safe, competent, cost-effective and efficient care for patients transferring from NFs to the ED. Additional data requested by the ED staff on fall and stroke will be reviewed and reported however was not used in the analysis comparing pre-and post interventions groups.

Setting

The setting was a single-site community hospital with 43,000 annual visits in southeastern Michigan. The ED receives one out of every five (65 years and older) community residents from a senior facility. Residents from the surrounding cities depend on eight EMS agencies. There are # senior facilities that utilize the ED as their 911 care provider.

Selection of Participants

Sample size was fixed by the number of preflight checklists received with the facility resident 65 years and older during the evaluation periods. Only skilled nursing, assisted living and independent facilities were included. Facilities transferring critically ill patients designated as a priority 1 transfer will have the option to fax necessary elements to the receiving facility ED within 15 minutes following transport. In an effort to avoid erroneous data, only preflight checklists with information recorded on the checklist and accompanying information were recorded. Checklists received without name of facility was excluded. All eight local EMS agencies were invited to participate. Six responded. Out of the six, five were instrumental in ensuring the checklist was given to the facility staff upon arrival and delivered to the ED.

Interventions

A 15 item emergency preflight transition checklist was used to facilitate communication of resident data (≥ 65 years) between all transferring facilities and the ED. The one-page double-sided instrument was printed on bright yellow paper to prevent blending with other black and white documents. The improvement will be measured by the number of key elements answered or received in relation to the number of elements requested. The post intervention group data will be collected by examining the checklist for accompanying data not recorded on the

checklist. Checklists were reviewed for the number of elements present, absent, not available or not applicable. Elements will be summed and represent “transfer-of- care “score (i.e. “0” (no elements) to “15” (all elements). All residents transferred to the ED between September 15th, 2014 and January 31, 2015 will be included in the study. The mean score of pre and posts will be compared along with participation in STAR-F.

The NFs instructions were printed at the top of the form (Figure I). The selection of responses was listed next to the elements. A choice of “not available” was added to help identify capability gaps. If the resident required immediate transport due to a deficit in their primary survey (airway, breathing, circulation, or requires defibrillation) and delay would jeopardize their condition, a fax number was included to transmit information within 15 minutes.

Methods and Measurements

Data collected was entered into a Microsoft Excel structured data abstraction form designed specifically for this study by the principle investigator (PI). All transition elements were recorded To ensure the accurate response was selected on the checklist, items eg. Code status, copy of advanced directives, medical, and surgical history was compared to the facility transfer papers. If the facility member circled yes and the information was not sent, the information was recorded as not sent. If the facility member circled no and the information was sent, the information was recorded as sent. This was corrected to reflect the true data being communicated. All preflight checklists that did not include the facility’s name or the PI could not validate the information were not included in the data collection. Any elements not scored and not sent were entered as “no”. Data collection was performed by Emergency Medicine Research Associates and the PI. The data elements are objective and did not require interpretation.

The values are presented as mean and standard deviation. Student’s *t* test for independent samples was used in the comparisons between Transition (STAR-F and non-STAR-F) and Preflight. Pearson’s chi square was used to compare proportion for each individual 15 check list items. Statistical tests with $p < 0.05$ were accepted as significant. The data was analyzed using Statistical Analysis Software (SAS, version 9.4, SAS Institute Inc., Cary, NC).

Outcomes

A 15-point scale was established as the outcome measure for measurement of quality and quantity of information received. The key elements were studied previously to determine if the transition collaborative group STAR-F would outperform the non-STAR-F. Observations of practice and feedback from the previous transition collaborative group study supported the utility of the preflight checklist.

Elements were scored as present or absent. (Not applicable or unavailable responses were recorded as yes because the data title was listed as “was information recorded”). The ED and EMS staff also requested additional information for those residents who were transported for stroke symptoms or injury due to a fall. Last known time normal for stroke symptoms and fall history was included on the checklist since unknown variables can contribute to more or less care.

Primary Data Analysis:

Statistical analyses were performed with Statistical Analysis Software (SAS, version 9.4, SAS Institute Inc., Cary, NC). Baseline values are presented as means and standard deviation as appropriate. Student’s *t* test for independent samples was used in the comparisons between Transition Collaborative Group (STAR-F and non-STAR-F) and Preflight. Pearson’s chi square

was used to compare proportion for each individual 15 check list items. Statistical tests with $p < 0.05$ were accepted as significant.

Sub Data Analysis

Data was also collected on those individuals who were transferred to the ED with stroke symptoms or transferred due to a fall requiring evaluation. Information such as last known time normal is critical for those in a window for treatment with fibrinolytic therapy. Fall history included details of witnessed, loss of consciousness, head trauma, type of fall, and length of time if found on floor to assist with decision, diagnosis and disposition. This information can make the difference on the diagnostics ordered, length of time in the ER and disposition.

Results

There were 186 preflight checklists in the data set between September 20, 2014 and January 31, 2015. The ED received a higher percentage of key elements (11.5 +/- 2.6) from the facilities utilizing the preflight checklist than the previous transition collaborative study (n=123) comparing STAR-F and non-STAR-F (8.6 +/- 3.3 and p-value .0001). (Table III). The frequency of key elements received in the ED increased from every facility (Figure II). The preflight AL facility (n=82) however, increased (11.2 +/- 2 p < .0001) compared to the earlier transition collaborative AL (n=33) group (7.4 +/- 3.1). The frequency of elements showed statistical significance using Chi-square tests for independence between key element and two study groups. Only Medication List and MAR did not show statistical significance (p-value < 0.05). (Table IV). The results of student t-test mean scores difference of checklist between Transition Collaborative Group and Preflight is 2.95 (p-value < 0.0001, 95% CI (-361, -2.28). (Table V)

The preflight checklist secondary outcome results (n=186) categorized into STAR-F (27.96%) and non-STAR-F (72.04%) did not show a statistical difference of key elements between the transition collaborative group (n=123) STAR-F (32.52%) and non-STAR-F (67.48%). The Chi-square tests for independence were conducted between each element and STAR-F status. None of key elements showed that there were significant (p-value <0.05) association between key elements and the STAR-F status in preflight. (Table VI) . The results of student t-Test mean difference scores of checklist between STAR-F and non-STAR-F is 0.74 (p-value = 0.0837, 95% CI (-0.158, 0.01)). (Table VII)

I am currently waiting for the Sub analysis on last known time normal and fall information: Is this necessary to report and should there be a table included?

Limitations

Although the transfer of key elements improved, the preflight checklist did not include social information or alerts to possible behavioral problems that may be helpful in caring for the resident. Prior to the study facility capability to surrender information was not determined thus this might have influenced the number of elements sent. Residents who reside in independent facilities are responsible for their own information unless they contract services from home care agencies within facility. Also the NFs did not receive instructions prior to the study therefore incorrect or blank responses may not be reflective of missing information but be reflective of unclear directions. Information not checked and not sent was recorded as a “no” and this may have also influenced the results although to help control for this, the preflight checklist answers were compared to information received.

The transition of care upon ED discharge to the senior facility was not studied. However, discharge protocol (began in 2012) required the ED nurse to call report and send discharge

documents (discharge instructions, prescriptions, medications given, progress notes, copy of exams, and laboratory reports) in an ED transition envelope. To this date, the process has been received positively.

Discussion

Nurses and medical providers from EDs and facility settings, along with EMS personnel, all admit transitional communication is poor between each other and agree there is a need to improve the current system of transfer documentation (Cwinn et al., 2009). This study included three types of NFs and determined the EMS, interim care provider in the continuum of care, to transport the checklist. The preflight checklist assisted in consistent transfer of key information needed for safe transport and rapid ED diagnosis, decision and disposition especially in AL residents. The checklist raised facility staff awareness to information needed and created a collaboration synergy of safe transport. It also highlighted difference of facility services and capabilities.

The accuracy of the checklist was less than optimal at the beginning. Sometimes the checklist response did not correlate with the written information recorded on the checklist or sent facility documents. It was determined the initial instrument was too crowded and the appearance was altered. This correction improved reliability. (Appendix B).

Also, in the beginning, the EMS “bridging” strategy to deliver the checklist was slow to adopt even though the paramedic leadership team agreed to implement team training. Moreover, EMS had difficulty in working the checklist into their flow but then determined the checklist would be kept on the cot for visibility and availability.

There was also some confusion among some EMS personnel regarding their role in the checklist. Many questioned why they were responsible to deliver the checklist. The PI met with

EMS personnel when they arrived in the ER to answer questions, reinforce why they were instrumental to the study since previous transition collaboration group study did not influence the non-STAR-F. The PI and ED staff also expressed gratitude and reinforced their contribution to improving transition. Updates were sent weekly by e-mail to EMS and posted in the ED and EMS break room. Moreover, informal verbal surveys were performed periodically to assess provider satisfaction.

One EMS agency added an alert reminder to their electronic medical record. An additional EMS agency visited their facility’s to notify them of the checklist study. Soon after the study began, an AL requested the checklist from their local EMS and changed the color to “pink” because yellow paper was currently being used for another process. Two other ALs called the PI and requested an in-service to understand how to complete prior to EMS arrival.

An EMS agency invited the PI to their fire station to educate the EMS on the importance of the checklist along with their local facility directors even though only one facility director responded. The “crush pills” nested in the dietary information column alerted us to a deficiency in the electronic medical record (EMR). There was not a clear cut way of reporting this need in our current EMR besides a communication order. The EMS and ED staff reported the last time normal reported for suspected stroke symptoms and fall information improved accuracy of decisions, diagnosis and disposition and tests ordered.

The documentation of the resident’s baseline mental status assisted in accurately screening for delirium features. Documentation of baseline functional status helped define activities of daily living status. Information regarding code status and advance directive documents protected end-of-life wishes and prevented wrongful resuscitation. Pre-arrival and baseline vital signs that included blood sugar and pulse oximetry results were not included in the

data analysis however this information was helpful for hypoglycemia and systemic inflammatory reaction syndrome for earlier sepsis identification and treatment.

The clinical importance of the checklist cannot be over estimated. EMS has acknowledged the preflight checklist has dramatically improved communication and enhanced relationships with facility staff. The years of EMS and ED frustration with flawed transitions have steadily decreased. The availability and timely information permitted EMS to be on the road sooner for other community 911 calls. ED staff satisfaction also increased because available information permitted prompt decisions and decreased facility phone calls. One EMS agency was able to provide the ED staff with a preflight checklist in 90% of their transports. The EMS contributed their success to their commitment in improving transition of care.

The most startling change happened at the January monthly STAR-F meeting. All non-STAR-F decided to join the monthly meetings and continue to work towards improving transition of care with EMS and the ED. The monthly meeting average attendance of approximately 35 individuals increased to 81 participants at the January 27, 2015 meeting.

Lessons learned

It is essential the PI deliver the message personally to EMS personnel instead of channeling communication through EMS training coordinators. This became evident after fielding multiple questions from EMS providers and reluctance noted in some EMS personnel upon their ED arrival once the study began. One EMS training coordinator struggling to engage colleagues invited the PI to their fire station. Immediately following the three sessions, the use of the checklist increased steadily. The checklist overall increased from 10% to 45% weekly.

In summary, shortfalls in hand-over documents are too numerous to count. The “preflight” checklist has been instrumental in improving transfer of key elements and lessens the

probability of a risky transition. The once echoed “déjà vu” here we go again of missing information and frustration began to slowly diminish as the study progressed. The participants in the study stated the checklist provided conversation thus inadvertently improved relationships.

The slow progress of the study taking flight demonstrated it takes time to get it right. Individuals have to believe through combined efforts and commitment will improve transitions of care because no one can do health care alone. Even though we celebrate improved communication with the preflight checklist, we will continue to refine the process of transition of care. Our attentions are now focused on every facility becoming checklist property owners and detail their capabilities. Moreover, ED nurses and facility staff will encourage residents in independent facilities to keep medication and medical history readily available for EMS just in case there is an emergency. Emergency “Just in Case of Emergency” brochures were made available (<http://www.stmarymercy.org/justincase>) along with “Plan in a Can” program. Local EMS and STAR-F is designing an instructional sheet on what to expect upon EMS arrival. A long range goal is to approach legislation on a universal checklist bill.

If the aerospace industry does not expect its pilot and crew to recall from memory each crucial step prior to lift-off and depart until each procedure steps are completed, why are health care professionals responsible for the safe care of others, be permitted to transfer a resident without history or care plan (checklist) that could prevent serious harm? One thing we know for sure: If you don’t use it, it doesn’t work (Atul Gawande, 2009).

Could the yellow preflight checklist be your golden ticket to a smoother transition?

4186 WORDS **not including the Abstract at the beginning**. There is a 4000 word limit.

If I include the data on fall and stroke this will be additional words to be counted.

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TABLE I

Comparison of Frequency of Elements between STAR-F and non-STAR-F

Key Element	STAR-F Checked (%)	non-STAR-F Checked (%)	P-value for Chi-Square
Med List	39 (97.5%)	72 (86.75%)	0.0597
MAR Included	27 (67.5%)	43 (51.81%)	0.0997
Today s Medication Times Documented	23 (57.5%)	28 (33.73%)	0.0122
Allergies Documented	35 (87.5%)	69 (83.13%)	0.5301
Code Status Documented	31 (77.5%)	48 (57.83%)	0.0330
Signed Copy of Code Status AD D	23 (57.5%)	22 (26.51%)	0.0008
Facility phone number documented	31 (77.5%)	52 (64.2%)	0.1381
Facility Address Documented	33 (82.5%)	59 (71.08%)	0.1719
Family DPOA Phone Number Documented	36 (90%)	69 (83.13%)	0.3128
Notification of Family DPOA Documented	16 (40%)	20 (24.1%)	0.1190
Medical History Documented	33 (82.5%)	63 (75.9%)	0.4077
Surgical History Documented	12 (30%)	17 (20.48%)	0.2440
Baseline Mental Status Documented	29 (72.5%)	20 (24.1%)	<.0001
Baseline Functional Status Documented	29 (72.5%)	19 (22.89%)	<.0001
Dietary Concerns Documented	23 (57.5%)	36 (43.37%)	0.1418

The frequencies for each individual checklist items are shown in the above table. The Chi-Square tests for independence were conducted between each element and STAR-F status. 5 out of 15 key elements showed that there were significant (p -value < 0.05) association between key elements and STAR-F status.

TABLE II

FACILITY	N	Mean	Std Dev	Std Err	Minimum	Maximum
NON-STAR-F	83	7.6747	3.0886	0.3390	0	14.0000
STAR-F	40	10.5000	2.8823	0.4557	3.0000	14.0000
Diff (1-2)		-2.8253	3.0236	0.5820		

FACILITY	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
NON-STAR-F		7.6747	7.0003	8.3491	3.0886	2.6796	3.6459
STAR-F		10.5000	9.5782	11.4218	2.8823	2.3611	3.7010
Diff (1-2)	Pooled	-2.8253	-3.9775	-1.6731	3.0236	2.6859	3.4592
Diff (1-2)	Satterthwaite	-2.8253	-3.9552	-1.6954			

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	121	-4.85	<.0001
Satterthwaite	Unequal	82.142	-4.97	<.0001

Above table shows the results of student t-test that compares check list score between STAR-F and NON-STAR-F facilities. The mean scores difference of checklist between STAR-F and NON-STAR-F is 2.83 (p -value <0.0001, 95% CI (-3.98, -1.67)).

Note: this is the overall check list score and the maximum = 14 (The highest check list score is 14).

TABLE III

Type of Facility	Transition Collaborative group (STAR-F & non-STAR-F) Mean±sStd(N)	Preflight Mean±Std(N)	p-value
Skilled Nursing Facility	10.1±2.7(58)	12.8±1.7 (74)	<.0001
Independent	7.2±3.5(28)	9.5±3.1(30)	0.0157
Assisted	7.4±3.1(33)	11.2±2.5(82)	<.0001
Group Home	5.7±2.9(3)	Not included	-
Total	8.6±3.3(123)	11.5±2.6(186)	<.0001

TABLE IV

Comparison of Checklist Elements: Preflight and Transition Collaborative Group

Key Elements	Preflight Elements Received (%)	Transition Collaborative Group Elements Received (%)	P-value for Chi-Square
Med List	168 (90.32%)	111 (90.24%)	0.7078
MAR Included	103 (55.68%)	70 (56.91%)	0.5091
Today s Medication Times Documented	134 (72.43%)	51 (41.46%)	<.0001
Allergies Documented	171 (91.94%)	104 (84.55%)	0.0319
Code Status Documented	144 (77.42%)	79 (64.23%)	0.0003
Signed Copy of Code Status AD D	120 (64.86%)	45 (36.59%)	<.0001
Facility phone number documented	162 (87.57%)	83 (68.6%)	<.0001
Facility Address Documented	159 (85.95%)	92 (74.8%)	0.0254
Family DPOA Phone Number Documented	176 (94.62%)	105 (85.37%)	0.0087
Notification of Family DPOA Documented	157 (84.41%)	36 (29.27%)	<.0001
Medical History Documented	167 (89.78%)	96 (78.05%)	<.0001
Surgical History Documented	76 (40.86%)	29 (23.58%)	<.0001
Baseline Mental Status Documented	139 (75.14%)	49 (39.84%)	<.0001
Baseline Functional Status Documented	140 (76.09%)	48 (39.02%)	<.0001
Dietary Concerns Documented	131 (70.43%)	59 (47.97%)	<.0001

The frequencies for each individual checklist items are shown in the above table. These are results of the Chi-Square tests for independence between key element and two study groups. The results demonstrate that all checklist items in the preflight have a higher percentage of element received than transition collaborative group except MAR Included. 13 out of 15 elements showed that there were significant (p -value<0.05) association between key elements and study groups.

TABLE V

T-Test: Comparison of Preflight and Transition Collaborative Group

COMPARISON PERIOD	N	Mean	Std Dev	Std Err	Minimum	Maximum
Transition Collaborative Group	123	8.5935	3.2914	0.2968	0	14.0000
Preflight	186	11.5430	2.6223	0.1923	2.0000	15.0000
Diff (1-2)		-2.9495	2.9067	0.3378		

COMPARISON PERIOD	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
Transition Collaborative Group		8.5935	8.0060	9.1810	3.2914	2.9252	3.7633
Preflight		11.5430	11.1637	11.9223	2.6223	2.3802	2.9197
Diff (1-2)	Pooled	-2.9495	-3.6142	-2.2848	2.9067	2.6939	3.1564
Diff (1-2)	Satterthwaite	-2.9495	-3.6464	-2.2526			

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	307	-8.73	<.0001
Satterthwaite	Unequal	220.32	-8.34	<.0001

Above table shows the results of student t-test that compares check list score between Transition Collaborative group and Preflight. The mean scores difference of checklist between Transition Collaborative group and Preflight is 2.95 (p -value <0.0001, 95% CI (-361, -2.28)).

TABLE VI

Key Elements	STAR-F (%)	NON-STAR-F (%)	P-value for Chi-Square
Med List	48 (92.31%)	120 (89.55%)	0.7464
MAR Included	34 (66.67%)	69 (51.49%)	0.1431
Today s Medication Times Documented	40 (76.92%)	94 (70.68%)	0.6595
Allergies Documented	48 (92.31%)	123 (91.79%)	0.7271
Code Status Documented	42 (80.77%)	102 (76.12%)	0.7905
Signed Copy of Code Status AD D	36 (70.59%)	84 (62.69%)	0.2544
Facility phone number documented	45 (88.24%)	117 (87.31%)	0.8652
Facility Address Documented	42 (82.35%)	117 (87.31%)	0.2255
Family DPOA Phone Number Documented	49 (94.23%)	127 (94.78%)	0.2560
Notification of Family DPOA Documented	46 (88.46%)	111 (82.84%)	0.6325
Medical History Documented	50 (96.15%)	117 (87.31%)	0.1950
Surgical History Documented	25 (48.08%)	51 (38.06%)	0.1784
Baseline Mental Status Documented	40 (78.43%)	99 (73.88%)	0.5148
Baseline Functional Status Documented	43 (84.31%)	97 (72.93%)	0.2488
Dietary Concerns Documented	40 (76.92%)	91 (67.91%)	0.2339

The frequencies for each individual checklist items are shown in the above table. The Chi-Square tests for independence were conducted between each element and STAR-F status. None of key elements showed that there were significant (p -value < 0.05) association between key elements and STAR-F status in the preflight.

TABLE VII

FACILITY	N	Mean	Std Dev	Std Err	Minimum	Maximum
NON-STAR-F	134	11.3358	2.7281	0.2357	2.0000	15.0000
STAR-F	52	12.0769	2.2652	0.3141	7.0000	15.0000
Diff (1-2)		-0.7411	2.6081	0.4261		

STARForUM_Facility	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
NON-STAR-F		11.3358	10.8697	11.8020	2.7281	2.4360	3.1006
STAR-F		12.0769	11.4463	12.7076	2.2652	1.8984	2.8092
Diff (1-2)	Pooled	-0.7411	-1.5818	0.0996	2.6081	2.3666	2.9048
Diff (1-2)	Satterthwaite	-0.7411	-1.5193	0.0371			

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	184	-1.74	0.0837
Satterthwaite	Unequal	111.08	-1.89	0.0618

Above table shows the results of student t-test that compares check list score between STAR-F and NON-STAR-F facilities. The mean difference scores of checklist between STAR-F and NON-STAR-F is 0.74 (p -value =0.0837, 95% CI (-0.158, 0.01)).

APPENDIX A

Emergency Care Transition Checklist

Nursing Facility: Please complete the checklist to ensure accurate information is provided prior to EMS departure to St. Mary Mercy Livonia. Attach to the top of transferring documents. If gathering information will delay transport, please fax checklist and required documents to 734.655.1299. **THANK YOU!**

FACILITY NAME: _____ **EMS AGENCY:** _____ **Date:** _____

Reason for transfer documented?	YES	NO	Not available
Current VS/pulse ox/blood sugar documented?	YES	NO	Not available
Baseline VS/pulse ox/blood sugar documented if transferring parameters abnormal for resident?	YES	NO	Not available
Medication Administration Record (meds given, discontinued, refused etc.) included in transferring documents?	YES	NO	Not available
Today’s medications administered times documented?	YES	NO	Not available
Medication allergies documented?	YES	NO	Not available
Code status documented?	YES	NO	Not available
Signed copy of code status or Advance Directive with transferring documents?	YES	NO	Not available
Facility phone number, address on transferring documents?	YES	NO	Not available
Family/DPOA phone number documented?	YES	NO	Not available
Notification of family/DPOA documented?	YES	NO	Not available
Medical History in transferring documents?	YES	NO	Not available
Surgical History in transferring documents?	YES	NO	Not available
Baseline mental status noted on transferring documents?	YES	NO	Not available
Baseline Functional status noted on transferring documents?	YES	NO	Not available
Dietary concerns i.e. pureed, thickener, crush pills (if N/A, select no)	YES	NO	Not available
Other: TRANSFER DUE TO STROKE SYMPTOMS:			
Last known time normal documented?	YES	NO	Not available

Other: TRANSFER DUE TO FALL:			
Fall witnessed?	YES	NO	Not available
Loss of consciousness documented as present, not present, or unknown?	YES	NO	Not available
Head trauma documented as present, not present or unknown?	YES	NO	Not available
Type of fall noted: mechanical vs. physiological?	YES	NO	Not available
If found on floor, last known time seen documented?	YES	NO	Not available

APPENDIX B

REVISED CHECKLIST

FACILITY TYPE: Skilled Assisted Independent Sub-acute

EMERGENCY CARE “Preflight” TRANSFER CHECKLIST

NURSING STAFF: Please complete. The checklist is a cue of information needed to help determine your resident’s plan of care. We hope by participating in this study, communication will improve and prevent adverse outcomes. **Please return to EMS upon their departure.** Fax to St. Mary Mercy ER within 15 minutes if unable to complete prior to EMS departure 734.655.1299. THANK YOU, ER & EMS PERSONNEL.

Facility Name: _____ EMS Agency: _____ Date: _____

REASON FOR TRANSFER & VITAL SIGNS	INFORMATION SENT WITH PATIENT?			
REASON FOR TRANSFER:	YES	NO	Unavailable	
Current VS(BP,P,RR) <input type="checkbox"/> pulse ox <input type="checkbox"/> blood sugar <input type="checkbox"/> (If your facility does not obtain VS select UNAVAILABLE for current and baseline)	YES	NO	Unavailable	
Baseline parameters if above are not the resident's normal VS <input type="checkbox"/> pulse ox <input type="checkbox"/> blood sugar (Select N/A if above parameters are baseline)	YES	NO	Unavailable	N/A

MEDICATION HISTORY (MAR is preferred over the Med List)	INFORMATION SENT WITH PATIENT?			
Medication Administration Record (daily record with listed times given)	YES	NO	Unavailable	N/A
Medication List	YES	NO	Unavailable	N/A
Today’s medications given?	YES	NO	Unavailable	N/A
Medication Allergies (if no allergies, select N/A)	YES	NO	Unavailable	N/A

CODE STATUS or ADVANCE DIRECTIVE	INFORMATION SENT WITH PATIENT?			
Code status or Advanced Directive (AD) <input type="checkbox"/> Full <input type="checkbox"/> DNAR	YES	NO	Unavailable	
Signed copy of Code Status or AD is required if resident a DNAR (If status is FULL CODE, circle N/A if there is no signed form)	YES	NO	Unavailable	N/A

HISTORY	INFORMATION SENT WITH PATIENT?			
MEDICAL HISTORY	YES	NO	Unavailable	N/A
SURGICAL HISTORY (If resident has no surgeries, select N/A)	YES	NO	Unavailable	N/A

BASELINE MENTAL & FUNCTIONAL STATUS & DIETARY NEEDS	INFORMATION SENT WITH PATIENT?			
Mental status <input type="checkbox"/> person <input type="checkbox"/> place <input type="checkbox"/> time <input type="checkbox"/> situation	YES	NO	Unavailable	N/A
Function <input type="checkbox"/> Independent <input type="checkbox"/> Needs some help <input type="checkbox"/> Dependent	YES	NO	Unavailable	N/A
Dietary needs: Pureed, thickener, crush pills (if no concerns select N/A)	YES	NO	Unavailable	N/A

FAMILY/DPOA	INFORMATION SENT WITH PATIENT?			
FAMILY/DPOA CONTACT NUMBER	YES	NO	Unavailable	N/A
FAMILY NOTIFIED OF TRANSFER TO THE ER?	YES	NO	Unavailable	N/A

STROKE SYMPTOMS OR FALL? – CONTINUE ON BACK

STOP! OMIT THIS SECTION IF REASON FOR TRANSFER IS

NOT RELATED TO STROKE SYMPTOMS OR FALL

TRANSFER DUE TO STROKE SYMPTOMS	INFORMATION SENT WITH PATIENT?			
LAST KNOWN TIME NORMAL DOCUMENTED? (If UNKNOWN, select unavailable)	YES	NO	Unavailable	

TRANSFER DUE TO FALL?	INFORMATION SENT WITH PATIENT?			
FALL WITNESSED?	YES	NO	Unavailable	
LOSS OF CONSCIOUSNESS (if UNKNOWN select unavailable)	YES	NO	Unavailable	
Head Trauma?	YES	NO	Unavailable	

(if UNKNOWN select unavailable)				
CIRCLE Type of fall: Mechanical or Physiological	YES	NO	Unavailable	
(if UNKNOWN select unavailable)				
Found on floor?	YES	NO	Unavailable	N/A
(If NOT found on floor, select N/A for this question and time frame)				
If found on floor – duration of time? Time: _____	YES	NO	Unavailable	N/A
(if UNKNOWN time frame, select Unavailable)				

Mechanical Fall: The person slipped, tripped or lost their balance. (Fall is the result of non-medical reasons)

Physiological Fall: If fall had been due to fainting, dizziness or a seizure further tests would be required.

Fall: “An unexpected event in which the participant comes to rest on the ground, floor or lower level”

QUESTIONS? Please notify Michelle Moccia DNPc, ANP-BC, CCRN 734-655-3643

MEDICAL RECORDS: THIS IS NOT A PERMANENT RECORD. PLEASE RETURN TO MICHELLE MOCCIA (SENIOR ER)

ER STAFF: PLEASE INSERT PREFLIGHT CHECKLIST IN THE YELLOW DESIGNATED FOLDER BY MAIN CLERK

FIGURE 1

PROCEDURE

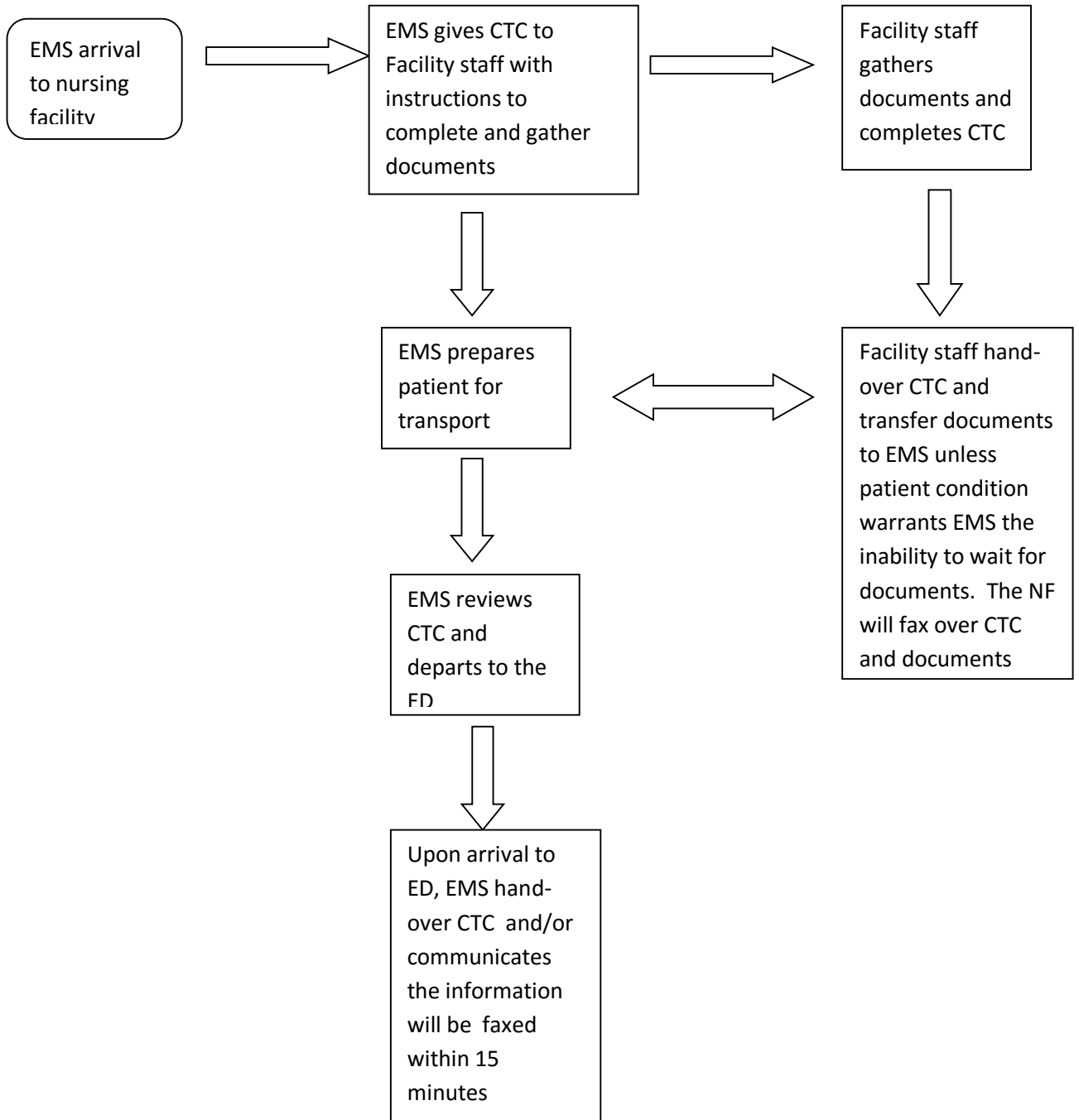


FIGURE II

Mean Comparison of Check List Score between Transition Collaborative Group and Preflight by Nursing Facility Type

