Supporting Patients as They Become Consumers:

Our Strategies for Access, Analytics and Care Collaborations to Integrate Care, Improve Outcomes and Add Value with Laboratory Services
185,868  ExpressCARE visits
304,086  ER visits
74,928   acute admissions
1,039,864 outpatient registrations
2,933,114 practice visits
HNL Client Locations - National
Our Mission

To inform, improve, and inspire….

one test, one answer, one insight at a time.
CX: Consumer Experience/Engagement
Patients are Becoming Consumers
Consumer Choice...... Is Evolving

LabCorp

Quest Diagnostics™

JPMorgan

amazon

Berkshire Hathaway Inc.

Apple

CVS

Walmart

Walgreens

How are you adapting?
Patients are Becoming Consumers

**Must Haves**
- Service
- Access
- Convenience
- Participation

**Cost (Not Price)**
- Not as Important (to the Consumer)
- Quality
- Recommendation
Health Care is Undergoing a Retail Revolution

Patients Are Becoming Consumers

New Drivers

Technology and Information > Quality
Convenience > Credentials/Continuity
Cost > Price

HNL’s Approach

Real-time Portals to Provide Results and Actionable Information
Predictable Service Time
Choice and Direct Access

Price Transparency
Personalized Engagement
Convenient Access
Then make it frictionless
The Customer Journey...
Simple Journey

Get Lab Rx

Location
Location

Hours
Hours

Directions
Directions

Wait
Wait

Times
Times

Not Now?
Not Now?

Reminders
Reminders

Visit Provider
Visit Provider

Where Now?
Where Now?

How Long?
How Long?

Immediate
Immediate

Notification
Notification
Frictionless CX

Not just information
- (“How do I get to you?”)

Answers to problems
- (“Get me there”)

And adding new value
- (“Come to me”)

Business Hours
Monday: 6:00 a.m. to 5:00 p.m. Tuesday: 6:00 a.m. to 5:00 p.m. Wednesday: 6:00 a.m. to 5:00 p.m. Thursday: 6:00 a.m. to 5:00 p.m. Friday: 6:00 a.m. to 5:00 p.m. Saturday: 7:00 a.m. to 11:00 a.m. Sunday: 7:00 a.m. to 11:00 a.m.

Currently Closed

Checkin to PSC

Uber Estimates to the PSC
uberX $8 to $10 in around 10 minutes
uberXL $11 to $15 in around 10 minutes

Start to PSC Now

Select app for navigation
Waze
Uber
Google Maps

Start to PSC Now

HNL Lab Medicine
Frictionless CX & MX

Registration information
johndoe

Reason for visit?
- Lab work
- Specimen to drop off
- Hourly glucouse testing

Scan Documents Pick Documents

Submit

Request submitted
We have received your request. We will confirm it when you are in 1000 meters range to the PSC. Thank you.
“Uber” Like Home Phlebotomy Service
Use Every Opportunity to Impact CX

- Patients
- Providers
- Clients

What HNL Location is open Now?

Emmaus is open till 6pm, the current wait time is less than 5 min. Would you like me to check you in?
Be where your customers are and accommodate their schedule
Traditional, Mobile and Express......
......also works for HNL
HNL Lab Tests Direct

ORDER YOUR OWN LAB TEST. Start saving today!

1. Pay with a credit card, FSA account or PayPal
2. An email will be sent to you when your results are ready.
3. Shop for tests 24/7 on our user-friendly website.

Visit one of more than 50 HNL testing locations in PA and NJ to have your sample collected.

ORDER YOUR OWN LAB TEST
Start Saving Today!
Setting and Meeting Expectations
Where?

...and How long?

1. Health Center of Bath (LVH)
   Address: 6649 Chrisphalt Drive, Bath, PA 18014
   Hours: Monday: 8a.m.-5p.m. Tuesday: 8a.m.-5p.m. Wednesday: 8a.m.-5p.m. Thursday: 8a.m.-5p.m. Friday: 8a.m.-5p.m. Saturday: 8a.m.-12p.m. Sunday: none
   Currently Open View More Details
   Phone: (610) 837-3740
   Fax: (610) 837-3740
   Current Wait Time: < 5 mins
Our SLA

- No appointments needed, ready when you are
- Walk-in service within 15 min
No Transaction Surprises

Price transparency and payment for service
Only a new concept to Healthcare.....
Challenges of the Retail Revolution in Healthcare

Know your customer
• Are they really who they say they are? Are they really covered (will you get a denial)…..

Provide price transparency
• No other industry can’t or does not give pricing prior to service…..

Get paid prior to service
• No other industry provides service prior to payment…..

Collect on balance due
• No other industry gives unlimited free credit…..

Provide credit / payment plans to ensure payment
• Rather get 10 small payments over 10 months vs write off the entire test!

Do this with real-time data
Eligibility

• Positively identify customer (no anonymity here)
• Determine insurance coverage
• Make this FAST and in real-time
• Ideally do this well before they see you!
Payments

- Provide actual out of pocket pricing
- Know actual copay/deductible
- Process payment at point of service
- Provide payment plan option
- Ideally do most of this before they see you

Please say to patient ...
- Instead of paying $0.00 now.
- Pay $0.00 each month for 10 months.
- For a small one-time fee of $0.00.
Payment Processing
You Can Track your Pizza. How Much More Important is Your Health?
Connect and Engage
Consumer-Driven Design

- Time to Deliver the Report
- Sharing of Lab Reports
- Personalization
- Lab Results at Your Fingertip
- Historical Trending
- 5 Years of Data
- Health Library
- Customer Engagement
Survey Says….

96% of people surveyed desired to access the results within 48 hours across **ALL** devices.

- **1%** Indicated wait period up to <72 hours
- **17%** Indicated wait period up to <48 hours
- **82%** Prefer a wait period of <24 hours

Survey details by the numbers:

- **100%** Participants have experience using patient portals
- **90%** Viewing Results: Over time as the most important feature and across all devices
- **60%: 40%** Demographics: Participants male to female ratio
- **40 to 70** Age: Age range of respondents
Welcome to the MyHNlAccess

At Health Network Laboratories (HNL), we understand your health is important. Whether you are managing a chronic condition or only see a doctor once a year, we know it can be stressful to wait for lab results. That’s why we offer this free service so you can get your results and manage your health. It’s just one part of our full-service laboratory.

More

MyHNlAccess Login

Email Address

Password

Forgot Password

Login or Register Now!

View Lab Results

View Health

Online Patient Care

Pay Your Bill Online

Find a Patient Service Center

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## My Lab Result

**Accession:** N11961614  
**Ordering Provider:** Patrick Gilhool  
**Date of Service:** Jan 21, 2014

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Low</th>
<th>Normal</th>
<th>High</th>
<th>Reference Range</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC with Automated Differential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>15</td>
<td></td>
<td></td>
<td>10-20.0</td>
<td>g/dL</td>
<td>View</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>36</td>
<td></td>
<td></td>
<td>40.0-54.0</td>
<td>%</td>
<td>View</td>
</tr>
<tr>
<td>WBC</td>
<td>27.2</td>
<td></td>
<td></td>
<td>4.5-11.0</td>
<td>thou/cmm</td>
<td>View</td>
</tr>
<tr>
<td>RBC, Automated</td>
<td>37</td>
<td></td>
<td></td>
<td>4.80-6.20</td>
<td>mil/cmm</td>
<td>View</td>
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<tr>
<td>Platelet Count</td>
<td>26.5</td>
<td></td>
<td></td>
<td>140-350</td>
<td>thou/cmm</td>
<td>View</td>
</tr>
<tr>
<td>MCV</td>
<td>271</td>
<td></td>
<td></td>
<td>80-100</td>
<td>fl</td>
<td>View</td>
</tr>
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</table>

**XYZ with Automated Differential**

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Low</th>
<th>Normal</th>
<th>High</th>
<th>Reference Range</th>
<th>Units</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>6.6</td>
<td></td>
<td></td>
<td>4.5-11.0</td>
<td>thou/cmm</td>
<td>View</td>
</tr>
<tr>
<td>RBC, Automated</td>
<td>3.18</td>
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<td></td>
<td>40.60-6.20</td>
<td>mil/cmm</td>
<td>View</td>
</tr>
</tbody>
</table>
# My Lab Result

## HEMOGLOBIN

<table>
<thead>
<tr>
<th>Dates of Service</th>
<th>Low</th>
<th>Normal</th>
<th>High</th>
<th>Reference Range</th>
<th>Units</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Feb 10, 2014 4:54 PM</td>
<td>4.300</td>
<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td></td>
</tr>
<tr>
<td>Feb 09, 2014 3:25 PM</td>
<td>17.200</td>
<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td>View</td>
</tr>
<tr>
<td>Jan 01, 2014 10:25 AM</td>
<td>17.800</td>
<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td></td>
</tr>
<tr>
<td>Dec 09, 2014 4:54 PM</td>
<td>14.200</td>
<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td></td>
</tr>
<tr>
<td>Nov 08, 2014 6:15 PM</td>
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<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td></td>
</tr>
<tr>
<td>Oct 07, 2014 4:54 PM</td>
<td>13.200</td>
<td></td>
<td></td>
<td>13.5-18.0</td>
<td>g/dL</td>
<td></td>
</tr>
</tbody>
</table>
DASHBOARD

GLUCOSE
180 Last Reading: Apr 16, 2014
190 Apr 18, 2014

CALCIUM
120 Last Reading: Apr 11, 2014
125 Apr 4, 2014

ALBUMIN
130 Last Reading: Apr 11, 2014
120 Apr 4, 2014

TRIGLYCERIDE
151 Last Reading: Apr 2, 2014
180 March 24, 2014

Latest Lab Results

ANDREW BLACK
GLUCOSE Aug 1, 2015

PETER E. FISHER MD
TESTOSTERONE, BIOAVAIL, CALC July 28, 2015

PETER E. FISHER MD
TESTOSTERONE, % FREE Jun 16, 2015

PETER E. FISHER MD
COMPLETE HEALTH CHE... Jun 12, 2015

PETER E. FISHER
TESTOSTERONE, % BIOAVAILABLE Jun 8, 2015

See all Lab Results

HNL UPDATES

HNL House Calls

GIVING CONVENIENCE IN PATIENT SERVICE A NEW NAME.

Do you have the time to go for the blood testing recommend for you?
Do you have reliable transportation to travel to the nearest Patient Service Center location?
I am taking care of my 90-year-old mother. She wants to share her results with me. How can we do that?

She can invite you to view her results. It’s really easy to do. She will just need to click on the Shared Accounts link under My Profile.

Thank you so much! This will really help me and my mom a lot!
**Urine Results History**

*Showing the 5 Latest Urine Results (Credits not included)*

<table>
<thead>
<tr>
<th>Date of Service</th>
<th>Accession</th>
<th>Medications Listed</th>
<th>Positive Findings</th>
<th>Negative Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/27/2017</td>
<td>H12005574</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07/27/2017</td>
<td>H12005573</td>
<td>None</td>
<td></td>
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</tr>
<tr>
<td>07/27/2017</td>
<td>H12005575</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07/27/2017</td>
<td>H12005528</td>
<td>None</td>
<td></td>
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</tr>
<tr>
<td>07/27/2017</td>
<td>H12005524</td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analyte Name**

- **PAIN MGT TAPEPATODOL, QN**
  - Turamadol (MS): Negative
  - N-Demethyl-Tapentadol (MS): 0.95 Inconsistent

- **PAIN MGT TRAMADOLO, QN**
  - Tramadol (MS): Negative
  - O-Tramadol (MS): 2.65 Inconstant

**Comments:** The absence of expected drug(s) and/or drug metabolites may indicate non-compliance. Impaired timing of specimen collection relative to drug administration, poor drug absorption, dilution or adulteration, urine sample, or limitations of testing. The drug concentration must be higher than or equal to the cutoff to be reported as present. Information depends on accuracy and completeness of patient medication information submitted. All confirmation quantitative testing was performed by Liquid Chromatography-Tandem Mass Spectrometry which was developed and performance characteristics determined by Health Network Laboratories and has not been cleared by the FDA. The laboratory is regulated under CLIA to perform high-complexity testing. This test is to be used for clinical purposes and should not be regarded as investigational or research.

*Note: Medications listed as indicated on requisition.
Consumer Engagement Through More Than Data

Use portals to educate and create value
More than Data….Knowledge
Opportunity to Educate and Create Value
Build Loyalty

Create personalized experiences
Calls answered within 30 seconds: 96%

Telephone abandonment rate: 0.20%
Real-time Portals to provide Results and Actionable Information

Choice and Direct Access

Price Transparency

Personalized Engagement

Convenient Access

Predictable Service Time

Choice and Direct Access
PSC Satisfaction Scores: CY Q4 2018

- **Location convenience of PSC**: 4.7
- **Appearance of facility**: 4.8
- **Hours of operation**: 4.8
- **Waiting time**: 4.7
- **Courtesy/Friendliness of staff**: 4.8
- **Professionalism/Skill of phlebotomist**: 4.9

**RATING**

- **Very Good/Excellent**
  - **Friendliness of phlebotomist**: 97%
  - **Skillfulness of phlebotomist**: 98%
  - **Wait time**: 93%
  - **Reported wait time <15 minutes**: 96%
Physician Practice Satisfaction Scores: CY Q4 2018

Physician Office Clients

- Overall Quality of Lab: Very Good/Excellent - 81%
- Overall Satisfaction with Lab: Satisfied/Very Satisfied - 89%

Overall lab quality: Very Good/Excellent: 81%
Overall satisfaction with lab: Satisfied/Very Satisfied: 89%
Test Ordering

Analysis

Follow Up

Analytics

Sample Collection

Results

Billing Services

Ordering
Informatics enabling transformation of the lab medicine value proposition

<table>
<thead>
<tr>
<th>Analytics</th>
<th>Predictive/Prescriptive/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Transformation</td>
<td>Enables it</td>
</tr>
<tr>
<td>RPA</td>
<td>Human + Machine Collaboration</td>
</tr>
<tr>
<td>EDA</td>
<td>Delivery in real-time</td>
</tr>
<tr>
<td><strong>Analytics + DT + RPA + EDA = Near Future State</strong></td>
<td></td>
</tr>
</tbody>
</table>

HNL Lab Medicine
Why?
For Whom?

- People
- Providers
- Payers
- Partners
- Populations
# Predictive and Prescriptive AI Models

## Objective:
Deliver actionable insights at the point of care

<table>
<thead>
<tr>
<th>Predictive Model</th>
<th>Actionable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Diabetes</td>
<td>Key risk factors for disease progression in Type II Diabetes</td>
</tr>
<tr>
<td>High Cost Patients</td>
<td>Tailored patient recommendations; Patient engagement</td>
</tr>
<tr>
<td>Sepsis Early Risk Alerting</td>
<td>Identification of high risk patients for sepsis (prevention focus)</td>
</tr>
<tr>
<td>Cancer Early-detection</td>
<td>Risk stratifying high risk patients; proactive monitoring</td>
</tr>
</tbody>
</table>
Sepsis – Predictive Modeling

Algorithm retained 31 predictors from 334 variables and determined 3 feature components.
Total n = 40,452; Sepsis n = 529

- 31 Predictor Variables (334 examined)
- Feature Space (3 Components)
- Sepsis (Y/N)

28 days prior to diagnosis event

Target Intervention for top 10% of highest risk patients

7 days prior to sepsis diagnosis
Early detection and warning system during admit
Sepsis diagnosis event

TIME

Longitudinal Patient History (Labs and Diagnosis)
Lead Period
Voice Enablement

Impact CX for patients, providers and clients

What HNL Location is open Now?

Emmaus is open till 6pm, the current wait time is less than 5 min. Would you like me to check you in?
IoT

Plenty of opportunities to make “dumb” things “smart”

• Optimize resource time
• Improve engagement and services
RPA Benefits in Digital Transformation

Digital workforce
- software that automates patterns of how humans use computers in rules-based tasks.

Digital employee
- a team member that is trained to carry out the process just like any employee, only faster and without mistakes. RPA solutions are frequently achieved with software robots (“Bots”)

Utility
- best applied to repetitive, predictable, rules-based activities. RPA can help automate large volumes of digital manual-processing work and gain operational efficiencies.
Hi! We are ‘Label Print’ Team – we are a 4 member team.

We can handle 1,500 label print calls per week (on an average 400 calls per person).

We take 5 to 6 minutes, on an average, to process a label print request.

Hi! I’m a ‘Bot’

I can handle 10,000 label print calls per week. Your 1,500 calls per week can’t keep me busy.

I take around 1 minute to process each request.
Hi! We are ‘Label Print’ Team – we are a 4 member team

More work? Need more trained workforce

We need more infrastructure to work

New process: Training required for each workforce

Hi! I’m a ‘Bot’

I’m still 85% free

My controller can run another 500 Bots like me

New process: Automate once and scale up as needed
High Availability

We are humans, we can be at one place at one time

Any downtime to call centre can lead to disruption

I take small breaks

I can be cloned

Yeah, my COPY running on another server can be up immediately and can do everything that I do

Uninterrupted round-the-clock service
Compliance and Quality

We follow standard operational procedures

Possibility of human error

Need to depend on audit trails in decentralized systems

I am an automated process

No such possibility

Credibility to handle highly confidential processes
“Soon managers will be fighting for BOTS instead of FTEs”
Event-Driven Architecture (EDA)

Event-driven architecture (EDA), is a software architecture pattern promoting the production, detection, consumption of, and reaction to events. Enables rapid response by coupling real-time data ingestion with real-time analytics at scale. (Wikipedia)

➢ Look at every system, tool, input as a “real-time” sensor
SOLUTION: REAL-TIME, EVENT-DRIVEN APPS

CONTEXT
Rules, best practices, constraints, predictions

Event Data Streams
- System Status
- Machine Status
- People Status
- Vehicle Location
- People Location
- External Conditions
- Notifications + Alerts
- Other Events

Real-Time Actions
- Relocate Machine
- Assign Technician
- Redirect Vehicle
- Stop Assembly Line
- Reorder Parts
- Assist Maintenance
- Control System
- Close Issue
PSC “Storming”
Informatics enabling transformation of the lab medicine value proposition

- **Analytics**: Predictive/Prescriptive/Value
- **Digital Transformation**: Enables it
- **RPA**: Human + Machine Collaboration
- **EDA**: Delivery in real-time

**Analytics + DT + RPA + EDA = Near Future State**
IF EVERYTHING SEEMS UNDER CONTROL,

YOU'RE NOT GOING FAST ENOUGH.
THANK YOU