

Roadmap  
for Improvements in the Alaska Trauma System

Trauma System Plan: 2018–2020

State of Alaska  
Department of Health and Social Services

Division of Public Health  
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# Roadmap for Improvements in the Alaska Trauma System

## Trauma System Plan

### **Executive Summary and Primary Recommended Plan Initiatives**

This Trauma System Plan (Plan) documents the features of the existing trauma system for the state of Alaska and the progress in implementing the recommendations for improvement made by the American College of Surgeons (ACS) in its System Review in 2008. Based on this foundation — and analysis of patient care data from the Alaska Trauma Registry — the Plan identifies additional goals and recommended initiatives to continue the process of improvement.

Providing the highest-quality trauma care for the people of Alaska presents significant challenges because of the expansive geography, low population density and periods of severe weather. An added challenge is the tradition in Alaska of maintaining, to a significant degree, two health care systems: one for Native Alaskans and one for other Alaskans.

While there are certain limitations in clinical resources, it is also important to note that there is broad participation in trauma care by all hospitals in Alaska and that the statewide per-capita supply of physicians is significantly *higher* than for the U.S. for all physicians (21% higher), primary care physicians (37% higher), specialist physicians (12% higher) and surgeons (28% higher). This means that there should be adequate physician resources — in the aggregate — to achieve the highest levels of quality. However, this is not to say that geographic distribution of physicians is optimal.

This Plan was developed by relying on the advice and recommendations of leaders within the Alaska trauma system and incorporating the experience of the consulting group (HealthWorks) and its trauma clinical, system and management experts, who were engaged by the Alaska Department of Health and Social Services (Department) to prepare this Plan.

Among the most notable strengths of Alaska's trauma system are the strong leadership from the Trauma Unit and other parts of the Department, the momentum that has been established in implementing recommendations by the ACS, the very high proportion of hospitals that are designated trauma centers, and the fact that all trauma centers and non-designated facilities participate in the trauma patient data registry. Because of full hospital participation, this is among the most comprehensive trauma registries in the U.S.

The time horizon for this Plan is three years. Over this period, the performance assessment process should guide fine-tuning of system policies and procedures, including tailoring statewide guidelines for regional considerations. Beyond the three-year planning horizon, more significant adjustments in the system – including possible additional changes in trauma center configuration – can be considered.

The central challenge for the Alaska trauma system involves the interplay between two issues. On the one hand, there is a significant number of patients with high injury severity and long pre-hospital times and/or times at clinics and Level 4 trauma centers (including significant numbers in the most remote portions of the state). On the other hand, there are not yet formal triage and inter-facility transfer guidelines to help optimize how promptly patients arrive at facilities that can provide definitive care, and there are no Level 3 trauma centers. These issues are, in part, caused by and then exacerbated by long transportation times from many regions. However as is shown in the report, depending on injury severity, 82% - 90% of transferred patients take longer than two hours before leaving a Level 4 trauma center for higher level of care and 34% - 78% take longer than three hours.

The Plan is grounded, not only in national professional standards and practical experience in the planning and operation of trauma centers and trauma systems, but also on analysis of the rich patient care data available in the registry. The Plan identifies the system's most notable strengths and includes goals and initiatives in the areas of increased outside funding, system performance evaluation, developing and formalizing guidelines for field triage and inter-facility referral, and consideration of changes in the configuration of trauma centers.

If this Plan is implemented, the most significant changes will be:

- Upgrading of rural clinics to Level 5 trauma centers
- Upgrading of Level 4 trauma centers in Juneau, Palmer and Fairbanks to Level 3 trauma centers
- Operation of a statewide trauma communications and dispatch center
- Formalized use of the formal field triage guidelines and inter-facility guidelines
- Collaboration with air medical services and pre-hospital providers for auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care to reduce, for a significant proportion of the most seriously injured patients, the elapsed times between injury, transfer and arrival at facilities for definitive care.

Analysis using the Alaska Trauma Registry and the trauma performance review process should be used to continually refine the triage and transfer guidelines, including tailoring statewide guidelines for regional considerations. Where additional resources are needed to support the improvements called for in this Plan, these funds will come from pursuit of one or more of several promising new sources.

## Background

### Acknowledgments

We would like to thank the many individuals who contributed to this report and the following State of Alaska programs for providing information for this report:

Alaska Trauma Registry  
Alaska Trauma Program Content: courtesy of  
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## Introduction

This Trauma System Plan (Plan) fulfills the requirements of the engagement agreement and the RFP. The key requirements of the RFP are summarized in the following paragraph:

The contractor will develop and complete by May 31, 2017 a statewide, *patient-focused* [emphasis added] trauma system plan that fosters policies, procedures, and practices of optimal trauma care to include ... this plan is intended to serve as a reference to Alaska's stakeholders ... *as a guideline to ameliorate gaps* [emphasis added] that exist in the current trauma system. The plan should be written with the collaboration and contribution, as needed, of the; Trauma System Review Committee, State Trauma Program Manager...and the key trauma stakeholders throughout the Alaskan health care community. The plan has been developed utilizing the "ACS-COT Trauma System Consultation for the State of Alaska 2008." The plan should identify and analyze 15 functional components, based on an evaluation guided by the "2006 Health Resources Services Administration Model Trauma System Planning and Evaluation" document. The plan includes operational and demographic data to evaluate Alaska's access to care for injured patients and the need for additional trauma center care.

The requirement that the Plan serve "as a guideline to ameliorate gaps that exist in the current trauma system" is taken to mean that the state believes there are significant opportunities for improvement and that the Plan will provide guidance to bring about meaningful change. In other words, the Plan should do more than document how the system is organized and how it functions and do more than make minor refinements.

In practical terms, the requirement for a "patient-focused" trauma system plan has been taken to mean that when the meaningful changes are recommended, they should be grounded principally in what is best for patient care quality and not be focused on the interests of providers in the trauma system, such as hospitals, physicians and pre-hospital providers.

Each section of the Plan begins with the functional components and benchmarks called for in the 2006 Health Resources Services Administration Model Trauma System Planning and Evaluation.

## Time Horizon

The time horizon for this Plan is three years. None of the recommended initiatives, nor the trauma center configuration recommended here, should be thought of as fixed beyond this three-year period. Indeed, the performance assessment process recommended in this Plan should guide fine-tuning of system policies and procedures throughout this period. Then, additional, more significant adjustments in the system — including possible additional changes in trauma center configuration — can be considered beyond the three-year planning horizon.

## Challenges

Because of its expansive geography (Alaska is larger than California, Montana and Texas combined), relatively small population, low population density and extreme weather, Alaska presents the most significant trauma system planning challenge in the United States. Despite these challenges, the state EMS agency and its trauma care stakeholders have developed a good trauma system. Significant opportunities for improvement exist, however. This Plan is designed to focus the efforts of the state EMS agency and stakeholders on a manageable set of practical initiatives to bring about significant improvements in quality and cost-effectiveness.

## Data Sources

Data sources for this report are the Alaska Trauma Registry, unless otherwise indicated.

## Geography and Demographics

Alaska's population in 2016 was estimated to be 739,828, an increase of 4.3% since 2010. This is like the rate of growth for the U.S. The state's land area is 570,000 square miles, with a population density of 1.2 per square mile that compares to a density of 87.4 for the U.S. Alaska's population is concentrated in six core statistical areas:

Figure 1: Population for Selected Communities, 2016

Core Statistical Area	2016 Census
Anchorage (including Matanuska-Susitna Borough)	401,635
Fairbanks	98,957
Juneau	32,739
Bethel	18,134
Kodiak	13,563
Ketchikan	13,758

Data Source: Alaska Population Estimates. <http://live.laborstats.alaska.gov/pop/index.cfm>

These six areas account for approximately 78% of the state's total population, with 22% of the population distributed across the expanse of the rest of the state. This large geographic portion of the state has a population density even lower than the 1.2 for the overall state, with approximately 0.4 people per square mile, compared to the U.S. at 87.4.

In Alaska, 9.9% of the population is over the age of 65, which is significantly lower than the U.S. percentage, which is 14.9%. In Alaska, 25.2% of the population is under the age of 18, which is moderately higher than the U.S. percentage, which is 22.9%.

In Alaska, 66.5% of the population is white, which is significantly lower than the percentage for the U.S., which is 77.1%. In Alaska, 14.8% of the population is Alaska Native or American Indian, which is very significantly higher than the U.S. percentage, which is 1.2%.

In Alaska, 16.4% of the population under 65 is without health insurance, which is significantly higher than the percentage for the U.S., which is 10.5%. In Alaska, 10.3% of the population is in poverty, which is significantly lower than the U.S. percentage, which is 13.5%.

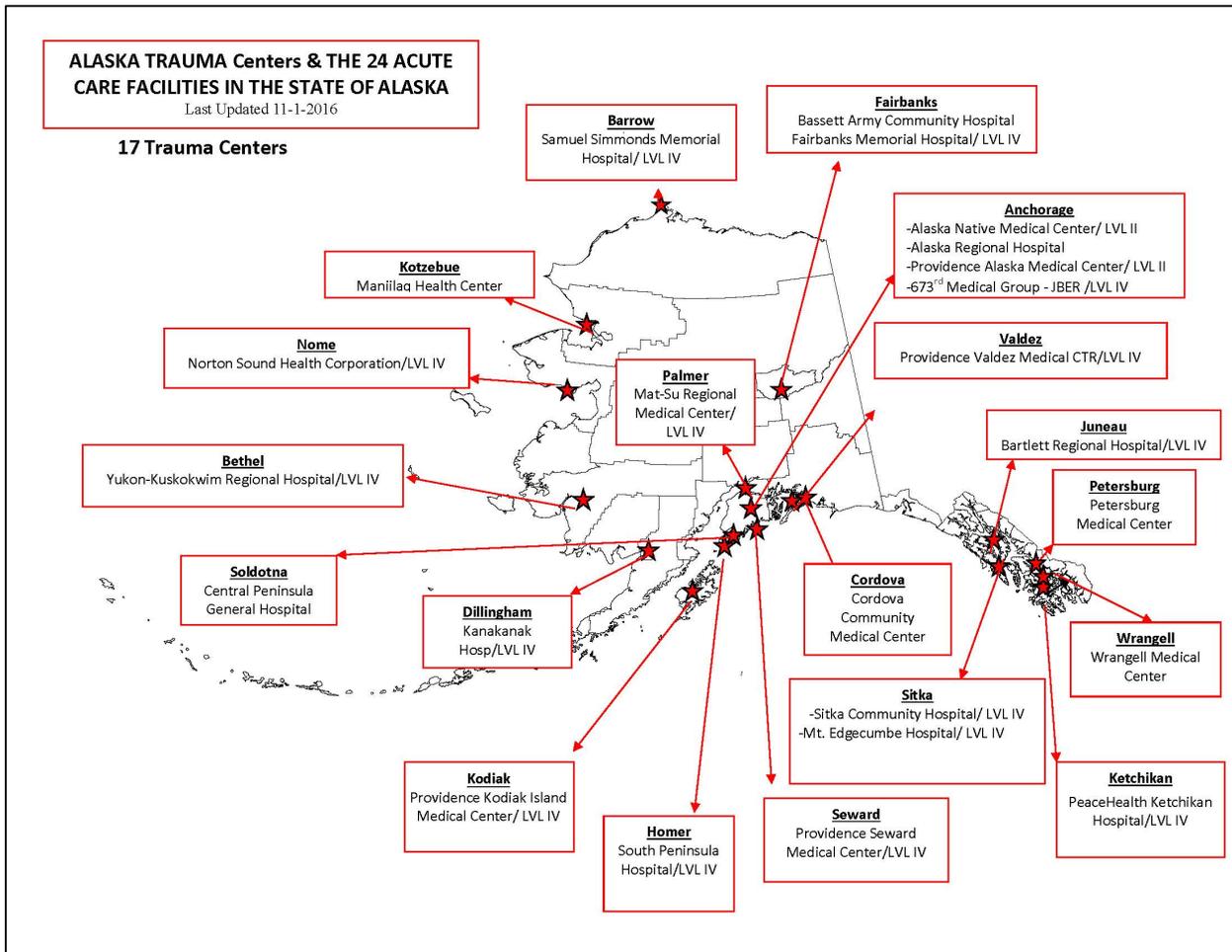
The locations of the designated trauma centers are shown in Figure 2 and Figure 3.

Figure 2: Hospitals in Alaska, With Trauma Status, 2016

Anchorage	Alaska Native Medical Center	2
Anchorage	Providence Alaska Medical Center	2
Juneau	Bartlett Regional Hospital	4
Dillingham	Kanakanak Hospital – BBAHC	4
Fairbanks	Fairbanks Memorial Hospital	4
Ketchikan	PeaceHealth Ketchikan General Hospital	4
Palmer	Matanuska-Susitna Regional Medical Center	4
Nome	Norton Sound Regional Hospital	4
Kodiak	Providence Kodiak Island Medical Center	4
Seward	Providence Seward Medical Center	4
Valdez	Providence Valdez Medical Center	4
Barrow	Samuel Simmonds Memorial Hospital	4
Sitka	SEARHC MT Edgecumbe Hospital	4
Sitka	Sitka Community Hospital	4
Homer	South Peninsula Hospital	4
Anchorage	673rd Medical Joint Base Elmendorf Richardson	4
Bethel	Yukon-Kuskokwim Delta Regional Hospital	4
Anchorage	Alaska Regional Hospital	Unspecified
Fairbanks	Bassett Army Community Hospital	Unspecified
Soldotna	Central Peninsula General Hospital	Unspecified
Cordova	Cordova Community Medical Center	Unspecified
Kotzebue	Maniilaq Health Center	Unspecified
Petersburg	Petersburg Medical Center	Unspecified
Wrangell	Wrangell Medical Center	Unspecified

Data Source: Alaska Trauma Center Designation Status 11-2016

Figure 3: Alaska Trauma Designation Map



Data Source: Alaska Trauma Registry Hospital Map, 2017

## Epidemiology of Injury

A comprehensive review of the epidemiology of injury in Alaska is found in the EMSC/SPROC Gap Analysis. For this Plan, the most important findings of the review are that rates of injury in Alaska are significantly higher than for the U.S. overall. These higher rates apply to most mechanisms of injury and racial groups.

## Understanding the Alaska Trauma System from Analysis of Registry Data

### *Overview of the Registry*

Alaska has an extraordinarily strong trauma patient registry. It is based on the participation of not only the two Level 2 trauma centers but also all the designated Level 4 trauma centers and all the non-designated hospitals. The system includes a comprehensive set of data fields. The individual who oversees the registry is highly skilled in understanding the data at source level and provides insightful analyses in a timely manner.

The data analyzed below is based on full-year 2016 data for patients meeting inclusion criteria. These data provide a vivid picture of the most challenging aspects of the Alaska system, including: (a) high incidence rate of injury — yet, because of relatively small total population, a relatively low volume of serious injury; (b) a distribution of significant numbers of life-threatening injuries throughout the vast geography; (c) strikingly long intervals from time of injury to definitive treatment; and (d) Level 4 trauma centers and non-designated hospitals handling notable numbers of the most seriously injured patients.



*Number of Patients and Severity of Injury*

The patient records in the registry for 2016 can be categorized as follows:<sup>1</sup>

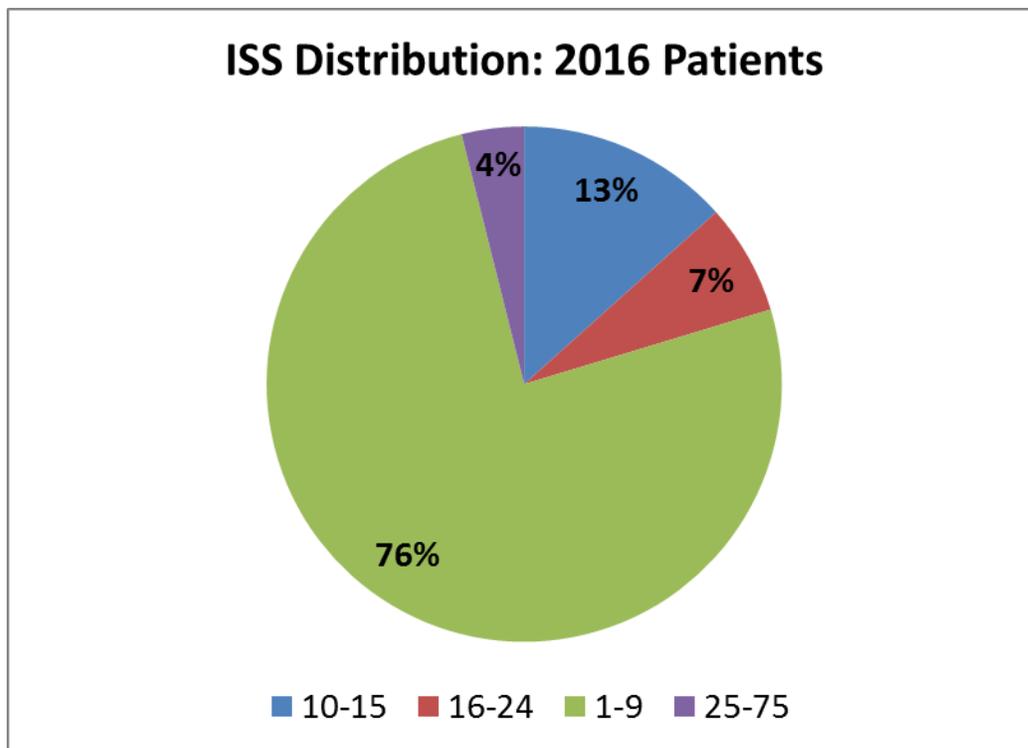
Figure 5: Patient Records in Registry, 2016

Clinic to First Hospital	407
Field to First Hospital	3,127
Hospital to Hospital	587
Total	4,121

*Data Source: Alaska Trauma Registry*

For nearly all patients in the registry, ISS information is provided. The distribution of ISS for all patients is shown in Figure 6. Eleven percent, or 427 cases, have ISS greater than 15 (7% between 16 and 24, and 4% greater than 25).

Figure 6: ISS Distribution, Statewide



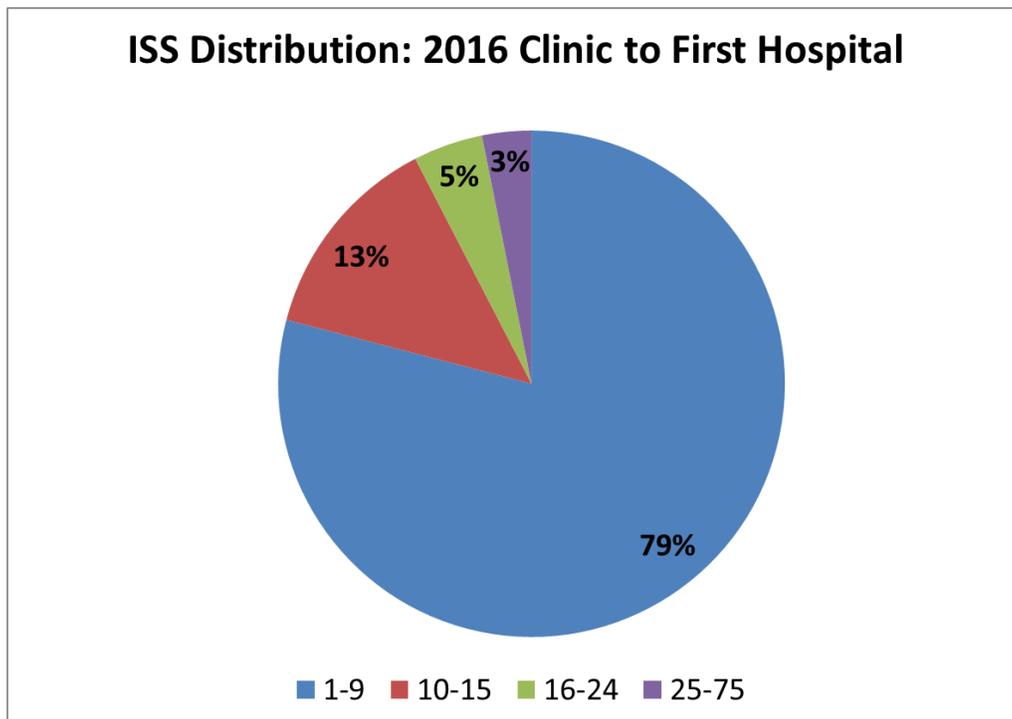
<sup>1</sup> This count includes patients more than once if they are admitted to one facility and then transferred to one or more hospitals. Thus, the data on volume in this report should be understood to be measuring patient encounters, not necessarily just unique patients.

To place this statewide figure in context, the ACS *minimum* volume for a *Level 1* trauma center is 240 patients with ISS greater than 15. This *minimum* is not required for Level 2 designation, but it is a reasonably good planning guideline as an *optimal* figure for Level 2 trauma centers. Since most patients with ISS greater than 15 should be treated at a Level 2 trauma center, a reasonable way to plan for the number of Level 2 trauma centers is to plan for those patients with ISS greater than 15.

Approximately 400 patients with ISS greater than 15 will be able to be transferred to a Level 2 trauma center. Thus, the best way to approach this 240 per trauma center target is to have two Level 2 trauma centers. If there were only one Level 2 trauma center, the volume would be 400 at that center — far greater than the guideline of 240. If there were three Level 2 trauma centers, there would be an average of 133 per trauma center. But with two Level 2 trauma centers, the average volume per trauma center would be 200, which is close to the guideline of 240.

Because of Alaska’s vast geography and sparse population, in many regions of the state even clinics receive very seriously injured patients. In 2016, 407 patients meeting registry inclusion criteria were brought to clinics. Those who were transferred from clinics to a hospital had a distribution similar to the statewide ISS distribution. This is shown in Figure 7.

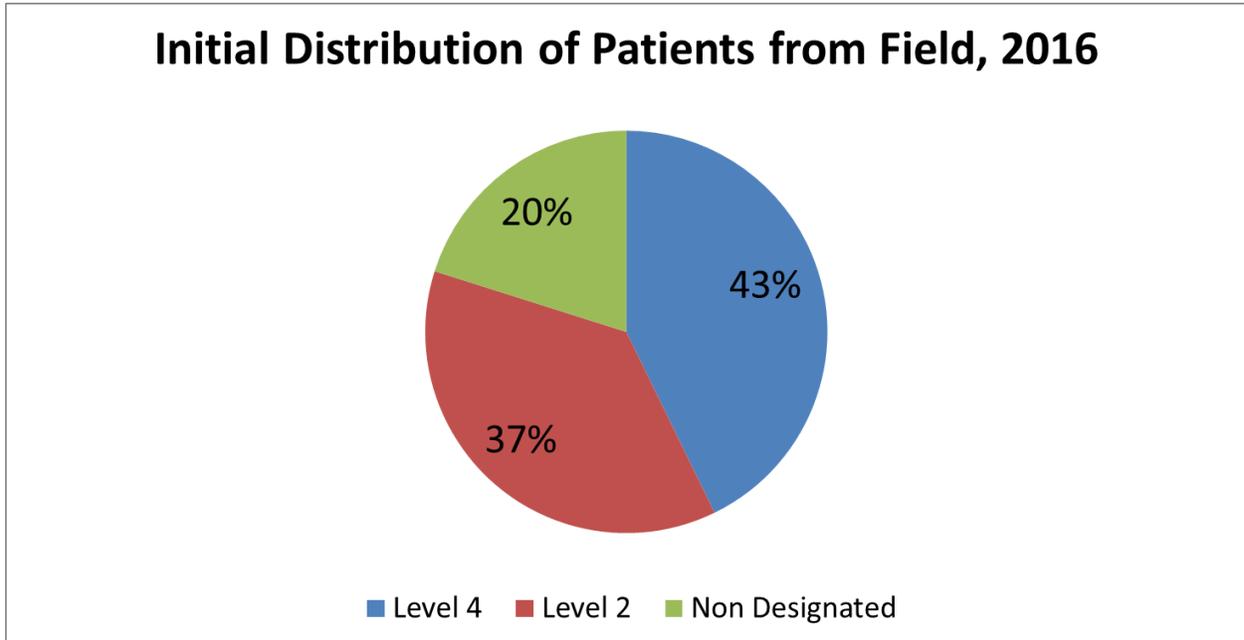
Figure 7: ISS Distribution Patients from Clinic to First Hospital



The following chart illustrates the initial destination of patients who meet registry inclusion criteria. Thus, it is evident how significant the Level 4 trauma centers are in the overall system. Because Level 4 trauma centers do not ever (or do not consistently) have the capability to

provide definitive trauma care, part of the challenge for improving the system is to either: (1) minimize time at Level 4 trauma centers before transfer, and/or (2) upgrade some Level 4 trauma centers to Level 3 trauma centers.

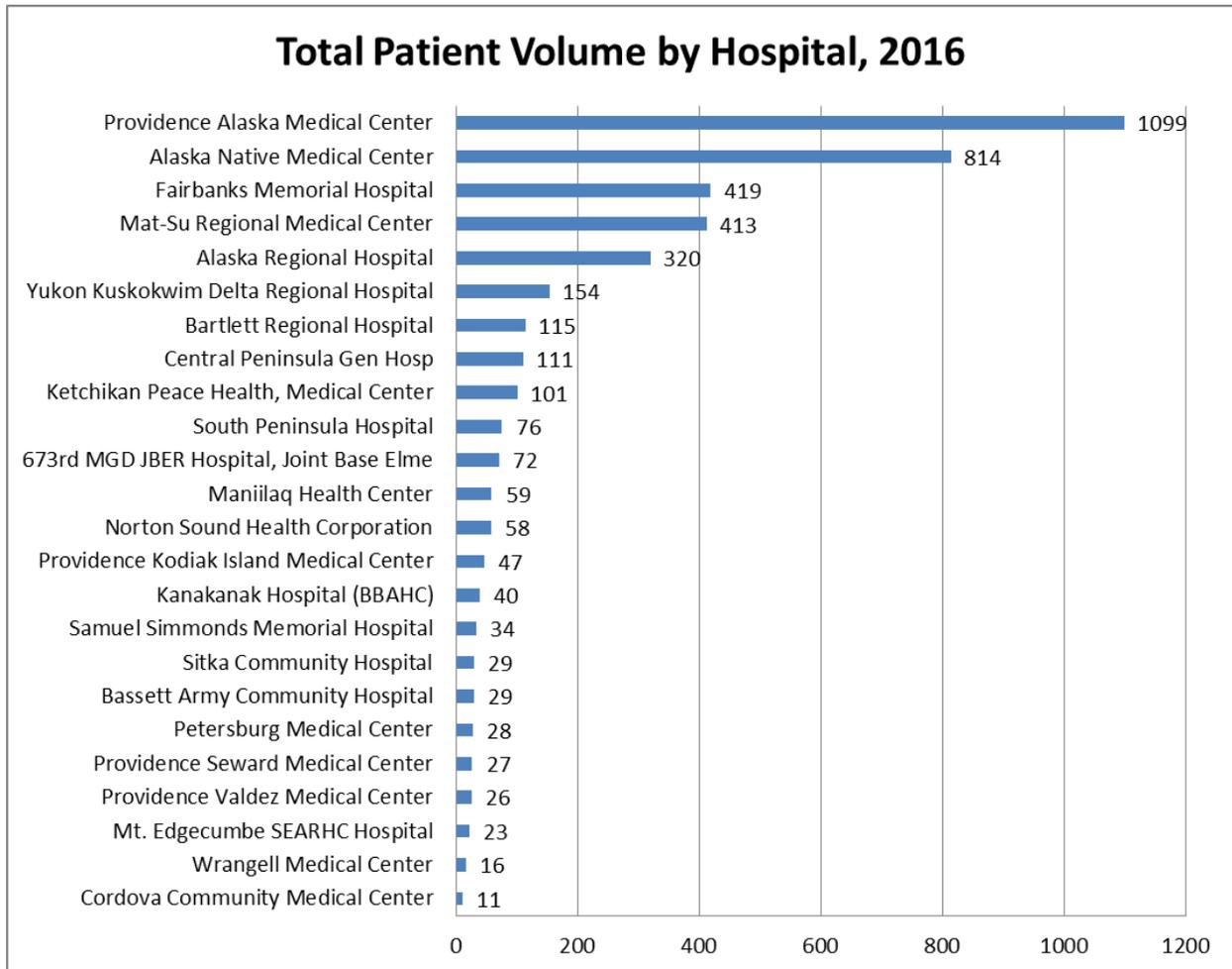
Figure 8: Initial Distribution of Trauma Patients from Field



*Volume by Hospital*

Total volume of trauma patients for all hospitals is shown in Figure 9.

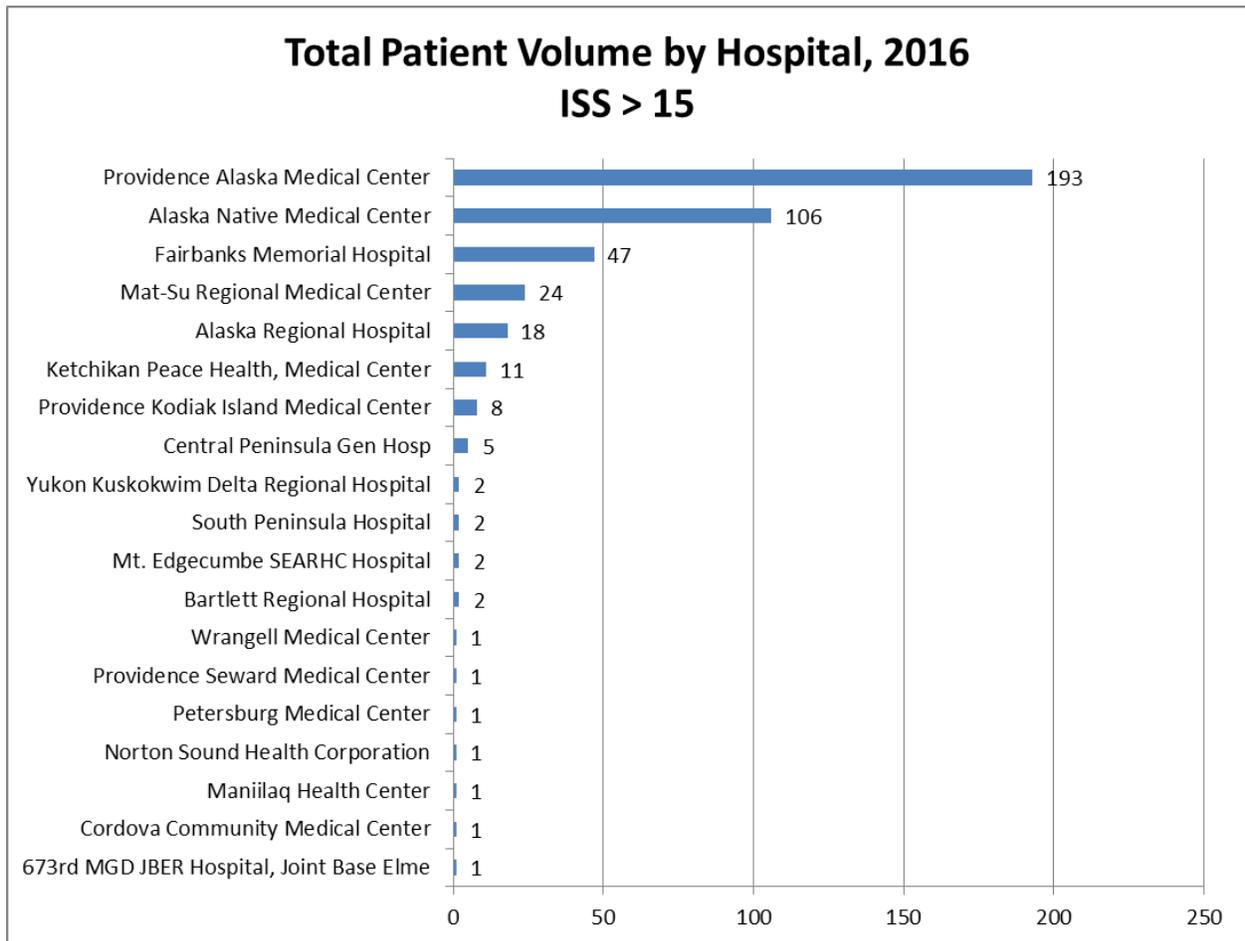
Figure 9: Trauma Volume by Hospital, 2016



The volume of patients with ISS greater than 15 (the most seriously injured patients) is shown across all trauma centers and non-designated hospitals in Figure 10. This is the group of patients for whom outcomes generally improve the most from prompt transport for definitive care in a Level 2 trauma center.

Providence Alaska Medical Center handles 193 patients or 45% of the patients with ISS greater than 15. The other Level 2 trauma center, Alaska Native Medical Center, handles 106 of these patients. Fairbanks Memorial Hospital and Mat-Su Regional Medical Center see 47 and 24 patients, respectively. Four hospitals (Providence Alaska, Fairbanks, Alaska Native and Mat-Su Regional Medical Center) account for approximately 87% of patients with ISS greater than 15.

Figure 10: Trauma Volume by Hospital, ISS Greater Than 15, 2016



Patient acuity for patients who are transferred from hospital to hospital is significantly higher than for patients who are triaged from the field to the first hospital. This basic relationship is as expected. This is because the primary group of patients who will be transferred from one hospital (typically a Level 4 trauma center or a non-designated hospital) to another (typically a Level 2 trauma center) will be those who need a higher level of care than the initial hospital can provide — and these will typically be higher-acuity patients; that is, patients with ISS greater than 15.

Figure 11: High Acuity Mix (Percentage of Patients with ISS > 15)

Hospital to Hospital	20%
Field to First Hospital	9%
Never Transferred from First Hospital (includes death, excludes Anchorage hospitals)	4%

*Significance of Clinics*

Clinics play an important role in the Alaska trauma system. In 2016, 407 patients met trauma registry inclusion criteria and were taken to clinics, of which 29 patients had ISS greater than 15 and 51 had ISS between 10 and 15. All 407 patients were transferred and admitted at a hospital, thus allowing these cases to be included in the Alaska Trauma Registry.

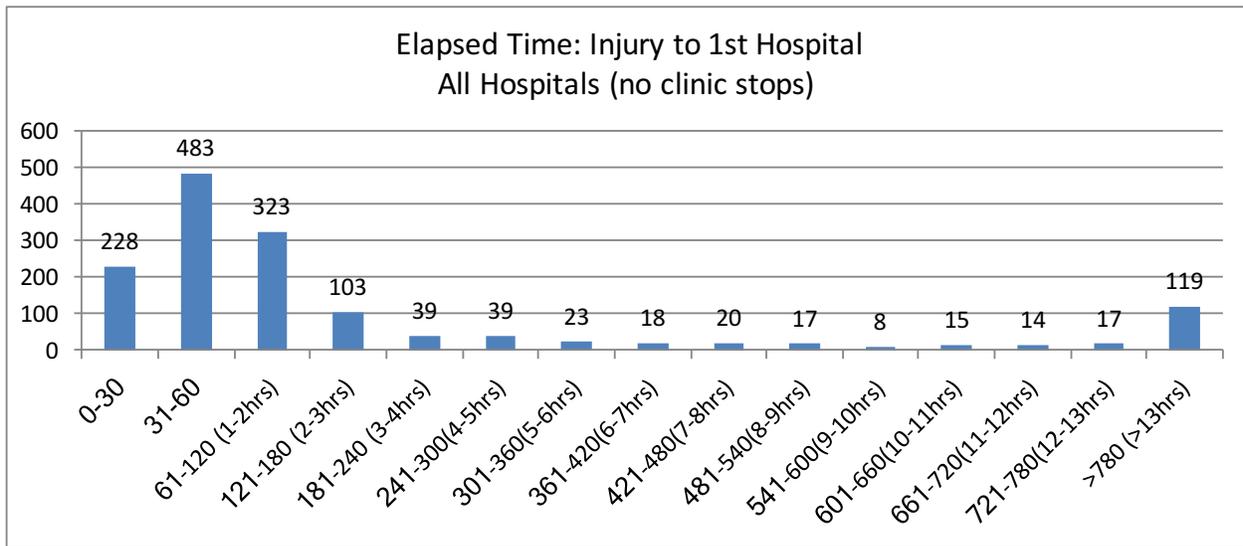
Figure 12: Injury Severity Score for Patients at Clinics and Transferred

ISS 1-9	302
ISS 10-15	51
ISS 16-24	17
ISS 25-75	12
ISS Blank	25
ISS Total	407

*Pre-Hospital Time*

The first analysis is for all patients whose initial treatment was at a hospital (includes all hospitals, regardless of designation level and patients who may have been whether they were subsequently transferred to a higher level of care). This group of patients is diverse. The group includes ground and air transport from urban, rural and bush Alaska to first hospital.

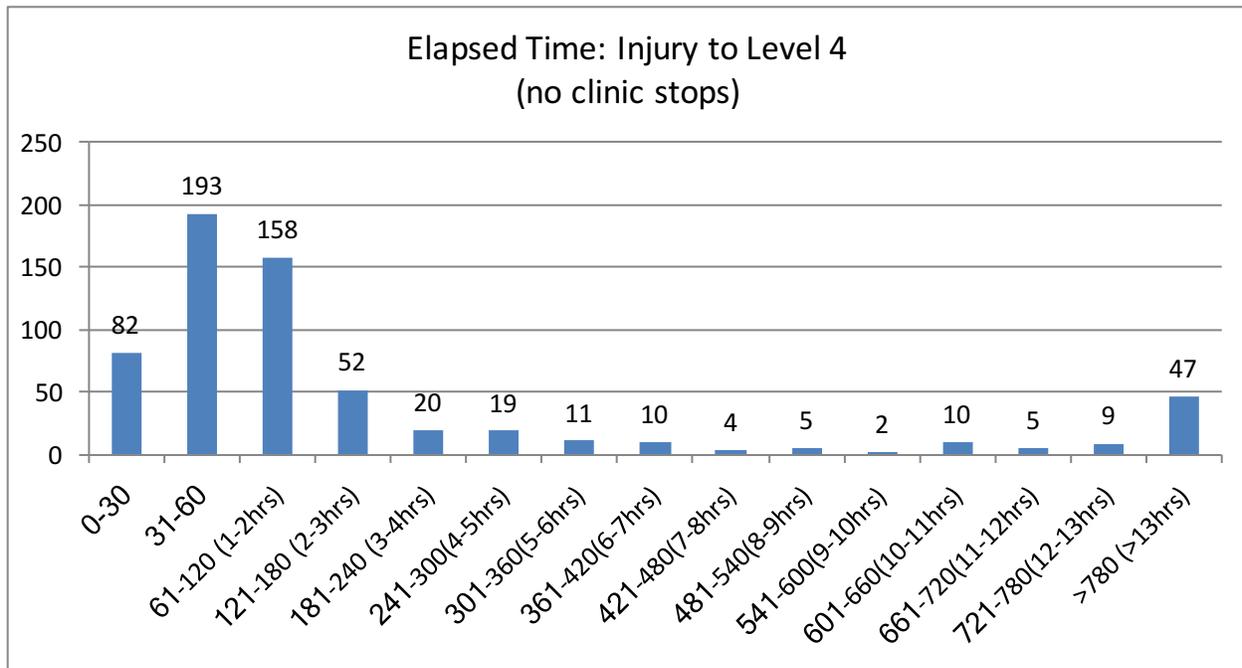
Figure 13: Elapsed Time from Injury to First Hospital



There were 1,466 such patients for whom time data were reported, or approximately four patients per day. Opportunities for improvement may be found for patients for whom transfer required more than two hours, which included 432 of the 1,466 patients, or 29%. Of those, an additional 290, or 20% of patients had times over four hours, and 165, or 11%, had times over 10 hours.

The next analysis focuses on the subset of patients who were taken to Level 4 trauma centers (without intermediate stops at clinics). Because this group is limited to Level 4 trauma centers, it reflects rural areas and small towns beyond Anchorage.

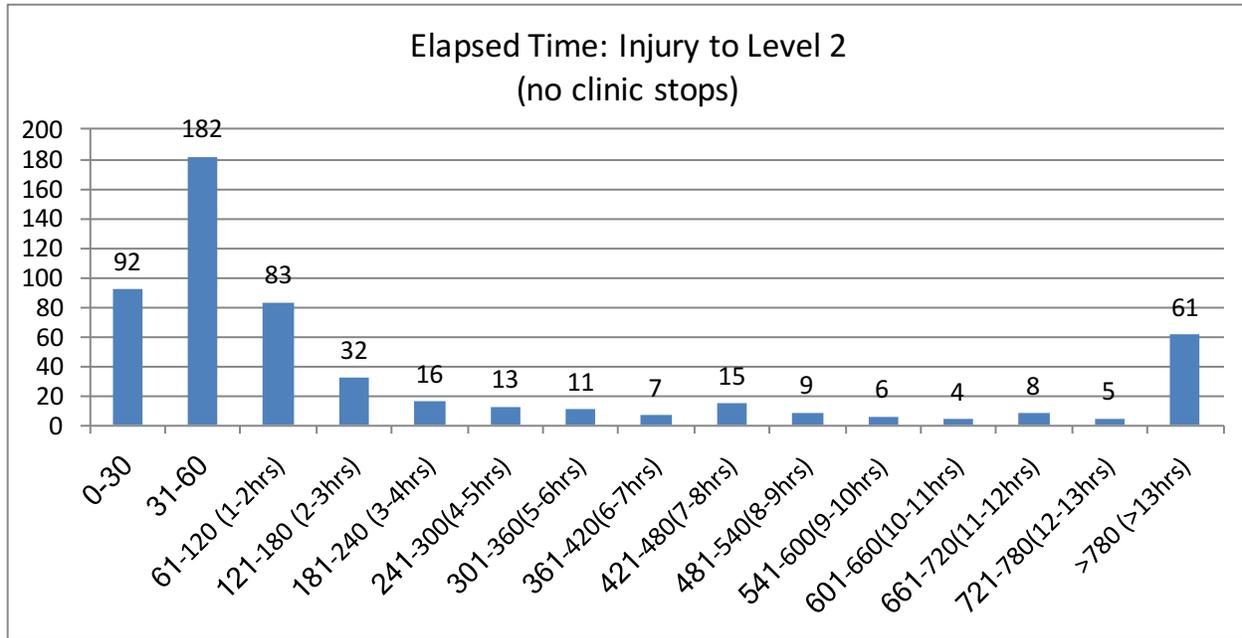
Figure 14: Elapsed Time from Injury to Level 4 Trauma Center



There were 627 such patients for whom there were times reported, or nearly two patients per day. Opportunities for improvement may be found for patients for whom transfers exceeding two hours, which included 194 of the 1,466 patients, or 31%. Of those, an additional 122, or 19%, of patients had times over four hours, and 71, or 11%, had times over 10 hours.

This chart focuses on the subset of patients who were taken to Level 2 trauma centers (without intermediate stops at clinics).

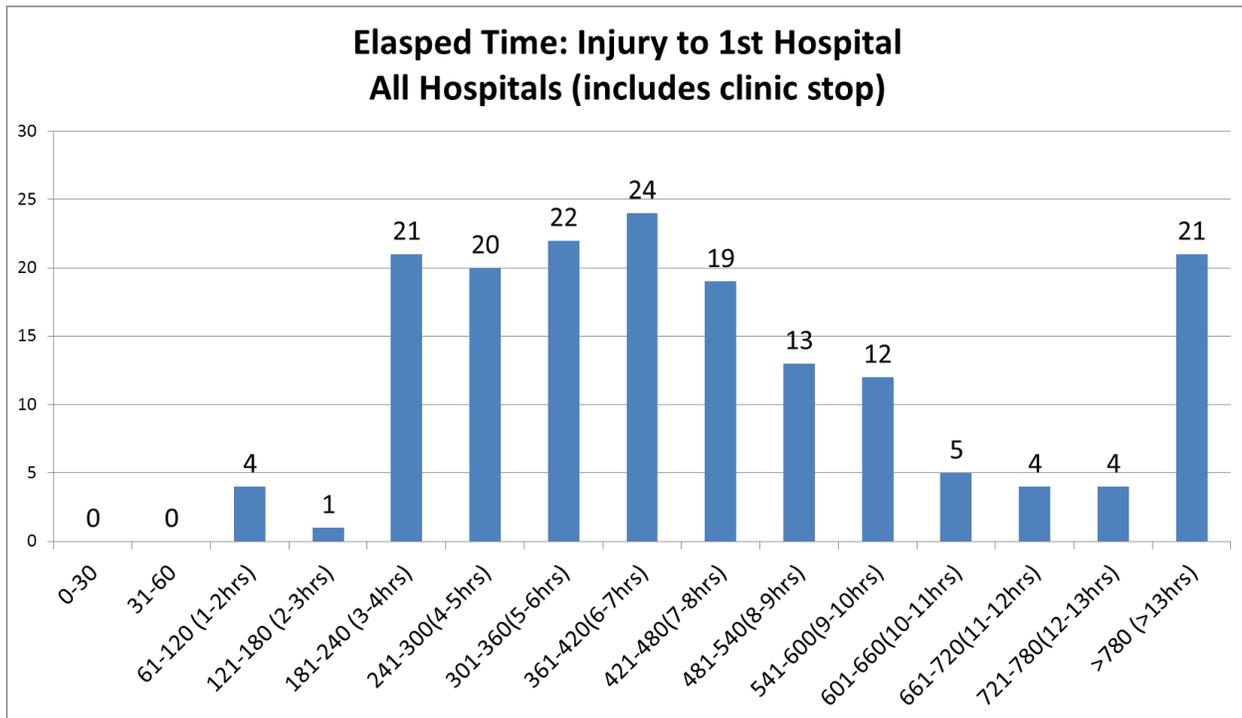
Figure 15: Elapsed Time from Injury to Level 2 Trauma Center



There were 544 such patients with the same basic pattern of long times (approximately 1.5 patients per day). Opportunities for improvement may be found for patients for whom more than two hours, which included 187 of the 544 patients, or 34%. Of those, an additional 139, or 25%, of patients had times over four hours, and 78, or 15%, had times over 10 hours.

The studies above exclude the patients who were taken to clinics before the first hospital. The next analysis focuses only on the patients who were taken first to clinics and then transferred to a hospital.

Figure 16: Elapsed Time from Injury to First Hospital

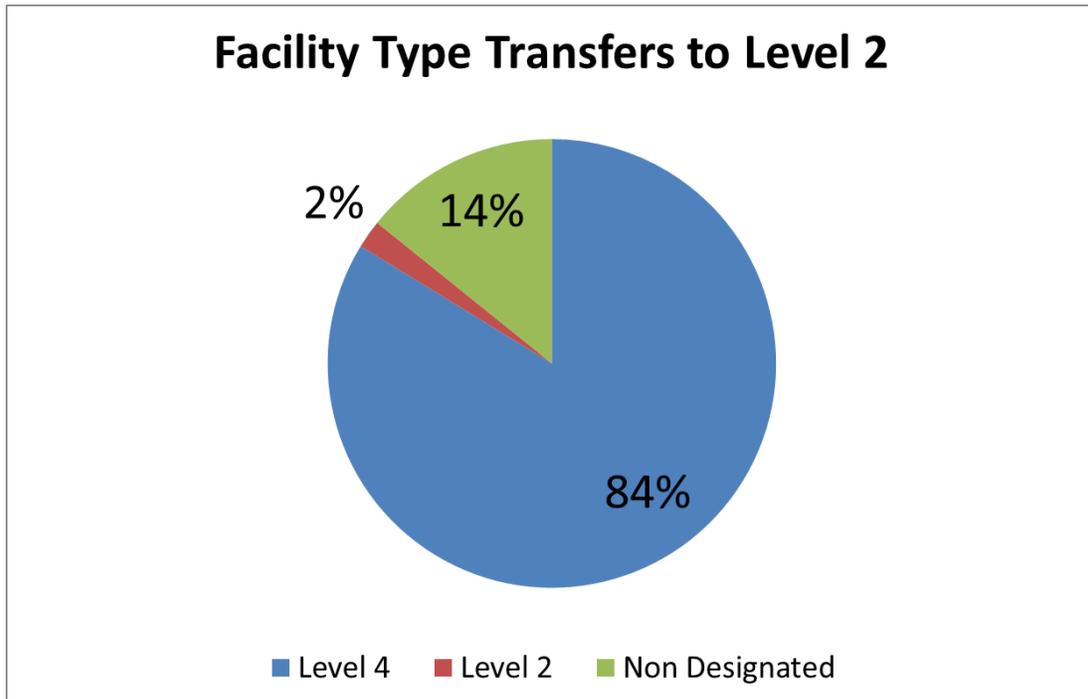


There were 170 such patients, or approximately one patient every two days. Opportunities for improvement may be found for patients for whom transfer required more than two hours, which included 166 of the 170 patients, or 98%. An additional 85% of patients had times over four hours, and 20% had times over 10 hours.

### *Transfers*

As would be expected, the great majority of transfers for high level of care were from Level 4 trauma centers. Facility type for transfers to Level 2 trauma centers is shown in Figure 17.

Figure 17: Transfers to Level 2 Trauma Centers from Type of Facility



The next analyses consider elapsed times for transfers from Level 4 trauma centers to Level 2 trauma centers. Figure 18 shows total elapsed time (including time at first hospital and transport time).

Figure 18: Elapsed Time from Level 4 Arrival to Level 2 Arrival

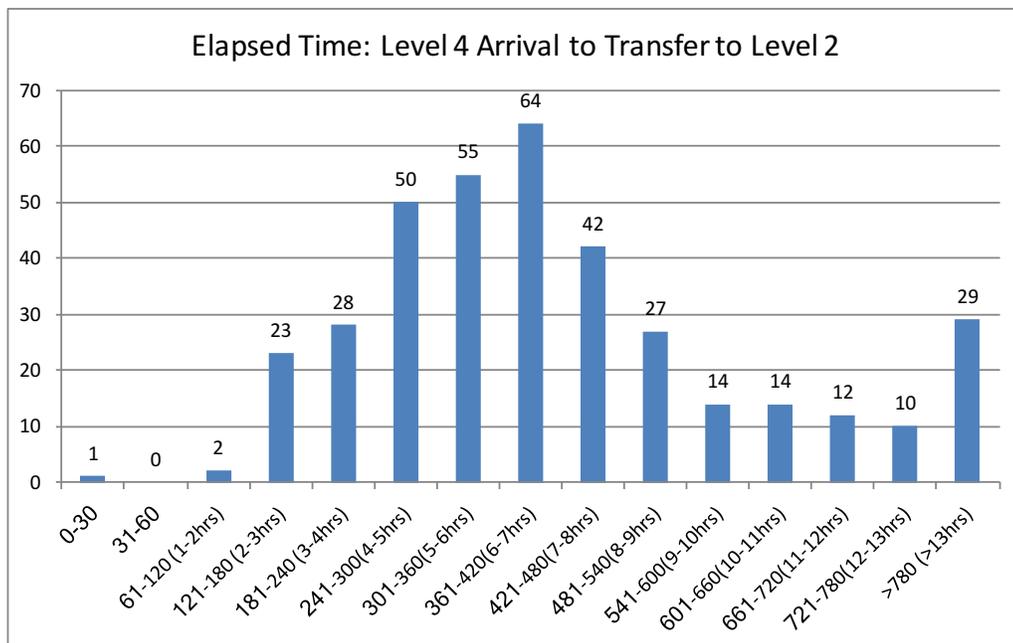


Figure 19 and Figure 20 show only time at the first hospital (excluding the transport time). These are times that reflect decision-making protocols and processes of care (including transport service activation).

Figure 19: Elapsed Time at Referring Hospital, All Transferred Patients

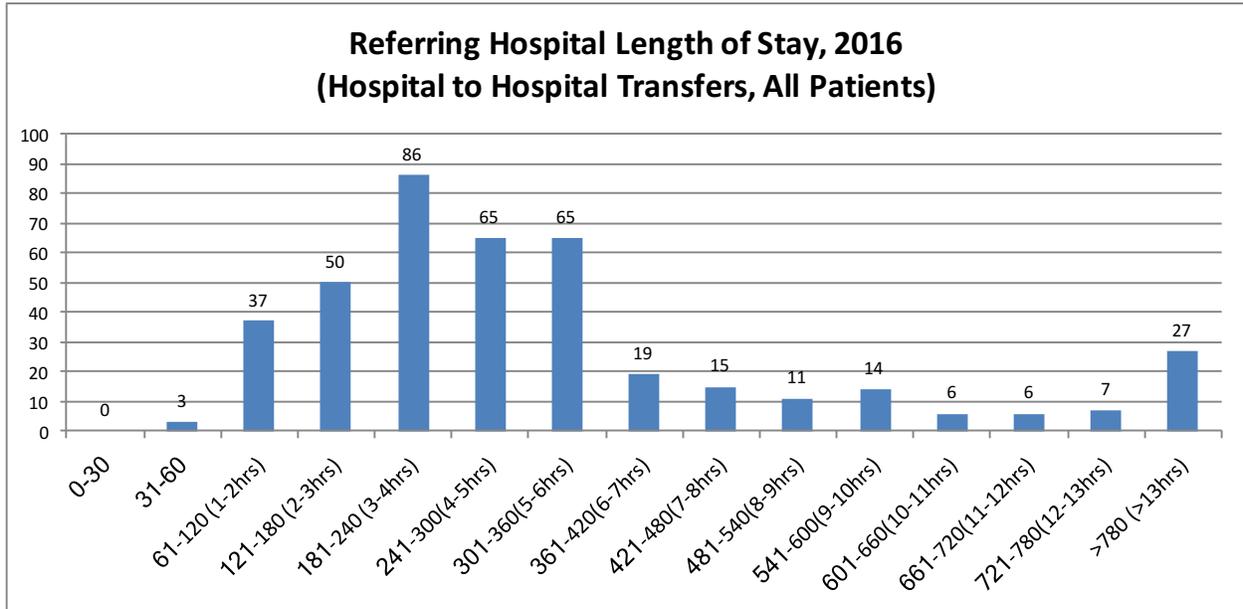
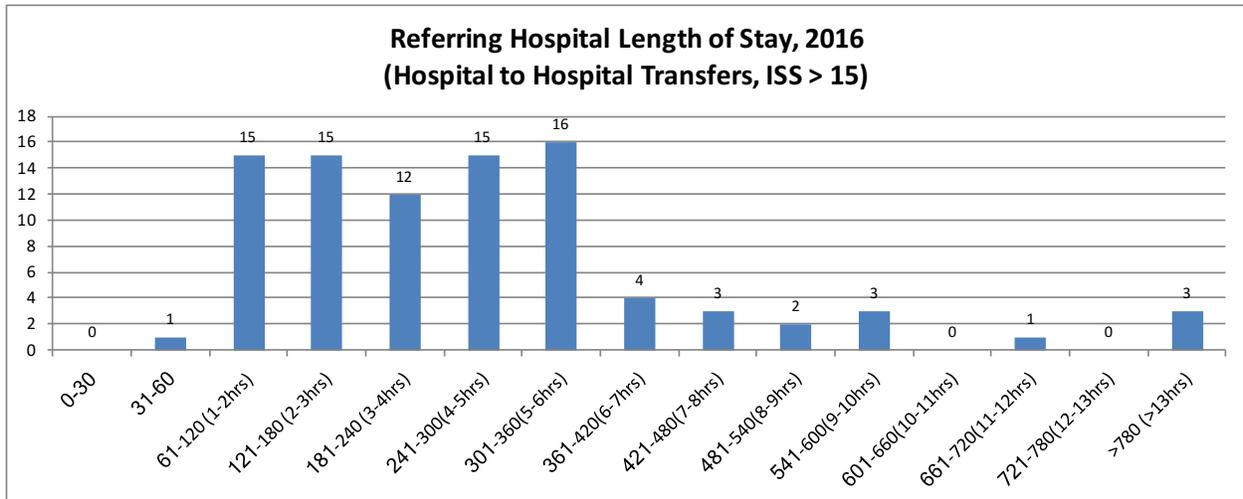


Figure 20: Elapsed Time at Referring Hospital, Transferred Patients with ISS > 15



Of greatest interest and concern are patients with transfer intervals greater than two or three hours. These thresholds come from the guidelines from the state of Washington:

- Two hours for those who have multiple injuries and a potential for deterioration
- Three hours for those who are stable with a limited chance of deterioration but still require inter-facility transport

Figure 21: Patients Exceeding Guidelines for Elapsed Time to Transfer

	% Greater Than Two Hours	% Greater Than Three Hours
All Transferred Patients	90%	78%
Transferred Patients ISS > 15	82%	34%

These data illustrate one of the most important opportunities for improvement: the opportunity to reduce delays at the first hospital for transport to a higher level of care.

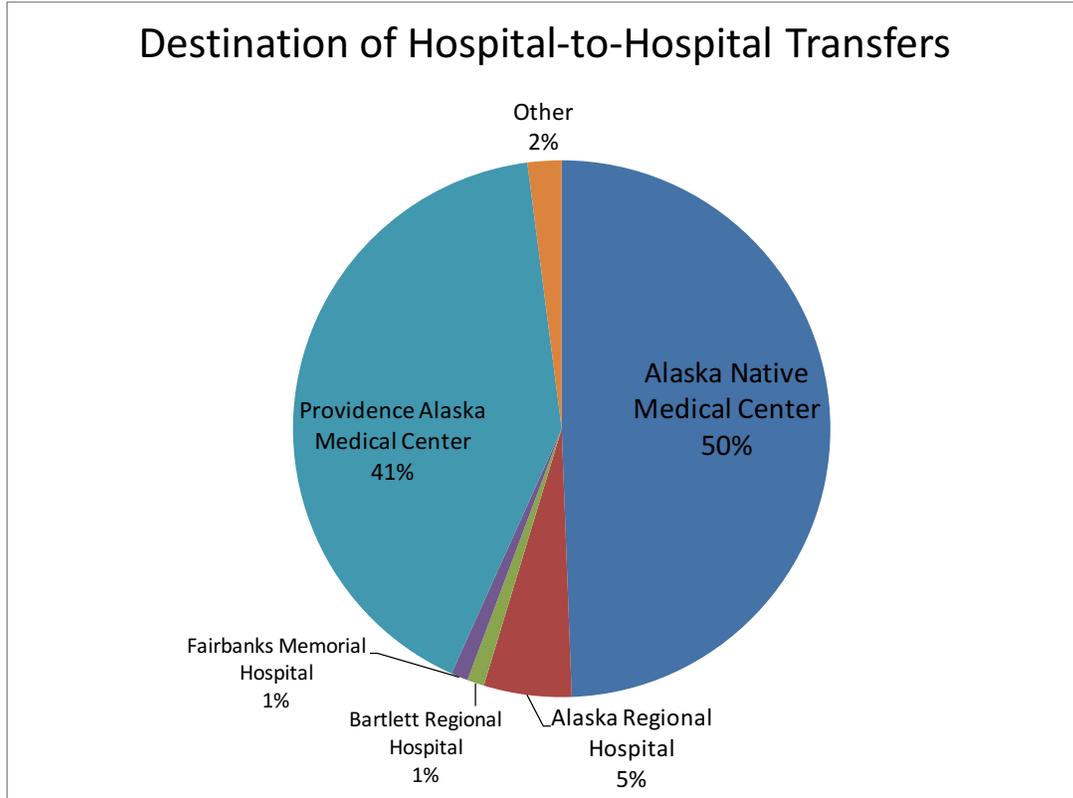
The fact that the time to transfer or re-triage so consistently exceeds the recommended maximum time is not caused by the typically long duration of transport. It is not known the factors that cause the long delay, but possible causes are: (a) the lack of statewide guidelines; (b) a lack of information on the consequences of delay; or (c) a belief that extended efforts at further evaluation or treatment might prevent the ultimate need to transfer. Nevertheless, it is important to recognize that the delays are being measured only on those patients who were ultimately determined to *require* transfer for higher level of care and the elapsed times exclude actual transport times.

These delays can be reduced significantly. Among the likely causes are:

- Very limited staff resources at many of the Level 4 centers, so a single critically injured patient can easily overwhelm staff and facilities, preventing prompt decision-making and transfer or re-triage
- Great distances for outbound and inbound transportation
- No formal guidelines for triage, re-triage and transfer, and no coordinated statewide communication function to handle launch of air medical services

The two Level 2 trauma centers are the primary destinations for patients transferred to a secondary hospital, with Alaska Native Medical Center accounting for a modestly higher proportion. For Alaska Native Medical Center, which sees fewer patients overall, the relatively high proportion of patients transferred in partially offsets its relatively small proportion of patients from Anchorage.

Figure 22: Destination Hospital for Transfers for Higher-Level Care



*Note: Data analysis is limited to the 24 acute-care hospitals in Alaska. Excludes transfers to Lower 48 states.*

Mode of Transport

The following charts illustrate the mode of transport for inter-facility referral.

Figure 23: Mode of Transport for Inter-Facility by Region

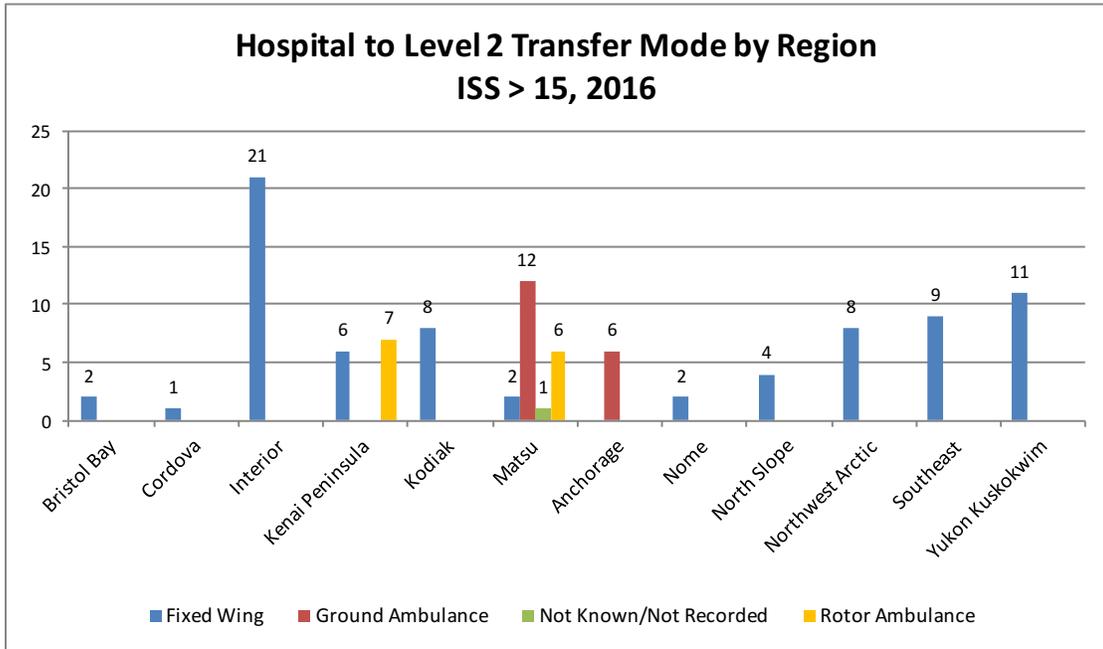
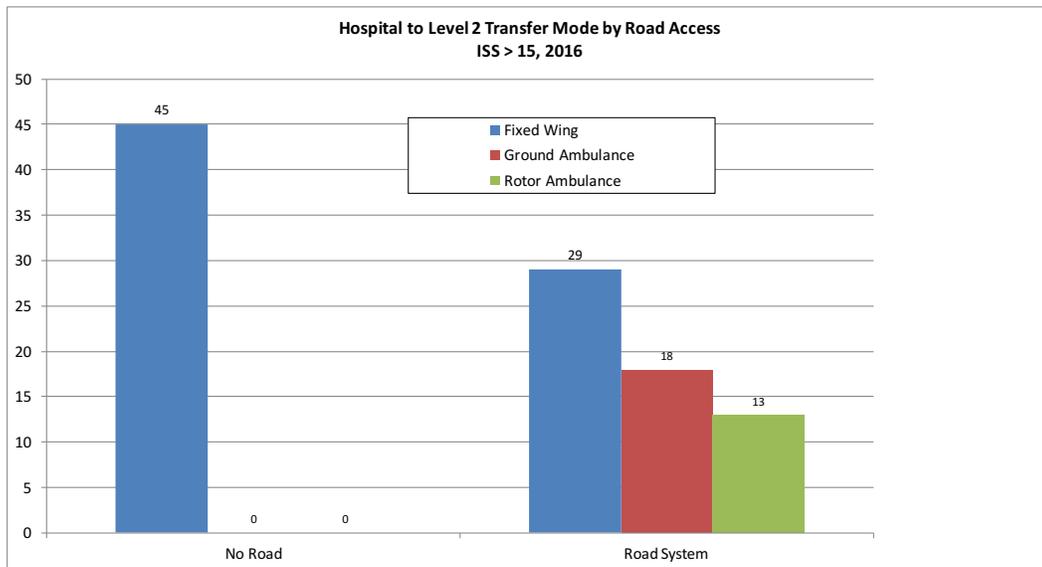


Figure 24: Mode of Transport for Inter-Facility by Road Access



This distribution of mode of transport appears logical and reasonable, with most transport for various distances. As discussed in other parts of the Plan, the key opportunity for improvement regarding inter-facility transport is more rapid transfer, particularly using the approach of auto launch with coordination of this response with field care and initial Level 4 hospital care.

Figure 25 developed by the largest air medical service in Alaska illustrates the one-hour response time range. Using this model, one-way flight times between key points within the state can be illustrated for two different classes of fixed-wing aircraft in Figure 26.

Figure 25: Map of Alaska Showing One-Hour Response Times

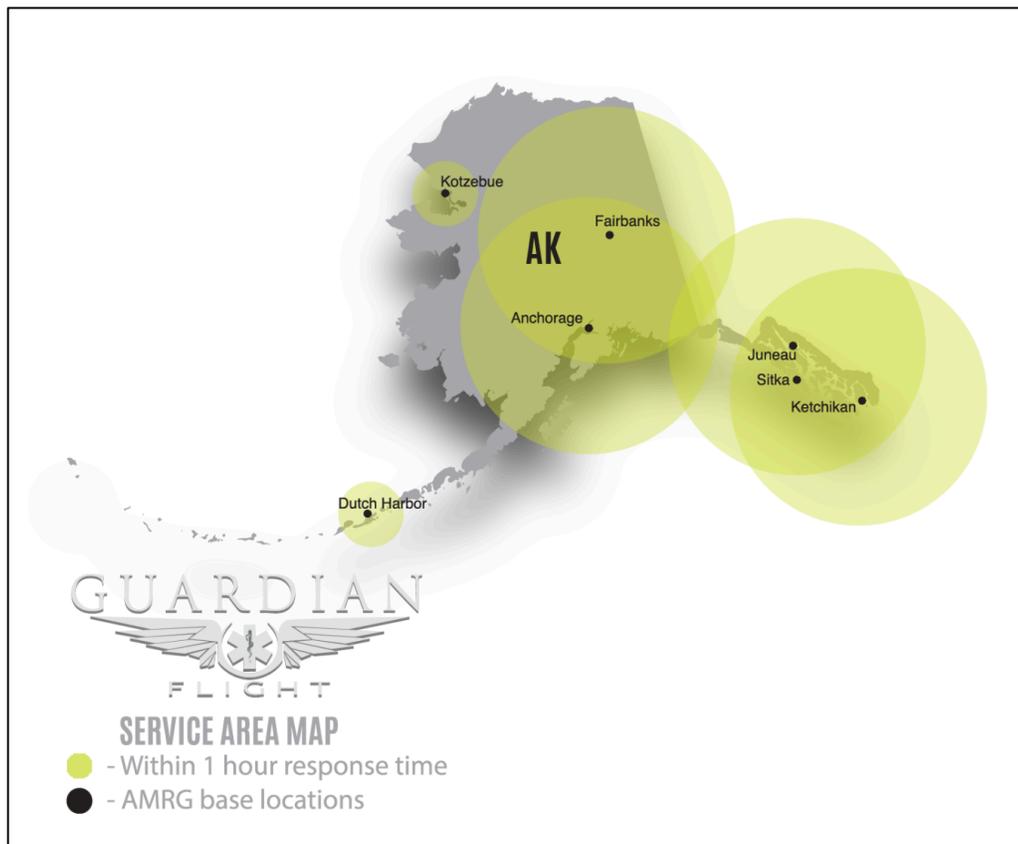


Figure 26: Distances and Flight Times

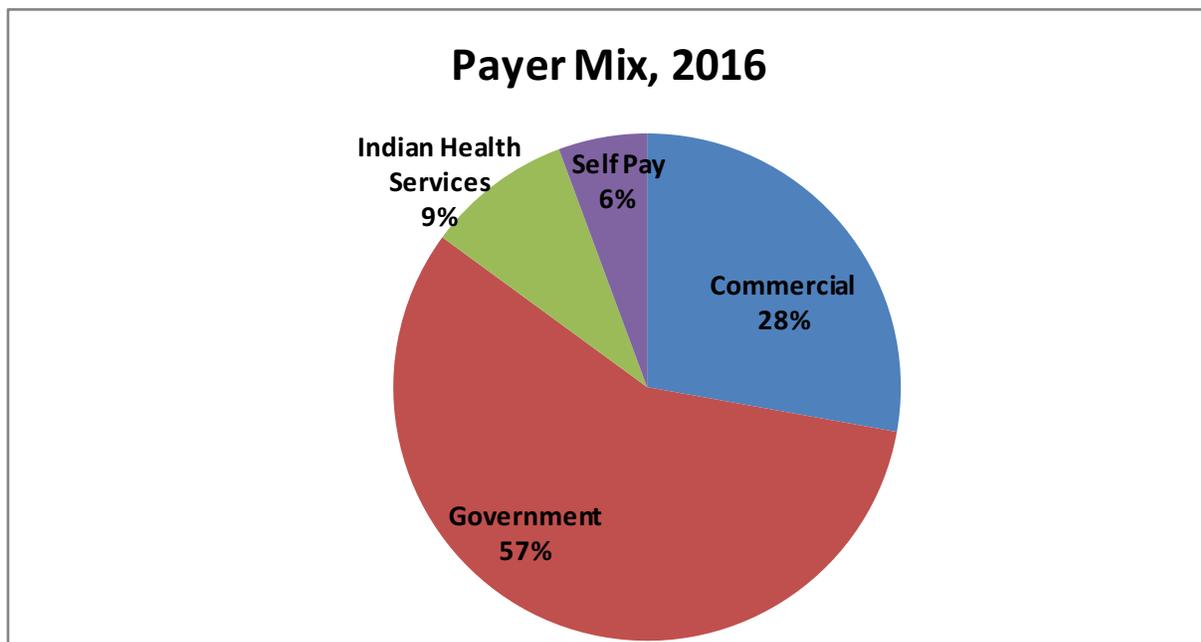
	Distance (nm)	Flight Time Twin Propeller at 312 kts Minutes	Flight Time Very Light Jet at 380 kts Minutes
Fairbanks to Anchorage	258	50	41
Fairbanks to Barrow	501	96	79
Fairbanks to Nome	520	100	82
Juneau to Anchorage	573	110	90

Data Source: Google Maps

*Payer Mix*

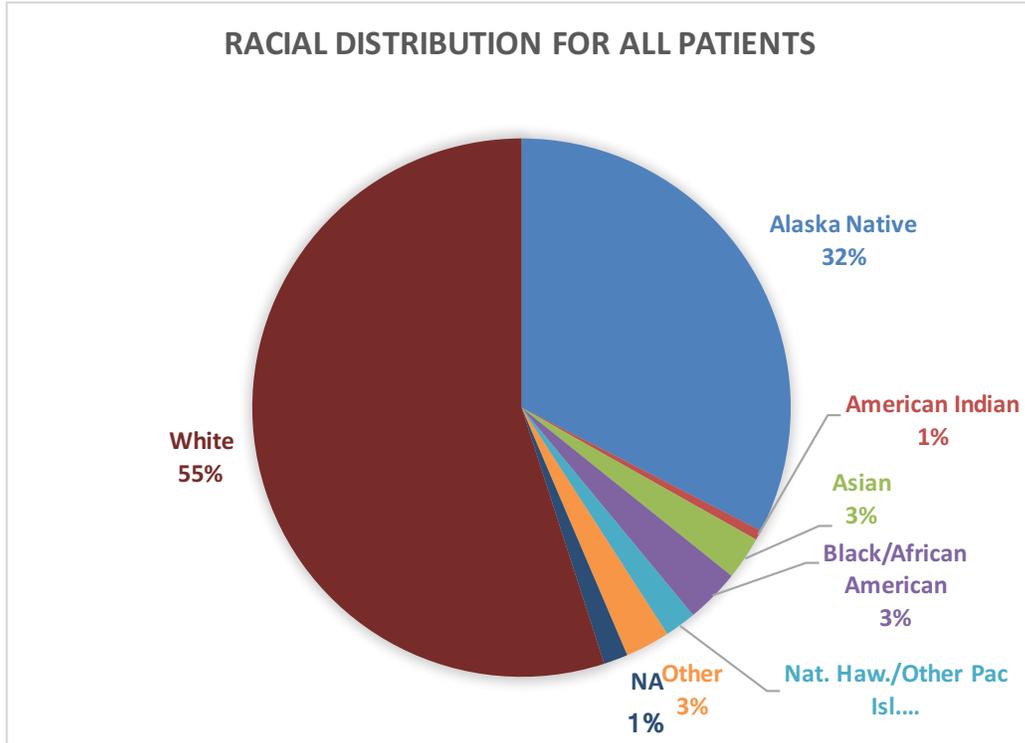
The following chart shows payer mix. The significance of payer mix for trauma system planning is that it is from the commercial insurance segment that hospitals, physicians and air transport providers can reasonably and fairly obtain premium rates of payment for services that can be used to finance improvements in the trauma center or broader trauma system.

Figure 27: Payer Mix for All Trauma Patients



Understanding racial distribution is important because of the tradition of a dual health care system in Alaska, where 32% of all trauma patients are Alaska Native.

Figure 28: Racial Distribution of Trauma Patients



Patients of all racial groupings are treated at all facilities, but the trauma system reflects a preference — reflecting the tradition of the dual health care system — for patients who are Alaska Native to be treated at Alaska Native Medical Center. At Alaska Native Medical Center, 96% of trauma patients are Alaska Native, while at Providence Alaska Medical Center, 6% of the trauma patients are Alaska Native.

The table that follows shows the Alaska Native proportion arrayed in descending order across all hospitals.

Figure 29: Alaska Native Population Trauma Patients by Hospital

Hospital	% Native Alaskan
Maniilaq Health Center	98%
Kanakanak Hospital (BBAHC)	98%
Yukon Kuskokwim Delta Regional Hospital	97%
<b>Alaska Native Medical Center</b>	<b>96%</b>
Samuel Simmonds Memorial Hospital	86%
Norton Sound Health Corporation	83%
Mt. Edgecumbe SEARHC Hospital	65%
Bartlett Regional Hospital	22%
Fairbanks Memorial Hospital	21%
Ketchikan Peace Health, Medical Center	21%
Providence Kodiak Island Medical Center	19%
Providence Seward Medical Center	19%
Wrangell Medical Center	13%
Providence Valdez Medical Center	12%
South Peninsula Hospital	9%
Cordova Community Medical Center	9%
Central Peninsula Gen Hospital	9%
Alaska Regional Hospital	8%
Mat-Su Regional Medical Center	6%
<b>Providence Alaska Medical Center</b>	<b>6%</b>
673rd MGD JBER Hospital, Joint Base Elme.	0%
Bassett Army Community Hospital	0%
Petersburg Medical Center	0%
Sitka Community Hospital	0%

### Implementation

The state and its trauma system have made good progress in improving the system, including implementing recommendations from the ACS and the Department’s gap analysis. At the same time, it is recognized that not all the recommendations have been implemented. A primary reason for this is that the Department and other parts of the trauma system (including the hospitals) have limited budget funding. It is not realistic to expect significant further progress (along with the recommendations in this Plan) without additional financial resources.

There are several practical sources for additional financial resources. The first is increased funding provided by the Alaska Legislature and governor to directly fund improvements in the trauma system. It is beyond the scope of this Plan to ascertain whether this is feasible within overall state financial constraints. The second potential funding source is private foundation grants. There is a reason to believe it may be feasible to attain these grants: Alaska poses the most significant trauma system planning challenge in the United States. One or more foundations interested in health care and emergency care may be attracted to support implementation of parts of this Plan on the basis that: "If trauma system planning can be optimized in Alaska, it can be optimized anywhere. The rest of the U.S. can learn from what can be achieved in Alaska." The third is to re-appropriate existing grants. The fourth is for trauma centers (and other providers such as physicians and air medical transport services) to obtain higher, more competitive rates of payment from commercial health plans.

#### *Coordinated Implementation of Recommendations from ACS and This Plan*

Even with the potential for new resources for the Department (from the sources discussed in this Plan), implementation of all remaining recommendations from the ACS plus the new initiatives recommended in this Plan will be impractical. For this reason, this Plan combines the highest-priority ACS recommendations that remain to be completed with the limited set of new initiatives from this Plan. If the Department can implement all the recommendations in this Plan within the three-year horizon, it will have addressed the highest-priority initiatives in both reports.

## 1. Trauma System Leadership

### Benchmarks for Trauma System Leadership

Trauma system leaders use a **process to establish, maintain, and constantly evaluate and improve** a comprehensive trauma system in cooperation with medical, professional, governmental and citizen organizations. This requires **strong state leadership**. The lead agency acts to protect the public welfare by enforcing various **laws, rules and regulations** as they pertain to the trauma system.

The most significant elements of a trauma system are the designation of the optimal number of hospitals as trauma centers at specified levels and the effective use of field triage and inter-facility transfer (re-triage) guidelines to get the right patient to the right facility in a timely fashion. For trauma system leadership to be effective, a lead agency needs to have the authority to implement those triage and transfer guidelines to optimize patient flow.

As shown in the analysis of registry data in the first section of this Plan, system performance shows two indicators that these objectives are not yet being reached. The most important step to optimize performance is to formalize the lead agency's authority for designating the optimal configuration of trauma centers and implementing those triage and transfer guidelines.

### Recommended Initiative for Trauma System Leadership

The Department of Health and Social Services should determine: (a) whether it has sufficient formal regulatory authority to implement trauma triage and inter-hospital transfer guidelines on a statewide basis; and (b) whether it has sufficient formal regulatory authority to limit the number of trauma centers at each level. If it does not have such authority, it should seek that authority from the governor and/or state Legislature.

### Recommended Initiative for Trauma System Leadership

Because of the size of the state and the unique challenges in triage, re-triage, transportation and definitive care across the large area, performance improvement activities should be conducted by three Regional Trauma Coordinating Committees (RTCCs) coordinating with the statewide Trauma System Review Committee (TSRC) and the Department.

## 2. System Development Operations

### HRSA Benchmark for System Development Operations

The state lead agency has a **comprehensive written trauma system plan** based on national guidelines. The plan integrates the trauma system with EMS, public health, emergency preparedness and emergency management. The written trauma system plan is developed in collaboration with community partners and stakeholders.

### Recommended Initiative for System Development Operations

This Plan and implementation of the recommended initiatives achieves this benchmark.

## 3. Trauma System Finance

### HRSA Benchmark for Trauma System Finance

The **financial** aspects of the trauma systems are **integrated into the overall quality improvement system** to assure ongoing “fine-tuning” and **cost-effectiveness**.

As discussed throughout this Plan, full implementation of the recommendations aimed at quality improvement will require additional financial resources. These resources will be required for upgrading Level 4 to Level 3, implementing triage and transfer guidelines, and accelerating quality monitoring.

### Recommended Initiatives for Trauma System Finance

The Department should consider pursuing the following four sources of funding to strengthen the trauma system and implement the recommendations in this Plan.

1. The Department should determine if it is politically practical to ask the Legislature and governor for increased direct public funding to improve the trauma system as provided in this Plan. If it is practical, then a formal request should be made. The Department advises that current law requires that even special funding sources (such as tobacco taxes or motor vehicle fines that many other states use to fund EMS programs) must stay within the general fund. However, it may be possible for the state to apply similar amounts to EMS programs such as trauma system improvements recommended in this Plan.

2. The Department should determine if one or more existing EMS grants can be re-appropriated to strengthen the trauma system.

3. The Department should pursue private grant funding to support certain initiatives in the trauma system (as defined in this Plan) in the areas of performance improvement, triage and

inter-facility guidelines monitoring and improvement, and emergency communications and transportation systems development. The case that should be made to the prospective private foundations can be: “Alaska presents the greatest challenge in the United States for trauma system design because of its vast geography and highly dispersed population. If trauma care can be optimized in Alaska, it can be optimized anywhere in the U.S. The rest of the U.S. can learn from what can be achieved in Alaska.”

4. Regardless of whether a proposal is made for increased public funding and whether there is success in obtaining private grant funding, the entire trauma system can benefit from increased reimbursement from commercial health insurance plans. Many hospitals in the U.S. do not obtain optimal reimbursement. The commercial health plans that operate in Alaska may need to do more to provide their fair share of support for needed improvements in the trauma system. Given Alaska’s unique challenges, it is inevitable that certain aspects of trauma care will involve premium costs. It is reasonable as a matter of public policy to expect these plans to share in some of these premium costs.

To this end, the Department should amend the terms of trauma center designation to require designated trauma centers to demonstrate that they have made reasonable efforts to optimize the rates of reimbursement secured from commercial health plans, as discussed in Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans. To the extent these efforts are successful, the Department should expect the trauma centers to apply the increased revenue to two uses: (1) amounts paid to the Department as designation fees by trauma centers; and (2) increased funding to trauma center programs. This program funding may include: (a) funding for injury prevention programs; (b) funding for trauma department activities in education and quality improvement focused on triage and inter-hospital transfer; (c) compensation paid to physicians to improve levels of physician coverage and response times; and (d) contracting with one or more fixed-wing air ambulances to be based in locations near Fairbanks and Nome to improve access for patients in the Interior, Southwest and Far North regions.

In many areas of the U.S., significant trauma center designation fees, particularly for Level 2 trauma centers, represent a significant source of EMS agency funding to operate and improve trauma systems.

#### 4. EMS System: Pre-Hospital Care and Triage

##### HRSA Benchmark for Pre-hospital Care and Triage

The trauma system is supported by an EMS system that includes communication, medical oversight, **pre-hospital triage** and transportation. The trauma system, EMS system and public health agency are **well integrated**.

The state has not implemented formal field triage guidelines. In Anchorage, the trauma centers have worked with the fire department to develop informal and voluntary field triage guidelines. The state has not adopted or endorsed these.

The two most important elements of a trauma system are, first, the designation of certain hospitals as trauma centers and, second, the promulgation of field triage and inter-hospital transfer guidelines to indicate which injured patients should be taken to which of the trauma centers (of various levels) and which should be taken to the non-trauma-center hospitals.

One of the most important initiatives called for in this Plan is development and implementation of formal field triage and inter-hospital transfer guidelines for the entire state. A preliminary set of guidelines is proposed below. These should be refined by the State Trauma Committee working through the three proposed regions to tailor the guidelines to the unique geography, resources and transport times of the three regions: Southeast, Southcentral and Bush (Southwest, Interior and Far North).

Particularly in the most remote areas of Alaska, it is not going to be clear how to handle a patient who could be referred to as a triage/transport bellwether patient:

This is a patient that meets standard physiologic trauma center triage criteria and is within one hour ground ambulance transport time to a Level 4 trauma center, but 700 miles (140 nm, 2.3-hour flight to a Level 2).

The decision to take this bellwether patient to the Level 2 trauma center has the benefit of speeding the time to definitive care.

The decision to take this bellwether patient to the Level 4 trauma center has the benefits of:

- Speeding the time to a hospital emergency service but delaying the time to definitive care, if definitive care is later found to be needed
- Avoiding the cost of over-triage

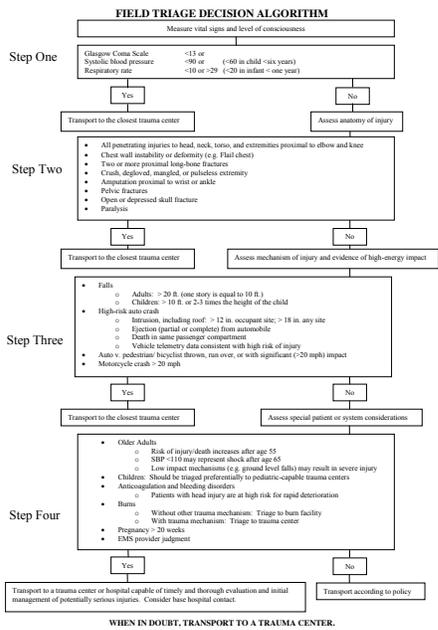
#### Recommended Initiative for Pre-hospital Care and Triage

The Department should adopt trauma triage guidelines. Pre-hospital provider and designated trauma centers should be required to adhere to these guidelines with monitoring.

Preliminary guidelines are shown below. These should be refined periodically by the committee based on analysis of registry data and the results from patient case quality reviews.

Moreover, these guidelines are intended to be generally applicable on a statewide basis; however, they should be tailored by the RTCCs for the unique characteristics of each of those three regions.

# Field Triage Guidelines



70% to 90% probability of life-threatening injury requiring definitive surgical care on an emergent or urgent basis

15 to 30% probability of life-threatening injury requiring definitive surgical care on an emergent or urgent basis

For special considerations and for air transport not feasible, apply judgement to choose between Level 4 and Level 2/3

## Triage Guideline

Ground/Air Time < 1.5 hours

Air Time 1.5 – 4+ hours

Direct to Level 2

Closest Level 2, 3 or 4 for planned re-triage to Level 2 with immediate dispatch air ambulance for **probable** transport to Level 2

Direct to Level 2

Closest Level 2, 3 or 4 for assessment and **possible** re-triage

To Level 4 always OK, if in extremis

Optimal implementation of these field triage guidelines (and re-triage guidelines), particularly from the most remote areas, will require a more aggressive use of an **auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care.**<sup>2</sup> The reduction in time from injury to definitive care at a Level 2 trauma center can be illustrated with the following comparative timeline for a “bellwether patient.”

This is a patient who meets standard physiologic or anatomic trauma center triage criteria and is within one hour ground ambulance transport time to a Level 4 trauma center, but 4–6 hours to a Level 2.

Figure 30: Comparison of Two Management Strategies:  
Auto Launch/Coordinated Response/Initial Level 4 Care versus  
Conventional Sequential Care

Time From Injury (Minutes)	Conventional Sequential Care at Level 4	New Approach	
		Auto Launch	Level 4 Care
0	PreHospital Provider Response		PreHospital Provider Response
15			
30	Field Care	Request Air Transport	Field Care
45			
60	Transport to Level 4		Transport to Level 4
75		Outbound to Level 4; 500 miles, 100 minutes	
90			
105	Level 4 Initial Care		Level 4 Initial Care
120			
135		Arrive at Remote Airport	Airport Transfer
150			
165	Request Air Transport		
180			
195			
210	Outbound to Level 4; 500 miles, 100 minutes		
225			Inbound to Level 2; 700 miles; 140 minutes
240			
255			
270	Airport Transfer		
285			
300			Airport Transfer
315			
330			
345			
360	Inbound to Level 2; 700 miles; 140 minutes		
375			
390			
405			
420			
435	Airport Transfer		
450			

Time Savings: 2.25 Hours

<sup>2</sup> An essential part of an effective auto-launch program is that requesting agencies and air medical ambulance providers understand that, in some instances, the air medical ambulance will need to be canceled if, and when, it is subsequently determined that the service is not appropriate. The cost of air medical ambulance operating prior to such cancellation is properly understood as a necessary cost of providing the service.

In this illustration, using the auto-launch-coordinated response/initial Level 4 care, the patient who meets the highest risk triage criteria receives definitive trauma center 2.5 hours sooner. This is such a significant savings in time to definitive care that it will almost certainly result in reduced mortality and reduced complications. Even for patients closer to a Level 2 than this bellwether patient, there can be significant reductions in time to definitive care using this strategy of **auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care.**

## 5. Transportation

### HRSA Benchmark for Transportation

The trauma system is supported by an EMS system that includes communication, medical oversight, pre-hospital triage and **transportation**. The trauma system, EMS system and public health agency are **well integrated**.

Scientific literature upon which to base guidelines about when to employ air transport instead of ground transport does not provide a professional consensus. However, a significant body of published research shows the benefits of air transportation. A review of this literature is shown in the section titled Appendix: References. This research literature is generally supportive of the several portions of this Plan that call for a more aggressive use of air transport, particularly using the auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care. At the same time, it is noted that not all studies show clear-cut benefits of all common uses of air transport; however, to the extent there may be some ambiguous findings from studies throughout the U.S., and given the extraordinary distances in Alaska and the large portions of the state without road systems, the benefits of air transport are even more clear.

Most studies of the benefits of air transport focus on whether it improves clinical outcomes. However, it is important to recognize that helicopter or fixed-wing transport of trauma patients from the field or for inter-facility transfers serves three purposes:

1. Reducing time to trauma center or high-level trauma center
2. Supplementing pre-hospital patient care staff
3. Preventing ground ambulances from being out of service while committed to a long transport

The benefit of preventing ground ambulances from being out of service while committed to long transports has not been evaluated in the research. For this reason, when pre-hospital staff face a “close call” about whether to call for air transport based on time considerations for the

subject patient, it is recommended that consideration be given to tilting toward air transport to preserve availability of local ground services for other patients.

#### Recommended Initiative for Transportation

Implement transportation guidelines providing for consideration of air transport when ground transportation time is one hour or longer. Refine this periodically based upon studies from the trauma registry and patient quality case reviews by the committee.

Expect approved air ambulance services to support the auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care in the same section. To the extent financial barriers to these developments may exist, the approved air ambulance services should be asked to pursue the strategies identified in the section in this report titled Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans.<sup>3</sup>

## 6. Communications

#### HRSA Benchmark for Communication

The trauma system is supported by an EMS system that includes **communication**, medical oversight, pre-hospital triage and transportation. The trauma system, EMS system and public health agency are **well integrated**.

As discussed in 4. EMS System: Pre-Hospital Care, decisions on triage destination, when to make inter-facility transfers and mode of transport involve a series of complex considerations. There is also a complex network of trauma centers, ground ambulances, and fixed-wing and rotor-wing air ambulances, each of which is dispatched and used based on local direction.

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<sup>3</sup> It may appear unusual for an EMS agency to establish expectations of trauma centers (and other providers) for optimizing its business relationships with commercial health plans. It is, however, appropriate for two reasons. First, in general, as indicated by the inclusion of a section on trauma system finance in the HRSA Model Trauma System Plan, assuring adequate financial resources is important. Second, in a trauma system with the unique challenges faced in Alaska, there is a direct public interest in developing a revenue stream sufficient to meet these challenges. Optimal rates of reimbursement from commercial health plans to trauma services providers (hospitals, physicians and air medical ambulances) is one of the most important sources of these resources.

## Recommended Initiative for Communications

Operate a single, 24/7 statewide dispatch center for trauma patients. Only such a center can know the status of resources, including air medical ambulances throughout the state, and can coordinate and optimize decision-making about how to apply the triage and inter-facility algorithm to determine the best destination and mode of transport. Because the U.S. Coast Guard State Coordination Center and the Rescue Coordination Center of the Air National Guard has good information of air assets, the single center should be developed in coordination with these agencies.

## 7. Acute-Care Facilities and Physicians

### HRSA Benchmark for Acute-Care Facilities and Physicians

**Acute-care facilities are integrated into a resource-efficient**, inclusive network that meets required standards and provides **optimal care** for all injured patients.

Currently there are 24 acute-care facilities in Alaska. In Anchorage, there are two Level 2 trauma centers, Alaska Native Hospital and Providence Medical Center, as well as one non-trauma center, Alaska Regional Hospital, that is requesting Level 3 consideration. Providence Medical Center is a Level 2 pediatric center, and Alaska Native is in the process of establishing a Level 2 pediatric center. There are 15 Level 4 facilities dispersed throughout the state. Three Level 4 centers may consider becoming verified as Level 3 centers in 2018: Palmer, Juneau and Fairbanks.

### Physicians

On a statewide basis, Alaska has a very solid supply of physicians. For the entire state, the physician supply (expressed as physicians per capita) is significantly *higher* than for the U.S. for all physicians (21% higher), primary care physicians (37% higher), specialist physicians (12% higher) and surgeons (28% higher). The geographic distribution of physicians including key surgical specialties may not be sufficient in certain areas to support an optimal trauma system. However, to the extent this is the case, there are be strategies to redeploy certain physicians.

The two communities of greatest need to confirm an adequate supply of surgical specialists are Fairbanks and Juneau. These two communities have Level 4 trauma centers and would benefit from upgrading these to Level 3. This would require at least two general surgeons and at least two orthopedic surgeons at each hospital.

Based on the supply of general and orthopedic surgery specialists in Alaska, the following table shows the nominal supply of these two specialties for Fairbanks and Juneau.

Figure 31: Physician Supply

		General Surgery		Orthopedic Surgery	
Supply Rate per 100,000, Alaska Statewide Average		11.08		10.77	
		Number of Physicians, Alaska Statewide Rate	Actual	Number of Physicians, Alaska Statewide Rate	Actual
Fairbanks Population	97,581	10.7	5 Near Fairbanks*	10.4	12 Near Fairbanks*
Juneau Population	31,275	3.4	4 at Bartlett Regional Hospital*	3.3	4 at Bartlett Regional Hospital*

These physician supply levels are sufficient to support the improvements in the configuration of trauma centers recommended in this Plan. Because the supply is not more than norms for the U.S. and Alaska overall, if there are not enough physicians in these key specialties who are interested in being part of the trauma service, it will be financially feasible to recruit additional physicians.

Two implications of Alaska’s higher supply of physicians compared to the U.S. average are seen in Anchorage, where there is an ample supply of physicians in key specialties for trauma. For example, there is significant specialty depth in tertiary fields such as trauma surgery, advanced trauma orthopedic surgery, neurosurgery, interventional radiology, and pediatric intensive care and surgery. This means that in Anchorage there is the capability to treat nearly all trauma patients within the state without having to transfer many patients to a Level 1 trauma center in Seattle (Harborview Medical Center). The only notable categories of trauma patients where transfer out of state is required are the more extensive burns and microvascular replantation. Second, with sufficient financial incentives, it may be possible to redeploy several of the Anchorage specialists to help staff developing Level 3 centers in Juneau, Fairbanks and Palmer.

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\* The figures for specialty physician supply in each of these communities are based on public sources and may not match the practical supply of regularly practices physicians in each of these communities.

## Hospitals and Trauma Centers

### Supply of Hospitals

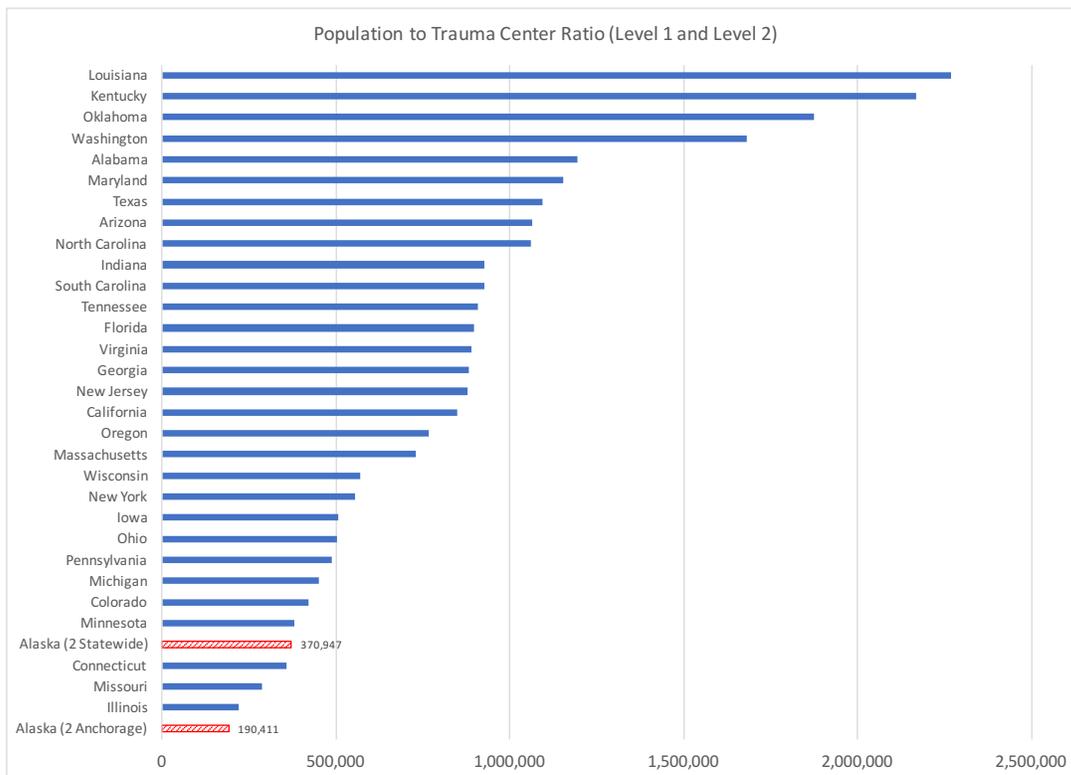
On a statewide basis, Alaska has a very solid supply of acute-care hospital beds that ranks in the middle of the range among the 50 states. Moreover, in Anchorage, the number of hospitals per capita is high relative to other urban areas in the U.S.

### Supply of Level 2 Trauma Centers

A widely-used indicator of trauma center supply is the ratio of population to trauma centers. Anchorage currently has two Level 2 trauma centers (Providence and Alaska Native), meaning the region in and around Anchorage has the highest supply of trauma centers of the 50 states. If the population of the entire state is considered, the ratio becomes slightly more moderate; however, Alaska remains at the low end of the population ratio. As will be discussed in the Plan section on trauma centers, this supply level means that significant caution should be exercised to avoid dilution of volume that could compromise quality.

The following chart illustrates the population to trauma center ratio for all 50 states.

Figure 32: Population to Trauma Center Ratio (Level 1 and Level 2)



With Alaska's low ratio of population to Level 2 trauma centers (190,000 calculated for Anchorage alone, 370,000 calculated for the state overall), there would be — in most state trauma planning work — a significant concern about volume at each trauma center being diluted to a level at which it may be difficult to achieve optimal quality. However, Alaska has a significantly higher incidence rate of injury, including life-threatening injury. As a result, the volume at each of the Level 2 trauma centers is higher than would typically be expected based simply on population levels.

At the two Level 2 trauma centers, the combined volume of inpatient admissions to the trauma services is approximately 2,287, with a total of 301 patients with ISS greater than 15. There is uneven distribution between the two centers. It is understood that the cause of the uneven distribution is the traditions of the dual health care system in Alaska. This Plan recognizes and respects these traditions but notes that trauma systems typically do not make this type of cultural and financial sponsorship distinction. The volume for each of the trauma centers is adequate for effective programs; however, from a system design perspective, there would be advantages of a distribution that is closer to even.

#### *Regulation of Number of Trauma Centers at Each Level*

The Alaska system is often described as inclusive, as is recommended by the ACS. Indeed, Alaska has one of the most inclusive trauma systems in the U.S. This is because a large proportion of the smaller hospitals participate in the system as Level 4 trauma centers. As a result, these smaller hospitals participate in the trauma registry data system and meet at least the minimum state standards for Level 4. In addition, each of the non-designated hospitals participates in the registry.

Refinement of the trauma system, however, may require clarifying what “inclusive” means in practical terms. Some stakeholders understand it to mean that any hospital that would like to serve as a trauma center at any specified level will be designated if it meets the designation requirements of the state and the ACS. A better definition of an inclusive system is one in which all hospitals play a role in caring for injured patients, but in which the trauma system authority limits the number of Level 2 and Level 3 trauma centers so that the fixed volume of the most seriously injured patients can be concentrated at Level 2 or Level 3 trauma centers.

In the U.S., only 11 of the 50 states have the statutory authority to regulate the number of trauma centers. In Alaska, there is no express statutory authority or trauma regulation to limit the number of trauma centers; however, the administrative agency advises that the DHSS commissioner has the authority to designate trauma centers in Alaska and that the commissioner can choose — based on advice from the advisory committee and based upon the needs of the community and the state — to decline to designate a trauma center even if it meets generally accepted designation or verification standards.

Alaska should consider updating regulations and/or statutes, if and as needed, to make more explicit the authority of the commissioner to limit the number of Level 2 and 3 trauma centers to assure adequate volume at existing Level 2 trauma centers.

The time horizon for this Plan is three years. This is enough time to implement recommendations related to clinics as Level 5 trauma centers and upgrade three Level 4 trauma centers to Level 3. It is also enough time to assess the impact of improvements in triage, re-triage, communications and transportation. These improvements will change patient flow and volume distribution. Some changes will increase volume at Level 2 trauma centers and other changes will decrease volume.

#### *Level 5 Trauma Centers*

##### Recommended Initiative for Acute-Care Facilities; Level 5 Trauma Centers

The Department should continue its efforts encouraging clinics to qualify to be recognized as Level 5 trauma centers. While this will not materially change patient flow, it will help these clinics standardize their resources and care processes in accordance with national standards. It will also help address the extremely long pre-hospital times for patients (as shown in the registry analysis above) who are taken first to clinics.

#### *Level 4 Trauma Centers*

##### Recommended Initiative for Acute-Care Facilities; Level 4 Trauma Centers

The five rural hospitals that are not designated as trauma centers should be encouraged to become Level 4 trauma centers. To the extent financial barriers to these developments may exist, these hospitals should be asked to pursue the strategies identified in the section in this report titled Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans.

#### *Level 3 Trauma Centers*

In three communities, the population is high enough to support upgrade from Level 4 to Level 3: Fairbanks, Juneau and Palmer. Although hospitals in these communities are designated as Level 4, it is understood that definitive care in general surgery and orthopedic surgery is at least sometimes promptly available. It is beyond the scope of this Plan to assess whether that surgical coverage is sufficiently comprehensive and responsive to meet Level 3 standards. If necessary, improved arrangements in coverage (and other resources for Level 3 designation) could be added so that these Level 4 centers could become Level 3 centers — reducing the number of longer-distance field triage transports to the Level 2 trauma centers and the number of secondary triage transports (that is, inter-hospital transfers).

Interviews with stakeholders indicate that a major hurdle for the Level 4 trauma centers that could become Level 3 trauma centers is the need to obtain commitments from general surgeons and orthopedic surgeons to respond promptly and consistently when needed. Obtaining these commitments typically requires increased compensation, which in turn may require new revenue sources to those hospitals.

The ground and air distances from those locations to the Anchorage trauma centers is as follows:

Figure 33: Distance to Native Alaska Regional MC or Providence Alaska MC

	Ground Distance	Air Distance	Transport Time by Most Appropriate Mode of Transport
Palmer: Mat-Su Regional	38 miles	41 miles	35 minutes (ground)
Fairbanks: Fairbanks Memorial Hospital	356 miles	258 miles	50 minutes (twin prop)
Juneau: Bartlett Regional Hospital	842 miles	496 miles	95 minutes (twin prop)

**Recommended Initiative for Acute-Care Facilities; Level 3 Trauma Centers**

Mat-Su Regional in Palmer, Fairbanks Memorial Hospital in Fairbanks and Bartlett Regional Hospital in Juneau should be encouraged to upgrade from Level 4 to Level 3 trauma centers. The challenges for accomplishing upgrades from Level 4 to Level 3 are assuring commitment by those hospitals and securing the required general surgery and orthopedic surgery coverage. A preliminary review of the supply of general surgeons and orthopedic surgeons indicates that there are sufficient physicians to support an upgrade. There are likely to be additional costs to meet Level 3 standards, including general surgery and orthopedic coverage. To the extent financial barriers to these developments may exist, these hospitals should be asked to pursue the strategies identified in the section in this report titled Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans.<sup>4</sup>

<sup>4</sup> It may appear unusual for an EMS agency to establish expectations of trauma centers (and other providers) for optimizing its business relationships with commercial health plans. It is, however, appropriate for two reasons. First, in general, as indicated by the inclusion of a section on trauma system finance in the HRSA Model Trauma System Plan, assuring adequate financial resources is important. Second, in a trauma system with the unique challenges faced in Alaska, there is a direct public interest in developing a revenue stream sufficient to meet these challenges. Optimal rates of reimbursement from

Alaska Regional Hospital could also become a Level 3 trauma center. Alaska Regional Hospital has the resource infrastructure and interest in serving in this role and currently sees approximately 369 trauma patients per year (18 with ISS greater than 15). It may also be consistent with a clause in the ACS report: “Mandate participation of all acute care hospitals in the trauma system within a 2-year time frame with trauma center certification or designation *appropriate to their capabilities* [emphasis added].”

There are two significant disadvantages to Alaska Regional Hospital becoming a Level 3 trauma center. Along with the reduction in volume at the two Level 2 trauma centers that would occur with the upgrading of the three Level 4 trauma centers, the upgrading of Alaska Regional Hospital would cause a further significant reduction in volume. The second disadvantage is that placing a Level 3 trauma center within a few miles of a Level 2 trauma center presents field triage dilemmas. For example, should a patient meeting mechanism-of-injury criteria be transported to a Level 3 that might be slightly closer than the distance to a Level 2?

Figure 34: Comparison of Distances; Potential Level 3 to Level 2 Trauma Centers

	Ground Distance
Anchorage: Alaska Regional Medical Center	3 miles
Palmer: Mat-Su Regional	38 miles
Fairbanks: Fairbanks Memorial Hospital	356 miles
Juneau: Bartlett Regional Hospital	842 miles

Thus, even though Alaska Regional Hospital has the resources to be a Level 3 trauma center, this would make no material improvement in access because the three hospitals are located within five miles of one another—so long as the two Level 2 trauma centers maintain closure and ambulance diversion rates for trauma at a very low level, such as below 1% on an aggregate basis (5% by hospital) —

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commercial health plans to trauma services providers (hospitals, physicians and air medical ambulances) is one of the most important sources of these resources.

*Level 2 Trauma Centers*

The ACS recommended two Level 2 trauma centers in Anchorage. Currently, Alaska Native Medical Center and Providence Alaska Medical Center are verified by the ACS as Level 2 trauma centers. As shown in Understanding the Alaska Trauma System from Analysis of Registry Data and in the charts below, volumes — total and ISS greater than 15 — at the two trauma centers are adequate for two effective Level 2 trauma centers.

Figure 35: Trauma Patient Volume by Hospital, 2016

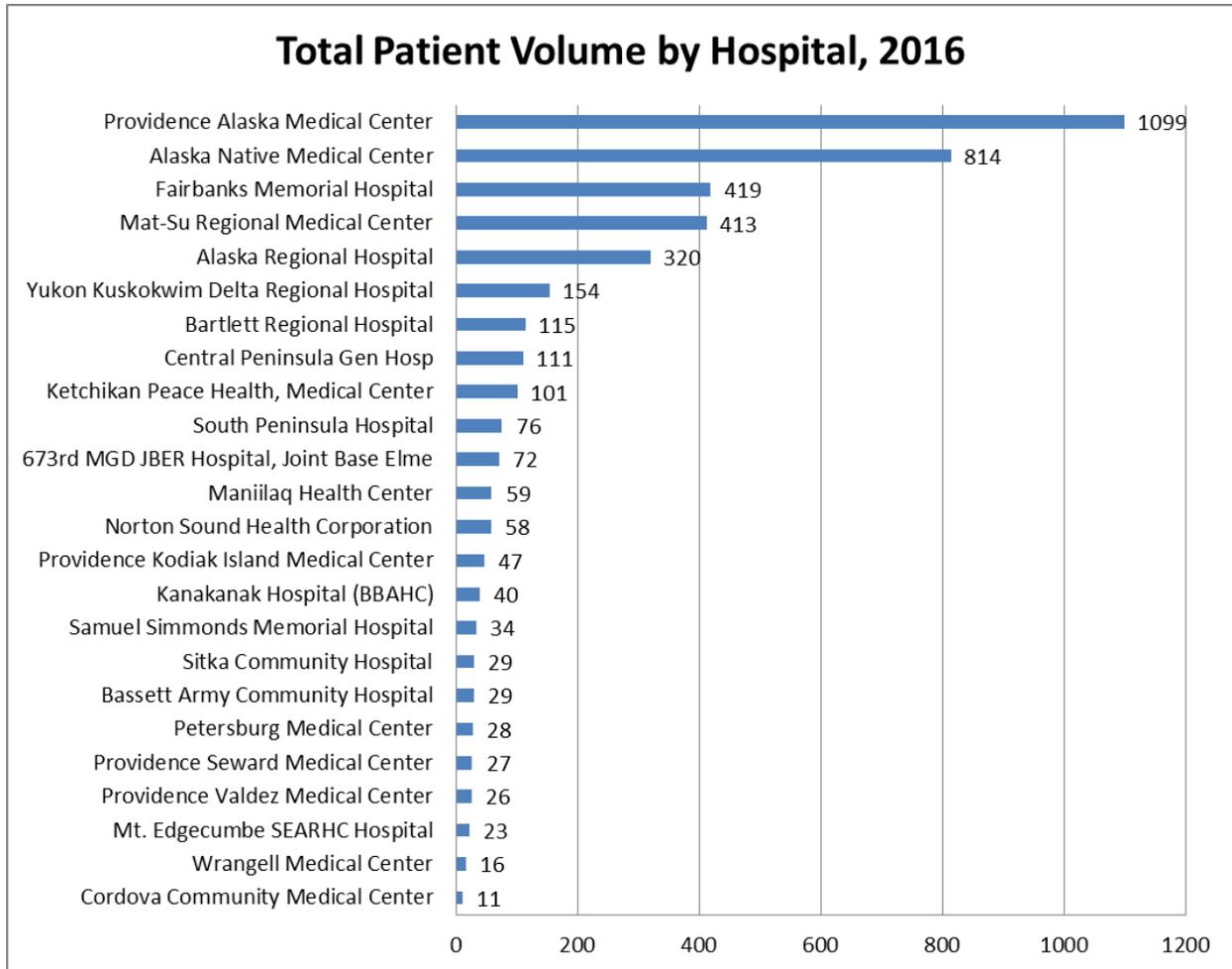
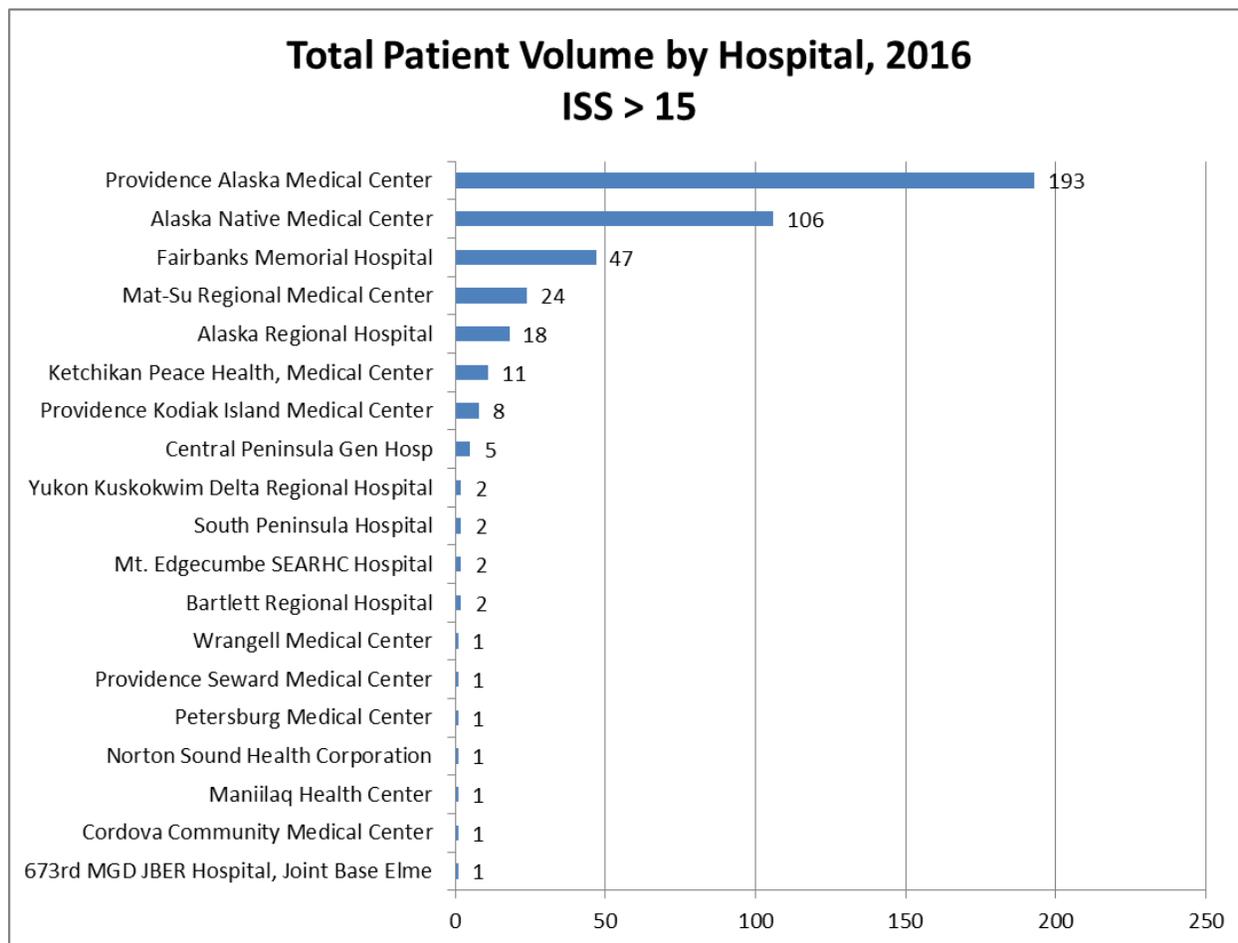


Figure 36: Trauma Patient Volume by Hospital, ISS > 15, 2016

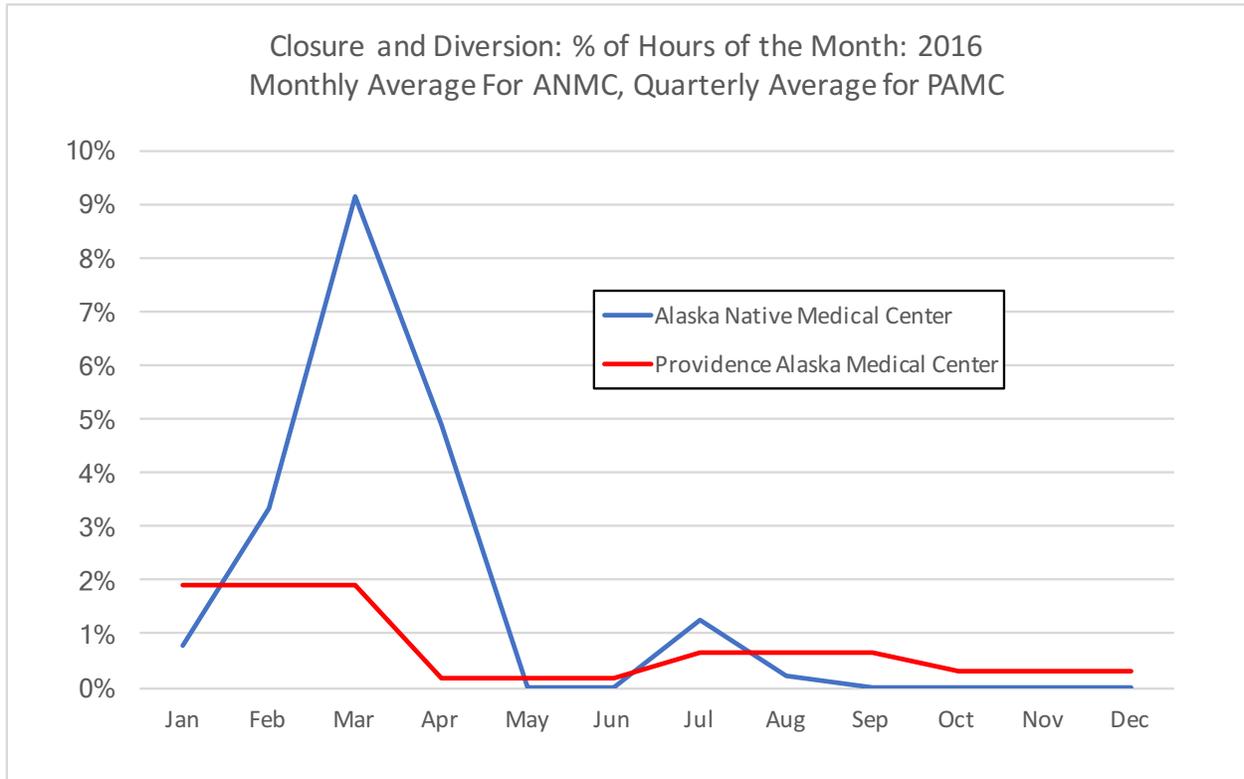


The volume of patients with ISS greater than 15 at Providence Alaska Medical Center approaches the minimum of 240 required by the ACS for a *Level 1* trauma center, which as discussed above is a reasonable target for planning a *Level 2* trauma center. However, volume for Alaska Native Medical Center (particularly the volume of 106 with ISS greater than 15) is such that a significant reduction in volume caused by changes elsewhere in the trauma system could dilute volume to a point where it would be difficult to maintain the highest quality and cost-effectiveness. That is one reason this Plan recommends maintaining the number of trauma centers in Anchorage at the current two, at least for the three-year time horizon of the Plan. Establishing a Level 3 trauma center in Anchorage would have the effect of such dilution.

The only system-driven basis to consider adding trauma center capacity in Anchorage would be if there were a distance-access problem or if ambulance closure and diversion is not kept at a negligible level. Closure and ambulance diversion rates for 2016 are shown in Figure 37.<sup>5</sup>

<sup>5</sup> During some quarters of the years 2012 to 2105, PAMC had rates between 8% and 23%.

Figure 37: Closure and Diversion Rates at Level 2 Trauma Centers



## Recommended Initiative for Acute-Care Facilities; Level 2 Trauma Centers

Maintain the number of Level 2 trauma centers in Anchorage at the current two and maintain the third hospital in a non-designated role for the three-year time horizon of this Plan. Allow completion of specific evaluation to measure the impact on volume associated with the changes in triage and transfer guidelines, transportation, and communication, and the upgrading of Level 4 to Level 3 trauma centers. Reassess configuration of trauma centers in Anchorage after the three-year time horizon for this Plan and the associated changes of Level 4 upgrades to Level 3 and changes in triage and transfer.

Require the two Level 2 trauma centers to keep their combined closure and diversion rate below 1% measured on a three-month rolling average basis. This can be achieved so long as each trauma center maintains its own diversion rate below 5% of the guideline recommended by the ACS. A trauma center with a higher rate can reduce it by increasing capacity, streamlining patient flow, changing diversion rules or coordinating with their “sister” trauma center to rebalance incoming volume. Consider designating a third trauma center in Anchorage if this rate cannot be achieved.

Also, expect the Level 2 trauma centers to pay a designation fee (as used in most other states) to help finance the new costs called for in this Plan for improvements in performance measurement, education and communications. To the extent financial barriers to these developments may exist, these hospitals should be asked to pursue the strategies identified in the section in this report titled Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans.<sup>6</sup>

## 8. Inter-Facility Transfer and Re-Triage

### HRSA Benchmark for Inter-Facility Transfer and Re-Triage

When injured patients arrive at a medical facility that cannot provide the appropriate level of definitive care, there is an organized and regularly monitored system to ensure the patients are **expeditiously transferred** to the appropriate, system-defined trauma facility.

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<sup>6</sup> It may appear unusual for an EMS agency to establish expectations of trauma centers (and other providers) for optimizing its business relationships with commercial health plans. It is, however, appropriate for two reasons. First, in general, as indicated by the inclusion of a section on trauma system finance in the HRSA Model Trauma System Plan, assuring adequate financial resources is an important part of a public trauma system plan. Second, in a trauma system with the unique challenges faced in Alaska, there is a particularly direct public interest in developing a revenue stream sufficient to meet these unique challenges. Optimal rates of reimbursement from commercial health plans to trauma services providers (hospitals, physicians and air medical ambulances) is one of the most important sources of these resources.

As shown in Understanding the Alaska Trauma System from Analysis of Registry Data (Transfers), current transfer times between Level 4 and Level 2 typically exceed recommended times by a very large margin.

#### Recommended Initiative for Inter-Facility Transfer and Re-triage

The Department should adopt inter-hospital transfer guidelines. Designated trauma centers should be required to adhere to these guidelines with monitoring by the Trauma Advisory Committee. Preliminary guidelines are shown below. These should be refined periodically by the committee based on analysis of registry data and the results from patient case quality reviews.

The Department should blend the best elements of its recently developed pediatric, head injury and rural transfer guidelines with the best of the guidelines developed by the State of Washington, which are shown below. Among the elements in the Washington guidelines that are recommended is the introductory section includes guidelines for maximum time before transfer of two and three hours (depending on severity).

The inter-hospital transfer guidelines (re-triage guidelines) should be coordinated and integrated with the field triage guidelines shown in 4. EMS System: Pre-Hospital Care and Triage and with the model of auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care in the same section.

As is the case for the triage guidelines, the inter-facility transfer and re-triage guidelines are intended to be generally applicable on a statewide basis; however, they should be tailored by the RTCCs for the unique characteristics of each of those three regions.

The Washington guidelines are broad, and because they are broad and call for the “decision to transfer being made rapidly,” are likely to result in more patients being transferred to Level 2 trauma centers or more rapid transfers. Similarly, implementation of the Departments guidelines for pediatrics, head injury and rural care are likely to result in more and more rapid transfers.

#### *Inter-Hospital Transfer Guidelines State of Washington*

##### Decision to Transfer

The **decision to transfer to the next higher level of care must be made rapidly** based on the physician’s assessment and clinical expertise. A trauma patient with multiple injuries who has a potential for deterioration must be transported as rapidly as possible with an emergency department length of stay (ED LOS) of **two hours or less**. Injured patients who are stable with a limited chance of deterioration but still require inter-facility transport should have an ED LOS of **three hours or less**.

*The decision to transfer to the next higher level trauma service must be based solely on the needs of the patient and not on the patient's or referring facilities connection to a preferred provider organization or managed care organization.*

### *Transfer Criteria*

*The following criterion includes examples of injuries and illnesses that may require inter-facility transport to a trauma service of equal or greater level of designation.*

#### *Physiologic Criteria*

- 1. Depressed or deteriorating neurologic status*
- 2. Respiratory distress or failure*
- 3. Requiring advanced airway management and/or ventilator support*
- 4. Serious cardiac rhythm disturbances associated with a traumatic event*
- 5. Status post cardiopulmonary arrest following a traumatic event*
- 6. Shock, uncompensated or responding inadequately to treatment*
- 7. Injuries requiring blood transfusion of two or more units of packed red blood cells (PRBC)*
- 8. High-risk obstetrical patient following a traumatic event*
- 9. Patients requiring any one of the following:*
  - a. Invasive monitoring (arterial and/or central venous pressure)*
  - b. Intracranial pressure monitoring*
  - c. Central venous pressure or pulmonary artery monitoring*
  - d. Unresponsive or prolonged vasopressors administrations*
  - e. Treatment for severe hypothermia or hyperthermia*
  - f. Treatment for renal failure, acute or chronic requiring immediate dialysis*

#### *Anatomic Criteria*

- 1. Fractures and deep penetrating wounds to an extremity complicated by neurovascular or compartment injury*
- 2. Fracture of two or more major long bones (such as femur, humerus)*
- 3. Fracture of the axial skeleton*
- 4. Spinal cord or column injuries*
- 5. Traumatic amputation of an extremity with potential for replantation*
- 6. Head injury when accompanied by any of the following:*
  - a. Cerebrospinal fluid leaks*
  - b. Open head injuries (excluding simple scalp injuries)*
  - c. Depressed skull fractures*
  - d. Decreased level of consciousness*
  - e. Intracranial hemorrhage*
- 7. Significant penetrating wounds to the head, neck, thorax, abdomen or pelvis*

- 8. *Pelvic fracture*
- 9. *Significant blunt injury to the chest or abdomen*

## 9. Rehabilitation

### HRSA Benchmark for Rehabilitation

The lead agency ensures that **adequate rehabilitation facilities** have been integrated into the trauma system and that these resources are made available to all populations requiring them.

Patient rehabilitation is an important part of a strong trauma system. Planning for patient rehabilitation begins immediately following patient arrival at the hospital. Rehabilitative efforts often begin during the hospital stay, and if needed, carry through to the patient’s convalescence at a rehabilitation facility and even after re-entry into the community.

Currently, Providence Alaska Medical Center and Alaska Regional Hospital have general rehabilitation inpatient units; however inpatient facilities for children do not exist, so children are often sent to other states. There are no facilities specialized in trauma brain injury and spinal cord injury.

Given the state’s relatively small total population, it is unlikely that there is sufficient demand for such specialized facilities.

### Recommended Initiative for Rehabilitation

Conduct a study using a random sampling of patients with major neurologic injuries and complex orthopedic injuries to determine if rehabilitation services begin early in the acute hospital stay. Provide a report to clinicians in the trauma system on findings, asking for education and follow-up monitoring if there are gaps from optimal performance.

## 10. Trauma Patient Registry

### HRSA Benchmark for Trauma Patient Registry

The lead trauma authority ensures that each member hospital of the trauma system **collects and uses patient data** as well as provider data to assess system performance and **improve quality of care**.

As noted above, the Alaska Trauma Registry is very strong. With participation of all facilities, including those not designated trauma centers, it is among the most comprehensive in the U.S. The registry is well maintained and current, and its registrar is skilled in conducting special studies using the data system.

### Recommended Initiative for Trauma Patient Registry

The high-quality registry should be preserved as it is currently designed. The registry should be used to conduct studies on two topics (as discussed in 4. EMS System: Pre-Hospital Care and Triage, 5. Transportation, and 7. Acute-Care Facilities and Physicians), to refine triage and inter-facility guidelines, refine guidelines for the use of the various modes of transport, and monitor the adequacy of the capacity at the Level 2 trauma centers.

## 11. System Evaluation and Performance Improvement

### HRSA Benchmark for System Evaluation and Performance Improvement

The lead trauma authority ensures that each member hospital of the trauma system **collects and uses patient data** as well as provider data to assess system performance and **improve quality of care**.

Because the state's geography is so large, and because the challenge for pre-hospital care, triage, re-triage and transfer, and definitive care varies by region, ongoing system evaluation and performance improvement will benefit by conducting these activities in three regions with their own committees: Southeast, Southcentral and Bush. These Regional Trauma Coordinating Committees (RTCCs) can tailor their work to local challenges and resources and link to the state agency. This work should include sharing of performance improvement data and studies with the regions and their medical directors.

This approach is used effectively in California, which is not as large and diverse as Alaska, but is a relatively large state.

RTCCs may facilitate discussions related to trauma care challenges within each region, working toward resolutions to minimize variations in practice. Additional regional issues may include addressing geographic isolation and coordinating trauma care resources and funding. RTCCs should refine "re-triage" or transfer guidelines for their hospitals based on those referenced in this Plan.

RTCC membership is voluntary and is drawn from trauma system partners within each region to include, but not be limited to, local EMS agency trauma system coordinators, EMS directors and administrators, trauma center medical directors, trauma center managers, non-trauma-facility representatives, and EMS providers. State-level activity includes reporting regional activities and issues, sharing regional work products, and preparing registry reports. The RTCCs should meet quarterly with an annual statewide meeting for the RTCCs to come together to share their work.

## Recommended Initiatives for System Evaluation and Performance Improvement

The Alaska trauma system should focus its system evaluation and performance activities on leveraging its extraordinary Alaska Trauma Registry to optimize field triage and inter-facility transfer. Specific initiatives are included in 4. EMS System: Pre-Hospital Care and Triage, 5. Transportation and 6. Communications

Operate three Regional Trauma Coordinating Committees to conduct performance monitoring and improvement activities, tailoring guidelines to the unique characteristics of the three regions.

## 8. Inter-Facility Transfer and Re-Triage

The Level 2 trauma centers should participate in the ACS TQIP program and report results to the Department for use in fine-tuning system design and performance and continuing education.

## 12. Education and Training

### HRSA Benchmark for Education and Training

**Education** for trauma system participants is developed **based on a review and evaluation of trauma data**. In cooperation with the pre-hospital certification and licensure authority, set guidelines for pre-hospital personnel for initial and ongoing trauma training including trauma-specific courses and those courses that are readily available throughout the state. An assessment of the needs of the public concerning trauma system information should be conducted.

Various disciplines are accessing continuing education; however, there is no system-wide theme in the educational efforts. This Plan provides the framework for a system-wide theme: triage, re-triage and inter-facility transfer.

### Recommended Initiative for Education and Training

The Department should identify education for pre-hospital care, field triage and re-triage, and transfer, including auto launch of air medical services and coordination of this response with field care and initial Level 4 hospital care.

### 13. Trauma Systems Research

#### HRSA Benchmark for Trauma Systems Research

A process is in place to facilitate the **access to data for evaluation and research**. The trauma system has developed mechanisms to engage the general medical community and other system participants in their research findings and performance improvement efforts.

Because none of the trauma centers in Alaska are Level 1, trauma research in Alaska will naturally be limited. It should focus on use of the registry to optimize triage and transfer guidelines and trauma center configuration.

#### Recommended Initiative for Trauma Systems Research

See Recommended Initiatives for System Evaluation and Performance Improvement. Both research and system evaluation and performance improvement are so central to this Plan that an additional research assistant position should be added to the Alaska Trauma Registry program – assuming the necessary additional funding can be obtained through the initiatives outlined in 3. Trauma System Finance and 7. Acute-Care Facilities and Physicians (new public and private grant funding, re-appropriation of existing grants and optimized reimbursement to providers from trauma services providers [some of which would be shifted to the Department through trauma center designation fees]).

### 14. Injury Prevention

#### HRSA Benchmark for Injury Prevention

A written injury prevention and control plan is developed and coordinated with other agencies and community health programs. The **injury program is data driven**, and targeted programs are developed based on high-injury-risk areas. **Specific goals with measurable objectives** are incorporated into the injury plan.

So much of what is done in trauma systems is reactive and so much of that is reaction to injuries that are preventable. Regional trauma systems primarily focus on providing care, and they cannot be responsible for injury prevention in a comprehensive way. Comprehensive prevention needs to involve families, schools, transportation systems design, and legislative and regulatory initiatives. However, trauma systems and trauma centers are uniquely qualified to play a key role because they have information on patterns of mechanism of injury and can attest to the human and financial costs of injury.

Seat belts dramatically reduce risk of death and serious injury. Among drivers and front-seat passengers, seat belts reduce the risk of death and serious injury significantly.



## Recommended Initiative for Injury Prevention

Injury prevention initiatives should be tailored to the unique needs of each region. For example, emphasizing increased seat belt usage, while important in Anchorage and other larger communities, will not be important in regions without significant road systems.

In areas with significant road systems, possible recommended initiatives: (1) consider state law for helmets for snowmobiles, ATVs and bicycles, and for motorcycle drivers over 18; and (2) continue and accelerate public education and enforcement campaigns to increase seat belt use from current 86% toward best practices in states where it is 95% or higher: Alabama, California, Georgia, Minnesota, Nevada, Oregon and Washington.

Within each region, injury prevention programs should be based on findings from the registry for that region.

It is recommended that the state consider shifting the organizational home for injury prevention to the State Trauma Unit. There are two reasons for this. First, it would facilitate use of the Alaska Trauma Registry data to provide ongoing monitoring of injury prevention patterns, results and outcomes. Second, it would facilitate coordination of state-sponsored injury prevention programs with the programs sponsored by the hospitals as they fulfill this part of their responsibilities as trauma centers.

## Appendices

### Appendix: 2008 ACS Review, Reported Progress

- Injury Epidemiology updated to 2015.
- Alaska has tripled the number of trauma centers since 2008. We currently have two Level 2, one Pediatric Level 2 and 15 Level 4 trauma centers.
- The Level 5 trauma center guidelines have been developed by the State Trauma Committee, but have not moved forward to the regulation phase. Level 5 trauma centers have been identified as sub-regional clinics (the State Trauma Committee identified 8–10 sub-regional clinics that see a similar number of trauma patients as the Level 4 trauma centers).
- All 24 hospitals submit to the Alaska Trauma Registry according to statutory guidelines.
- The TSRC has taken on the task of trauma education, performance improvement (State PI Plan, EMS PI Indicators), and pediatric, head injury and rural trauma transfer guidelines.
- The TSRC has reorganized with broad multidisciplinary membership.
- The state is currently forming regional trauma committees that will be subsets of the State Trauma Committee. There will be three regions: Southeast, Southcentral and Bush. The Regional Trauma Committees will be multidisciplinary, with primary focus on regional system development.
- The Alaska state website disseminates information on the Alaska Trauma System, status of the trauma system and educational opportunities. The State Trauma Office routinely updates and reports to community partners, such as the Joint Emergency Preparedness Group (JMEPG), Injury Prevention Group, Alaska Traumatic Brain Injury, and Alaska Hospital and Nursing Home Association (ASHNA).
- Planning meetings for all stakeholders are now posted on the Alaska website in a timely manner.
- The state trauma committee meets in person in Anchorage and via teleconference. The Alaska trauma program managers and the ATR managers each meet quarterly.
- The state trauma program manager was appointed in 2010.
- The current chair of the Alaska Trauma System Review Committee serves as the trauma medical director.
- The State Trauma Office defers medical direction to the chair of the TSRC. At one point, the state had contracted to use the state EMS medical director, but we found that the TRSC chair was better suited to meet the needs of the trauma unit.
- The state is updating outdated guidelines. It is the intent to update the community classification to meet the ACS-COT verification levels. When the trauma unit sends a questionnaire regarding rural and pediatric transfer in rural communities, this is presented as a gap in understanding trauma centers and their capabilities. This was identified in the gap analysis.
- The state has received FLEX funding in the past, primarily for Level 4 trauma center verification reviews.

- There is no injury prevention specialist on the TSRC. All the trauma centers have robust injury prevention programs, and hospital injury prevention specialists are on their trauma committees.
- The state trauma office supports trauma-related education, including TCCC, TECC, PHTLS, ATLS, B-CON, DMEP, ABLIS, ATOM, ASSET and ATCN. The state trauma unit has taught multiple trauma triage and other trauma-related courses.
- The Trauma Medical Director listserv is available on the state trauma website.
- The EMS database is NEMSIS 3. Not all EMS agencies submit to the EMS database; Some agencies submit directly to NEMSIS and bypass the AURORA system
- An ACS-verified second Level 2 trauma center was designated.
- Standardized trauma triage criteria are best for all regions: 2011 CDC Field Triage Criteria, Pediatric and Rural Transfer Guidelines. The municipality of Anchorage Fire Department has trauma criteria guidelines for patient transport.
- We developed Pediatric and Rural Transfer Guidelines, PI of primary and secondary transfers; implemented CDC guidelines; and current Trauma Triage Guidelines exist in the municipality of Anchorage through the Anchorage Fire Department. All “status 1” patients (higher-level trauma) are required to go to a Level 2 trauma center.
- Performed a detailed statewide communication assessment.
- Developed a statewide trauma PI plan.
- State Trauma PI Indicators are reviewed on a quarterly basis, and reported to the TSRC.
- Ensured that all elements considered essential to system development, evaluation and performance improvement in the state of Alaska are evident and working in the new trauma registry and are consistent with the National Trauma Data Standard (NTDS) definitions. This is an ongoing and annual process to stay current. Please see attached ATR and NTDB data dictionary.
- Safeguard the legacy data by maintaining the current software system separately and discretely from the new system until a legacy data transfer has occurred and validation queries have been completed.
- The web registry allows for autonomous entry for all 24 facilities. There is no travel required from the state as of 2012.
- Twenty-two of 24 facilities have submitted to the NTDB annually since 2011. The two facilities that do not participate are Department of Defense hospitals. Alaska has 2 TQIP Level 2 trauma centers.
- Linkage with the Aurora Prehospital Database is being done and should be complete by the end of 2017.
- On an ongoing basis, data is being used for research as well as the TSRC (i.e., head injury guidelines update in 2017).
- There is a guideline with the Anchorage Fire Department for diversion status of trauma patients. The state monitors diversion trauma status of Level 2 trauma centers. Data is shared with the Mayors Advisory Council of EMS as requested.
- The Alaska Head Injury Guidelines are being revised. The committee met in February 2017 and is in its first revision.

## Appendix: References

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## Appendix: National Courses Available for Trauma Education

Here are the national courses available for trauma system education:

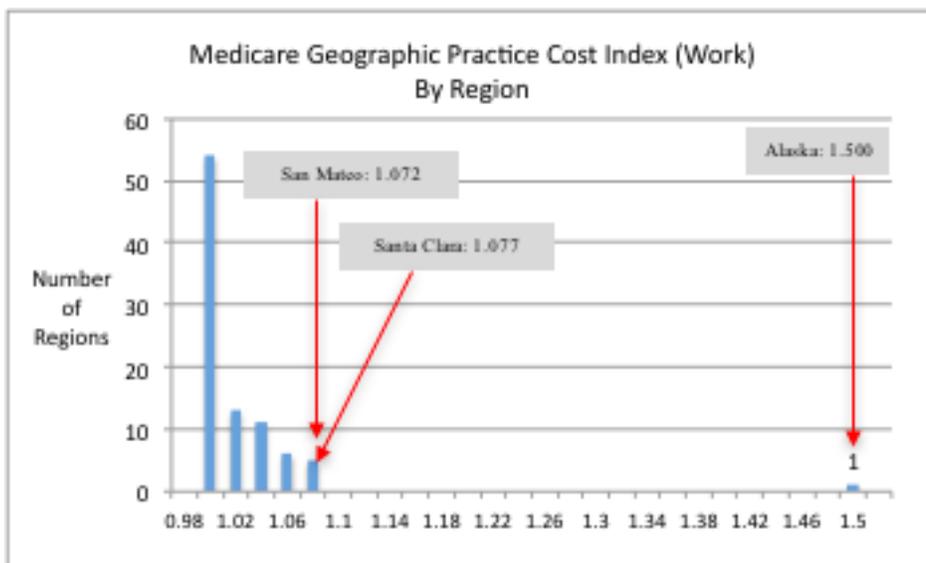
- **RTTDC: Rural Trauma Team Development Course**
- DMAT: Disaster Medical Assistant Team
- PEPP: Pediatric Emergencies for Pre-hospital Providers
- **PHTLS: Pre-Hospital Trauma Life Support**
- GEMS: Geriatric Education for Emergency Medical Services
- **ATLS: Advanced Trauma Life Support for physicians and mid-level providers**
- ATOM: Advanced Trauma Operative Management for physicians
- ASSET-Advanced Surgical Skills for Exposure in Trauma
- TNCC: Trauma Nurse Core Curriculum
- ENPC: Emergency Nurse Pediatric Course
- **ATCN: Advanced Trauma Course for Nurses**
- TCAR: Trauma Care After Resuscitation for nurses across the continuum of care
- PCAR: Pediatric Care After Resuscitation

Those shown in red will be among the most relevant to the recommendation for the theme in section 12. Education and Training.

These should be supplemented by customized courses for first responders, pre-hospital providers, ED staff at clinics, Level 4 centers, Level 3 centers (when established) and Level 2 trauma centers. The courses should focus on the triage and re-triage guidelines recommended in this Plan and refined by the Department.

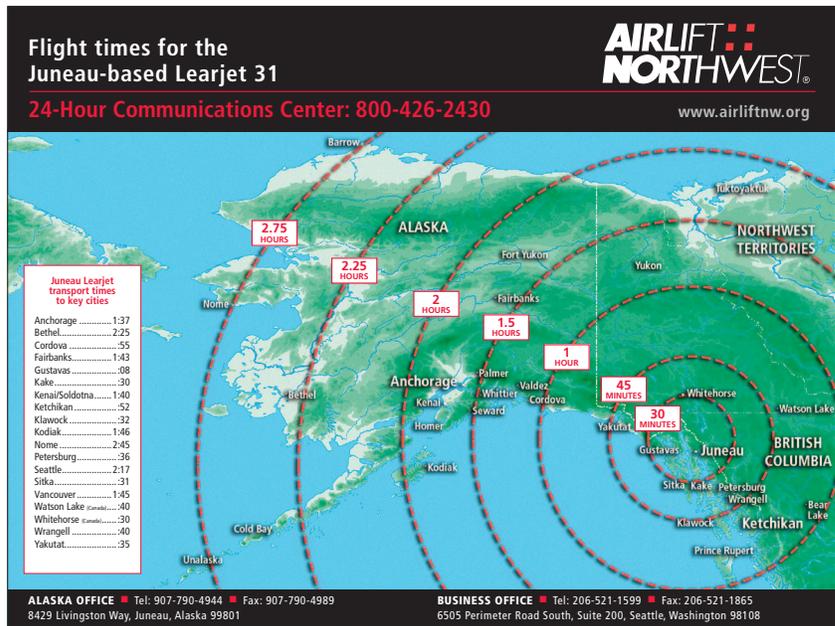
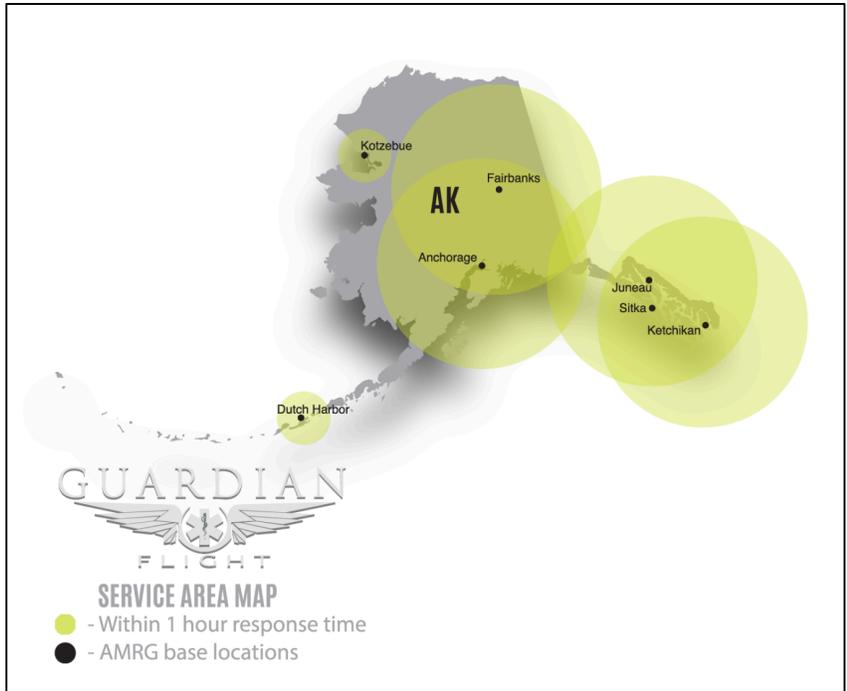
## Appendix: Recognition of Premium Medical Costs in Alaska

It is generally recognized that there are premium costs and payment rates for hospital medical care in Alaska. For example, this was shown in a 2011 report for the Alaska Health Care Commission by Milliman, "Facility Payment Rates in Alaska and Comparison States." A similar premium relationship is seen regarding physician practice costs, as shown in the following chart on the Medicare cost index.



However, based on experience in trauma center pricing and commercial contracting throughout the United States, it is likely that these widely recognized premium costs for hospital and physician care in general do not translate fully into pricing and contract rates for trauma services for hospitals, physicians and air medical services. As discussed in the body of this Plan, it is thus likely that Level 2 trauma centers in Alaska and prospective Level 3 trauma centers have an opportunity to increase net revenue for trauma services from commercial health plans. These increased revenues can be applied to help secure needed physician coverage for some Level 4 trauma centers to become Level 3 trauma centers and to, through designation fees paid to the Department, help fund other initiatives recommended in this Plan, such as improvements in performance, communications and air medical ambulance services.





**ALASKA  
2012**

Air Medical Services	RW only	RW/FW	FW only	Total Services (Row Sum)
Services Headquartered in State	2	5	5	<b>12</b>
Out-of-State Services with RW or FW Bases in State	0	1	0	<b>1</b>
State Size				
Population (Y2010)				710,231
Geographic Area (Square Miles)				656,425

Number of Bases & Aircraft Operating in State		
Type	Bases in State	Aircraft in State
<b>Rotor Wing (RW)</b>	9	33
<b>Fixed Wing (FW)</b>	19	34
<b>Total** RW &amp; FW</b>	25	67

\*\*If a single air medical service has a base with both RW and FW aircraft types, the base is included in RW base inventory AND in FW base inventory, but included only once in Total RW & FW base inventory.

Rotor Wing Services (May also have Fixed Wing)							
Provider ID#	Service Name	Base Name / Site	City (AK)	Zip	Type Location	# Aircraft	
						RW	FW
AK001	LifeMed Alaska	Bethel Airport	Bethel	99559	Airport		1
AK001		Central Peninsula Hospital	Soldotna	99669	Hospital	1	
AK001		Fairbanks International Airport	Fairbanks	99706	Airport		2
AK001		Ted Stevens Anchorage Int'l Airport	Anchorage	99502	Airport		3
AK001		Wolf Lake Airport	Palmer	99654	Airport	1	
AK002	North Slope Borough S&R	Wiley Post-Will Rogers Mem. Airp.	Barrow	99723	Airport	2	1
AK003	Alaska Air National Guard	Eielson AFB	Fairbanks	99702	Airport *	1	
AK003		Joint Base Elmendorf-Richardson	Anchorage	99506	Airport *	5 #	4
AK005	Capital City Fire/Rescue	Juneau International Airport	Juneau	99801	Airport	11+	
AK007	US Coast Guard Air Sta. Sitka	Coast Guard Sitka Airport	Sitka	99835	Airport *	3	
AK008	US Coast Guard Air Sta. Kodiak	Coast Guard Kodiak Airport	Kodiak	99615	Airport *	8	4
AK009	Guardian Flight, Inc.	Anchorage International Airport	Anchorage	99502	Airport		2++
AK009		Fairbanks International Airport	Fairbanks	99709	Airport		3
AK009		Juneau International Airport	Juneau	99801	Airport		1
AK009		Ketchikan Airport	Ketchikan	99901	Airport		1
AK009		Ralph Wein Memorial Airport	Kotzebue	99752	Airport		1
AK009		Sitka Rocky Gutierrez Airport	Sitka	99835	Airport		1
AK009		Unalaska / Dutch Harbor Airport	Dutch Harbor	99685	Airport		1
AK009		Wasilla Airport	Wasilla	99654	Airport	1	
WA001	Airlift Northwest †	Juneau Airport	Juneau	99801	Airport		1

+ RW provided by commercial helicopter services for air medical use as needed. RW all part time and not dedicated solely to air medical response.

† Service is a RW/FW service but only operates FW in this state.

\*Military Base performs civilian transports when weather bad or civilian services not available.

++ Rotates among bases.

# Some RW deployed overseas.

Fixed Wing Only Services						
Provider ID#	FW Service Name	Airport Name	City (AK)	Zip	# FW	
AK006	Norton Sound Critical Care Air	Nome Airport	Nome	99762	2	
AK011	40-Mile Air, LTD.	Tok Airport	Tok	99780	1	
AK013	SE Alaska Reg Health Consortium (SEARHC)	Sitka Airport	Sitka	99835	3**	
AK014	Alaska Regional Hospital Life Flight	Ted Stevens Anchorage Int'l Arpt.	Anchorage	99502	1	
AK015	Bristol Bay Area Health Corp.	Dillingham Airport	Dillingham	99576	1	

\*\* One is a SPARE.

## Appendix: Strategies and Experience in Optimizing Net Revenue from Health Plans

HealthWorks' broad experience throughout the United States over the past 20 years with trauma centers, trauma physicians and air medical ambulances shows that, in most cases, net revenue can be increased through careful analysis of market patterns and direct dialogue with commercial health plans. In many cases, charge levels and contract rates can be increased to an optimal position in market distribution. This is because trauma centers, trauma physicians and air medical ambulance services are not always aware of how their charges and contract rates compare to the market. There are several sources (some public and some proprietary) for obtaining benchmark data on charges and contract rates.

At the same time, direct engagement with commercial health plans can lead to higher contract rates, with "carve-outs" from rates for routine services. The first stage of the process of optimizing rates is to educate commercial payers about trauma services and market practices for contracting for them. Health plans do not always appreciate the premium costs required to provide those services. The need for this education for Alaska will be greater than normal because health plans may not recognize that unique characteristics of Alaska and its trauma system — geography, sparse population, adverse payer mix, long transport distances, needs for special triage and inter-facility transfer systems — drive up trauma costs.

These health plans also need to recognize that they should not expect the normally discounted rates they obtain in network contracts because — when it comes to trauma patients — they are not providing the benefits in contracts such as preferentially directed volume of non-emergency services. It is reasonable for the Department, an agency of state government, to expect commercial health plans that choose to do business in Alaska to pay their fair share of the costs of an optimal trauma system.