Leveraging Electronic Health Records Across Disability Insurance Value Chain

Electronic Health Record (EHR) is an extension of Electronic Medical Record (EMR), which is a digitized version of patient medical records. EHR goes beyond the information collected in the provider's office and provides aggregated information of the patient across all healthcare touchpoints from multiple providers.

EHR typically contains information such as diagnoses(diseases), treatments conducted including hospitalizations and surgeries, medications, physician notes, and various lab and diagnostic tests.

Organizations have several needs that require the use of EHR. Most of the uses lie in healthcare provider and payer set up focusing on improved quality of patient care. At the same time, life and disability insurers have found novel ways of using Artificial Intelligence and Machine Learning on EHR data for underwriting and claims management purposes.

Underwriting:

For disability insurance, the process of underwriting looks to assign the risk class of applications based on three aspects:

1. Health
2. Financial Health
3. Occupation

Applicants would have to address questions pertaining to lifestyle and basic health questions. The insurer might also order a medical examination to conduct basic diagnostic tests. For higher disability benefits, in-depth exams may also be conducted.

At times, the insurance company might require Attending Physician Statements (APS). The process of acquiring the APS generally increases the time for underwriting. This is one area where EHR will be able to significantly reduce the time for processing and improve quote-to-bind ratio for insurers. Since EHR contains the entire medical touchpoints of an individual, the applicant's health records can be directly searched and determinations about the risk class can easily be codified.

Disability prediction and progression:

A disability insurer might want to understand factors that could be indicators of disability. Many of the disability insurers have different types of disability products such as:

1. Absence plans
2. Short Term Disability (STD)
3. Long Term Disability (LTD)

While absence plans by themselves do not require an insurer to pay but they involve administrative and operational overheads. STD and LTD plans, by definition, require the insurer to pay once the claims are approved.
An insurer can apply Artificial Intelligence/Machine Learning techniques on EHR data to address the following problems:

A. HEALTH TRIGGERS FOR DISABILITY: EHR data provides a rich set of health factors – diagnosis, treatments and even lifestyle aspects such as smoking, obesity, etc. Models can be developed to explain disability as a function of these attributes coming from health records. These models can be used to provide employer level insights for insurers. The insurer could use these insights to engage with customers (employers) to develop wellness programs. Refer to Figure 1 for an example.

MUSCULOSKELETAL DISORDERS

Nature of work
- Ergonomic workshops / reminders on posture
- Workplace design

Bone Density / Calcium Deficiency
- Healthy eating motivation programs
- Fitness check-ups

Industry Type
- Improving the work processes
- Company wide checks on ergonomic risks

Past Injury
- Support for health check-ups
- Fitness motivation programs

Figure 1: Employee Wellness Programs

B. PROGRESSION MODELS: Many claimants who file an absence claim or an STD claim due to their health condition, if not treated properly, bridge-over to LTD plans. Insurers may be interested to develop models that predict which claimants would progress from:

1. Absence Plans to STD
2. STD to LTD

Once these progression models are developed the insurance companies can proactively engage with the employers and employees (claimants) reducing the levels of progression. Refer to Figure 2 below for a representative set of attributes that can help predict progressions.

Absence Plan

- Diagnosis
- Lifestyle
- Treatment

STD

LTD

- Diagnosis
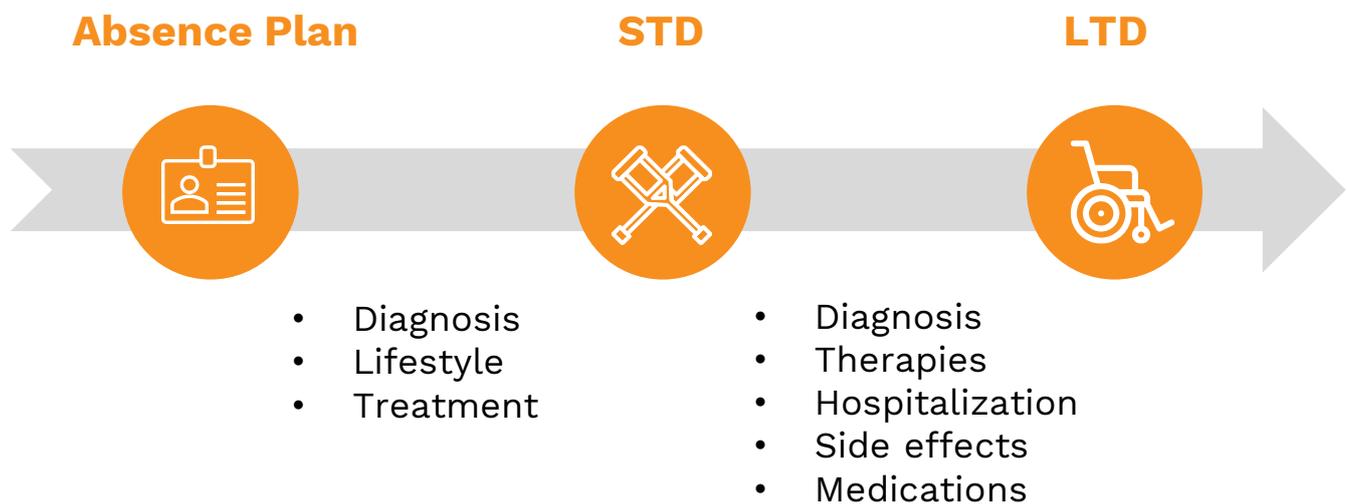- Therapies
- Hospitalization
- Side effects
- Medications

Figure 2: Disability Claim Progression

C. RETURN TO WORK (RTW) ASSESSMENT: RTW is one of most important topics of any Disability insurer. Keeping the RTW duration down is a major goal for almost all insurers. EHR data could be used to develop health personas of claimants. Refer to Figure 3 for representative personas. Those personas could be used to study different claimant segments and be used to develop targeted intervention programs to help claimant return to health/work sooner.
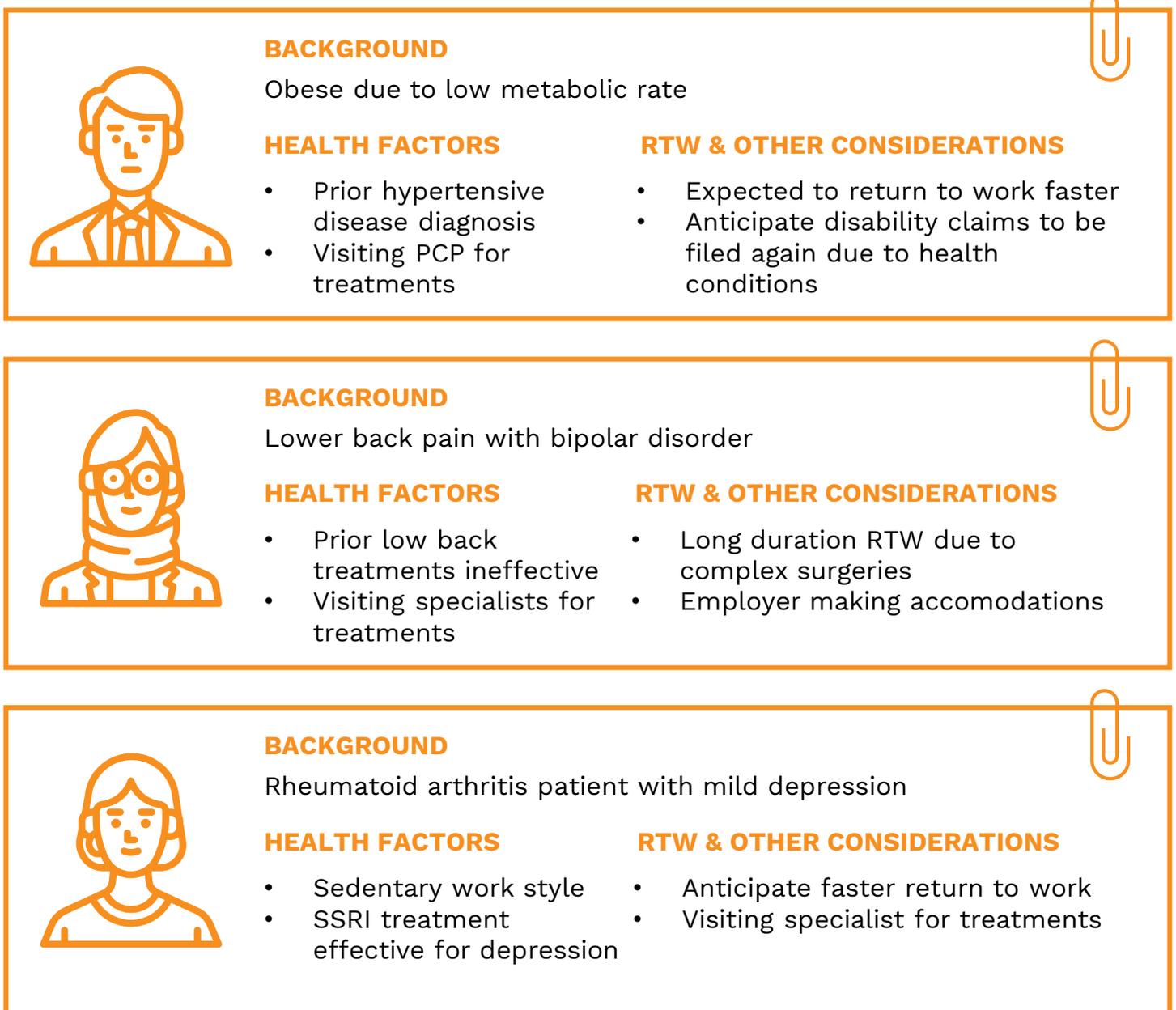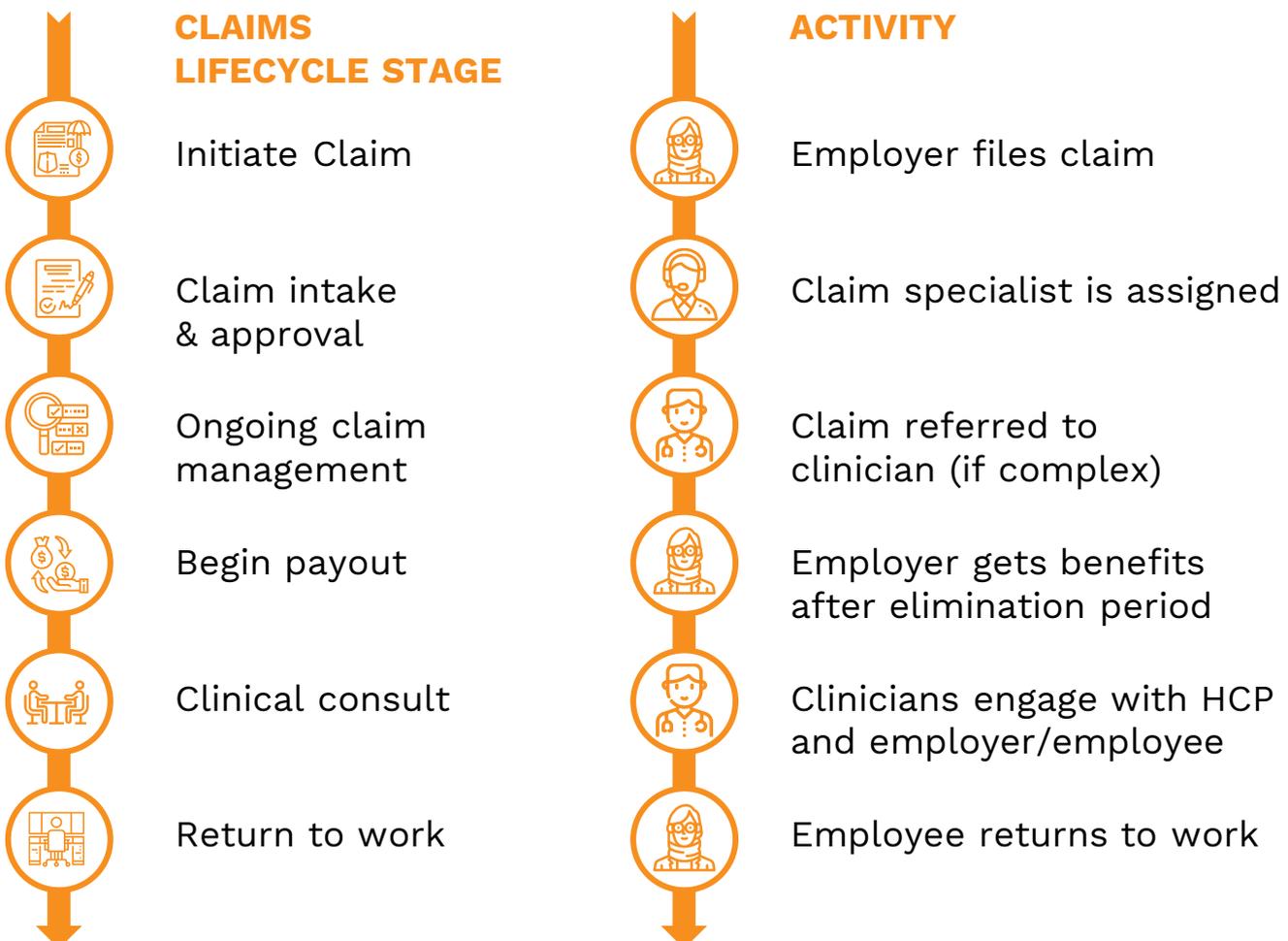
CLAIMANT PERSONAS

BACKGROUND
Obese due to low metabolic rate

HEALTH FACTORS
- Prior hypertensive disease diagnosis
- Visiting PCP for treatments

RTW & OTHER CONSIDERATIONS
- Expected to return to work faster
- Anticipate disability claims to be filed again due to health conditions

BACKGROUND
Lower back pain with bipolar disorder

HEALTH FACTORS
- Prior low back treatments ineffective
- Visiting specialists for treatments

RTW & OTHER CONSIDERATIONS
- Long duration RTW due to complex surgeries
- Employer making accomodations

BACKGROUND
Rheumatoid arthritis patient with mild depression

HEALTH FACTORS
- Sedentary work style
- SSRI treatment effective for depression

RTW & OTHER CONSIDERATIONS
- Anticipate faster return to work
- Visiting specialist for treatments

Figure 3: Claimant Personas

Tiger Analytics' Experience

A leading provider of Life and Disability Insurance engaged Tiger Analytics to evaluate external health records from their vendor. The objectives were to use external health data for a sample of the insurer's participants to perform the following:

1. Map healthcare touchpoints to disability claim events and create an integrated claims journey of participants
2. Understand triggers for improving/deteriorating health conditions
3. Build claimant personas to create differentiated intervention strategies to help manage return to work

Tiger assessed the current state of the disability claim management processes to get a first-hand understanding of any pain points and to better evaluate how to use external data to support objectives.

CLAIMS LIFECYCLE STAGE

- Initiate Claim
- Claim intake & approval
- Ongoing claim management
- Begin payout
- Clinical consult
- Return to work

ACTIVITY

- Employer files claim
- Claim specialist is assigned
- Claim referred to clinician (if complex)
- Employer gets benefits after elimination period
- Clinicians engage with HCP and employer/employee
- Employee returns to work

Disability Claim Management Process for a leading insurer

Based on the information provider, we made the following observations:

1. Sub-optimal process of referring claims to clinician
2. Lack of visibility on healthcare journey of claimants prior to being disabled
3. Lack of accurate and complete diagnosis of claimants within internal IT systems
4. Lack of metadata/medical taxonomies to aid in classification

To start with, we built a robust process including a set of APIs to gather external metadata such as RxNorm and VA Health system to aid in taxonomy creation. Once this was gathered, using the EHR data, the healthcare touchpoints were mapped for all the participants in the sampled data.

A few disease conditions were selected as a pilot to test the robustness of insights derived, which were:

1. STD and LTD claimants' healthcare journeys provided a good understanding of leading and lagging indicators (therapies/comorbidities/surgery, etc.) of disability claims
2. Treatment progression charts (Sankey flow) provided a view of the type of medication pathways of these members
3. Claimant personas helped understand how combinations of health and lifestyle factors impact return to work

Tiger conducted a deeper review of these results with the business stakeholders (claims management and clinical teams) and it was observed that a deeper study was warranted on treatment progression analysis due to the uniqueness of certain claimants' conditions. The insights from claimant personas helped frame inputs for a Clinical Recommendation Engine that is being developed to frame intervention strategies to help claimants return to work.

Tiger also recommended to enhance the sample size of participant data so that additional unique features can be captured to make more robust recommendations.

EHR Considerations:

While the premise of leveraging EHR to address a myriad number of business problems holds promise, there a few points that need to be considered before trying to use EHR data.

1. **Cost vs coverage** – EHR data can be a costly proposition if the coverage or hit ratio relative to the population is less. In other words, if a significant proportion of the applicants have health records then the use cases leveraging health records can be successful. For instance, if the applicant base is primarily rural where access to health facilities can be less than desirable, the likelihood of obtaining the health records of those individuals will be less. Also, costs to a carrier will vary depending upon the vendor used and volume of records sourced.

2. **Privacy considerations** – The use of EHR data is typically governed by HIPAA privacy rules. Insurers using data from EHR providers, therefore, must take steps to protect clients' healthcare data from security incidents and government fines. There could also be stringent rules against using health data for marketing activities.

3. **Vendor Landscape** – There are hundreds of EHR vendors focusing on different aspects of healthcare systems. Epic and Cerner are most common EHR vendors by market share. It is to be noted that most vendors do not have a common data standard. Many vendors have developed their own platform, content, and user interfaces. So, insurance companies will have to evaluate what platform works bests given the expected volume and coverage. It is not uncommon for insurance companies to ask for sample data to test the effectiveness for various use cases. In that case, it would be beneficial if the insurer negotiates for a larger sample size to determine areas where EHR will be more valuable.

As a product, disability insurance is going to get important as many companies may want to invest more in employee wellness programs especially in the wake of the COVID-19 pandemic.

That would mean insurers may need to prepare adequately and plan for pay-out reserves more diligently in the months to come. In addition to some of the traditional benefits that EHR can offer such as effective claims management or helping identify optimal RTW strategies, it can certainly help insurers to also help identify population that is at risk for various comorbidities and aid in reserve calculations.

DINESH RAMAN

Dinesh is an Associate Director, Consulting with a focus on Insurance and Financial Services. He brings over 13 years of experience in delivering novel analytics solutions at Comcast, E&Y, and Mu Sigma. He has helped several top tier institutions design analytics strategy and build AI-led solutions to deliver significant value.
Dinesh holds a bachelor's degree in computer science & engineering from Anna University.

CITATIONS:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2605590/

https://www.fiercehealthcare.com/tech/epic-cerner-growing-ehr-market-share-increased-hospital-consolidation-klas

https://www.healthcaredive.com/news/global-ehr-market-on-track-to-top-39b-by-2022/530016/

For more details, write to info@tigeranalytics.com