



Alberta Health Services

ALBERTA HEALTH SERVICES – DATABASE DESIGN

A preliminary study in best practices for effective data analysis and a step towards achieving Alberta Health's annual strategic objectives

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Introduction

Alberta Healthcare Services Canada's largest provincewide, integrated healthcare system that delivers health services to over 4.5 million people living across Alberta. The organization delivers the services mentioned on behalf of the Government of Alberta's Ministry of Health.

AHS has an extensive network of health services partners across Alberta that include Covenant Health, physicians, allied health professionals, pharmacies, surgical facilities, local governments, and Indigenous communities. It continues to expand this network by funding new projects and operations across the province.

As such, AHS has been given the task and responsibility to lead Alberta Health's strategic direction for health in Alberta. Such a mandate in the modern era insists upon leveraging technology and data to ensure an optimal use of resources and the best possible provision of services to the public.

Purpose

According to AHS' 2023-2024 business plan, it aims to '...spend \$10 million to improve primary healthcare and access to addictions and mental wellness supports, life promotion and wellbeing with Indigenous communities, and additional cultural supports across AHS facilities to support culturally safe care.' ([Alberta Health Services 2023 – 2024 Business Plan](#))

The purpose of this study is to present a preliminary framework of health data collection and storage for health partners under AHS' ambit. The framework will aim to improve the precision, relevance, and organization of data points as a step towards greater data fluency. It will enable AHS, as a stakeholder and leading provider of health services across Alberta, to make informed decisions around funding policies. It will also help AHS to measure the direct impact of funding that it provides to its health service partners.

Objectives

This document offers information towards the following measurable objectives:

- Collect historical operational data belonging to AHS' health partners from legacy storage formats and create a pipeline to store it in a more organized database moving forward.
- Create a framework database to log monthly health services provision from each Partner for the purpose of monitoring efficiency and discovering gaps in service.

Second phase objectives

- Amass geographic and demographic data across Alberta to identify pockets of high demand for primary and emergency health services. Compare this data with compiled Health Services Partners data from Phase 1 of this study.
- Use aggregation and data analysis to measure the return of AHS' investments towards Healthcare Partners.

Analysis of current database design

To gauge the efficacy of the current database design and its ability to measure efficiency and quality of service provision, we will have to gain access to the framework. Numerous interviews with current stakeholders, users, and managers will grant further insight into requirements.

As this is not possible at the current stage of this study, we will base our design on best practices and standards, with AHS' annual objectives at the forefront of the thought process.

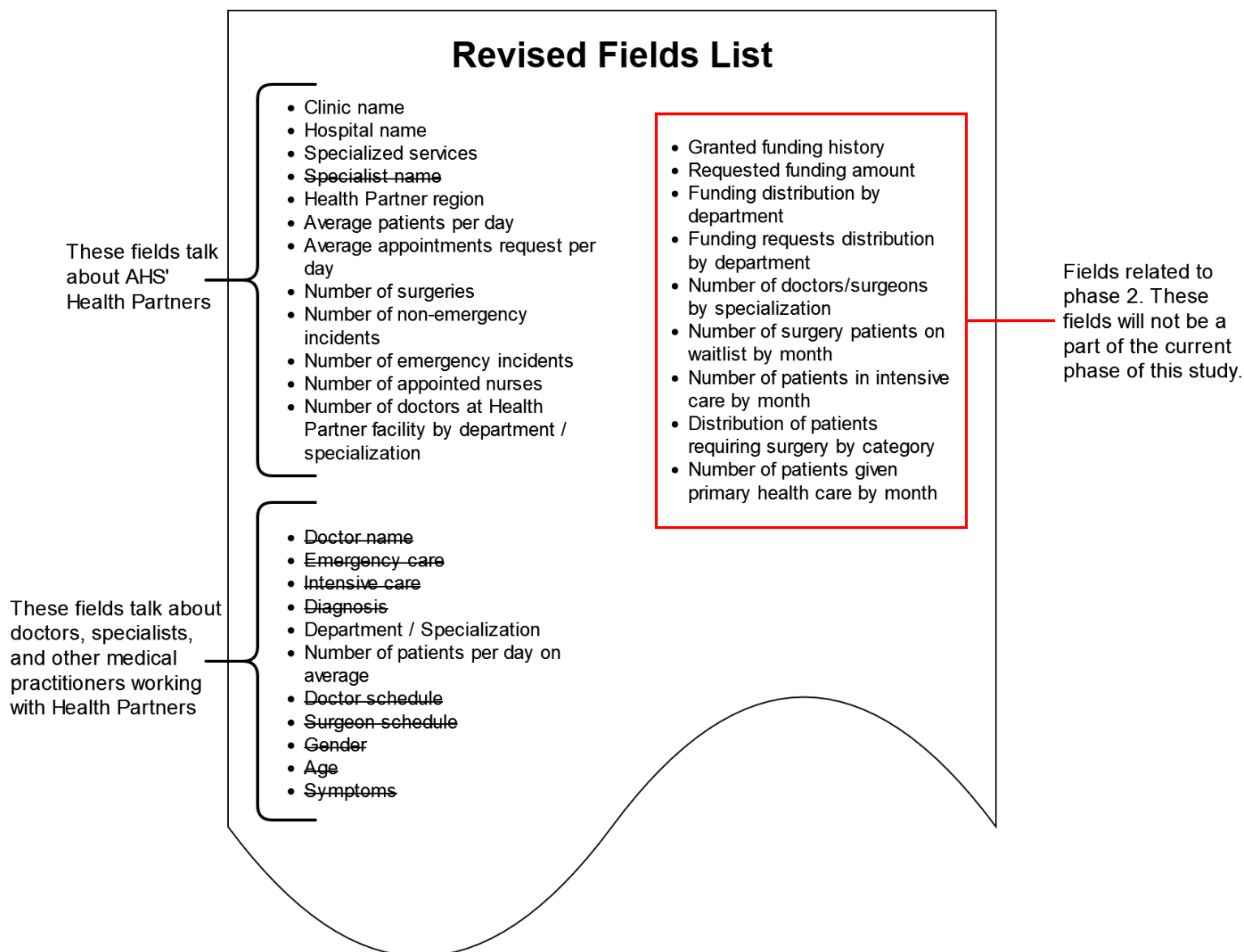
Database components

Fields

Standard medical and clinical practice can help us compile a **preliminary list of fields** that represent data points currently being stored and used by AHS' health partners. We can also incorporate fields that exist in global health service frameworks as additions into our list.

Preliminary Fields List

- Clinic name
- Hospital name
- Department
- Specialist name
- Doctor name
- Health Partner region
- Average patient per day
- Average appointments request per day
- Emergency care
- Intensive care
- Number of emergency incidents
- Patient name
- Number of surgeries
- Number of non-emergency incidents
- Number of appointed nurses
- Diagnosis
- Specialization
- Number of patients per day
- Doctor schedule
- Surgeon schedule
- Gender
- Age
- Symptoms
- Granted funding history
- Requested funding amount
- Funding distribution by department
- Funding requests distribution by department
- Number of doctors/surgeons by specialization
- Number of surgery patients on waitlist by month
- Number of patients in intensive care by month
- Distribution of patients requiring surgery by category
- Number of patients given primary health care by month



Subjects discovered via the Preliminary Fields List:

- Health Services Partners
- Medical practitioners
- Staff and nurses
- Regions
- Departments/Specializations
- Nature of case

These subjects will be treated as separate entities within the scope of this study that are related to each other in varying ways. These relationships are further broken down and explained for clarity.

The next step was to remove all aggregating and computable fields that were present in the Preliminary Fields List. The fields removed are presented below:

- Average appointments request per day
- Average patients per day
- Number of patients per day on average

Preliminary tables list

Subjects	Preliminary Tables List
<ul style="list-style-type: none">• Health Services Partners• Medical practitioners• Staff and nurses• Regions• Departments/specializations• Nature of case	<ul style="list-style-type: none">• Health Services Partners• Medical practitioners by departments/specialization• Regions• Departments/specializations• Cases handled

Understanding what each table depicts

Primary tables

Health Services Partners

A Health Service Partner within AHS' ambit may include clinics, acute medical care hospitals, and other health delivery institutions.

This table lists the Health Service Partners that work with AHS. Each HSP has a unique ID (int) and is situated in one of the regions that are listed in another table.

The purpose of this table is to keep track of different HSPs that can be found region-wide and will be of significance during deeper analysis of healthcare provision.

Department/Specialization

This table lists existing and new departments of service within the listed HSPs. It simply makes provisions for departments and links into a Master Table. This helps us keep track of which departments are available in all different HSPs.

As an example, some departments are Cardiology, General Surgery, and Pediatrics.

Cases handled

This table plays a vital role in a deeper analysis of the nature and number of cases being handled by the HSPs. It takes into account all the other major entities mentioned in this study and brings them under one umbrella i.e. a medical case.

Secondary tables

Regions

The regions table helps us divide the geographic locations of HSPs into zones that are already being used by AHS. Geolocation of health centers can play a major role in the provision of timely healthcare.

Medical practitioners

This table gives a unique ID to each medical practitioner and links them to medical cases and incidents. This will help us tally the number of practitioners with respect to HSPs and geographic locations.

Master table

The Master Table is centrally positioned to perform aggregating computations that help us better understand the efficiency of health provision across HSPs. It does this by keeping a record of which HSPs medical practitioners are providing services at and under which departments.

Table relationships for clarity

TABLE	RELATIONSHIP	DESCRIPTION
Master table	One-to-many	The master table has a relationship with all 3 primary tables. It will allow us to perform deeper analysis and use queries to get entity aggregations.
Primary tables		
Health services partners	One-to-many	In the HSP table, every individual HSP has a relationship with 2 primary tables and 1 secondary table. A single HSP can have multiple cases and multiple departments but can only be in 1 region.
Department/specialization	One-to-many	Every department can belong to multiple HSPs and each department can have multiple cases.
Cases handled	One-to-many	This table is vital to record the number of cases over time and utilize during further analysis. For this purpose, it has a relationship with both other primary tables and 1 secondary table.
Secondary tables		
Regions	One-to-many	The Regions table shows that 1 region/zone can have multiple HSPs.
Medical practitioners	One-to-many	This table allows a single medical practitioner to handle multiple cases in multiple HSPs.

Entity relationship diagram

