

Advancing Health in America

2025 AHA Annual Survey Information Technology Supplement

Please return to: AHA Annual Survey Information Technology Supplement 155 N. Wacker Drive Suite 400 Chicago, IL 60606

HOSPITAL NAME:

CITY & STATE:

Please Note: This year we continue to include questions designed to capture progress and persistent challenges to interoperability and exchange. This information will provide important data on the state of health IT and interoperability in hospitals nationwide.

GENERAL INSTRUCTIONS: Please respond to each of the following questions as of the day the survey is completed.

EHR System and IT Vendors

۱. ۱	Which vendor below provides your primary <u>inpatient</u> electronic health record (EHR) or electronic medical
	record (EMR) system? (Please check only one). "Primary" is defined as the system that is used for the largest
	number of patients or the system in which you have made the single largest investment. Please answer based on
	vendor name rather than product.

- a. Allscripts
- b. D Altera Digital Health
- c. C Athenahealth
- d. 🛛 Cerner
- e. CPSI/Evident
- f. D Epic
- g. D MEDHOST
- h. D Meditech
- . U Would prefer not to disclose EHR vendor
- j. U We do not use an EMR/EHR system (go to 1a)
- k. Other (please specify):

1a. If you indicated you do NOT use an EMR/EHR system, what are the primary challenge(s) that have prevented your hospital from implementing and using an EMR/EHR system? (Please check all that apply).

- a. Upfront capital costs/lack of access to capital to install systems
- b. D Ongoing cost of maintaining and upgrading systems
- c. Dobtaining physician cooperation
- d. Dobtaining other staff cooperation
- e. Concerns about security or liability for privacy breaches
- f. Uncertainty about certification requirements
- g. Limited vendor capacity
- h. Lack of adequate IT personnel in hospital to support implementation/maintenance
- i. Challenge/complexity of meeting Promoting Interoperability program criteria within implementation timeframe
- j. D Pace and extent of other regulatory requirement changes
- k. \Box Other (please specify):

END OF SURVEY FOR RESPONDENTS WHO DO NOT USE AN EMR/EHR

2. Does your hospital provide outpatient care to patients?

- Note: Outpatient care refers to both hospital-based and satellite outpatient departments/sites.

3. Do you use the same primary inpatient EMR/EHR system vendor (noted above) for your primary outpatient EMR/EHR system? "Primary" is defined as the system that is used for the largest number of patients or the system in which you have made the single largest investment. Please answer based on vendor name rather than product.

a. **D** Yes, share single instance

b. Yes, but do not share the single instance/vers	sion
---	------

c. □ No **d.** □ Do not know **e.** □ NA

4. Have you used the capability to export multiple records from your primary inpatient EHR system to support any of the following uses? (Please check all that apply).

Sometimes referred to as "bulk" export, this functionality enables analytics and reporting, population management, or switching EHR systems.

- a. Analytics and reporting
- b. D Population health management
- c. C Research purposes
- d. D Switching EHR systems
- e. Have not used the capability yet
- f. Do not have this capability

Participation in health information exchange networks

- 5a. Please indicate your level of participation in a <u>state, regional, and/or local</u> health information exchange (HIE) or health information organization (HIO).
 - 1. HIE/HIO is operational in my area and we are participating and actively exchanging data in at least one HIE/HIO (go to 5b)
 - 2. HIE/HIO is operational in my area, but we are not participating (go to 5b)
 - 3. HIE/HIO is not operational in my area (go to 6)
 - 4. Do not know (go to 6)
- **5b.** Please indicate which state, regional and/or local HIE/HIO(s) with which your hospital participates and actively exchanges data as well as the first year your hospital actively participated in this HIE/HIO. Note: A list of known active HIEs is included in an attachment and numbered. Please either write the HIE name or its number on that list below. If the HIE is not listed, please be sure to mark it as "Other" and write the complete HIE name.02

5b1a. Name/reference number: _____ 5b1b. First Year Your Hospital Participated: _____

5b2a. Name/reference number: _

5b2b. First Year Your Hospital Participated: _____

5b3a. Name/reference number: _____ 5b3b. First Year Your Hospital Participated:

- 6. Which of the following <u>national</u> health information exchange networks and/or frameworks does your hospital currently actively participate in (i.e., operational exchange)? (Please check all that apply). Note: We ask about participation in the Trusted Exchange Framework and Common Agreement (TEFCA) in a separate section.
 - a. CommonWell Health Alliance
 - b. De-Health Exchange
 - c. Civitas (formerly SHIEC)/Patient Centered Data Home (PCDH)
 - d. Carequality (network-to-network trust/governance framework)
 - e. EHR vendor-based network that enables record location and exchange <u>within</u> the EHR vendor's network of users (e.g., Epic's Care Everywhere)
 - f. Other national health information exchange network

g. Do not participate in any national health information exchange networks (either via vendor or directly)

h. Do not know

Trusted Exchange Framework and Common Agreement

7. Are you aware of the Trusted Exchange Framework and Common Agreement[™] (TEFCA[™])? https://www.healthit.gov/topic/interoperability/trusted-exchange-framework-and-common-agreement-tefca

a. Yes b. No (go to 9)

8. If yes, are you currently participating or do you plan to participate in TEFCA exchange (such as through your HIE or other national network)?

a. Yes, currently participating and have partner/contract in place

b. Yes, plan to participate and have partner/contract in place

c. Yes, plan to participate but <u>do not</u> have partner/contract in place

d. \Box No, not participating and do not plan to

e. Don't know

Querying information from outside providers or sources

9. How often are the following electronic methods used to <u>search for (e.g., query or auto-query) and view</u> patient health information from <u>sources outside your organization or hospital system</u>? (*Please indicate how often each method is used across each row below*).

Ele	ctronic Methods	(1) Often	(2) Sometimes	(3) Rarely	(4) Never	(5) Do not know/NA
a.	Provider portals that allow you to view records in another organization's EHR system					
b.	Interface connection between EHR systems (e.g., HL7 interface)					
c.	Access to other organizations' EHR system using login credentials					
d.	Regional, state, or local health information exchange organization (HIE/HIO).					
e.	EHR vendor-based network that enables record location within the network (e.g., Care Everywhere)					
f.	EHR connection to national networks that enable record location across EHRs in different networks (e.g., CommonWell, eHealth Exchange, Carequality).					
g.	Other electronic					

Sending patient health information

10. When a patient transitions to another care setting <u>outside of your organization or hospital system</u>, how often does your hospital use the following methods to <u>SEND</u> patient health information in a structured format? (*Please indicate how often each method is used across each row below*).

Methods without intermediaries	(1) Often	(2) Sometimes	(3) Rarely	(4) Never	(5) Do not know/NA
a. Mail or fax					
b. eFax using EHR					
c. Provider portals that allow outside organization to view records in your EHR system					
d. Interface connection between EHR systems (e.g., HL7 interface)					
e. Login credentials that allow access to your EHR					

f. Other					
Methods with intermediaries	(1) Often	(2) Sometimes	(3) Rarely	(4) Never	(5) Do not know/NA
 g. Health information service providers (HISPs) that enable messaging via DIRECT protocol 					
h. Regional, state, or local health information exchange organization (HIE/HIO).					
i. EHR vendor-based network that enables exchange with vendor's other users. (e.g., Epic's Care Everywhere)					
j. National networks that enable exchange across <u>different</u> EHR vendors (e.g., CommonWell, eHealth Exchange, Carequality)					
k. Other					

11. When a patient transitions to another care setting or organization, to what extent does your hospital <u>electronically send or make available</u> patient health information to the following providers in a structured format (e.g., CCDA) that they are able to use? (Please check only one option in each row).

	(1) Most/All	(2) Some	(3) Few/None	(4) Do not know
a. Other Hospitals outside your system				
b. Ambulatory Care Providers outside your system				
c. Long-term and Post-Acute Care Facilities				
d. Behavioral Health Facilities				

Receive and Integrate patient health information

12. When a patient transitions from another care setting <u>outside your organization or hospital system</u>, how often does your hospital use the following methods to <u>RECEIVE</u> patient health information in a structured format? (*Please indicate how often each method is used across each row below*).

Methods without intermediaries	(1) Often	(2) Sometimes	(3) Rarely	(4) Never	(5) Do not know/NA
a. Mail or fax					
b. eFax using EHR					
 c. Provider portals that allow you to view records in another organizations' EHR system 					
 d. Interface connection between EHR systems (e.g., HL7 interface) 					
 Access to other organizations' EHR system using login credentials 					
f. Other(Please specify)					
Methods with intermediaries	(1) Often	(2) Sometimes	(3) Rarely	(4) Never	(5) Do not know/NA
 g. Health information service providers (HISPs) that enable messaging via DIRECT protocol 					
h. Regional, state, or local health information exchange organization (HIE/HIO).					

i. EHR vendor-based network that enables exchange with vendor's other users. (e.g., Epic's Care Everywhere)			
j. National networks that enable exchange across <u>different</u> EHR vendors (e.g., CommonWell, eHealth Exchange, Carequality)			
k. Other (Please specify)			

13. When a patient transitions from another care setting or organization, to what extent does your hospital electronically receive or query patient health information from the following providers in a structured format (e.g., CCDA) that you are able to use? (Please check only one option in each row).

	(1) Most/All	(2) Some	(3) Few/None	(4) Do not know			
a. Other Hospitals outside your system							
b. Ambulatory Care Providers outside your system							
c. Long-term and Post-Acute Care Facilities							
d. Behavioral Health Facilities							
 14. Does your EHR integrate the information contained in summary of care records received electronically (not eFax) without the need for manual entry? Note: This does NOT refer to automatically adding data to the patient's medical record without provider review. a. Yes, routinely b. Yes, but not routinely c. No d. Don't know e. NA 							
 15. Does your EHR present health insurer real-time prescription benefit information? a. ☐ Yes, for all or almost all payers b. ☐ Yes, for a limited set of payers c. ☐ No d. ☐ Don't know 							
Availability and usage of data that is exchanged							
16 When treating a patient that was se	en hy a provider o	utside vour organiz	zation or hosnital s	vstem do			

- 16. When treating a patient that was seen by a provider outside your organization or hospital system, providers at your hospital have necessary clinical information available electronically (not e-Fax) from outside providers or sources? c. 🗖 No b. \Box Yes, but not routinely d. Don't know a. Yes. routinely
- 17. How frequently do providers at your hospital use patient health information received electronically (not e-Fax) from outside providers or sources when treating a patient?

a. 🗖 Often	b. D Sometimes	c. CRarely	d. 🗖 Never	e. 🗖 Do not know
------------	----------------	------------	------------	------------------

Barriers to exchange and interoperability

Which of the following issues does your hospital currently experience when trying to electronically (not eFax) send, receive or find (query) patient health information to/from other organizations or hospital systems? Please check all that apply and indicate whether the issue is a major barrier (i.e., greatly reduces the value or frequency of exchange or prevents exchange with all or most organizations that you would like to exchange information with) or minor barrier (i.e., a persistent challenge that modestly reduces the value or frequency of exchange, but does not typically prevent exchange).

18a. Barriers related to electronically sending patient health information

	(a) Major barrier	(b) Minor barrier	(c) Not a barrier
1. Providers we would like to electronically send patient health			
information to do not have an EHR or other electronic system			
capable of receiving the information			
2. Difficult to locate the address of the provider to send the			
information (e.g., lack of provider directory)			
3. Many recipients of our electronic care summaries (e.g.,			
CCDA) report that the information is not useful			

18b. Barriers related to electronically receiving patient health information

	(a) Major barrier	(b) Minor barrier	(c) Not a barrier
1. Difficult to match or identify the correct patient between			
systems			
2. There are providers whom we share patients with that don't			
typically exchange patient data with us			
3. There are providers who share data with us but do not			
provide those data in the format that we request			
4. There are providers who state they cannot share our			
patients' data with us because they cannot be certain we will			
safeguard the privacy or security of the data to the same			
standards they meet.			

18c. Other barriers related to exchanging patient health information

	(a) Major barrier	(b) Minor barrier	(c) Not a barrier
1. Experience greater challenges exchanging (e.g.,			
sending/receiving) data across different vendor platforms			
2. We have to pay additional costs to send/receive data with			
outside organizations/hospital systems			
We had to develop customized interfaces in order to			
exchange (e.g., send/receive) data with outside			
organizations/hospital systems			
4. We are unable to mitigate cybersecurity risks inherent in how			
the requestor wants to connect to our systems.			
5. We are unable to unambiguously segment data that are			
requested from data we cannot share/have been asked by the			
patient not to share.			

Information Blocking Practices

Information blocking is defined in rules that first applied to actors' practices on April 5, 2021. The following set of questions ask about practices that may constitute information blocking based on your understanding of the rules. Please visit the following link for more information: https://www.healthit.gov/topic/information-blocking

19a. To what extent have you observed or experienced the following entities engaging in information blocking behaviors?

		(a) Often/ Routinely	(b) Sometimes	(c) Never/ Rarely	(d) Not Applicable (i.e., we have not tried to get information from this source)	(e) Don't Know
1.	Developers of Certified Health IT (e.g., Enterprise EHR vendors)					
2.	National Networks (e.g., CommonWell, eHealth Exchange)					
3.	State, regional, and/or local health information exchange					
4.	Healthcare providers					

19b. In what form(s) have you observed or experienced information blocking by Enterprise EHR vendor(s)?

	(a) Often/ Routinely	(b) Sometimes	(c) Never/ Rarely	(d) Don't Know
1. Price – for example:				
 Using high fees to avoid granting third-parties access to data stored in the vendor's EHR system Charging unreasonable fees to export data at a provider's request 				
(such as when switching vendors)				
2. Contract language – for example:				
 Using contract terms, warranty terms, or intellectual property rights to discourage exchange or connectivity with third-party Changing material contract terms related to health information exchange after customer has licensed and installed the vendor's 				
technology				
3. Artificial technical, process, or resource barriers – for example:				
Using artificial technical barriers to avoid granting third-parties access to data stored in the vendor's EHR system				
4. Refusal – for example:				
 Refusing to exchange information or establish connectivity with certain vendors or HIOs Refusing to export data at a provider's request (such as when switching vendors) 				
5. Other (please list):				

19c. In what form(s) have you observed or experienced information blocking by healthcare providers?

	(a) Often/	(b) Sometimes	(c) Never/	(d) Don't
	Routinely		Rarely	Know
 Artificial technical, process, or resource barriers – for example: Requiring a written authorization when neither state nor federal law requires it 				
 Requiring a patient to repeatedly opt in to exchange for treatment, payment, and operations (TPO) 				
2. Refusal – for example:				
 Refusing to exchange information with competing providers, hospitals, or health systems 				
3. Strategic affiliations – for example:				
 Promoting alternative, proprietary approaches to information exchange Exchanging only within referral network or with preferred referral 				
partners				
4. Other (please list):				

19d. If you have experienced practices that you believed constituted information blocking in the past year, have you ever reported the information blocking to HHS using the Report Information Blocking Portal?

https://www.healthit.gov/report-info-blocking

1. Yes 2. No

3. NA (Did not experience information blocking within the past year) 4. Don't know

Advanced Analytics / Artificial Intelligence (Annual)

This section asks about artificial intelligence (AI) used at your hospital. While definitions of AI vary, for the purpose of this section, all machine learning, non-machine learning predictive models, large language models and generative models are considered AI.

20. Please indicate whether your hospital currently uses each of the following types of AI <u>integrated</u> into your EHR:

	(1) Yes	(2) No but plan to use in the next year	(3) No, and no plans in the next year	(4) Don't know
a. Machine Learning-based Predictive Models (not including Generative AI)				
 b. Other Non-Machine Learning Predictive Models (e.g., APACHE IV) 				
c. Generative AI including large language models (e.g., ChatGPT, GPT-4, Google Gemini, Nuance DAX Copilot)				

21. Please indicate whether your hospital currently uses each of the following types of AI <u>NOT integrated</u> into your EHR:

	(1) Yes	(2) No but plan to use in the next year	(4) Don't know
a. Machine Learning-based Predictive Models (not including Generative AI)			
 b. Other Non-Machine Learning Predictive Models (e.g., APACHE IV) 			
c. Generative AI including large language models (e.g., ChatGPT, GPT-4, Google Gemini, Nuance DAX Copilot)			

If responded with "(2) No but plan to use in the next year" or "(3) No, and no plans in the next year" to all of the options in Questions 20 and 21, please skip to Question 27.

22. . To which of the following uses is your hospital currently applying any of the types of AI tools above? (Please check all that apply).

		(1) From EHR developer	(2) From any other source (e.g., a third- party developer or self-developed)
Predicti	ve Use Cases		
a.	Predicting health trajectories or risks for inpatients (such as early detection of onset of a disease or condition like sepsis; predicting in-hospital fall risk)		
b.	Identify high risk outpatients to inform follow-up care (e.g., readmission risk)		
C.	Monitor health (e.g., through integration with wearables)		
d.	Assist in medical image interpretation (e.g., radiology)		
e.	Recommend treatments (e.g., identify similar patients and their outcomes)		
f.	Simplify or automate billing procedures (e.g., propensity to pay)		
g.	Facilitate scheduling (e.g., predicting no-shows or block utilization).		
Genera	tive Use Cases		
h.	Patient-facing chatbot		
i.	Generate patient-portal messaging		
j.	Ambient documentation of clinical encounters		
k.	Generate discharge summaries for patients		
I.	Summarize patient chart for nursing handoff		

m.	Summarize patient chart during transition from another setting of care	
n.	Generate prior authorizations	
0.	Generate or suggest billing codes from the chart	
General	Use Cases	
р.	Clinical decision support	
q.	None of the above	
r.	Don't know	
S.	Other administrative use cases (describe):	
t.	Other clinical use cases (describe):	

23. Who developed the AI tools (machine learning or other predictive models and generative AI models including large language models) used at your hospital? (Please check all that apply).

	(a) Our EHR Developer	(b) A third-party developer	(c) Self-developed	(d) Public domain	(e) Don't know
1. Machine learning or other predictive models					
2. Generative AI					

24a. For what share of your AI tools does your hospital or health system have information on the tool's development, testing, and use (e.g., training data information, test results, intended use/out-of-scope use)? (Please check only one option in each row.)

	(a) All models	(b) Most models	(c) Some models	(d) Few models	(e) None	(f) Don't know
1. Machine learning or other predictive models						
2. Generative AI						

24b. For what share of your AI tools is this information available to end users? (Please check only one option in each row.)

	(a) All models	(b) Most models	(c) Some models	(d) Few models	(e) None	(f) Don't know
1. Machine learning or other predictive models						
2. Generative AI						

25a. What share of your machine learning or other predictive models have been evaluated using data from <u>your</u> <u>hospital or health system</u> for: (*Note: the next question asks about generative Al*).

	(a) All models	(b) Most models	(c) Some models	(d) Few models	(e) None	(f) Don't know
 Model Accuracy (e.g., sensitivity or specificity) 						
 Model Bias (e.g., false positive parity across patients from different races, conditions, or other factors) 						
 Post-implementation evaluation or monitoring of accuracy, bias or impact 						

25b. What share of your generative AI tools including large language models have been evaluated using data from <u>your hospital or health system</u> for:

	(a) All models	(b) Most models	(c) Some models	(d) Few models	(e) None	(f) Don't know
1. Model Accuracy (e.g., usefulness of generated text)						
2. Model Bias (e.g., bias in generated text; different usefulness across subgroups)						
 Post-implementation evaluation or monitoring of accuracy, bias or impact 						

26. Who in your hospital or health care system is accountable for evaluating AI models? (Please check all that apply).

- a. Designated Senior Executive (CMIO / CIO / Director of Technology)
- b. D Specific Committee or Task Force for AI
- c. Clinical Decision Support Committee / other non-Al Specific Committee
- d. Division/Department Leaders
- e. 🛛 IT staff
- f. I None of the above
- 27. Thank you for your cooperation in completing this survey. If you are not the CIO, or person responsible for information technology, have they reviewed your answers to this survey?

a. 🗖 Yes

b. 🗖 No

Respondent Name (please print) Circle CIO or Print Title if other (Area Code) Telephone #

___/__/___ Date of Completion

Name of CIO (if other than respondent)

Email Address

NOTE: PLEASE PHOTOCOPY THIS INFORMATION FOR YOUR HOSPITAL FILE BEFORE RETURNING THE ORIGINAL FORM TO THE AMERICAN HOSPITAL ASSOCIATION. THANK YOU.

HIO List

- 1. Alabama One Health Record
- 2. Arkansas State Health Alliance for Records Exchange
- 3. Atrium Health CareConnect
- 4. Big Sky Care Connect
- 5. Bronx RHIO
- 6. C3 Health Information Exchange
- 7. **CAHIE**
- 8. Camden Coalition of Healthcare Providers
- 9. Carolina eHealth Network SC (Part of KONZA)
- 10. Chesapeake Regional Information System for Patients-DC (Part of CRISP Shared Services)
- 11. CIE San Diego
- 12. ClinicalConnect Health Information Exchange
- 13. Community Health Access Network (CHAN)
- 14. Community Health IT
- 15. Connie (Part of CRISP Shared Services)
- 16. Connxus (Integrated Care Collaboration)
- 17. Contexture
- 18. CRISP (MD) (Part of CRISP Shared Services)
- 19. CRISP Shared Services
- 20. CTHealthLink (Part of KONZA)
- 21. CyncHealth Iowa
- 22. CyncHealth Nebraska
- 23. Delaware Health Information Network
- 24. East Tennessee Health Information Network
- 25. Emergency Department Information Exchange (EDIE)
- 26. Florida Health Information Exchange
- 27. GenesisLink TX (Part of KONZA)
- 28. Georgia Health Information Network
- 29. Georgia Regional Academic Community Health Information Exchange
- 30. Greater Houston Healthconnect
- 31. Greater Newark Health Care Coalition
- 32. Guardian HIE
- 33. Hawaii Health Information Exchange
- 34. Health Gorilla
- 35. Health Services South Carolina (Part of CRISP Shared Services)

- 36. healtheConnect Alaska (Part of CRISP Shared Services)
- 37. HealtheConnections
- 38. HEALTHeLINK
- 39. HealtheParadigm GA (Part of KONZA)
- 40. HealtHIE Nevada
- 41. HealthInfoNet
- 42. Healthix
- 43. HealthShare Exchange of Southeastern PA
- 44. HealthSYNC LA (Part of KONZA)
- 45. HIXNY
- 46. Idaho Health Data Exchange
- 47. Indiana Health Information Exchange
- 48. Kansas Health Informaton Network (Part of KONZA)
- 49. Kentucky Health Information Exchange
- 50. Keystone HIE
- 51. KONZA
- 52. Lewis And Clark Information Exchange
- 53. Los Angeles Network for Enhanced Services
- 54. Louisiana Health Care Quality Forum
- 55. Manifest MedEX
- 56. Marin Health Gateway
- 57. Mass Hlway
- 58. Michigan Health Information Network
- 59. Mission HealthConnect
- 60. Mississippi Health Access Exchange (MHAX) -MS (Part of KONZA)
- 61. MyHealth Access Network
- 62. NC Health Information Exchange Authority
- 63. New England Healthcare Exchange Network (NEHEN)
- 64. New Jersey Health Information Network
- 65. North Coast Health Improvement and Information Network
- 66. North Dakota HIN
- 67. Ohio Health Information Partnership (CliniSync)
- 68. OneHealth New Jersey NJ (Part of KONZA)
- 69. OnePartner HIE
- 70. Orange County Partnership RHIO (OCPRHIO)

- 71. Oregon Community Health Information Network (OCHIN)
- 72. PelEx
- 73. Pennsylvania eHealth Partnership Program
- 74. PHIX
- 75. PHNIQ (Pediatric Health Network)
- 76. Pioneer Valley Health Information Exchange (PVIX)
- 77. Providence St. Joseph Health
- 78. Puerto Rico HIE
- 79. Reliance e-Health Collaborative
- 80. Rhode Island Quality Institute (Part of CRISP Shared Services)
- 81. Rio Grande Valley Health Information Exchange
- 82. Rochester RHIO
- 83. SacValley MedShare (Part of KONZA)
- 84. SafeHealth
- 85. San Diego Health Connect
- 86. San Mateo County Connected Care
- 87. Serving Communities Health Information Organization
- 88. SHINE of Missouri MO (Part of KONZA)
- 89. South Carolina Health Information Exchange (SCHIEx)
- 90. South Dakota Health Link
- 91. Stony Brook University Hospital
- 92. SYNCRONYS

Network

- 93. Texas Health Services Authority
- 94. Trenton Health Information Exchange
- 95. USVI Office of Health IT (Part of CRISP Shared Services)
- 96. Utah Health Information Network
- 97. Velatura Public Benefit Corporation
- 98. Vermont Information Technology Leaders
- 99. Virgina Health Information (Part of CRISP Shared Services) 100.Wisconsin Statewide Health Information

101.WVHIN (Part of CRISP Shared Services)

102. Wyoming Frontier Information