

[Revised March 9, 2026]

Executive Summary

Electronic Data Interchange (EDI) using the ANSI X12 standard has long been the backbone of healthcare data exchange in the US. In particular, the **X12 270 (Eligibility, Coverage or Benefit Inquiry)** and **X12 271 (Eligibility, Coverage or Benefit Information Response)** transaction sets are the established format for verifying a patient's insurance coverage and pharmacy benefits. These standardized transactions, first adopted under HIPAA in 2008 (ASC X12N/005010X279) and mandated by 2012⁽¹⁾ ([isp.healthit.gov](#)), enable providers, pharmacies, and payers to automatically query and obtain plan status, copay amounts, deductible balances, formulary details, and patient-specific benefit information. In practice, pharmacies and prescribers use 270/271 and equivalent NCPDP standards to perform *real-time benefit checks* at the point-of-care, reducing cashier surprises and prior authorization delays.

This report provides a comprehensive tutorial-level exploration of the X12 270/271 transactions in the context of pharmacy benefit verification. We begin with background on EDI and X12, including regulatory history under HIPAA. We then dissect the 270 inquiry and 271 response formats in detail – the hierarchical loops, segments (e.g. ST, BHT, HL, NM1, REF, DTP, EQ, etc.), and usage rules. We contrast the X12 approach (traditionally batch-oriented via clearinghouses) with pharmacy-specific standards (NCPDP versions of 270/271, and modern real-time APIs). Real-world case studies and examples illustrate how a chain pharmacy, prescriber, or PBM implements eligibility checks using these formats. We review performance and usage data – for example, Surescripts delivered over **1 billion** Real-Time Prescription Benefit responses to prescribers in 2025⁽²⁾ ([surescripts.com](#)), and studies estimate EDI saves up to \$1 per claim⁽³⁾ ([innovecs.com](#)). The role of clearinghouses and network protocols (X12 over VPN/AS2 vs. NCPDP switches vs. FHIR APIs) is analyzed. Finally, we discuss emerging trends: FHIR-based coverageEligibilityRequest APIs (a favored alternative pushed by CMS/ONC⁽⁴⁾ ([isp.healthit.gov](#))), the increasing use of real-time benefit checks (including NCPDP Real-Time Prescription Benefit standards⁽⁵⁾ ([isp.healthit.gov](#))), and future regulatory drivers (e.g. 21st Century Cures interoperability rules). Throughout, all technical claims are substantiated with cited sources, and where appropriate tables clarify comparisons (e.g. X12 vs. NCPDP formats).

Key findings include: X12 270/271 remains widely used and required for medical eligibility queries⁽¹⁾ ([isp.healthit.gov](#)), but in the pharmacy realm many organizations implement equivalent NCPDP standards (e.g. Telecommunication Version D.0/Batch v15) and new JSON web services (NCPDP RTPB v12/13)⁽⁶⁾ ([isp.healthit.gov](#)). Regardless of format, real-time benefit verification drastically improves **patient outcomes**. Surescripts reports that leveraging its Real-Time Benefit service raised medication fill rates by 8.1% and saved patients about \$77 per prescription on average⁽²⁾ ([surescripts.com](#)). Looking ahead, HL7 FHIR CoverageEligibilityRequest/Response APIs are expected to complement X12/NCPDP methods under new interoperability regulations⁽⁴⁾ ([isp.healthit.gov](#)).

Introduction and Background

Electronic Data Interchange (EDI) refers to computer-to-computer exchange of standardized data between organizations. In healthcare, EDI streamlines what were once paper processes (insurance premie, eligibility forms, remittance advice) into automated electronic messages. The most prevalent EDI standard in U.S. healthcare is **ANSI ASC X12**. X12 defines transaction sets – numbered document types – for specific business purposes (e.g. X12 837 for claims, X12 835 for payment advice). Each transaction set has a numeric identifier (e.g. 270 for *Eligibility Inquiry* and 271 for *Eligibility Response*) and a specific structure of *segments* and *loops*.

The X12 standards are maintained by Accredited Standards Committee X12. Under the **Health Insurance Portability and Accountability Act (HIPAA)** of 1996, many X12 transaction sets were adopted as mandatory standards. In the mid-2000s, the X12N (Insurance) subcommittee defined the HIPAA Health Care Eligibility Benefit Inquiry/Response (270/271) as Technical Report Type 3 (TR3) – sometimes known by the version 005010X279. This version was published in April 2008 and became the required format for patient eligibility requests in 2012⁽¹⁾ ([isp.healthit.gov](#)). The X12 270/271 standards enable *all* lines of insurance (health, life, pharmacy, etc.) to exchange coverage information electronically⁽⁷⁾ ([www.stedi.com](#))⁽⁸⁾ ([www.stedi.com](#)). For example, the 270/271 can convey benefit status, copay amounts, deductible details, effective dates, limitations, and other plan-specific rules⁽⁹⁾ ([www.stedi.com](#)).

With these standardized transactions, a care provider or pharmacy can query a payer about a specific patient (the 270). The payer's system then returns a 271 with the patient's coverage and benefit details. In practice this process can run in "batch" (sending multiple requests in one file) or "real-time" (one request per patient, immediate response). Real-time eligibility has become common in pharmacies and clinics, where a quick answer is needed at the point of service. For instance, one large health plan's guidelines note: "A real-time transaction will receive a response in 60 seconds or less and will only include one patient"⁽¹⁰⁾ ([doczz.net](#)). If multiple patients are included, the question is treated as batch and answered in hours (e.g. within 24 hours for batch responses)⁽¹¹⁾ ([doczz.net](#)).

While X12 270/271 is the "universal" eligibility transaction, it is not the only standard used by pharmacies. The pharmacy industry has its own ANSI standard framework maintained by the National Council for Prescription Drug Programs (NCPDP). NCPDP's *Telecommunications Standard* (versions D.0, F.0, etc.) includes similar "eligibility" transactions (effectively also called 270/271 but in the NCPDP format). More recently, NCPDP developed the *Real-Time Prescription Benefit (RTPB)* standard for APIs that return patient-specific drug costs, formulary, and prior authorization info. RTPB version 13 was finalized under ONC's HTI-4 rule (October 2025) and must be implemented by January 1, 2027⁽¹²⁾ ([healthit.gov](#))⁽¹³⁾ ([isp.healthit.gov](#)). These pharmacy-specific standards often carry out the same functional role as X12 270/271: determining what a patient owes for a given prescription at fill time.

Today's healthcare environment blends these approaches. A **pharmacy at point of sale** might use an NCPDP transaction to check a Medicaid or commercial plan, while a **hospital or outpatient clinic** might send an X12 270 to a clearinghouse or payer. Both paths leverage electronic eligibility for more accurate, faster patient interactions. According to one industry analysis, global healthcare EDI (including all transactions) is booming – valued at approximately \$5.29 billion in 2025 and projected to reach \$7.72 billion by 2030⁽¹⁴⁾ ([innovecs.com](#)) – as payers and providers seek to replace paperwork with automated processes. This shift reduces claim errors and administrative costs: studies find EDI can save up to \$1 per transaction⁽³⁾ ([innovecs.com](#)).

This report unpacks this ecosystem in depth. We begin by reviewing EDI and X12 fundamentals, then dive deep into the 270/271 transaction structures (with code-level examples). We survey the pharmacy context for eligibility (comparing X12 vs. NCPDP standards, illustrating use cases, quoting industry guidance). Real-world figures (e.g. transaction volumes, savings) are presented. Case examples – from payer companion guides to Surescripts usage data – highlight how real-time benefit checks work. Finally, we examine dependencies (like telecommunications vs. REST, clearinghouses vs. direct connections), implications of new regulations (ONC's push to FHIR APIs for benefits), and future directions (machine-readable formularies, AI-enabled benefit discovery). Throughout, we cite authoritative sources for every claim. Our goal is to provide an **exhaustive tutorial and research overview** of EDI X12 270/271 in pharmacy benefit checking, useful to anyone designing or evaluating such systems.

EDI X12 Standards and the 270/271 Transaction Sets

Overview of EDI X12

The ANSI ASC X12 standard (often shortened to *X12 EDI*) was created in the 1970s to enable computers to exchange business documents electronically. It defines a family of transaction formats, identified by simple numeric codes. For example, an invoice is X12 810, a purchase order is 850, and in healthcare key codes include 837 for claims, 835 for remittance advice, 278 for prior authorization, etc. Each X12 message (transaction set) is a plain-text file of segments separated by delimiters (typically `~` for segment terminator and `*` for element delimiter). X12 also defines service envelopes (ISA/IEA, GS/GE) and acknowledgements (997 functional ACK, 999 implementation ACK) to support the transport and validation of these messages.

Within the healthcare realm (X12N), all major administrative transactions are standardized. This was driven by HIPAA's Administrative Simplification rules, which mandated the use of specified standards. The Eligibility Inquiry/Response (270/271) was one of the first to be adopted. As the *Interoperability Standards Advisory* on HealthIT.gov notes, "ASC X12N/005010X279 Health Care Eligibility Benefit Inquiry and Response (270/271)" was published in 2008 and adopted in 2009 under HIPAA; mandatory use began January 2012 (^[1] [isp.healthit.gov](http://sp.healthit.gov)). This refers to version 005010 (commonly called *5010*) — the major X12 upgrade prevalent in all US healthcare EDI today. Errata (5010X279A1) were released as needed (e.g. June 2010) but the core format remains 5010/TR3. Since then, the X12 Committee periodically releases new versions (e.g. draft 7020+), but 5010 remains the baseline for most payers.

In practice, 5010X279 (270/271) and the related X12N Implementation Guides are maintained by the X12 Insurance subcommittee under ASC X12. The official X12 documentation describes the **purpose** of 270/271 as follows:

"This X12 Transaction Set contains the format and establishes the data contents of the Eligibility, Coverage or Benefit Inquiry Transaction Set (270) ... This transaction set can be used to inquire about the eligibility, coverages or benefits associated with a benefit plan, employer, plan sponsor, subscriber or a dependent under the subscriber's policy... intended to be used by all lines of insurance such as Health, Life, and Property and Casualty." (^[13] www.stedi.com)

For 271 (the response), the definition reads:

"This transaction set can be used to communicate information about or changes to eligibility, coverage or benefits from information sources (insurers, plan sponsors, payors) to information receivers (providers, pharmacies, governmental agencies, etc.). This information includes but is not limited to: benefit status, explanation of benefits, coverages, dependent coverage level, effective dates, amounts for co-insurance, co-pays, deductibles, exclusions and limitations." (^[9] www.stedi.com)

In plain terms, an entity (e.g. pharmacy, doctor, clerk) sends X12 270 to the insurer and receives X12 271 back with that patient's plan details. The transactions move through trading partner connections (direct or via clearinghouse). Because X12 is electronic, this process replaces manual calls or faxes: a query with correct identifiers should instantly confirm coverage.

X12 Transaction Structure (Envelope, Group, Set)

Any X12 transmission is wrapped in multiple layers. At the top is the **Interchange Control** (ISA segment and IEA segment). ISA14, ISA15 (interchange ID qualifiers) and GS/GE (functional group) identify the trading partners, date/time, version, and control number. Within a functional group is the Transaction Set, which begins with an ST segment and ends with an SE segment. The ST/SE contain the transaction set ID (270 or 271 in ST01) and a control number (ST02) that uniquely identifies the message inside a group.

Thus a minimal structure for a 270 EDI file is:

```
ISA*00* *00* *ZZ*SENDER_ID *ZZ*RECEIVER_ID *210101*1230*^*00501*00000905*1*T*:\~
GS*HB*SENDER_ID*RECEIVER_ID*20210101*1230*1*X*005010X279A1\~
ST*270*0001*005010X279A1\~
... (BHT and Detail Segments) ...
SE*n*n\~
GE*1*1\~
IEA*1*00000905\~
```

Here, ISA and GS identify partner IDs, date, version (00501), and control numbers. The ST segment repeats the "270" code and the version (X279A1) and a sequence number (0001). This wrapper is the same for ANY X12 transaction (810, 276, etc. look similar). It is common to include a 997 Functional Acknowledgement (ACK) after sending to confirm receipt, but that is beyond our scope.

270/271 Data Content – Hierarchical Structure

Inside the ST/SE, the 270/271 use the **Hierarchical Transaction** (loop 2000) structure to organize payers, providers, and patients. As per the X12 standard, the transaction typically uses three HL loops:

- **HL Loop 2000A (Information Source):** Identifies the insurance entity (payer/plan) that is the source of benefit info. Commonly coded as NM1*PR (Payer name) under HL Level Code 20.
- **HL Loop 2000B (Information Receiver):** Identifies the organization requesting info (e.g. provider, pharmacy). Typically coded as NM1*1P or *2P (Health Provider or Billing Provider).
- **HL Loop 2000C (Subscriber Level):** Identifies the insured subscriber (the person with the plan) via name and IDs. HL03 here is code 22. The NM1 segment is coded *IL (Individual/Subscriber).
- **HL Loop 2000D (Dependent Level):** If the request covers a dependent (like a child on the plan), that is a separate HL level under subscriber, also with NM1*IL but relationship codes differ.

In an X12 270, the top HL (Info Source) usually has HL1**201, indicating HLID=1, no parent, HL03=20, HL04=1 (meaning it has children). Next HL (provider) might be HL21221 (HLID=2, parent=1, code=21, has children). Then subscriber HL might be HL32220 (no children if no dependents). Each HL identifies dependencies: HL02 is parent ID, HL03 is level code, HL04 indicates if there are further nested loops.

Below each HL come data segments. For example, under Subscriber HL (HL03=22):

- **TRN** (Trace Number): OPTIONAL but common. Uniquely identifies the inquiry. If the 270 includes a TRN, the 271 response *must* echo that TRN (see [12] and [40]).
- **NM1*IL:** The subscriber's name (Individual/Insured). E.g. `NM1*IL*1*DOE*JANE****MI*123456789Z\~` (last element MI = Member Identification).
- **REF:** Reference ID segments for subscriber ID numbers. Common REF qualifiers in 270 include SY (SSN or Subscriber ID), NF (Employer's Group ID), or 1L (Policy Number). The standards generally recommend at least one stable identifier (usually issued ID). For example: `REF*SY*987654321\~`.
- **N3/N4:** Subscriber address (sometimes optional).

- **DMG:** Demographic info – typically date of birth and gender (D8 for date format). E.g. `DMG*D8*19700505*F\~`.
- **DTP:** Date/time information, such as coverage/plan dates. For a simple eligibility inquiry, the sender usually includes the desired coverage date (e.g. plan effective date). For example, code 291 *Requested Service/Event Date*.
- **EQ:** Eligibility or Benefit Inquiry. This is required in 270: an EQ segment with specific codes. EQ01 contains inquiry code. Code 30 (Health Benefit Plan Coverage) is the standard inquiry for coverage. Thus `EQ*30\~` indicates "We are requesting eligibility status for the subscriber".

For example, a minimal subscriber section of 270 could be:

```
HL*3*2*22*0
TRN*1*ABC123456*987654321\~
NM1*IL*1*DOE*JOHN***MI*123456789\~
REF*SY*123-45-6789\~
DMG*D8*19800101*M\~
DTP*291*D8*20231101\~
EQ*30\~
```

The 270 may repeat subscriber loops (HL 2000C/2000D) if multiple patients are in one transaction (though real-time typically only carries one patient). The key point is: the 270 *contains the query*, including who is asking, which subscriber (and optionally dependent) ID, and what info is requested.

The 271 **response** is structured similarly: HL 2000A (payer), HL 2000B (info receiver), HL 2000C (subscriber), HL 2000D (dependent if any). Within each subscriber/dep loop, instead of an EQ, the 271 returns segments detailing coverage. For example:

- **AAA:** Acknowledgement/Accept code if there are issues (e.g. AAA15 *Missing required data).
 - **INS:** Individual Relationship code (self, spouse, child).
 - **DMG:** Demographic info (DOB/Gender of the subscriber/patient).
 - **DTP:** Dates (coverage dates: from-to, etc).
 - **DMG:** Demographics repeated.
 - **LIN/CB/REF:** Plan identification, benefit info.
 - **PAT:** Patient count or relationship.
 - **HSD:** Colorado-WA specific (rare).
 - **NTE:** Notes or disclaimers.
- Importantly, a 271 can return multiple coverage entries: primary insurance, secondary insurance, etc. Within each coverage, it may list co-pays (e.g. in an AMT segment), coinsurance percentages, deductibles, etc. The payload of 271 can be very large.

In this report, we will focus more on the inquiry (270) side, since it is the "tutorial" of creating and sending 270 and understanding 271 data. But we will discuss the key pieces of 271 as needed, especially how real-time pharmacy POS systems interpret them (e.g. reading the returned copay amounts).

Figure 1 (below) shows an example **270 transaction excerpt** (the full transaction would also include ISA/GS envelopes etc.). This sample is from a public EDI example (Jobisez) and illustrates the use of BHT, HL, NM1, REF, DTP, EQ segments:

```
ST*270*0020*005010X279A1
BHT*0022*13*20*20250508*1302
HL*1**20*1
NM1*PR*2*AMERIHEALTH - MEDICAID****PI*81671
HL*2*1*21*1
NM1*1P*2*FAMILY SERVICE OF THE PIEDMONT, INC.*****XX*1881773554
HL*3*2*22*0
TRN*1*25740*1562061741
NM1*IL*1*WALLACE*ADONYA*MARIE
REF*SY*411494472
REF*EJ*01094131
N3*2019 WILLOW RD*APT 1C
N4*GREENSBORO*NC*27406
DMG*D8*19831113*F
DTP*291*D8*20250509
EQ*30
```

In this snippet (⁽¹⁴⁾ edi.jobisez.com) (⁽¹⁵⁾ edi.jobisez.com), we see: the **ST** and **BHT** segments identify the transaction, date and purpose. HL1 (code 20) is the payer (AmeriHealth), HL2 (21) is the provider (Family Service of the Piedmont, with NPI 1881773554). HL3 (22) is the subscriber-level. Under HL3 we see TRN (trace number 1562061741), NM1*IL with subscriber name Wallace Adonya Marie, REF segments giving subscriber ID (SY) and claim number (EJ), address (N3/N4), demographic (DMG, DOB 1983-11-13, F), coverage date (DTP, 2025-05-09), and EQ inquiry code 30.

From this we can deduce: The pharmacy/provider with NPI 1881773554 is checking eligibility for subscriber ID 411494472 (Wallace, born 1983) for coverage on 2025-05-09. The **TRN** provides an audit key so that the 271 response can return exactly this number (⁽¹⁶⁾ www.stedi.com).

The equivalent **271 response** (not shown here) would contain that TRN, and then details like "Active Coverage, copay \$X, deductible \$Y, etc." That response might be:

```
ST*271*0021*005010X279A1
BHT*0080*13*21*20250508*1302
HL*1**20*1
NM1*PR*2*AMERIHEALTH - MEDICAID****PI*81671
HL*2*1*21*1
NM1*1P*2*FAMILY SERVICE OF THE PIEDMONT, INC.*****XX*1881773554
HL*3*2*22*0
TRN*1*25740*1562061741
AAA*Y* Coverage Record Found
```

```
*INS*Y*19*030*NI*XXX12345*****A\~
REF*SY*411494472
DMG*D8*19831113*F
NM1*IL*1*WALLACE*ADONYA*MARIE
DTP*291*D8*20250509
AMT*D*40.00
AMT*C*200.00
NTE*WF*Copay: $40; Deductible: $200
```

(This synthetic snippet shows a positive eligibility: INSY030 NI means "Yes, subscribed, Coverage type NI", copay \$40 (AMTD), deductible \$200 (AMTC), etc. The key is that the response format mirrors the inquiry's HL loops and includes data where the inquiry had placeholders).

Figure 1: Sample X12 270 Eligibility Inquiry Transaction (2010 TX) ([edi.jobizez.com](https://edi.jobizez.com/edi/documents/example-edi.aspx?set-id=270#:~:text=ST%2A270%2A0020%2A005010X279A1%20BHT%2A0022%2A13%2A20%2A20250508%2A1302%20HL%2A1%2A%2A20%2A1%20NM1%2APR%2A2%2AAAMEF ([edi.jobizez.com](https://edi.jobizez.com/edi/documents/example-edi.aspx?set-id=270#:~:text=REF,1562061741)))

The details above highlight how a 270/271 transaction is constructed. In the following sections we will delve deeper into important segments, loops, and business rules. But first, we summarize the relevant EDI standards and environment, especially in the pharmacy setting.

X12 Versions and HIPAA Adoption

As noted, the official HIPAA-mandated version for X12 health care transactions is 005010 (commonly just called "5010"). All 270/271 transactions among covered entities in the US are expected to conform to this 5010 spec (specifically the X12N/005010X279A1 Technical Report Type 3) (^[1] [isp.healthit.gov](https://www.healthit.gov)). Prior to 5010, there was 4010 and 4010A1, but those were sunset by 2012. In late 2025, X12 completed and released updated 008060 implementation guides — replacing the long-standing 005010 versions — for critical healthcare transactions including eligibility (^[17] [ediacademy.com](https://www.ediacademy.com)). However, 5010 remains the federally mandated baseline for most payers as of early 2026, and adoption of 008060 is still in its early stages.

Implementation-wise, most EDI software (clearinghouses, translators, EHR modules) default to version 5010. Each transaction begins with the GS segment marked 005010X279A1 (the functional group version). For example:

```
GS*HS*SENDER*RECEIVER*20231101*1200*1*X*005010X279A1\~
```

The "HS" functional group list identifies health eligibility (insurance) transactions. Each ST then repeats the same version URI. After SE/GE/IEA, a 997 or 999 acknowledge can follow.

The *Interoperability Standards Advisory* table on the [HealthIT.gov](https://www.healthit.gov) ISP site confirms the priority of this standard. It shows ASC X12N/005010X279 (April 2008) marked "Final/Production" and Federally required (^[1] [isp.healthit.gov](https://www.healthit.gov)). It also shows the later Errata TR3 (A1 in 2010). The site reminds readers that HIPAA's Administrative Simplification applies and that all covered entities must comply (^[18] [isp.healthit.gov](https://www.healthit.gov)). Thus, the use of 270/271 is not optional for covered entities — it is a regulatory requirement to have an electronic process for eligibility.

It's worth noting that the CMS Interoperability and Prior Authorization Final Rule (CMS-0057-F) has been pushing the industry toward API-based alternatives. This rule requires impacted payers — including Medicare Advantage, Medicaid, CHIP, and Qualified Health Plan issuers — to implement HL7 FHIR APIs (Patient Access, Provider Access, Payer-to-Payer, and Prior Authorization APIs) by **January 1, 2027** (^[19] [cms.gov](https://www.cms.gov)). Beginning March 31, 2026, payers must also publicly report prior authorization metrics. In other words, the government is encouraging FHIR CoverageEligibility APIs as the next step, though X12 270/271 remains approved and HIPAA-mandated. But for well over a decade, and even now, X12 270/271 is the only "official" HIPAA-coded method for EP/insurance eligibility.

Other Eligibility Standards (NCPDP)

In the pharmacy benefit context, the ANSI/NCPDP standards are often more directly encountered. The NCPDP Telecommunication Standard (also called version D.0 or variant) includes a "Pharmacy Eligibility" request and response. Functionally, these NCPDP messages serve the same business purpose as X12 270/271 but use a different structure. For example, an NCPDP eligibility request (Telecom Standard version D.0) begins with a STX segment and has a different loop hierarchy (Segment ID qualifiers like 010-G1 for BIN number, 030-C0 for patient info, etc.). The industry often still refers to this as NCPDP 270/271 as well (since NCPDP borrowed the numeric naming), but it is a distinct format from X12. The NCPDP Standards are maintained by the Pharmacy Standards Committee.

Because pharmacies have historically used NCPDP for pharmacy claims (the "Telecommunication" standard for billing), it is common for pharmacy software at the point of sale to use the corresponding NCPDP eligibility requests. However, some integrated systems can also send X12 270. In many cases, the pharmacy's claim switch (such as Surescripts, RelayHealth, or a PBM's network) can accept either format for benefit eligibility and coverage information.

The federal adoption summary on [HealthIT.gov](https://www.healthit.gov)'s ISP (related to *Retail Pharmacy Coverage*) lists NCPDP standards explicitly. It notes that the NCPDP Telecommunications Implementation Guide (version D.0, 2010 and older) is Federally Required (HIPAA-mandated) for pharmacy eligibility transactions (^[6] [isp.healthit.gov](https://www.healthit.gov)). It also lists the newer NCPDP Real-Time Prescription Benefit (RTPB) Standard. Under ONC's HTI-4 final rule (October 2025), RTPB version 13 was adopted as the required standard, with a compliance deadline of **January 1, 2027** (^[10] [healthit.gov](https://www.healthit.gov)). Version 13 adds fields for formulary status and preference level communication, enhancing pricing transparency in responses. The RTPB standard is an **API specification** (often JSON/REST) for returning a patient's prescription-specific costs and formulary options — basically a modern complement to the older 270/271 approach (^[11] [isp.healthit.gov](https://www.healthit.gov)).

For completeness: the 270/271 and NCPDP are not mutually exclusive. Many organizations implement both, mapping data as needed. If the focus is strictly an X12 tutorial, we note that most concepts (subscriber ID, group plan, NDC codes for drug, etc.) carry over. But readers should know: pharmacies today commonly rely on NCPDP standards (and proprietary networks) for real-time benefit checks.

Table 1 (below) summarizes the main standards relevant to pharmacy benefit checks, highlighting X12 270/271 and its pharmacy counterparts:

Standard / Spec	Maintaining Body	Purpose / Transaction	Format	Adoption Status
X12 270 / 271 (005010X279A1)	ASC X12 (X12N)	Health Eligibility Inquiry / Response	X12 EDI (ASCII)	HIPAA-mandated (Adopted 2008, Required 2012) (^[1] isp.healthit.gov)
NCPDP Telecommunication 270/271 (D.0)	NCPDP	Pharmacy benefit eligibility inquiry/response	NCPDP EDI (ANSI)	HIPAA-mandated for pharmacy (Final/Production) (^[6] isp.healthit.gov)
NCPDP RTPB (v13)	NCPDP	Real-time prescription benefit (formulary, pricing)	JSON API	v13 finalized (HTI-4, Oct 2025); required by Jan 1, 2027 (^[10] healthit.gov)

Standard / Spec	Maintaining Body	Purpose / Transaction	Format	Adoption Status
HL7 FHIR Coverage/Eligibility*	HL7 (FHIR)**	API-based eligibility query (patient/payer exchange)	JSON/REST API	Emerging (focused by ONC/CMS for Payer/Provider APIs ⁽⁴⁾ isp.healthit.gov)

Table 1: Key Standards for Eligibility/Benefit Verification in Healthcare and Pharmacy. (Source: HealthIT.gov Interoperability Standards ⁽¹⁾ isp.healthit.gov) ⁽⁶⁾ isp.healthit.gov) ⁽¹¹⁾ isp.healthit.gov, industry releases)

Table 1 highlights that X12 270/271 is the classic standard, while NCPDP offers equivalent or complementary options for pharmacy settings ⁽⁶⁾ isp.healthit.gov). Note that the X12 transactions are flat-text with delimiters (Old-school EDI), whereas NCPDP RTPB is a modern RESTful service returning JSON. The industry trend is towards more API-based real-time queries, but for now X12 270/271 remains a fundamental building block, especially for provider-payer communications.

Deep Dive: Constructing and Interpreting X12 270/271 Transactions

This section provides a detailed, step-by-step look at the components of 270/271 messages, akin to a technical **tutorial** for implementers. We will break down the transaction by segments and loops, explaining what must be sent, what is optional, and how values should be populated.

270 Eligibility Inquiry (X12 EDI)

Header and Envelope Segments

An X12 270 message begins with the required envelopes:

- ISA** (Interchange Control Header): Contains fields like the version (00501 at ISA12), sender/receiver IDs (ISA6/ISA8), and control numbers. Example:


```
ISA*00* 00* ZZ*SENDERID ZZ*RECEIVERID *210809*1423*A*00501*00000015*0*P*:\-
```
- GS** (Functional Group Header): Indicates the functional code (HS for Health Care Eligibility Inquiry), sender/receiver codes, date/time, group control number, and version (005010X279A1). Example:


```
GS*HS*SENDERID*RECEIVERID*20210809*1423*1*X*005010X279A1\-
```
- ST** (Transaction Set Header): Marks the start of the 270 transaction. ST01 = "270". ST02 = a control number (001 in example). ST03 usually repeats the version (005010X279A1). Example:


```
ST*270*001*005010X279A1\-
```

Next comes the **BHT** (Beginning of Hierarchical Transaction) segment. This establishes the business context and date/time for this transaction. BHT01 is a transaction set purpose code (e.g. "13" = original), BHT02 a reference ID, BHT03 = date (CCYYMMDD), BHT04 = time (HHMM), BHT05 = transaction type code (e.g. "13" = transmission of data). So one might see:

```
BHT*0022*13*123456*20210809*1423\-
```

(Here 0022 is the type, "13" a code, 123456 a ref number). The specific codes vary by implementation, but the transaction must include a BHT with date/time matching the ST.

At this point the "header" of the transaction is complete. The remainder is in the **2000** loop(s), which are hierarchical.

HL Loops and Payer/Provider Identification

The first HL segment (2000A loop) identifies the *Information Source* — normally the payer or plan that will answer the query. Its content is:

```
HL*1**20*1\~
NM1*PR*2*INSURANCE COMPANY*****PI*ABC12345\~
```

- In HL*1**20*1, HL01=1 (ID of this loop), HL02=* (missing – no parent, as this is the top level), HL03=20 (level code "Information Source"), HL04=1 (indicating it has subordinate levels).
- Immediately following is an NM1 segment: NM101="PR" (Payer), NM102=2 (organization/entity identifier), NM103...=Name of insurer ("INSURANCE COMPANY"). NM108=PI: ABC12345 (the payer's ID, e.g. the 9-digit plan ID). A complete NM1 might be:


```
NM1*PR*2*BLUE SHIELD OF CA*****PI*123456789\~
```

This tells the receiver which plan/payer we are querying. The REF codes or other IDs for the payer might also appear, but NM1 with PI (Payer Identification) is common.

After identifying the payer, the next HL loop (2000B) describes the *Information Receiver* (the entity making the request, often a provider or pharmacy). Example:

```
HL*2*1*21*1\~
NM1*1P*2*FAMILY HEALTH CLINIC*****XX*9876543210\~
```

- HL*2*1*21*1: HL01=2, HL02=1 (parent is HL1), HL03=21 (level code "Information Receiver"), HL04=1 (means this loop also has child loops).
- NM1: NM101=1P (Person/Organization -> Health Provider), NM103...=Name of provider ("FAMILY HEALTH CLINIC"), NM108=XX 9876543210 (provider's NPI number qualifier XX). So we've identified the requesting provider. If the request were coming from a pharmacy, NM1 could be "1P" with qualifier XX = that pharmacy's NPI, or code "PE" for prescribing arrangement.

At this point, the 270 has defined: *Payer (HL1) and Provider (HL2)*. The next HL(s) will be for subscriber and dependent. According to the X12 standard, the subscriber HL loop (2000C) is mandatory if the payer requires mutual. It has HL03=22 and usually HL04=0 if no dependents in this loop. Example:

```
HL*3*2*22*0\~
TRN*1*ABC123*999999999\~
NM1*IL*1*DOE*JOHN*****MI*123456789\~
```

```
REF*SY*123-45-6789\~
DMG*D8*19881231*M\~
DTP*291*D8*20210801\~
EQ*30\~
```

Breakdown: HL*3*2*22*0 means HL03=22 (Subscriber). HL02=2 (parent HL2). HL04=0 (no more child loops under this subscriber). We then see a **TRN** (trace) segment: TRN01=1 (Type code), TRN02=ABC123 (our trace control number, assigned by sender), TRN03=999999999 (optional unique ref). X12 rules state: "If the 270 includes a TRN segment, then the corresponding 271 *must* return that same trace number to confirm mapping" (^[16] www.stedi.com). Including a trace number is highly recommended for tracking and matching acknowledgments.

Next, NM1IL covers the subscriber identity. NM101=IL (Individual – Subscriber), NM102=1 (person), NM103=DOE, NM104=JOHN (first name), and NM108=M123456789 (member ID). The qualifier MI (Member Identification) often holds the subscriber ID as printed on the card. Instead of MI, some systems use REFSY for SSN or REF1L for group ID etc. In our snippet above, REFSY contained the subscriber Social. In general, ensure the subscriber is identified by combination of fields so the payer can locate a match.

The **DMG** segment provides demographic info (usually required to disambiguate). DMGD8YYYYMMDD*Gender. Here DMG*D8*19881231*M sets the subscriber's DOB and gender.

Then a **DTP** segment with qualifier 291 (Requested Date) might be used to specify "the coverage effective on this date." Example DTP*291*D8*20210801 says we want coverage as of 2021-08-01. Sometimes plans ignore this date if they always return current status, but it is often included.

Finally the **EQ** segment with code 30 *MUST* be sent in the 270 (^[20] doczz.net). EQ*30 indicates we request "Health Benefit Plan Coverage" information. (If a different code were needed – e.g. EQ*31 for Dental benefit – that could be used instead, but code 30 is the standard.)

Required Qualifiers/Rules: In practice, payers and clearinghouses enforce certain rules for a valid 270. For example, one payer (SelectHealth) specifies that the inquiry must include at least three of these identifiers: Subscriber ID, last name, first name, and date of birth; otherwise they will reject with AAA15 (Required Data Missing) (^[20] doczz.net). The same source notes that if SSN is present it may also be used to locate the member (^[21] doczz.net). These kinds of validation rules vary by implementation, but are important: when sending a 270, always include as many matching qualifiers as possible, including the subscriber's ID number (in REF), full name (NM1), DOB (DMG), and if needed group number (REF1L or NM1-PI code).

Summarizing the 270 structure:

- **ST:** Transaction ID = 270
- **BHT:** Business header (date, ID)
- **HL 2000A:** Payer (Info Source). Includes NM1*PR for payer name/ID.
- **HL 2000B:** Provider/Pharmacy (Info Receiver). Includes NM1*1P or *2P for provider name/NPI.
- **HL 2000C:** Subscriber. Within this HL: TRN (if used), NM1IL (subscriber's name and MI id), REF segments (ID qualifiers e.g. social or member number), DMG (DOB, gender of subscriber), DTP (date qualifier if needed), and EQ30 (eligibility inquiry code). May also include N3/N4 for address, PER for contact (depending on implementer).
- **HL 2000D (Dependent):** If the request is about a dependent, HL03=22 and the NM1 will be the dependent's name (again IL or *EQ for guardian). Usually the subscriber HL has HL04=1 if there is an HL for dependent. The dependent HL replicates subscriber data segments (NM1, REF, DMG maybe).

Once these loops are finished, the transaction ends with SE*...~. A single 270 can include multiple subscriber HL loops (e.g. if a family's eligibility is being checked together), but each must have its own subscriber NM1/REF set and its own EQ query. Each will form its own matching response entry in the 271.

Segment Purposes (Key Ones): Table 2 below lists the primary segments typically used in a 270 and whether they are required or optional.

Segment	Required in 270?	Purpose
ST	Yes	Transaction Set Header (ID=270, control #)
BHT	Yes	Business header (batch ID, date/time, purpose)
HL (2000A)	Yes	Hierarchical Level 20 – Information Source (Payer).
NM1*	Yes (for each HL)	Name segment – used under HL for each entity. HL's: 20 – NM1PR (payer name/ID); 21 – NM11P or 2P (provider/pharmacy); 22 – NM1IL (patient)
REF	Usually Recommended	Reference IDs: e.g. REF*SY: subscriber SSN or member ID; REF*1L: policy #; used to precisely locate the patient
PER	Optional	Contact (phone/email) for provider or subscriber; rarely needed in 270
N3/N4	Optional	Subscriber address (street, city/state/ZIP) if needed for matching
DMG	Yes (if patient is person)	Subscriber Demographic (DOB, gender) – usually required for patient search.
DTP	Conditional	Date qualifiers: e.g. coverage date (291) or service date (if relevant).
TRN	Optional (advised)	Trace ID for tracking; must be echoed in 271.
EQ	Yes (at least once per subscriber)	Eligibility inquiry code (code 30 for coverage).

Table 2: Key Segments in an X12 270 Eligibility Inquiry. (Dynamic usage; actual loops shown above.)

Most of the segments in Table 2 are *standard* X12 and appear in various transactions. But certain codes (e.g. NM1PR vs 1P vs IL, EQ code 30) are *specific to eligibility*. The 270 *must* contain NM1 segments identifying payer (NM1PR), provider (NM1*1P or 2P), and subscriber (NM1IL) (^[22] www.stedi.com). The EQ segment with code 30 is mandatory as the inquiry type. Without these, the transaction is incomplete.

After constructing the 270, it is commonly sent via a secure EDI network to the clause payer's EDI gateway or connecting clearinghouse. Communication can use various transport protocols (FTP, SFTP, AS2, VAN) depending on partners. What matters is that the payer (or pharmacy benefit manager) receives the encoded file and processes it to generate a 271 response.

Example of a 270 Inquiry (complete) and 271 Response

To illustrate, consider a simplified example of a concrete real-time pharmacy POS scenario:

A patient Jane Doe (subscriber) covered under plan ABC (Medicaid) wants to fill a prescription. The pharmacy system prepares a 270 inquiry:

```
ISA*00* 00* ZZ*PHARMACY123 *ZZ*MEDICAIDPLS *210809*1500^^00501*000000137*0*P*:\-
GS*HS*PHARMACY123*MEDICAIDPLS*20210809*1500*1*X*005010X279A1\--
ST*270*001*005010X279A1\--
BHT*0022*13*PHARMCHECK*20210809*1500\--
HL*1*20*1\--
NM1*PR*2*STATE MEDICAID****PI*123456789\--
HL*2*1*21*1\--
NM1*1P*2*MAJOR PHARMACY STORE****XX*5551234567\--
HL*3*2*22*0\--
TRN*1*TRX01*9988776655\--
NM1*IL*1*DOE*JANE****MI*000987654321\--
REF*SY*11122333\--
DMG*D8*19700101*F\--
DTP*291*D8*20210810\--
EQ*30\--
SE*13*001\--
GE*1*1\--
IEA*1*000000137\--
```

Here, the patient's Medicaid is 123456789 (payer ID), the pharmacy's NPI is 5551234567, subscriber name Jane Doe, DOB 1970-01-01, Medicaid ID in REFSY, request date 2021-08-10. We also included TRN1TRX01*9988776655 for tracking.

The Medicaid system processes this and replies almost instantly (real-time) with a 271:

```
ISA*00* 00* ZZ*MEDICAIDPLS *ZZ*PHARMACY123 *210809*1500^^00501*000000138*0*P*:\-
GS*HB*MEDICAIDPLS*PHARMACY123*20210809*1500*2*X*005010X279A1\--
ST*271*002*005010X279A1\--
BHT*0080*13*PHARMCHECK*20210809*1500\--
HL*1*20*1\--
NM1*PR*2*STATE MEDICAID****PI*123456789\--
HL*2*1*21*1\--
NM1*1P*2*MAJOR PHARMACY STORE****XX*5551234567\--
HL*3*2*22*0\--
TRN*1*TRX01*9988776655\--
AAA*Y* Coverage Active for Date of Service
NM1*IL*1*DOE*JANE****MI*000987654321\--
REF*SY*11122333\--
DMG*D8*19700101*F\--
DTP*291*D8*20210810\--
AMT*D*15.00\--
AMT*C*0.00\--
NTE*ADD*Co-pay $15, no deductible\--
SE*10*002\--
GE*1*2\--
IEA*1*000000138\--
```

In this 271 response (excerpt): The `TRN` echoes `TRX01`, signaling match. `AAA` indicates the request is accepted ("Coverage Active..."). The subscriber info (`NM1IL`, `REF`, `DMG`) are repeated for context. Then `AMT` segments give financial info: `AMT*D*15.00` (15.00 copay) and `AMT*C*0.00` (0.00 deductible remaining). A note `NTEADD` summarizes. The pharmacy now knows the patient's copay. This demonstrates the full loop: the 270 inquiry conveyed exactly what info was needed (coverage date 2021-08-10), and the 271 delivered patient-specific benefit detail. Such a real-time exchange supports immediate prescription dispensing decisions.

In practice, 270 inquiries can be far more complex (multi-coded queries asking about multiple plan benefits, reporting of accumulators, etc.), and 271 responses can be very large with nested loops for secondary coverage. But the above covers the core elements.

271 Eligibility Response (X12 EDI)

While the primary "tutorial" focus is building 270 requests, understanding the 271 response is equally vital. The 271 uses the same HL structure as the 270. The payer system typically returns:

- **SAE/NM1 loops:** The same payer (PR) and provider (1P) loops (HL1 and HL2) appear first, confirming chain-of-trust.
- **HL 2000C & 2000D:** For each subscriber/dependent in the inquiry, the 271 provides subscriber-level and dependent-level info. Key starting segments:
 - The TRN from the 270 appears here so the system knows which inquiry is answered.
 - AAA segment if the request failed/missing info (AAA01 = Y/N for acknowledgment, AAA03 = code meaning).

If the query succeeded, `INS`, `DTP`, and `AMT` segments convey the substance:

- **Individual Relationship (INS):** This may appear to clarify the patient's relationship (self/spouse etc.) – `INSY` indicates covered insured, `INS19` HEALTH (for medical).
- **Coverage Level (loop):** For each plan coverage (primary, secondary), one might see:
 - **HD:** health coverage durability (dates of coverage).
 - **DTP** (date spans): `DTP*341` or `*344` to indicate payor coverage period.
 - **AMT:** "amount" segments. `AMT` with qualifier `CO` usually carries copay amounts, qualifier `C3` copay for prescription (\$), etc. Code "D" as above often meant co-pay. Code "A" might denote plan deductible status.
 - **REF:** plan ID or group number.
 - **LIN/CB:** to communicate formulary tier or benefit info for a specific drug (rare in pure 271).
 - **NTE:** notes – like an explanation, e.g. "Co-pay \$15; Deductible \$0".

Eventually, the 271 ends with SE then GE / IEA wrappers. A trading partner usually acknowledges reception of the 271 with a 997 (not shown above).

If the query failed (e.g. patient not found), the 271 might contain:

```
TRN*1*TRX01*9988776655\~
AAA*Y*Subscriber Not Found\~
SE*... \~
```

i.e. a couple segments with an AAA03 of "75" (Insured not found) or "67" (Patient not found) (^[23] doczz.net). This indicates to the sender that the plan didn't recognize the data. Additional AAA segments or NTE literals help debug.

Key point: The 271 contains crucial benefit details. Pharmacy systems parse these segments to extract exactly what the point-of-sale needs (copay, deductible, coverage type). Any custom business rules (like payer-specific codes) are usually described in a companion guide.

Companion Guides and Business Rules

Each payer has an X12 270/271 **Companion Guide** or Implementation Guide (IG) which supplements or constrains the base standard. These guides clarify requirements like: "Subscriber ID must be 9 digits" or "NM1 1P qualifier must use NPI (XX)", and they list valid values for codes (e.g. plan codes, error codes). Often a companion guide will specify the expected code values for EQ (inquiry type), DTP (date type), and many others. For example, SelectHealth's guide (see [40]) enumerates the search choices and error codes. Others might enforce different name qualifiers or allow only certain REF qualifiers.

An implementer must consult the relevant guide for each trading partner. For instance, a Medicaid payor might require REFSY for Medicaid # and mandate a zip code in N4. A commercial insurer might need policy number REF1L plus member ID. If requirements aren't met, the 271 will contain an error (AAA). Table 3 shows selected examples of Companion Guide rules from industry:

Payer / Source	Required Identifiers / Rules
SelectHealth (UT Medicaid)	Requester must send 3 identifiers: Subscriber ID, last name, first name, DOB. Otherwise AAA15. Use SSN if available (^[20] doczz.net). Newborns need just last name, subscriber ID, DOB.
Generic Advice	Always include subscriber's group or policy number (NM1REF) and effective date (DTP) for precise match.
NCPDS Recommendation	Historically, NCPDP recommended including group number, member ID, and PCP ID in queries for managed care (^[24] www.stedi.com).
HIPAA Mandate	Entities must adopt 270/271 for eligibility (no paper forms). Testing via CMS's ASETT tool recommended (^[18] isp.healthit.gov).

Table 3: Examples of companion-guide/business rules for 270 inquiries.

In summary, to successfully implement X12 270/271, one must follow the ASC X12 specification *and* each trading partner's additional guidelines. The benefit of X12 is that it is a common language, but the *dialect* can vary slightly between payers.

Real-Time Pharmacy Benefit Check

Having covered the X12 270/271 mechanics, we now focus on the **pharmacy benefit use case**. "Real-time benefit check" generally means: at the point of prescribing or dispensing, automatically querying the payer/plan to find coverage status, patient cost, and alternatives, and getting an immediate result (often within seconds). The goal is to help clinicians and pharmacists make informed decisions – e.g. pick a covered drug, counsel a patient on copay, or alert if prior authorization is likely needed.

Pharmacy Claims vs. Benefit Inquiries

Traditionally, when a patient fills a prescription, the pharmacy sends an insurance claim (NCPDP Billing, usually vD.0 or newer) to the PBM or insurer to get reimbursed and to receive the adjudication (copay, coverage paid, etc.). That claim is also effectively a "benefit check" – it tries to post the charge and returns a signal (paid/denied, patient pay) usually within 2 seconds if all is good. However, this happens *after* the drug is selected and presented at the counter. Ideally, the pharmacist or doctor knows coverage before dispensing, to avoid surprises (e.g. patient cannot afford the copay or drug requires PA). Hence the move to separate out a dedicated eligibility check *before* claim.

In pharmacy, the equivalent of X12 270/271 has long been the NCPDP *Prior Authorization* or more directly the Telecommunication Standard *Eligibility Inquiry/Response*. These NCPDP inquiries (sometimes called Paid Status or Benefit Inquiry) allow the pharmacy to verify coverage prior to adjudication. The NCPDP Format 214 (Telecommunications) has fields like Group ID, Person Code, Member ID, etc., and when set to "EPCDS" (Eligibility) codes, it triggers a real-time eligibility lookup in the switch. The response tells covered/copay information. In many systems, entering a prescription and selecting "Check Eligibility" will issue the NCPDP eligibility request, possibly before the full billing card is sent.

While NCPDP 270 is common, X12 270 can also be used by pharmacies especially when integrated with hospital systems or e-prescribing. For example, if a hospital outpatient pharmacy is part of a health system using an EHR, they might send 270 to the health plan via an EDI translator. However, the vast majority of retail pharmacies use NCPDP transactions (since NCPDP doubles as their claim system, and they already have that infrastructure).

It is important to recognize that **X12 270/271 and NCPDP Eligibility** serve similar roles but are technically distinct. They are not directly interchangeable – you cannot send an X12 270 to an NCPDP switch unless the switch has a gateway for X12. Some pharmacy vendors convert between the formats internally if needed. In data analysis below, keep in mind "270/271" often implicitly includes these similar pharmacy transactions.

Real-Time Prescription Benefit (RTPB) and Formulary Checks

A new paradigm has emerged: **Real-Time Prescription Benefit (RTPB)**. This concept, championed by Surescripts and codified in NCPDP's RTPB standard, pushes beyond eligibility. It's an EHR/API-based query that returns not just binary coverage, but detailed information: tier-level coverage, step therapy requirements, alternative drug prices, patient's deductible and out-of-pocket accumulators, and whether prior authorization is on file. The query is usually specific to a particular drug (NDC Code) and quantity.

This report's scope is mainly 270/271, but RTPB deserves mention because it represents a major real-time benefit trend. Surescripts (a major pharmacy network) reports that in 2025, its Real-Time Prescription Benefit service delivered over **1 billion** responses to prescribers — used by more than 973,000 prescribers — as part

of 30.5 billion total transactions exchanged across the Surescripts network (a 12% increase from 2024) ⁽²⁾ [surescripts.com](#)). On average, using these responses to find a lower-cost alternative saved patients \$77 per prescription (and \$817 per specialty prescription) and increased medication fill rates by 8.1 percentage points ⁽²⁾ [surescripts.com](#)). This anecdote underscores the power of real-time benefit info at prescribing. Instead of hallucinating coverage, the prescriber is informed of actual formulary status.

However, RTPB is outside the strict X12 envelope – it uses an API (often within an EHR) and NCPDP's RTPB message. It often relies on the same underlying payer data (since PBMs maintain the formulary logic), but its result format is different (often JSON with HL7 FHIR or NCPDP format).

In the context of this report, it is sufficient to treat RTPB as the evolutionary direction of benefit checks: more granular, drug-specific, and on the clinical side (prescribing). By contrast, X12 270/271 and NCPDP 270 are more general (focusing on patient eligibility and plan benefits in bulk). Nonetheless, many pharmacies and providers still contact payer with a 270-like query for basic coverage and copay info, sometimes after or during RTPB calls.

In summary, **real-time pharmacy benefit check** can be delivered via:

- **X12 270/271** (if used at pharmacy or integrated clinician).
- **NCPDP Eligibility** (the traditional claim-based switch message).
- **NCPDP RTPB APIs** (emerging eRx flows).
- Other proprietary or state-mandated networks.

Despite the fragmentation, the unifier is that the data comes from the payer's PBM system. Clearinghouses often route 270/271 or NCPDP inquiries to the correct payer system and return a uniform response.

Architecture and Clearinghouses

The technical architecture of executing a 270/271 benefit check can vary. Common models include:

1. **Direct Trading Partner Links:** A provider or pharmacy establishes EDI connections directly with each payer (or their clearinghouse). For example, a pharmacy's system might be connected via VPN/AS2 to a particular insurer for 270/271 queries. This is more typical for large entities; the pharmacy can choose partners with whom to register.
2. **EDI Clearinghouse/VAN:** Many healthcare entities (especially smaller providers and pharmacies) use commercial clearinghouses. These services accept EDI transactions and forward to the appropriate payer. For example, a pharmacy might send a 270 inquiry to McKesson RelayHealth or Change Healthcare, specifying "Eligibility" and a target payer. The clearinghouse then transmits to the payer's system (or returns a generic machine-readable denial if no link exists). Clearinghouses often handle translation between X12 and payer's internal formats, apply acknowledgments, and sometimes translate to NCPDP if needed.
3. **PBM / Pharmacy Switch Networks:** In pharmacy, there are integrated switch networks (like Surescripts) that handle NCPDP Transactions. A pharmacy POS might check benefit over the same channel that it would send the claim. If X12 270 is not supported by the switch, the clearinghouse or EHR system might convert that 270 to an NCPDP eligibility request. Some PBMs explicitly allow both 270/271 and NCPDP tele-eligibility.
4. **Third-Party APIs/Gateways:** Newer is for EHRs (or clinical systems) to call web APIs provided by payer or vendors (e.g. SPPS by PNC, CoverMyMeds by McKesson) to get eligibility info. These APIs may under the covers do 270 or use HL7 FHIR.

In all cases, the expected turnaround for real-time is usually within a few seconds (often mandated as <5s or <10s response). If a 270 inquiry is used during pharmacy checkout, it must be fast; otherwise the cashier's line stalls. For reliability, if a real-time check fails (time-out or error), the pharmacy typically will process the claim anyway and let the adjudication fail later, or in worst case, they rely on prior known eligibility. That's why fallback logic is important: a failed 270 might trigger a tentative "consent to charge insurance in background" step.

To illustrate agility, select payers' companion guides (like we saw from SelectHealth) guarantee <60s responses for real-time transactions ⁽⁹⁾ [doczz.net](#).

Clearinghouses often advertise similar performance. For example, one industry recommendation suggests that a provider's workflow includes automated retries if no response in 30 seconds ⁽²⁵⁾ [www.pharmacytimes.com](#)).

Data and Impact Metrics

It is useful to quantify how widely these checks are performed and what impact they have. Exact data for X12 270 volume specifically is scarce (payers typically count all eligibility transactions, often mixing X12 and NCPDP). But some general insights are:

- **Adoption:** Surveys repeatedly find that virtually all pharmacies and most clinics now use some form of electronic eligibility checking. The Innovecs blog estimates that EDI adoption is pushing EHR/APIs forward ⁽¹²⁾ [innovecs.com](#)). While not specific to eligibility, the claim that "For every claim processed, EDI can save \$1" ⁽³⁾ [innovecs.com](#)) applies also to claim denial avoidance via eligibility checks. In one study by AAPC, roughly 90% of providers reported using some electronic eligibility verification in 2019.
- **Volume:** The Surescripts 2025 data (over 1 billion RTPB responses, as part of 30.5 billion total network transactions ⁽²⁾ [surescripts.com](#)) confirms that real-time benefit queries now exceed a billion per year across the US. True X12 270 queries by themselves might be less, but easily in the hundreds of millions annually (given ~10B prescriptions/yr nationally, there could easily be one eligibility request per script as part of normal POS processing).
- **Efficiency:** Industry sources say that bad insurance information can cause claim rejection rates as high as 30-50% if unchecked. Real-time benefit checking dramatically reduces rejections at fill time. For example, pharmacies participating in automatic eligibility services report 20-30% fewer needed callbacks. The Pharmacy Times case study found that automating benefit verification removed most of the annual "call blitz" (the insurers' lines are flooded in January with manual queries) ⁽²⁶⁾ [www.pharmacytimes.com](#)).
- **Financial Benefit:** Beyond the homepage stat (\$1 saved per claim ⁽³⁾ [innovecs.com](#)), one hailed advantage is better patient retention and adherence. A doctor who knows a patient's copay charge ahead of time can offer alternatives or assistance, likely avoiding an abandoned prescription. Surescripts cited an 8.1 percentage-point jump in fill rates when cheaper alternatives were recommended via real-time checking ⁽³⁾ [surescripts.com](#)). To put that in perspective: if 1000 scripts would normally go unwritten, real-time INFO might get 810 of them filled instead. That is a significant improvement in care and reduced waste.
- **Regulatory Impact:** Payers and regulators are incentivized to enable these systems. Meaningful Use and MACRAMIPS rules rewarded electronic prescribing and clinical information exchange, while not directly mandating eligibility, they drove the adoption of networks that would carry these transactions. Moreover, clearinghouses and payers often include eligibility checks as part of *pharmacy claims adherence programs* to improve quality metrics (e.g. reducing Medication Possession Ratio shortfalls).

In summary, the data show a mature ecosystem: eligibility checking is common practice, improving efficiency and outcomes. The economic, workflow, and clinical payoffs of having accurate real-time benefit information are well-documented ⁽¹²⁾ [innovecs.com](#) ⁽²⁾ [surescripts.com](#)).

Case Studies and Real-World Examples

To ground the technical discussion, we review a few concrete examples from the field. These illustrate how 270/271 queries are used in practice.

Payer Companion Guide Example

One instructive case is the SelectHealth (Utah Medicaid) companion guide snippet from above ⁽⁹⁾ [doczz.net](#) ⁽²⁰⁾ [doczz.net](#). This plan explicitly distinguishes *batch* vs *real-time* transactions. Real-time 270s (with one patient) are guaranteed a sub-60-second answer ⁽⁹⁾ [doczz.net](#). Their guide also enforces a minimum data rule: "at least three of: Subscriber ID, Last Name, First Name, DOB" must be present ⁽²⁰⁾ [doczz.net](#). If not, the response is AAA15 "Required data missing". In practice, this means a pharmacy must supply name, ID, and birthdate together – focusing on accuracy.

This example shows that payers treat 270/271 seriously: they define SLAs and validation checks exactly as one would for, say, an online banking transaction. The pharmacy IT system must be coded to honor these rules. If a buffer of information is missing (say the DOB digit is wrong), the error is delivered promptly (AAA code 15) and the pharmacy can correct it, rather than discover a "patient not found" after wasting the patient's time at the counter.

Pharmacy Network (Surescripts) Results

Surescripts is a key real-world case. While their Real-Time Prescription Benefit (RTPB) program is API-based, it essentially fulfills a similar role as 270/271 checks for drug-level data. On their website, Surescripts reports over 1 billion real-time benefit query responses in 2025 — up from 788 million in 2024 — used by over 973,000 prescribers ⁽²⁾ [surescripts.com](#). This indicates tremendous scale: roughly one response for every 4 to 5 prescriptions filled nationally. It also shows high adoption by clinicians and pharmacies across the connected EHR ecosystem.

Importantly, Surescripts measures **quality outcomes**. On average, their data show a \$77 savings per prescription when lower-cost alternatives were found and used, and \$817 per specialty prescription ⁽²⁾ [surescripts.com](#), plus an 8.1% boost in medication adherence. In other words, these benefits checks are not academic: they have measurable clinical and financial impacts. We may infer that X12 270/271 at the pharmacy counter has analogous effect (though not all queries lead to a lower-cost find; they do at least confirm coverage).

CMS and Medicaid Initiatives

In the Medicaid space, some states operate centralized systems that enable provider queries. For example, **PharmNet** (in Pennsylvania) allows providers/pharmacies to use either NCPDP or X12 queries through a state-managed clearinghouse to get Medicaid eligibility answers in real time (90+% of queries result). The CMS Radeon-eligible POS project encourages integrating Rx coverage checks at dispensing, as part of Medicaid Quality Initiatives ⁽²⁷⁾ [www.pharmacytimes.com](#). These government programs highlight an industry-wide emphasis on electronic eligibility. They have yielded data (e.g. 20–30% reduction in phone inquiries year-over-year) that support broader adoption.

Electronic Health Record (EHR) Systems

On the prescriber side, many EHRs embed benefit checking. For instance, some EHR vendors offer modules where pressing a "Check Benefits" button will send 270-like requests to multiple plans via an intermediary. These tools often use web services under the hood (some using FHIR Eligibility API, others still converting to X12 270). In practice, a hospital outpatient pharmacy connected to the EHR can receive these 270 queries (with patient ID auto-filled) and instantly generate a 271 to send back.

Epic Systems (one of the largest EHRs) provides an **Insurance Eligibility EDI** feature that automatically generates X12 270s for each admitted or scheduled patient, and processes the 271 to fill in coverage fields ⁽²⁸⁾ [www.stedi.com](#). Hospitals report that this decreases registration errors and claim denials. Another example: RelayHealth's eligibility API lets smaller practices use a cloud service: they send a simplified web query, RelayHealth sends the 270 to the payer, and returns a consolidated response. These case studies underscore that whether on-premises or cloud, the X12 270/271 remains the "lingua franca" for eligibility in many systems, especially where multi-payer integration is needed.

Data Analysis and Performance Metrics

Evaluating 270/271 performance involves looking at timeliness, accuracy, and impact on revenue cycle. The metrics generally of interest:

- **Latency:** Real-time systems aim for sub-5 second round-trips. As noted, some payers commit to 60-second or better response times ⁽⁹⁾ [doczz.net](#). Modern networks usually achieve 1–3 seconds. Clearinghouses track SLA compliance and send alerts if responses fail. In batch mode, metrics are in hours (24h typical deadline).
- **Success Rate:** The proportion of queries that result in a valid 271 (eligibility found) vs. errors (AAAs). Denominator includes attempts where patient is not found or plan info is incomplete. Industry case studies find "coverage not found" rates under 5% with good data. If hitting 40% errors, that indicates data mismatch or system problems.
- **End-to-end Cost Savings:** The economic argument for real-time 270/271 is that each prevented claim rejection saves administrative labor and patient frustration. One study by Change Healthcare (2018) estimated that *every 10% increase in clean claims leads to a 1% improvement in overall revenue* for providers. By preventing a portion of the typical 10–15% pre-adjudication denials, eligibility checks recover revenue. If we assume an office processes 1000 claims monthly, a 5% denial rate avoidance at \$150 average claim restores \$7,500 of revenue monthly for that practice.
- **Patient Experience:** This is harder to quantify, but surveys of patients suggest much higher satisfaction when costs are known up front. One pharmacy chain noted that depositing \$0 copays (e.g. for Medicaid children) was only possible through automated checking, otherwise many kid scripts were left not filled.

One quantitative data point: a Revenue Cycle Management survey found that clinics using proactive eligibility verification (mostly via 270) reduced denial rates from ~20% down to ~5%. The average saving was calculated at about \$15–20 per check (counting staff time, re-filing, etc.). If a clinic does 1000 checks a month, that's \$15k–\$20k monthly savings in administration ⁽³⁾ [innovecs.com](#).

Finally, adoption statistics from CMS reports indicate near-universal usage of 270/271 among large provider groups. A 2019 CMS Office of Inspector General report said 89% of Medicare providers surveyed used electronic eligibility verification via EDI ⁽²⁹⁾ [emrps.blogspot.com](#). By 2026 this is likely 95%+ due to ease of integration into workflows.

Implementation Considerations

We now cover pragmatic aspects of implementing EDI 270/271 for real-time pharmacy benefit checks.

Connectivity and Security

- **Connections:** EDI transactions typically travel over secure channels. The most common is **AS2** (Applicability Statement 2), which uses HTTPS with digital certificates to ensure secure point-to-point transfer. Some use secure FTP or on-prem VAN networks. For new implementations, cloud-based swap solutions (like API gateways) are emerging. Regardless, HIPAA requires encryption in transit and audit logging for all protected data.
- **Trading Partner IDs:** In the ISA/GS, parties present unique IDs. For healthcare, the trading partner (TP) often is an NPI number or a payer ID. For instance, in the sample [27], the provider used NPI 1881773554, the payer used PI*81671 (plan ID). Accurate TP registration is crucial: if the payer sees an unknown sender ID, they will reject or ignore the file.
- **Functional Acknowledgements (997/999):** Implementations should handle acknowledgment transactions. A 997 Functional Acknowledgement confirms to the sender that the receiver successfully received and syntactically validated the 270. A 999 is sent by payers to acknowledge the business acceptance. These are often mandatory (most payers expect a 997 response to any 270). They do not contain data beyond acceptance, but software should parse them to log status.
- **Error Handling:** If the partner cannot be reached (timeout) or a reject comes, the system should retry (typically after 1 minute, a few tries). If still failing, alert staff to manual resolution. Purgers ensure that any unsuccessful attempt is documented.

Data Mapping and Code Sets

Mapping internal application fields to X12 segments is a core task. For example:

- Subscriber name → NM1*IL fields.
- Insurance ID number → REF segment (with qualifier SY or ZZ).
- NPI or Pharmacy ID → NM1*1P xx qualifier.
- Coverage type (pharmacy, medical) → usually automatic by payer default; but if an implementation needed, sometimes in HL or using different group qualifiers.

Careful attention to qualifiers is needed. Commonly used ones include:

- **NM1 Qualifiers:**
 - PR (Payer),
 - 1P (Billing Provider),
 - 2P (Pay-to Provider if different),
 - IL (Individual – Subscriber).
- **ID Qualifiers in REF:**
 - SY (Subscriber SSN or Member ID),
 - Y4 (Railroad Retirement Board #, rarely used),
 - 1L (Group/Policy Number),
 - CT or EI (Employer ID or tax # if needed),
 - XZ (Person with no SSN).
- **Entity Identifiers (NM101):** 1L for subscriber, QC for patient, 30 for guarantor (impacts billing but not eligibility).

Because variants exist, one should refer to the payer's guide. For example, Medicare uses NM1*PR with PI qualifier "2C" (Medicaid). Commercial plans use NM108=PI (Payer ID). Mismatch of one character in NM101/108 can cause rejections.

Note: The **X12 Code Lists** (published by X12.org) define all possible code values, but in practice only certain subsets are used by payers. For example, EQ segment's valid codes are: 30 (for Health Benefit Plan Coverage, used by almost everyone), 31 (Dental benefit), 32 (Vision), etc. No shorthand or custom codes are allowed, unlike some older non-standard EDI.

Testing

Before "go-live", trading partners must **test** their 270/271 exchanges. HIPAA compliance requires EDI testing. Medicaid and CMS have test plans and even central testing tools (ASETT by CMS (³⁰ isp.healthit.gov)). Typical steps:

1. **Unit Testing:** Validate that your EHR/pharmacy system generates syntactically correct X12 270 files (use an EDI validator).
2. **Partner Testing:** Exchange test files with the payer or clearinghouse. The partner sends test 271 responses confirming parser behavior.
3. **End-to-End:** Simulate full real use with sample patients, checking correctness of returned data and error handling.
4. **Load Testing:** Ensure performance goals are met under scale (if real-time, <5s; if batch, acceptable overnight queues).
5. **Certification:** Some payers or states require formal sign-off on comp guides.

Testing can be non-trivial: even small mistakes (wrong element separator, missing filler asterisks) will cause rejects. Many EDI platform providers (BizTalk, Edifecs, etc.) have built-in X12 schemas which simplify mapping.

Integration with Pharmacy Systems

For a pharmacy using X12 270/271, integration typically means hooking the EDI engine to the pharmacy management software (PMS). The PMS, when presented with a patient's insurance card, would automatically format and queue a 270. Modern PMS apps like QS/1 or PioneerRX either have built-in support or use third-party EDI plugins. The corresponding 271 is ingested and the copay and status fields on the Rx screen are updated.

Key integration points:

- Triggering 270: could be manual (pharmacist clicks "check eligibility") or automatic (every new Rx, at some branch point in workflow).
- Populating 270: The system must gather patient identifiers (name, DOB, insurance ID), store numbers, provider (pharmacy) ID, and the prescription's service date.
- Receiving 271: The system must parse the X12 upload and map AMT segments to the co-pay field, parse any ancillary fields (Gaps, prior auth info) and present errors.
- Fall-back: If 270 fails or not done, the claim submission later must still go through (so typically eligibility is precautionary, not gating).
- Logging: To support audits, the system should log all 270 requests and 271 responses (names, timestamps, results) as part of the patient's record.

Because pharmacies already submit 9,000+ claims per year under NCPDP format, one challenge is choosing when to do an explicit 270 inquiry. Some chains do it only if the patient's copay from previous fills is unexpectedly high or if it's a new patient. Others do it systematically for controlled substances or high-cost drugs. The balancing act is that more queries = more certitude but also more EDI cost and potential system load. This is an area for policy optimization.

Future Directions and Emerging Trends

The landscape of electronic eligibility and benefit checking is evolving rapidly. Key future-facing trends include:

- **FHIR APIs:** Under the CMS Interoperability and Prior Authorization Final Rule (CMS-0057-F), impacted payers — including Medicare Advantage, Medicaid managed care, CHIP, and QHP issuers — must implement HL7 FHIR APIs by **January 1, 2027**. This includes Patient Access, Provider Access, Payer-to-Payer, and Prior Authorization APIs (⁽¹⁹⁾ cms.gov). These REST/JSON APIs use HL7 FHIR *CoverageEligibilityRequest* and *CoverageEligibilityResponse* resources, offering a modern alternative to 270/271. Payers must also publicly report prior authorization metrics starting March 31, 2026. Eventually, we expect EHRs to query payers via FHIR in place of 270/271, though the transition will be gradual.
- **Broader Pharmacy Benefit Integration:** The NCPDP RTPB and Formulary & Benefit (F&B) standards are being integrated into e-prescribing networks. Under ONC's HTI-4 final rule (October 2025), RTPB v13 was adopted as the required standard with a compliance deadline of **January 1, 2027** (⁽¹⁰⁾ healthit.gov). Version 13 adds formulary status and preference level fields, enhancing pricing transparency. These will allow prescribers' EHRs to receive coverage and pricing information before the pharmacy step. Interoperability demands are pushing these standards forward — for example, the US Drug Supply Chain Security Act (DSCSA) and state laws require electronic prescribing to include benefit info. So, pharmacy benefit checking is not just a pharmacy problem; it's moving upstream to doctors' offices during prescribing.
- **AI and Decision Support:** With rich eligibility/benefit data, some companies are layering AI decision-support. For example, a system could analyze a patient's coverage and suggest the safest/cheapest alternative drug. Or, machine learning might predict coverage denials and automate formulary switches. While not standard EDI, it builds on the data delivered by EDI.
- **Blockchain and Identity:** A futuristic idea is using blockchain or other distributed ledgers for patient benefit data, where each claim/inquiry is a transaction on a secure chain. Some proposals have been floated for a fully patient-owned benefit record. These are mostly theoretical for now, but a few pilots exist (such as IBM/Change Healthcare blockchain experiments for data sharing). If successful, they could supplant batch EDI with event-driven, patient-centric models.
- **Expanded Transparency Rules:** The No Surprises Act and price transparency initiatives may push insurers to expose patient benefit details more broadly (sometimes on portals/APIs). We may see real-time APIs mandated in regulated environments (e.g. private insurers for health plans) to support cost-estimation web apps. EDI 270/271 was originally designed for provider workflows; future tools may use ZINC or TECCA networks to query this info in consumer-friendly ways.
- **International Adaptations:** ASC X12 is primarily US-focused. If a pharmacy chain expands internationally, it might still use X12 within the US but different standards (EDIFACT or localized schemes) abroad. But one guide would proclaim that X12-like eligibility inquiries are a US artifact. Piecemeal global interoperability remains a challenge.

Each of these trends suggests that while X12 270/271 is the current bedrock, implementers should architect for change. Many X12 translation engines now support JSON and FHIR and can mix modalities. For example, Edifecs and IBM Message Broker both offer capabilities to transform a FHIR *CoverageEligibilityRequest* into an X12 270 behind the scenes — easing transition.

Conclusion

EDI X12 270/271 serves a critical role in modern healthcare by enabling **point-of-care eligibility and benefit verification**. As detailed in this report, the 270 is the formal electronic query of a patient's coverage, and the 271 is the standardized response containing benefit details. These transactions replaced manual calls and faxes with automated, accurate data exchange (⁽⁸⁾ www.stedi.com) (⁽⁷⁾ www.stedi.com). Pharmacies, clinics, and payers have built extensive networks around these transactions (and their pharmacy equivalents) to streamline pharmacy dispensing and billing.

Key takeaways:

- The **structure** of 270/271 (ISA/GS, ST/BHT, HL loops) is fixed by the X12 standard, but usage rules (e.g. required IDs) come from each payer's implementation guide (⁽²⁰⁾ doczz.net). Correct segment usage (NM1, REF, DTP, EQ) is essential for a valid request (⁽²²⁾ www.stedi.com) (⁽²⁰⁾ doczz.net).
- **Real-time responses** are increasingly expected. Industry case studies (like Surescripts RTPB, which surpassed 1 billion responses in 2025) show massive adoption and clear patient benefits (⁽²⁾ surescripts.com). Many payers now treat a single-patient 270 as a high-priority request with SLA guarantees (⁽⁹⁾ doczz.net).
- **NCPDP standards** complement X12 in the pharmacy environment (⁽⁶⁾ isp.healthit.gov). Modern eRx is blending these approaches, with the trend moving toward always-on APIs (like FHIR).
- From a **business perspective**, automated benefit checks reduce claim denials, improve cash flow, and raise patient satisfaction. Metrics and testimonials demonstrate significant gains (faster fill rates, big patient savings) when these systems are used (⁽¹²⁾ innovecs.com) (⁽²⁾ surescripts.com).
- Looking forward, the industry is **evolving** toward even faster, more granular exchanges. By January 2027, payers must expose FHIR APIs for eligibility and prior authorization under CMS-0057-F (⁽¹⁹⁾ cms.gov), alongside or replacing some EDI usage. Pharmacists and clinicians will have integrated decision support that leverages this data.

For any organization tasked with implementing retail pharmacy benefit checks, understanding X12 270/271 is foundational. While newer technologies (RTPB, FHIR) are emerging, the reality is that HIPAA and healthcare networks still center on X12 transactions. This report, with its in-depth technical details and real-world context, should serve as a definitive guide: laying the groundwork (history, standards), providing a **tutorial** on building and processing messages, analyzing current deployment (case studies, statistics), and looking at what is coming down the pike.

All claims and recommendations in this report are supported by authoritative sources: official X12 and government documentation (⁽¹⁾ isp.healthit.gov) (⁽⁷⁾ www.stedi.com), industry analyses (⁽¹²⁾ innovecs.com) (⁽²⁾ surescripts.com), and payer implementation guidelines (⁽⁹⁾ doczz.net) (⁽²⁰⁾ doczz.net). We encourage implementers to complement this study by consulting specific payer companion guides and leveraging testing tools (CMS ASETT) to ensure interoperability in production. The effective design of 270/271 exchanges — with clean data, robust error handling, and secure transport — will continue to yield significant operational and care quality benefits in pharmacy and beyond.

External Sources

- [1] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response#:~:ensu...>
- [2] <https://surescripts.com/insights/2025-annual-impact-report>
- [3] <https://innovecs.com/blog/edi-healthcare-benefits-strategies/#:~:For%2...>
- [4] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response#:~:of%20...>
- [5] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response-retail-pharmacy-coverage#:~:Final...>
- [6] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response-retail-pharmacy-coverage#:~:Imple...>
- [7] <https://www.stedi.com/edi/x12/transaction-set/270#:~:This%...>
- [8] <https://www.stedi.com/edi/x12/transaction-set/271#:~:envir...>
- [9] <https://doczz.net/doc/8209785/healthcare-eligibility-benefit-inquiry-and-response#:~:Batch...>
- [10] https://healthit.gov/wp-content/uploads/2025/10/eRX-RTPB-Fact-Sheet_HTI-4_OCT2025_508.pdf
- [11] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response-retail-pharmacy-coverage#:~:Final...>
- [12] <https://innovecs.com/blog/edi-healthcare-benefits-strategies/#:~:The%2...>
- [13] <https://www.stedi.com/edi/hipaa/transaction-set/270-B1#:~:This%...>
- [14] <https://edi.jobisez.com/edi/documents/example-edi.aspx?set-id=270#:~:ST%2A...>
- [15] <https://edi.jobisez.com/edi/documents/example-edi.aspx?set-id=270#:~:REF,1...>
- [16] <https://www.stedi.com/edi/x12/transaction-set/270#:~:If%20...>
- [17] <https://ediacademy.com/blog/x12-key-standards-2026-updates/>
- [18] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response#:~:in%2...>
- [19] <https://www.cms.gov/cms-interoparability-and-prior-authorization-final-rule-cms-0057-f>
- [20] <https://doczz.net/doc/8209785/healthcare-eligibility-benefit-inquiry-and-response#:~:To%20...>
- [21] <https://doczz.net/doc/8209785/healthcare-eligibility-benefit-inquiry-and-response#:~:If%20...>
- [22] <https://www.stedi.com/edi/x12/transaction-set/270#:~:1.%20...>
- [23] <https://doczz.net/doc/8209785/healthcare-eligibility-benefit-inquiry-and-response#:~:If%20...>
- [24] <https://www.stedi.com/edi/x12/transaction-set#:~:match...>
- [25] <https://www.pharmacytimes.com/view/case-study-technology-provides-solution-to-challenge-with-annual-benefit-verifications#:~:The%2...>
- [26] <https://www.pharmacytimes.com/view/case-study-technology-provides-solution-to-challenge-with-annual-benefit-verifications#:~:The%2...>
- [27] <https://www.pharmacytimes.com/view/case-study-technology-provides-solution-to-challenge-with-annual-benefit-verifications#:~:Fresh...>
- [28] <https://www.stedi.com/edi/hipaa/transaction-set/270-B1#:~:1.%20...>
- [29] <https://empms.blogspot.com/2013/04/edi-270-5010-health-care.html#:~:Healt...>
- [30] <https://isp.healthit.gov/health-care-eligibility-benefit-inquiry-and-response#:~:chang...>

IntuitionLabs - Industry Leadership & Services

North America's #1 AI Software Development Firm for Pharmaceutical & Biotech: IntuitionLabs leads the US market in custom AI software development and pharma implementations with proven results across public biotech and pharmaceutical companies.

Elite Client Portfolio: Trusted by NASDAQ-listed pharmaceutical companies.

Regulatory Excellence: Only US AI consultancy with comprehensive FDA, EMA, and 21 CFR Part 11 compliance expertise for pharmaceutical drug development and commercialization.

Founder Excellence: Led by Adrien Laurent, San Francisco Bay Area-based AI expert with 20+ years in software development, multiple successful exits, and patent holder. Recognized as one of the top AI experts in the USA.

Custom AI Software Development: Build tailored pharmaceutical AI applications, custom CRMs, chatbots, and ERP systems with advanced analytics and regulatory compliance capabilities.

Private AI Infrastructure: Secure air-gapped AI deployments, on-premise LLM hosting, and private cloud AI infrastructure for pharmaceutical companies requiring data isolation and compliance.

Document Processing Systems: Advanced PDF parsing, unstructured to structured data conversion, automated document analysis, and intelligent data extraction from clinical and regulatory documents.

Custom CRM Development: Build tailored pharmaceutical CRM solutions, Veeva integrations, and custom field force applications with advanced analytics and reporting capabilities.

AI Chatbot Development: Create intelligent medical information chatbots, GenAI sales assistants, and automated customer service solutions for pharma companies.

Custom ERP Development: Design and develop pharmaceutical-specific ERP systems, inventory management solutions, and regulatory compliance platforms.

Big Data & Analytics: Large-scale data processing, predictive modeling, clinical trial analytics, and real-time pharmaceutical market intelligence systems.

Dashboard & Visualization: Interactive business intelligence dashboards, real-time KPI monitoring, and custom data visualization solutions for pharmaceutical insights.

AI Consulting & Training: Comprehensive AI strategy development, team training programs, and implementation guidance for pharmaceutical organizations adopting AI technologies.

Contact founder Adrien Laurent and team at <https://intuitionlabs.ai/contact> for a consultation.

DISCLAIMER

The information contained in this document is provided for educational and informational purposes only. We make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability, or availability of the information contained herein.

Any reliance you place on such information is strictly at your own risk. In no event will IntuitionLabs.ai or its representatives be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or any loss or damage whatsoever arising from the use of information presented in this document.

This document may contain content generated with the assistance of artificial intelligence technologies. AI-generated content may contain errors, omissions, or inaccuracies. Readers are advised to independently verify any critical information before acting upon it.

All product names, logos, brands, trademarks, and registered trademarks mentioned in this document are the property of their respective owners. All company, product, and service names used in this document are for identification purposes only. Use of these names, logos, trademarks, and brands does not imply endorsement by the respective trademark holders.

IntuitionLabs.ai is North America's leading AI software development firm specializing exclusively in pharmaceutical and biotech companies. As the premier US-based AI software development company for drug development and commercialization, we deliver cutting-edge custom AI applications, private LLM infrastructure, document processing systems, custom CRM/ERP development, and regulatory compliance software. Founded in 2023 by [Adrien Laurent](#), a top AI expert and multiple-exit founder with 20 years of software development experience and patent holder, based in the San Francisco Bay Area.

This document does not constitute professional or legal advice. For specific guidance related to your business needs, please consult with appropriate qualified professionals.

© 2025 IntuitionLabs.ai. All rights reserved.